Exchange rates, prices, and wages, 1277–2008

Historical Monetary
and Financial Statistics for Sweden

# Exchange rates, prices, and wages, 1277–2008

Edited by Rodney Edvinsson, Tor Jacobson,
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*Ekerlids Förlag*

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The project web site: www.riksbank.se/forskning/historiskstatistik
Cover design: John Persson
Cover illustration: Elias Martin, View of Stockholm from Mosebacke (1790)
Setting: Gyllene Snittet AB, Helsingborg
Printed by: Bulls Graphics in Halmstad, March 2010
ISBN 978-91-7092-124-7

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# Introduction to *Historical Monetary and Financial Statistics for Sweden: Exchange rates, prices, and wages, 1277–2008*

**Rodney Edvinsson, Tor Jacobson and Daniel Waldenström**

## 1.1. Background to the project

This book presents new evidence on the long-run evolution of Sweden's monetary and financial system, beginning in the Middle Ages and leading up to the present day. These new series have been generated as part of a research project run by Sveriges Riksbank, *Historical Monetary and Financial Statistics for Sweden*. In this project, a group of academic scholars from the disciplines of economic history and economics have compiled existing evidence and assembled new data. The present volume presents chapters dealing with exchange rates, consumer prices and wages.

The overall ambition of this project has been to construct time series that are consistent over time and adjusted so as to fit the definitions that are applied today. There is a great difference between compiling contemporary statistics, for which data are often easily accessible, and historical statistics, where the availability of data is more of a problem. Linking long-run time series requires not only an understanding of their economic importance but also thorough knowledge of the relevant historical circumstances under which the data were generated in the past. Needless to say, this makes great demands of the researchers compiling these series.

History offers empirically oriented economists an indispensable substitute for scientists' laboratories. Having comparable series that span extensive time periods will greatly facilitate long-term analysis of a number of important issues. For example, the relation between money supply and inflation, or detecting specific long-run patterns in the macroeconomy, require that data are consistent and comparable across

*The Gate Coin (1885), by Johan August Malmström (1829–1901), a Swedish artist associated with the Symbolist movement. It was quite common in Sweden for children to earn money by opening gates for a passing equipage. The gate money was usually one to five öre per equipage, sometimes more. In 1885, five öre (= 1/20 krona) was the equivalent of a male agrarian worker's pay for around 20 minutes' work; it could buy one kilogram of potatoes or one egg.*
Source: http://commons.wikimedia.org/wiki/File:Grindslanten.jpg

time periods. Economic forecasting can also be based on consistent historical series that go a long way back in time, not just the latest 10 to 15 years. Moreover, our comprehension of the causes and effects of financial crises arguably relies on historical analysis, e.g., by comparing the course of events leading up to the Great Depression around 1930 and to the recent financial turmoil that started in 2007.

It is our intention that the series generated within this project will not only be used in academic research. People working with policy analyses, wishing to draw conclusions from historical comparisons, as well as teachers and students at universities and high-schools, should find much useful material here. In order to make the database as accessible to as many as possible, all data and descriptions presented in this volume, as well as additional material used to construct the series, are freely available on the web site of the Riksbank.[1] This database also publishes series of

1 The address to the database is http://www.riksbank.com/research/historicalstatistics (English version) and http://www.riksbank.se/forskning/historiskstatistik (Swedish version).

money supply, interest and stock returns, and state loans. There are also plans to include other monetary and financial statistics.

A main source of inspiration for this project is a similar recent project at Norges Bank. In the fall of 2004, the Bank published the volume *Historical Monetary Statistics for Norway 1819–2003*, with Øyvind Eitrheim, Jan T. Klovland and Jan F. Qvigstad as editors. Together with a second volume published a few years later (Eitrheim, Klovland and Qvigstad, 2007), the Norwegian project has generated considerable new macroeconomic historical evidence with long-run series on prices, money, banking statistics, interest rates, exchange rates and GDP. Most importantly, all series were made freely available on the Bank's internet site for scholars, students and the public to use at will.

While the project is arguably unique in its scope and explicit focus on building a broad historical statistical database, there are other previous contributions with similar ambitions. For example, the seminal contributions of Friedman and Schwartz (1963) and Cagan (1965) in describing U.S. monetary history greatly increased the general knowledge of and interest in the historical development of monetary and financial systems. Following their lead, subsequent studies of monetary histories in other countries are, e.g., Jonung (1975) on Sweden and Capie and Webber (1985) on the United Kingdom.[2]

Why should Sveriges Riksbank shoulder the responsibility for building up a new public access database with historical monetary and financial statistics? There are several reasons. First, building and maintaining a scientific database is a public good that individual researchers cannot be expected to provide. As scholars regularly tend to move on to different places or topics, they are unable to provide the continuity needed to maintain a scientific database. A public institution is better suited to run a database and in the context of a monetary database the Riksbank represents perhaps the most natural 'focal point' for the research community. Second, the Riksbank already has a long-standing tradition in taking an active part in promoting the Swedish monetary and financial system, as well as in gathering information about it. The Riksbank is the world's oldest central bank, founded in 1668 by the Swedish Parliament, with a central role in the monetization of Sweden.[3] Third, in the 1920s the Riksbank initiated a research project that much resembles ours. Although it was mainly aimed at writing the history of the Bank, a considerable part of the undertaking was the assembly of historical monetary and financial statistics, including long-run series on prices, interest rates, exchange rates and bank balance sheets (Sveriges

2 There are some other previous attempts to compile international historical statistics, e.g., Flandreau and Zumar (2004).

3 One can, of course, discuss whether Sveriges Riksbank was the first central bank in a modern sense. The Bank of England was established somewhat later, in 1694, but performed more central bank-like practices, such as lender of last resort, before Sveriges Riksbank did (Brisman, 1918).

*Exchange rate notations on the Swedish riksdaler in marks kopparmynt in the primary material used in Chapter 4. The material shows, for example, that in June 1655, one riksdaler was valued at 16 marks 4 öre kopparmynt (=16.5 marks kopparmynt). The sum was the equivalent of a male unskilled labourer's pay for around four days' work in Stockholm (see Chapter 9).*

Source: Sandbergska samlingen, vol. OO (Riksarkivet), f. 631a.

Riksbank, 1931).[4] A fourth reason why the Riksbank should take responsibility for a project like this is that it continues where Norges Bank started, extending the work on the construction of an extensive international historical statistical database. Hopefully, these early Nordic efforts will inspire central banks in other countries to begin their own similar projects.

4 *Sveriges riksbank 1668–1918–1924: bankens tillkomst och verksamhet* was published between 1918 and 1931 and deals with the history of the Riksbank and monetary conditions since the establishment of the Riksbank in 1668 (to some extent, the earlier history of Stockholms Banco is also taken up). This work was produced by the Riksbank's statistical department. Five volumes were published, altogether 2,832 pages. Volumes I–IV are arranged chronologically. Volume V contains a table annex of 221 pages, an overview of the composition of the board of governors and a history of coins and banknotes from the earliest coins until the present. Volume I also contains tables. The statistical table annex in Volume V consists of four parts: 1) statistics on the Riksbank 1668–1924, 2) exchange rates 1668–1924, 3) the private banks 1834–1924, and 4) the Swedish banks' position with regard to other countries.

## 1.2. Contents of this volume

The nine remaining chapters present novel time-series evidence collected exclusively for this project. In all chapters, the reader is offered a careful description of the making of the series as well as an introduction to the series as such and how they have evolved over time.

The major contribution of the chapters is the detailed accounts of the construction of the series. These accounts include details on how and from where the underlying data were assembled but also to what extent the series have been adjusted so as to guarantee consistency and comparability over time. In many cases, the underlying data come from different sources and may even differ somewhat in their definitions, depending on how they were generated in the first place. For example, no continuous wage series covering the entire period from the Middle Ages to the present exists, for the simple reason that the nature of work has changed entirely over time. Instead, when constructing a composite long-run series, wages for different types of work are combined by making specific adjustments to possible breaks between the constituent series. Similar problems arise when different price series are to be spliced together when constructing a historical Consumer Price Index.

In Chapter 2, Rodney Edvinsson presents an overview of the monetary standards in Sweden from the Middle Ages to the present, and how they evolved from a commodity to a fiat standard. The monetary history of Sweden is both fascinating and perplexing. The foundation of the Riksbank, the world's oldest central bank, is in itself a consequence of a Swedish peculiarity in the 17th century: the copper standard. At the end of the chapter there is a list of monetary terms historically in use in Sweden, mostly the names of various domestic currencies.

The theme in Chapters 3, 4, 5, 6 and 7 is exchange rates. Chapters 3 and 4 focus on the relation between various currencies used as means of payment in Sweden from the Middle Ages to the early 19th century. In Chapters 5, 6 and 7, foreign exchange rates in 1658–2008 are assessed.

In Chapter 3, Rodney Edvinsson, Bo Franzén and Johan Söderberg present extensive new evidence on the evolution of the Swedish monetary system in the first half of the second millennium. It was in this period that parts of the economy came to be monetarised. However, during the Middle Ages the monetary system was decentralised, with different currencies circulating in different provinces, and it was not until the 16th century that a common monetary system was formed in the Kingdom of Sweden-Finland.

In Chapter 4, Rodney Edvinsson discusses various domestic currencies that circulated in Sweden-Finland 1534–1804. He deals with the period when multiple domestic currencies existed at floating exchange rates relative to each other. These currencies were based on silver, gold and copper, but it was also in this period that pure fiat money came into circulation.

In Chapter 5, Rodney Edvinsson deals with the foreign exchange in 1658–1804. It was during the 17th century that a foreign exchange developed. The most-traded


*Left, a copper plate with the nominal value of two daler silvermynt (copy). In 1742 this amount was equivalent to wages for three days' work; today, that would correspond to several thousand SEK (see money on the right).*

bills of exchange were on Amsterdam and Hamburg, reflecting Sweden's close economic relations with Germany and Holland.

In Chapter 6, Håkan Lobell deals with foreign exchange during 1803–1914, a period when Sweden was first on a silver standard, and then switched to a gold standard in 1873. The foreign exchange underwent a major transformation. Since the gold points are significantly narrower than the silver points, the volatility of the foreign exchange decreased significantly after 1873. In the 18th and 19th centuries, bills on London became more important, as England overtook Holland economically and London became the centre of the international financial markets.

In Chapter 7, Jan Bohlin provides an overview of Swedish 20th-century exchange rates, including the construction of a composite trade-share weighted exchange rate index for Sweden in 1914–2008. This index is used to trace the strength of the Swedish currency during various periods. In the 20th century the dollar was the most important quoted foreign currency, as the United States overtook Britain as the major power.

In Chapter 8, Rodney Edvinsson and Johan Söderberg present a new long-run series on the consumer price index for Sweden. The authors have compiled newly located evidence in the Middle Ages and spliced it with later series, creating the longest continuous Consumer Price Index series for Sweden to date.

Chapters 9 and 10 compile historical data on wages in Sweden from the Middle Ages to the present, making it possible to assess the long-term development of real wages.

In Chapter 9, Johan Söderberg deals with wages in the pre-industrial era, mainly based on unskilled labourers in Stockholm. He uses the Consumer Price Index to deflate nominal wages, to follow the evolution of real wages. An interesting result is that real wages were basically stagnant before the industrial breakthrough.

In Chapter 10, Svante Prado presents long-run wage series between 1860 and 2007. He focuses on female and male manufacturing workers. During this period real wages have risen continuously, which can be contrasted to the pre-industrial period discussed in Chapter 9. The most astonishing leap took place in the aftermath of the First World War, due to the restriction of working hours.

## 1.3. A bird's-eye view of the second millennium in Sweden

This book covers the monetary history of Sweden in most of the second millennium. Although the book title sets the beginning at 1277 (as the first documented exchange rate notation is from that year), Chapter 3 also discusses developments of the monetary system during the late Viking Age and its first coins, minted as early as 995. Figures 1.1, 1.2 and 1.3 provide a long-term view of some important monetary variables. Figures 1.1 and 1.2 present the annual growth rates of prices and real wages, respectively, per century. Figure 1.3 presents the indices of silver's purchasing power in Sweden and UK/England.[5] The correlation between the two indices is very strong, which shows that the Swedish CPI presented in Chapter 8 gives reasonable results concerning long-term developments when compared to the UK/England.

Covering such a long period, and attempting to construct various indicators to describe developments over centuries, is of course not without problems. Elements of anachronism are inevitable whenever historical generalizations are to be made. Following exchange rates, inflation and real wages through time requires definitions that are applicable to all of the investigated periods. The chapters of this book therefore put much effort into conceptual issues.

One of the most obvious anachronisms throughout the book is our use of the name Sweden, as also discussed in Chapters 2, 3 and 4. The historical meaning of the Kingdom of Sweden has changed over time, including redrawings of geographic borders, constitutional regime switches determining the right to issue currency, charter banks and so forth.

Monetary history is closely connected to political history. Changed borders usually changed the currency that was used in the affected areas. Establishing a common monetary system is in itself a political process; a recent example is the development

5 The purchasing power of silver is set equal to 100 for the OECD in 2005, which implies that in that year it stood at 82.6 in Sweden and 87.7 in UK. This is based on household PPPs for the final consumption index. See OECD (2009-01-29).

of the European Union and the euro. While macroeconomic historical data, such as GDP, are often constructed for countries within present-day borders, this method is not as meaningful to apply to, for example, exchange rates. Parts of present-day Sweden are therefore disregarded in this volume, which at the same time does cover areas that historically belonged to and were integrated with the Swedish realm, but are not part of present-day Sweden. The monetary history of Sweden is also closely connected to the monetary history of other Nordic countries. Throughout history there have been several monetary and political unions between various Nordic countries.

For the Middle Ages it is particularly difficult to write a distinctly Swedish monetary history. Figure 1.3 shows that the purchasing power of silver was higher in Sweden than in UK/England, which reflects the backwardness of the Swedish economy. As discussed in Chapter 3, during most of the Middle Ages there was no unified monetary system in Sweden. The Swedish mark was linked at times to the mark of other Nordic countries and Lübeck. In the 13th century, present-day Finland became a consolidated part of the Swedish kingdom, and remained so up to 1808/09, when it was conquered by Russia. Although Gotland, an island in the Baltic Sea, was part of Sweden up to 1361, it had its own currency that also circulated in parts of the Swedish mainland up to the 15th century. Scania, Halland and Blekinge in the south of present-day Sweden belonged to Denmark, except for a brief period in the 14th century, while Jämtland in the northwest of present-day Sweden was part of Norway. It was not until the 17th century that these territories, including Gotland, were conquered by Sweden.

Sweden (including Finland), Norway and Denmark formed a union in 1397 under the rule of Queen Margaret I of Denmark. Although Sweden continued to mint its own coins, counting in Danish currency was common in the south of Sweden up to the mid-16th century, as discussed in Chapter 3. Continual tension of an economic nature within the union led to a conflict between Swedes and Danes in the 15th century. The union finally fell apart in the early 1520s, when King Gustav (Eriksson) Vasa assumed power over Sweden and Finland. Denmark and Norway continued the union, which lasted until 1814.

As discussed in Chapter 3, while the fine silver content of the Swedish mark deteriorated during the Middle Ages, prices expressed in Swedish marks were stable (except for a brief period after the mid-14th century). This was an effect of the rising purchasing power of silver (see Figure 1.3), which, in turn, was a consequence of a declining population and trade following the Black Death (probably the most severe economic crisis of the second millennium) and other epidemics. As shown by Johan Söderberg in Chapter 9, real wages reached a high point in the late 15th century, which was also the low point of the population curve. The highest real wage rate during the Middle Ages, reached in 1478, was not surpassed until the 1890s. Such a peak in real wages in the late 15th century has also been observed for England.[6]

6 Campbell (2009, p. 29).

The 16th century was the opposite of the Middle Ages. The process of political decentralization was reversed under Gustav (Eriksson) Vasa . The Protestant Reform and the seizure of Church property further strengthened the central power. The monetary system was unified. The purchasing power of silver and real wages declined due to population growth (see Figures 1.2 and 1.3), expansion of trade and the influx of silver to Europe. Inflation was further accentuated by successive debasements (a well-known practice that has been in use as far back as the Roman Empire). In 16th-century Sweden, the stronger state implied greater possibilities to manipulate the currency in order to increase seignorage during times of war. In fact, as shown in Figure 1.1, the Swedish inflation rate in the 16th century was even higher than in the 20th century.

The 17th century saw the rise of Sweden as a great power, from being an undistinguished country. Due to its involvement in the Thirty Years' War, Sweden was transformed into a leader of Protestantism. Beside Gotland, Scania, Halland, Blekinge and Jämtland, also Estonia (from 1561), Livonia, Kexholm, Ingria, Western Pomerania, Wismar, and Bremen and Verden came under its rule, although the Swedish currency was not introduced in all territories (see, for example, Chapter 5 concerning the exchange rate on Swedish Pomerania). Sweden's power was partly based on the expansion in mining. A monetary innovation was introduced in 1624, the copper standard.

Although the combined copper and silver standard caused some deterioration of the currency, the heavy copper plates limited its magnitude, and inflation was lower than in the previous century (see Figure 1.1). As discussed in Chapter 9, population growth slowed down, which together with the expansion of mining and new incomes from the conquered territories caused real wages to rise somewhat during the 17th century (see Figure 1.2).

As discussed in Chapter 4, from around the mid-17th century up to 1776, Sweden de facto had at least five currencies, three based on silver, one on copper and one on gold. Occasionally additional currencies existed. In Sweden, it was during this period of multiple currencies circulating alongside each other that the fiat standard arose. After 1710 the use of transferred notes expanded significantly. However, the first experience of a fiat standard was not with paper money, but with coin tokens towards the end of the Great Northern War (1700–21). As shown in Chapter 5, in comparison with its neighbours, Sweden's currency weakened in the 17th and 18th centuries.

The Great Northern War ended the Swedish empire. Estonia, Livonia, Ingria and parts of Finland were ceded to Russia. During the Age of Liberty (1718–72), monarchy was limited by parliamentary rule (which, however, was not a democracy). The press developed substantially during this period. From this period we also have rich sources on economic statistics, such as prices and exchange rates, published by various papers. The Age of Liberty ended with Gustav III's coup d'état in 1772. An absolute monarchy lasted up to 1809, when King Gustav IV Adolf, the son of Gustav III, was

*King Gustav I (Vasa) in 1557 or 1558.*
Source: Nationalmuseum.

removed from power by a new coup staged by radicalized officers, fuelled by the defeat of Sweden in its war against Russia. The new Swedish constitution of 1809 was influenced by Montesquieu's ideas of the balance of powers. One of Napoleon's generals became king of Sweden in 1818 as Karl XIV Johan.

Economically, the 18th century exhibited a continuation of some of the trends from the 16th century. The circulation of fiat money, which came to dominate money supply, was followed by an increased rate of inflation (see Figure 1.1). Population growth caused real wages to decline (see Figure 1.2) to a low point at the time of the Napoleonic wars, as discussed in Chapter 9. Various studies of food consumption show that the calorie intake decreased between the 16th and 17th centuries and was then roughly stagnant between the 17th and 18th centuries.[7]

In 1776–7 a major currency reform was implemented; the copper standard was abolished and the riksdaler silver coin was introduced as the main currency unit in order to stabilize the monetary system. However, paper money continued to circulate, and its convertibility into silver was later withdrawn. In 1789–1834 the inflation rate was substantial but Sweden was not alone in experiencing a monetary crisis during the Napoleonic wars. For example, the Russian and Danish currencies deteriorated more than the Swedish.

Following the loss of Finland to Russia in 1809, Norway and Sweden formed a political union in 1814 which lasted until 1905, when Norway gained full political independence. At first the union did not lead to any monetary homogenization; Norway formed its own central bank in 1816 and issued its own currency. After positive Swedish experiences of linking the currency to a fixed silver rate since 1834, however, plans for monetary cooperation emerged. Following the introduction of the gold standard in 1873, the krona was introduced as the common currency unit in Sweden, Denmark and Norway, and a formal Scandinavian currency union was formed (see further Håkan Lobell's discussion in Chapter 6). During the entire silver and gold standard periods in the 19th century, Swedish inflation rates were quite low (see Figure 1.1).

As discussed by Johan Söderberg in Chapter 9, in the 19th century the Malthusian trap was avoided thanks to technological development and the spread of potatoes. Real wages started to increase despite the rising population (see Figure 1.2). From 1850, GDP per capita started to rise significantly and doubled during the course of the second half of the 19th century, which was followed by increases in real wages as well. This was preceded by important political changes. The struggle between conservative and liberal political forces peaked at the end of the 1830s and was followed by several important liberal reforms in the period 1840–66. The guild system was abolished in 1846. Full freedom of trade was introduced in 1864.

The First World War ended the monetary stability of the previous century, as discussed in Chapter 7. The gold standard was suspended in 1914, and although it

7 Morell (1986).

was later reintroduced in 1922–31 and under Bretton Woods in 1951–71, price stability could not be maintained.

In Chapter 7 Jan Bohlin concludes that there were two periods when the value of the krona changed significantly: 1915–24, when it appreciated, and 1977–93 when it depreciated in several steps. The exchange rate reflects the relative economic development of Sweden vis-à-vis other rich countries. During and after the First World War, Sweden's relative economic position was strengthened. Sweden developed from one of the poorest countries in Western Europe in the 19th century, to one of the richest in the 1960s. Real wages increased substantially during the course of the 20th century, as shown by Figure 1.2 and further discussed by Svante Prado in the final chapter.

Inflation was aggravated in the 1970s, 1980s and early 1990s. During the recessions in the late 1970s, early 1980s and early 1990s, Sweden's currency weakened, thus contributing to economic revival but also causing price instability. How these devaluations affected long-term Swedish economic growth is still a debated issue. The manipulation of the Swedish currency by political authorities at times of difficulty is a well-established practice, and its historical roots can be traced to the 16th, 17th and 18th centuries. The issue of price and exchange rate stability is not new; it has been debated continually from the Middle Ages to the present. Commitments to a stable currency have been made time and again in history, but great events, such as wars and deep economic crises, often, but far from always, have shattered such assurances.

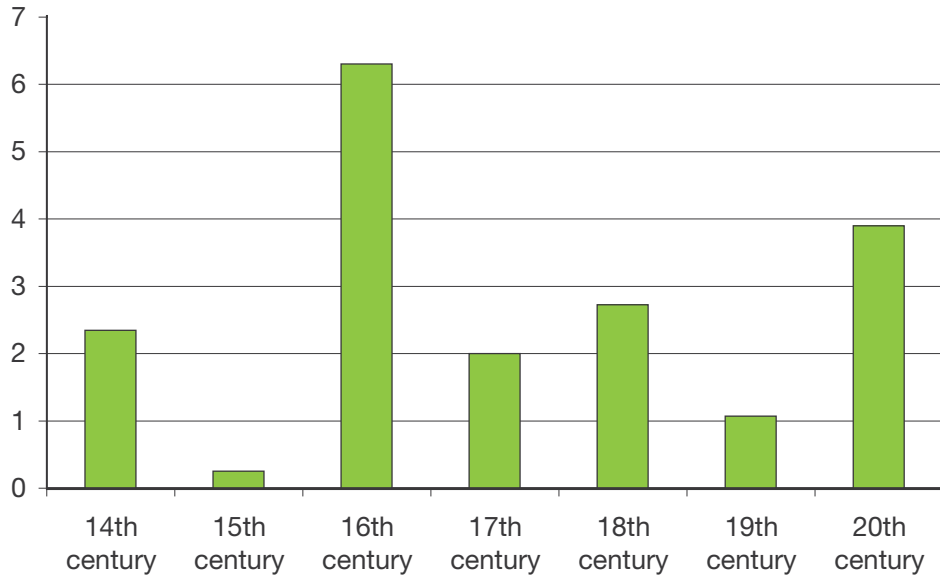
## Acknowledgements

A number of people have contributed to the making of this book. In the initial stages of this project, Claes Berg and Lars Jonung made important contributions to its realization. We have from the very beginning received invaluable support and input from the Norwegian scholars working with their similar project at Norges Bank, in particular Ola Grytten and Jan Tore Klovland at the Norwegian School of Economics and Business Administration in Bergen and Øyvind Eitrheim at Norges Bank.

In the process of completing the separate chapters in this volume, a couple of interim workshops were organized in which the following external experts participated and submitted comments and suggestions: Peter Englund, Klas Fregert, Cecilia von Heijne, Lars Jonung, Lars O. Lagerqvist, Svante Öberg and our Norwegian colleagues mentioned above.

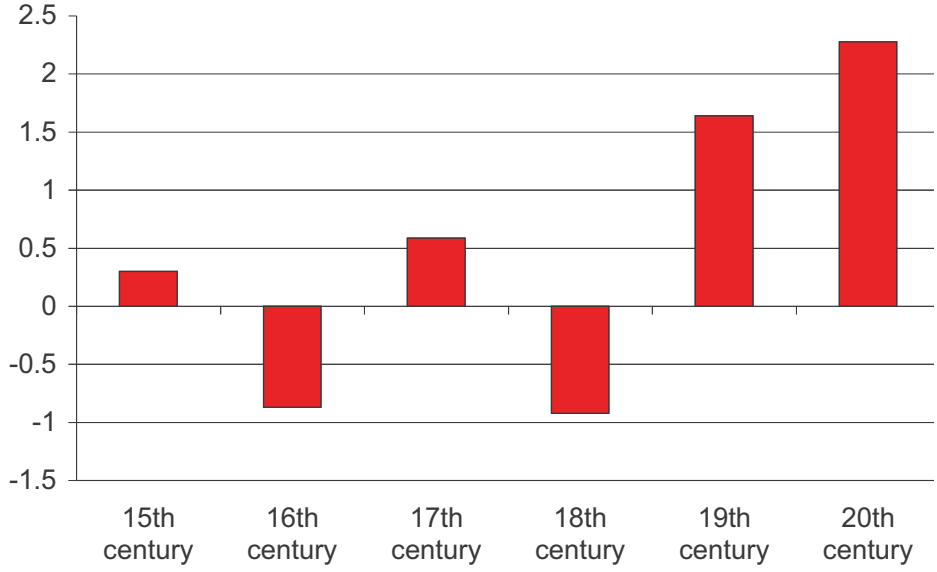
Finally, we would like to thank Mira Barkå and Claudio Carillo at the archive of the Riksbank for helping us to find foreign exchange rates in the 18th, 19th and 20th centuries, Eva Wiséhn at the Royal Coin Cabinet for pictures of coins and notes, and Patrick Hort for improving our written English.

**Figure 1.1.** *The average annual rate of inflation (per cent) in Sweden from the 14th to the 20th century.*



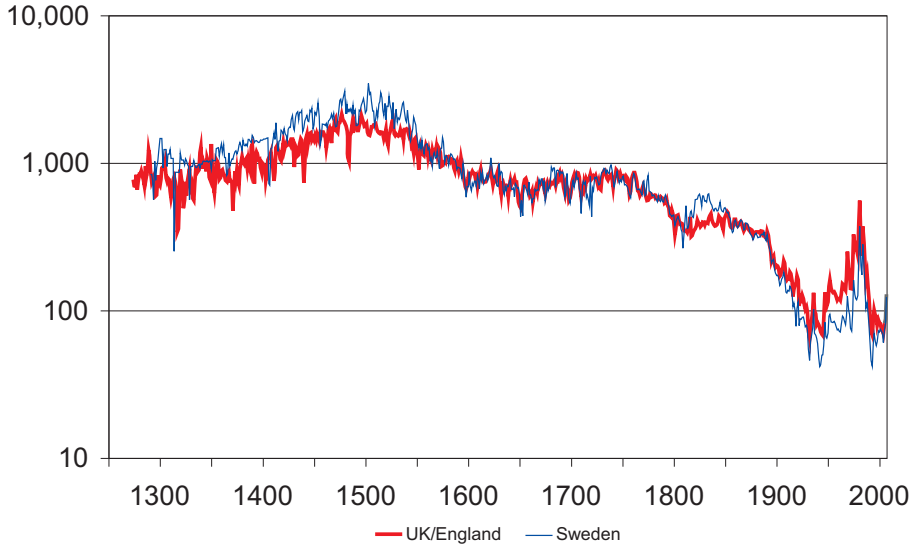

Source: Chapter 8.

**Figure 1.2.** *The average annual growth rate (per cent) of real wages in Sweden from the 15th to the 20th century.*




Source: Chapters 9 and 10.

**Figure 1.3.** *The purchasing power of silver in UK/England and Sweden 1273-–2006 (OECD average in 2005 =100).*




Source: Based on Chapters 3, 4, 5, 6, 7 and 8, Officer (2008), Lindert (2006), and OECD (2009-01-29).

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# 2.
# Swedish monetary standards in a historical perspective[1]

**Rodney Edvinsson**

## 2.1. Introduction

Since 1873 the krona (crown, abbreviated SEK), divisible into 100 öre, has been the main monetary unit in Sweden. Before that date Sweden had various domestic currencies that were used as means of payment. In various periods there was a fluctuating market exchange rate between these currencies. Inflation figures, for example, will therefore differ depending on which monetary unit one follows because the value of some currencies fell more over time than the value of others.[2]

This chapter classifies the monetary standards in Sweden from the Middle Ages to the present, and gives an overview of the various currencies that were in use. A commodity standard was in place during most of Sweden's history, while the fiat standard is a rather late innovation. The classification into monetary standards is also related to the issue of debasement under the commodity standard and the mechanisms behind the rise of multiple currencies. Exchange rates of coins often deviated somewhat from the theoretical exchange rates based on the relations between their intrinsic metal values. The monetary history of Sweden provides examples of immediate as well as protracted adjustments of exchange rates and prices in response to debasement.

The term "Sweden" used in this book could be questioned from a historical perspective. Up to the 17th century, the monetary history of various regions within the present borders of Sweden coincided with Denmark's. Since Finland was part of the kingdom of Sweden-Finland up to 1809, the monetary history of Sweden and Fin-

1 I want to thank especially Jan Bohlin, Bo Franzén, Klas Fregert, Cecilia von Heijne, Lars O. Lagerqvist, Johan Söderberg and Daniel Waldenström for comments on the content of this text.

2 One example is given in Jansson, Palm and Söderberg (1991, pp. 6–12), for the 17th century.

land coincided up to the early 19th century. Norway and Sweden formed a union in 1814-1905. Up to 1814, the Norwegian monetary system was coordinated with the Danish. In the period 1814–73, Norway retained its own system, where 1 speciedaler = 120 skillings.[3] During the Middle Ages Gotland had its own monetary system.

This book discusses foreign exchange rates as well as exchange rates between various domestic currencies used in Sweden. Foreign exchange is intimately connected to the domestic currency system. Most domestic currencies, like mark, daler and riksdaler, were originally imported. The riksdaler and the ducat[4] circulated as domestic as well as foreign coins.[5] At the exchange, often no distinction was made between riksdaler in foreign and domestic coins. Foreign coins played an important role not least because in earlier times international transactions were made in coins.[6]

The appendix at the end of this chapter lists various money terms that have been used in Sweden, and Finland, up to the early 19th century.

## 2.2. The functions of money

Money has four basic functions: a medium of exchange, a store of value, a unit of account and a standard of deferred payment. A distinction is sometimes made between the all-purpose money of modern economies, which serves all of money's four basic functions, and the special-purpose money of economies that are not fully monetarised, which in limited contexts only serves one or two of these functions.[7]

Money can exist in either physical or ideal form. Money in ideal form is a pure unit of account or notational device, and was used in exchange and counting houses. Money in physical form (mainly coins before paper notes came into circulation) was initially the only or main medium of exchange and store of value, but this changed during the Early Modern Period, first in foreign trade. Some of the foreign currencies quoted in Sweden in the 17th and 18th centuries – most notably, the Hamburger reichstaler banco – were not minted coins but monies of account.

In the medieval and early modern monetary system, it is important to distinguish between monetary units referring to physical means of payment and the ones that served merely as units of account. Although a monetary unit could establish identity between physical and ideal monies, there were periods when a difference arose. This could upset the different functions of money, for example, implying that the unit of account and standard of deferred payment could refer to different mediums of exchange valued differently in the market. After a period of confusion and conflict about, for example, the type of money in which old debts should be paid, the conse-

3 Lagerqvist and Nathorst-Böös (1968, p. 56).
4 The ducat is spelled 'dukat' in Swedish.
5 Also in Denmark, most of the rix-dollar coins that circulated in the 16th century were of foreign origin (Friis and Glamann, 1958, p. 3).
6 Heckscher (1941, p. 5).
7 Thurborg (1989, p. 89). The distinction is criticised in Melitz (1970).

quence could be bifurcation of old monetary units. For example, the term daler referred at first to daler coins minted with a fixed silver content; in the 1570s the daler coin was set equal to 4 marks. Later the daler coin came to be valued at more than 4 marks and a bifurcation occurred between the daler as a coin and the daler as a unit of account. The daler as a coin then came to be termed riksdaler, while the daler became a unit of account equal to 4 marks (see Table 2.3). During the 17th century, the term daler bifurcated further (see Chapter 4).

## 2.3. Commodity money

Money first arose as commodity money, existing in physical form and primarily valued for its physical properties. This was also the main form of money in a longer historical perspective. The permanent replacement of commodity money by fiat money is a recent innovation, established in the closing decades of the 20th century.

The introduction of a single domestic currency system can be seen as part of the transformation from a pre-capitalist, feudal or semi-feudal economy, to a modern, capitalist one. An efficient national market required a common abstract standard.[8] To be an effective unit of account for commodities, money itself had to rise beyond its original physical commodity form. However, this Weberian process of rationalisation within the monetary sphere was protracted and complicated, involving achievements as well as setbacks, a process that is still continuing (at least at the international level, as shown by the rise of the Euro in the late 20th century).

Commodity money was linked to various precious metals. In Sweden, three metals have been important in this respect: silver, gold and copper.

Even when commodity money prevailed, coins of precious metal were never 100 per cent pure commodity money. Money as pure commodity would not be money. Velde, Weber and Wright (1999) emphasise that commodity money, as the name suggests, is a 'hybrid of a commodity and money'.[9] The peculiarity of money is that its usefulness mainly comes from its property as exchange value, not from its physical properties. The face value of the metal coins was generally somewhat higher than their intrinsic metal value, which enabled the ruler to obtain an income from minting. The difference constitutes a 'fiat component' of the coin's face value.[10] As Nathan Sussman puts it, '[t]he holder of bullion willingly paid a premium to have raw metal transformed into standard coins, due to the savings on transaction costs to be gained from using a universally accepted medium of exchange'.[11] Keynes even defines a non-monetary economy as 'an economy in which there is no asset for which

8 Davidson (1919, p. 118).
9 Velde, Weber and Wright (1999, p. 306).
10 Sargent and Velde (2002, p. 19).
11 Sussman (1993, p. 50).

The Banker and His Wife*, by Marinus van Reymerswaele (1490–1546). The picture shows gold as well as silver coins, and was painted at the time of a commercial revolution in Europe.*
Source: http://commons.wikimedia.org/wiki/File:De_geldwisselaar_en_zijn_vrouw.jpg

the liquidity-premium is always in excess of the carrying-costs'.[12] Had the monetary unit exactly reflected its fine metal content, the mint would have suffered a loss because of the minting costs.

In other words, the mint equivalent, the nominal value minted from a fixed weight of a metal (measured in, for example, daler silvermynt per ship pound), was somewhat higher than the mint price, i.e. the price of bullion when it is brought to the mint.[13] The mint price and the market price of bullion were not necessarily equal.[14] The mint equivalent less the mint price is the gross seignorage per unit weight.[15] Gross seignorage includes minting costs; net seignorage is the mint's pure profit. The seignorage rate is the ratio of seignorage per unit weight to the mint price (of the same unit weight). For example, at the height of the Great Debasement in England, in 1547, one troy pound pure silver was minted into 7.2 pounds sterling – the mint equivalent – while the mint price of the same unit weight of silver was

12 Keynes (1936, p. 239).
13 Quinn and Roberds (2006, p. 12).
14 Smith (1999 [1776], pp. 59 and 130).
15 Redish (2000, p. 27). Sussman (1993, p. 50), uses the terms 'mint charge' instead of gross seignorage and 'mint par' instead of mint equivalent.

2.996 pounds sterling.[16] The (gross) seignorage per minted troy pound pure silver was, therefore, 4.204 pounds sterling, and the (gross) seignorage rate 1.403 or 140.3 per cent (=4.204/2.996), an extremely high profit rate at the time.

Minting was connected to power and the state formation process. This process was not linear. For example, the first attempt to mint coins in Sweden in the late 10th and early 11th centuries was abandoned.[17] As argued by Jacques Melitz:[18]

'The monetary evolution of the West has not been guided by an invisible hand of progress, but largely imposed by conspicuous actions of government … Many of the foremost features of the monetary systems we know today, in fact, are the result of governmental improvisations following crises.'

Given that the relative price of bullion does not change dramatically, commodity money should be accompanied by price stability. However, inflation under commodity money is well known, as discussed further in Chapter 8. This reflects the hybrid nature of commodity money, and that it includes a fiat component, which could be temporarily increased.

Depreciation under a metallic standard involves an increase in the mint equivalent. It occurs either by enhancing money, i.e. increasing the legal value of the existing coin, or through debasement, i.e. reducing the fineness of the precious metal from which the coins are minted or by reducing the weight of the coins (or both). The ruler could temporarily increase his income from minting through debasement (provided the mint price initially does not increase as much as the mint equivalent).[19] Monetary debasement was the main source of secular inflation in Sweden before 1715, while later inflation was mainly caused by excessive supply of fiat monies.[20] Debasements also gave rise to a complicated monetary system, with the circulation of parallel currencies.

Inflation takes different forms under a metallic and a fiat standard. Under a metallic standard, the debased coins are supposed to circulate at par with the old, better coins but in reality there is usually, with some delay, a premium on the better coins. Under a fiat standard, the previously issued fiat monies usually do not circulate at a premium, although the bifurcation between riksgälds and banco notes in Sweden during the 1790s shows that this can happen (as mentioned in Chapter 4).

Occasionally, depreciation led to the formation of separate currency systems, when the inferior coins usurped the names of the better coins[21] (as in the case of the term daler in Sweden). Therefore, many monetary units became devalued over time (see the list of money terms in the appendix).

The strengthening of the monetary unit, or recoinage, under the metallic stan-

16 Redish (2000, p. 90).
17 Malmer (1995, p. 25).
18 Melitz (1970, p. 1032).
19 Spufford (1988, pp. 289-290), and Redish (2000, p. 34).
20 Läge (1961).
21 Heckscher (1941, p. 4).

dard was not the mirror image of depreciation. For example, it was not accompanied by negative seignorage. Although nominal prices usually fell substantially following the introduction of better coins, this should not be interpreted as severe deflation, which is taken account of by the inflation index presented in Chapter 8. When the ruler returned to strong money, he began minting coins of a fine metal content that approximated the older coins before debasement. Whereas under depreciation, debased coins were, at least officially and initially, supposed to be at par with the older better coins, under recoinage the face value of the debased coins was reduced significantly and exchanged at this reduced value for the new strong coins.[22] This can be compared with the 20th century when zeros have been struck from inflation notes on various occasions (see Chapters 7 and 8). The debased coins often ceased to be legal tender after some time.

The face value of the coin could fall beneath its intrinsic metal value, which, for example, often happened with old coins with a higher content of precious metal than the new debased coins with the same face value. According to Gresham's Law, if the difference is sufficiently large, the better coins tend to be driven out of circulation and melted down.[23]

However, good money does not always drive out bad money,[24] as shown by the many examples for Sweden in Chapters 3 and 4. The issue is connected to the problem of whether coins circulated by weight, i.e. in accordance with their intrinsic metal value, or by tale, i.e. in accordance with their face value. The better coins could command a premium (though not necessarily in proportion to their weight), allowing them to stay in circulation. Although the existence of legal tender legislation required individuals to accept both good and bad coins as if they were of equal value, this was not easily enforced. Even when enforced, the better coins were often hoarded (i.e. used as a store of value) rather than melted down, allowing them to be brought back as means of payment under changed circumstances.

The type of transaction tended to differentiate the demand for various types of means of payment. Coins of smaller denomination could be minted with an intrinsic metal value that was significantly lower than their face value;[25] this became more common in the 19th century. Such coins became de facto token coins. Copper was mostly used for this purpose. Reducing the minted amount of coins of smaller denomination, according to the so-called 'standard formula', meant that their value did not fall below their face value, at the same time as shortages of petty coins could be avoided.[26] This could be accomplished by either restricting free minting (see below) or increasing the seignorage rate of petty coins.

22 Spufford (1988, p. 290), and Sussman and Zeira (2003, p. 1776).
23 Heckscher (1936 vol. I:1, pp. 202–3), and Heckscher (1941, pp. 3–4).
24 Redish (2000, p. 30), and Rolnick and Weber (1986).
25 Redish (2000, pp. 107–9).
26 Sargent and Velde (2002, p. 5).

## 2.4. Classification into monetary standards

Arthur Rolnick and Warren Weber write that a monetary standard refers to 'the objects that serve as the unit of account and that back the objects that circulate as generally accepted means of payment (i.e., the objects that back the objects that are money)'.[27] Monetary standards can be classified in various ways and the definitions and terminology can vary between studies.

A currency can be seen as a system of account, with a fixed relation between the monetary units constituting this system. Table 2.1 presents a classification into monetary standards used in this chapter for Sweden, based on the relation between the currency (or currencies) and the object (or objects) backing the currency (or currencies).

The main difference is between commodity and fiat standards. Under a *commodity standard* the currency is backed by a fixed amount of a commodity, or several commodities under a *multi-commodity standard*. Several currencies can also be backed by the same commodity. When the commodity is a metal it is called a *metallic standard*. Under a *fiat standard* the unit of account is some abstract value not linked to any commodity. The classification of monetary standards is primarily connected to the function of money as a unit of account, and not, for example, to whether notes or intrinsic value coins are the most common means of payment.

The difference between various standards is not black and white. For example, the date when Britain introduced the gold standard is difficult to pin down – the years 1717, 1774, 1816, 1819 and 1821 have been suggested depending on what criteria one uses.[28] Thus, a distinction must be made between the official monetary standard and the de facto standard in place (see Table 2.2). A country can be on a metallic standard officially, while de facto the metallic standard has been abandoned if the circulating notes are made inconvertible.

Under a pure metallic standard there must be complete freedom to exchange money for metal and metal for money.

One condition often set for a pure metallic standard is free minting, i.e. that anyone can go to the mint and procure for a quantity of unminted metal an amount of coins, with a deduction for seignorage (i.e. 'free' does not mean free of charge).[29] A pure metallic standard also presupposes unrestricted export and import of the metals from which the coins are minted.

Under a metallic standard based on free minting the price of bullion fluctuates – at least theoretically if the markets function efficiently – within the strict borders of the bullion points (gold, silver or copper points), as is further discussed by Håkan Lobell in Chapter 6 for the 19th century. These points are not determined arbitrarily, but are market prices. At the upper bound of the bullion price it is profitable

27 Rolnick and Weber (1997, p. 1310).
28 Redish (2000, pp. 161–2).
29 Velde and Weber (1998, p. 5).

to turn specie coins into bullion. Bullion will then be exported. At the lower bound of the bullion price it is profitable to deliver bullion to the mint. Bullion will then be imported.

The interval between the upper and the lower bullion point is narrower for silver than for copper and even narrower for gold than for silver. An increase in seignorage rates lowers the lower bound of the bullion price and thus increases its distance from the upper bound. Furthermore, Thomas Sargent and Francois Velde argue that the 'intervals between the minting and melting points for large and small denomination coins identify a price level band within which the ordinary quantity theory operates, cast in terms of the total quantity of coins'.[30]

Free minting can be restricted and minting can be conducted on government account. In Sweden, free minting was periodically restricted, for silver coins in the 16th century[31] and for copper coins in the 17th and 18th centuries.[32] When the right to procure minted coins for unminted metal at the mint is restricted or does not exist, the market value of coins can be held significantly above their intrinsic commodity value. Under such circumstances, there is no lower bound for the bullion price, although the upper bound still exists, since the option of melting coins into bullion continues to be open.[33] The band within which the ordinary quantity theory operates will also be wider under such conditions.

The difference between free and restricted minting is not always clear, for instance in the case of a significant increase in the seignorage rate. If the fiat component of a coin's face value is large, the coin in question becomes de facto a token coin. Furthermore, Thomas Sargent and Francois Velde argue that in the absence of an explicit free minting policy, the ruler can still pursue a policy that resembles this. Provided the ruler tries to maximise profit, the mint would buy an unlimited amount of metal at a mint price.[34]

The *mono-metallic standard* is based on a single metal. The alternative is the *multi-commodity standard*.[35] In the West, the multi-commodity standard was not finally abandoned until the late 19th century.

The most common multi-commodity standard involves two precious metals. The most common combinations have been silver and gold, gold and copper, and silver and copper. Velde and Weber define a bimetallic standard de jure as one in which two different metals 'have unlimited legal tender at a fixed rate and both are freely minted'.[36] According to Eli Heckscher, while the *bimetallic standard* implies a fixed relation between two types of coins based on two different metals, the *parallel stan-*

30 Sargent and Velde (2002, p. 11).
31 Heckscher (1935 vol. I:1, p. 202).
32 Heckscher (1936 vol. I:2, p. 606).
33 Sargent and Velde (2002, p. 20), and Cottrell (1997, p. 10).
34 Sargent and Velde (2002, p. 129).
35 Redish (2000, p. 26).
36 Velde and Weber (1998).

*dard* allows a floating exchange rate between coins of different metals.[37] The bimetallic standard is rather unstable and usually de facto transforms into a parallel or a mono-metallic standard. The fluctuations in the relative prices of various metals cause the mint equivalent at some point in time to be lower than the bullion price for one of the metals. Coins minted from the latter metal therefore either tended to be exchanged at a premium or were withdrawn from circulation (see below). Some authors use a broader definition of bimetallism, referring to all monetary standards where two different metals back one or several currencies.

While fiduciary monies, bank notes and token coins, issued by private or public institutions, are convertible into precious metals, fiat monies are not.[38] Under a *fiat standard,* bank notes and token coins are inconvertible. In practice, it can sometimes be difficult to make a distinction between a fiat and a metallic standard.[39]

Under a *full metallic standard,* all monetary transactions are conducted in metallic coins. With the exception of the early 1660s, this was the case in Sweden up to around 1700. The full metallic standard was initially replaced by a *specie standard*, implying that fiduciary monies, notes convertible into coins, were issued. The classic example is the international gold standard in 1880–1914 (see Chapter 6).[40] Under a *bullion standard*, the circulated notes are partly covered by unminted bullion, which was the case when the gold standard was partly re-established internationally in the 1920s. Indirectly it implies that free minting is abolished (if unminted bullion could be exchanged for specie coins it would de facto be a specie standard). Under a specie or bullion *exchange standard* the national currency is convertible into currencies that, in turn, are convertible into specie or bullion. Only small fluctuations are allowed in the exchange rates. The classic example of a gold exchange standard is the Bretton Woods system after the Second World War (only the dollar was convertible into gold, while other currencies followed the dollar), lasting up to 1971 (see Chapter 7).

If free minting prevails (and the seignorage rate is very low), the value of coin types in the same precious metal would tend to be fixed (or fluctuate within a very narrow band). However, if free minting is restricted for at least one coin type, the exchange rate between different coin currencies of the same precious metal could fluctuate. Under such a system, it was usual for each coin currency to have its own legal status and sphere of circulation. For example, in 17th century Sweden, debts made in one coin currency usually had to be paid back in the same coin currency, i.e. there was a clear separation between different standards for deferred payment. Eli Heckscher names such a system a *coin types standard* (a free translation of the terms "sortmyntfot" in Swedish and "Sortengeld" in German that Heckscher actually used), which he distinguishes from the parallel standard. Under the latter, according to a narrow definition (especially if free minting is a condition), the exchange rate is

37 Heckscher (1936 vol. I:2, p. 607).
38 Redish (2000, pp. 25 and 246).
39 Lobell (2000, pp. 13–14).
40 Redish (2000, p. 246), and Flandreau and Zumer (2004).

fixed for coin types of the same metal.[41] Some authors use a broader definition of the parallel standard that would include fluctuating exchange rates between coins types of the same metal.

In this chapter, the somewhat broader term *multi-currency standard* is introduced, defined as a standard in which several units of account exist that are not fixed in value relative to each other. This is contrasted to a *mono-currency standard*, based on a single currency (see Table 2.1). For example, the present division of one krona into 100 öre constitutes a mono-currency standard. It involves only one system of account, not two separate systems, since the relation between krona and öre is fixed.

While a parallel standard is always a multi-currency standard, the multi-currency standard can also be combined with mono-metallism. Furthermore, it can be combined with a fiat standard, if the exchange rates between two or more fiat currencies, or fiat and metallic currencies, fluctuate relative to each other.

Under a bimetallic standard, two different metals back the same unit of account or currency, and a fixed exchange rate is presupposed (at least de jure) between coins minted from the two metals. It is, therefore, a mono-currency standard (see Table 2.1).

Here the terms multi- and mono-currency standard are used to describe the domestic economy. At an international level, a multi-currency standard usually prevails. The introduction of various currency unions (for example, the euro or the international gold standard) can be described as attempts to introduce a mono-currency standard for several countries.

## 2.5. From commodity to fiat standard

Table 2.2 contains descriptions of the monetary standard in Sweden from the 12th century to the present. The riksdaler before 1777 and gold coins before 1873 were mainly international currencies, and have not been considered when establishing monetary standards. Table 2.3 is a summary of the value relations between various currency units, according to official and market rates. The categorisation of Table 2.2 should not be regarded as rigid, since in practice various monetary standards partly overlap.

Standards that exist on a permanent basis are easier to identify. One problem concerns periods with a temporary fiat standard, as a result of the need to finance a war. Although the currency was then made inconvertible, there were expectations that convertibility would be restored later at the original rate of conversion. Michael Bordo and Finn Kydland therefore argue that such arrangements should be seen as forms of metallic standards.[42] In Table 2.2 a differentiation is made between 'long-term' and 'short-term' standards. Before the collapse of the Bretton Woods system,

41 Heckscher (1936 vol. I:1, p. 205).

42 Bordo and Kydland (1992).

**Table 2.1.** *Classification into monetary standards developed in the present study based on the relation between the currency(ies) and the object(s) backing the currency(ies).*

| | | Number of currencies | |
|---|---|---|---|
| | | **One currency (mono-currency standard)** | **Two or more currencies (multi-currency standard)** |
| **Object(s) backing the currency(ies)** | **One commodity (mono-commodity standard)** | Mono-currency, mono-commodity standard. | Multi-currency, mono-commodity standard. |
| | **Two or more commodities (multi-commodity standard)** | Mono-currency, multi-commodity standard (for example, bimetallic standard according to a narrow definition). Is unstable and usually transforms into a parallel or a mono-currency, mono-commodity standard. | Multi-currency, multi-commodity standard. Two cases:<br>1) fixed relation between coins of the same metal (parallel standard according to a narrow definition); or<br>2) fluctuating exchange rate between coin types of the same metal. |
| | **Abstract unit(s) and commodity/ies** | Is logically excluded. Would be a mono-currency, mono-commodity standard with convertible fiduciary money circulating. | Combined fiat and commodity standard. Often de facto a fiat standard if commodity currencies play a minor role. |
| | **Abstract unit(s) (fiat standard)** | Mono-currency, fiat standard. | Multi-currency, fiat standard. |

all fiat standards were more or less viewed as temporary (sometimes lasting several decades), and the link to a metal was sustained in one form or another.

On a long-term basis, Sweden was, in one form or another, on a silver standard up to 1624, on a copper and silver standard 1624–1776, on a silver standard 1776–1873, on a gold standard 1873–1971, and on a fiat standard from 1971 onwards.

In Europe (and other parts of the world[43]) before the 19th century, silver was the main precious metal backing the currency commonly in use. Gold currency was used to a lesser extent, mainly for high-value transactions.[44] In Sweden, before the adoption of the gold standard in 1873, gold coins played only a minor part in domestic trade. The ones imported or minted were mainly used in foreign trade. In medieval and early modern Europe, silver formed a standard to which all currencies and prices could be related. It is therefore the practice of some price historians to transform

43 See, for example, Flynn, Giráldez and von Glahn (2003).

44 Friedman (1990, p. 85).

*Gold bars produced in Sweden in mid-1950s by Boliden. Each bar weighed 12½ kg and was worth 73,000 SEK according to the Bretton Woods arrangement, which Sweden joined in 1951. In 1955, this sum was the equivalent of a male manufacturing worker's pay for 7 years (see Chapter 10).*

Source: http://www.riksbank.se/upload/Bilder_riksbank/Kat_sedlar_mynt1/huller_buller_high.jpg

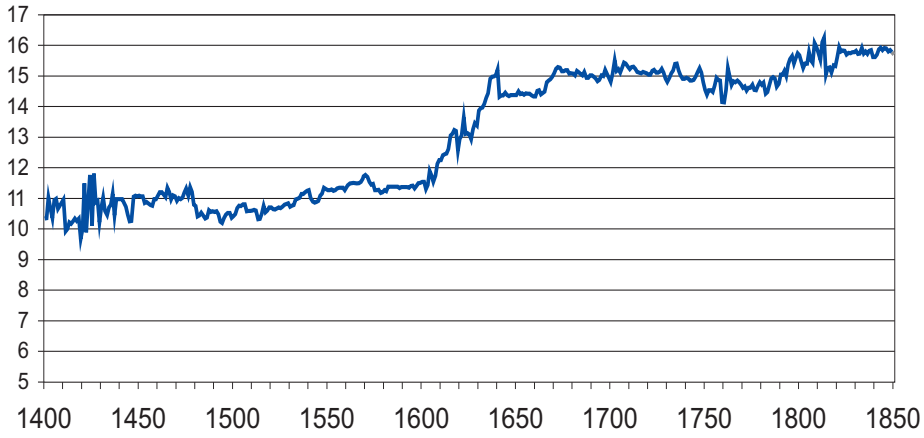
prices in the local currency into prices in grams of silver, which makes historical prices comparable internationally.

Figures 2.1 and 2.2 present the 'world' gold-silver (value) ratio from 1400 to 2005 (average of France, Kraków, and Austria 1400–27 and 1542–51; England, France, Kraków, Luzern and Austria 1427–1541 and 1552–1686; Hamburg 1687–1832; and London from 1833 onwards). Apart from a rise in the first half of the 17th century, the ratio was quite stable before the classic international gold standard in 1880–1914. The exchange rate of one ducat (a gold coin) in riksdaler (linked to silver), presented in Chapter 4 for the period 1652–1776, also displays a surprising stability over time.

During the 15th and 16th centuries the 'world' gold-silver ratio was around 11. During the first half of the 17th century it increased from 11–12 to 14–15, and then stayed at 14–16 up to the 1870s. Gold became relatively more precious than silver when most developed countries went over from a silver to a gold standard. In the late 19th century the ratio increased to above 30. During the 20th century the value ratio was extremely volatile and its level was much higher than in the previous centuries.

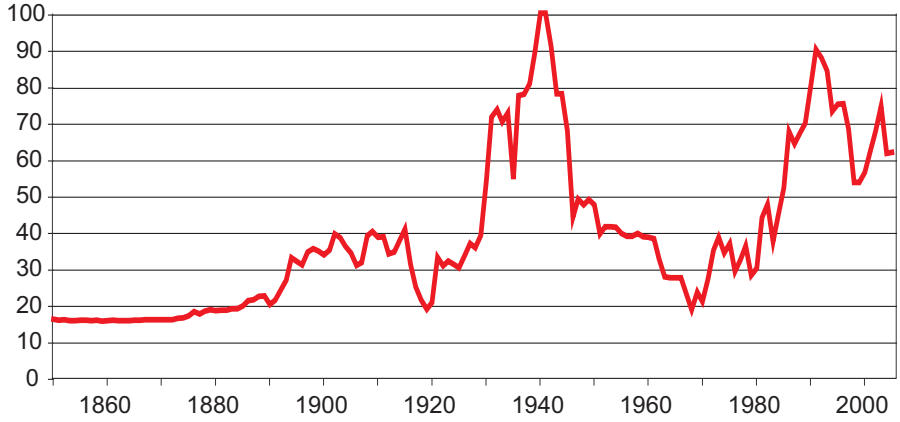
One important source of depreciation was the wear from circulation and clipping of coins, which implied that newly minted coins (if not debased) tended to be under-

**Figure 2.1.** *'World' gold-silver (value) ratio 1400–1850*




*Sources:* 'MEMDB – Medieval and Early Modern Data Bank' and 'Measuringworth.com'. Average of France, Kraków, and Austria 1400–26 and 1542–51; England, France, Kraków, Luzern and Austria 1427–1541 and 1552–1686; Hamburg 1687–1832; London 1833–50.

**Figure 2.2.** '*World' gold-silver (value) ratio 1850–2005.*




*Source:* 'Measuringworth.com". Based on London prices. Continues the series from Figure 2.1.

valued relative to older coins.[45] Short-term solutions were either recoinage, when clipped coins were exchanged for new ones at a reduced rate, or debasement, when new, inferior coins could circulate at par with the old ones.[46] The metallic standard was never a complete guarantee for the intrinsic metal content. A debasement cycle consists of rapid debasement followed by recoinage. In Sweden, debasement cycles occurred in the 1350s, the 1360s, 1521–24, 1561–76 and 1590–93, which are further discussed in Chapters 3 and 4. The period 1716–19, dealt with in Chapter 4, could also be described as a debasement cycle, although the debased coins rather resembled fiat money. Most of these debasement cycles were connected to war and the need to finance the war through increased seignorage, and tended to be accompanied by rapid price increases. During these debasement cycles older better coins circulated alongside the debased ones, multiplying the number of currencies.

The empirical evidence from Sweden shows that the exchange rates of coins often deviated somewhat from the theoretical exchange rates based on the relation between their intrinsic metal contents. Furthermore, there are examples of immediate as well as protracted adjustments of exchange rates and prices in response to debasement. There were also large regional differences. When free minting and the number of debased coins were restricted, these coins initially constituted only a small part of the total money supply, and their value could be upheld significantly above their intrinsic metal value. At times, there was a shortage of means of payment, allowing the successful implementation of this strategy. On some occasions there was an anticipation that the debased coins would later be exchanged for better coins, either at par or at least at a better rate than implied by their fine metal content, allowing them to temporarily and partly function as token coins. This occurred, for example, in 1590–92 and 1716–18.

Against this background, there was a need for a currency unit, alongside current money, with a stable precious metal content. In Sweden, the mark silver and various gold coins had this function during the Middle Ages (see Chapter 3), while the riksdaler had that role after the 1530s (see Chapter 4). In Amsterdam and Holland, bank monies arose in the 17th century that were linked to the better coins, according to the standard of the mint, implying that a premium was paid for those monies, as discussed further in Chapter 5. These two foreign currencies also played an important role in the Swedish economy.

From 1624, copper coins were minted in Sweden with the intention that they would circulate at their intrinsic value, which was unusual in Europe. For example, a two-penny copper coin was minted in England in the 1790s with an intrinsic value equal to its face value, weighing 56 grams, but such coins were ordered once only and later castigated as being too clumsy for ordinary use.[47]

Sweden was the world's largest producer of copper and the minting of copper coins was used to regulate the international price of copper. During the 17th century

45 Redish (2000, p. 33).
46 Sussman (1993, p. 52).
47 Redish (2000, p. 108).

*Copper plate minted in 1644 to the nominal value of 10 daler silvermynt, weighing 19.7 kg. 10 daler silvermynt was the equivalent of a male unskilled labourer's pay for around 33 days' work in Stockholm, and could buy five hectolitres of grains or 30 kg of butter. Photo: The Royal Coin Cabinet, Stockholm.*

the value ratio of copper to silver was around 94.[48] The heaviest copper coins were minted in the form of plates weighing from 0.5 to 20 kg. The copper standard coexisted with the silver standard (see Chapter 4).

In 1777 Sweden returned to the sole silver standard (based on the riksdaler as its main currency unit), which, with the exception of suspended convertibility in 1809–34, then existed up to 1873. In the period 1834–73, free minting was the rule for both silver and gold coins. In the 19th century, minting taxes were introduced, amounting to 0.75 per cent from 1830 for silver coins and to 0.3 per cent from 1835 for gold coins.[49]

The first banknotes in Europe of a modern type were issued by Stockholms Banco in 1661, a precursor of the Riksbank, established in 1668, but it was in the 18th century that non-metallic money came to dominate money supply. The *fiat standard* was in place during four periods in the 18th and 19th centuries: 1716–19, 1745–76, 1789–1803 and 1809–34. All four periods were preceded by wars and the need to finance these by issuing fiat money, which exemplifies how monetary innovation is often the result of crisis. Convertibility was later restored in every case but the fiat

48 Heckscher (1936 vol. I:2, pp. 602–3).
49 *Nordisk familjebok* (1913).

monies were exchanged at a reduced rate, even though the initial plan was to restore convertibility at the old par value.

The ducat, a gold coin, continued to be minted up to 1868. In 1868–72 another gold coin, the carolin, was minted to link the Swedish gold currency to the Latin Monetary Union, formed in 1865.[50] One carolin was equal to 10 French francs (or units of the Latin Monetary Union) and to 7.1 riksdaler riksmynt. Its fine gold content was 2.90322 grams. Since one riksdaler contained 25.5045 grams fine silver, this relation would imply a gold-silver (value) ratio of 15.59. In comparison, the Latin Monetary Union was based on a gold-silver (value) ratio of 15.5 to 1.

However, plans to join the Latin Monetary Union were abandoned after the Franco-German war in 1870–71.[51] Instead, a Scandinavian Currency Union was formed by Denmark and Sweden in 1873, and Norway joined two years later (see Chapter 6). The main currency unit was the krona (crown), which was exchanged for one riksdaler riksmynt. Counting in riksdaler banco and riksdaler specie was abolished. When the Scandinavian Currency Union was formed, Sweden also changed from a silver to a gold (specie) standard, which lasted up to 1914 (see Chapters 6 and 7). The fine gold content of one krona was 0.403 grams. Since the riksdaler specie was equal to 4 kronor, the derived gold-silver (value) ratio was 15.81, which was in accordance with international markets. The krona of Sweden, Norway and Denmark, respectively, were equal. After the Scandinavian Currency Union was finally abolished in 1924, the krona continued to be Sweden's currency unit.

When the gold standard was introduced in 1873, free minting was abolished for silver but continued for gold coins. The tax amounted to 0.25 per cent for 20-krona gold coins and ⅓ per cent for 10-krona gold coins.[52]

During the 20th century the fiat standard was in place in 1914–22/24, 1931–51 and 1971 onwards (see Chapter 7).

After the outbreak of the First World War, the Riksbank suspended convertibility into gold on 2nd August 1914. Convertibility was reintroduced at the old par value after the war, de facto in November 1922 and de jure on 1st April 1924, at the previous price of gold, but was suspended again on 27th September 1931 following the international Great Depression.[53] The period 1924–31 was not a full return to the gold specie standard of 1873–1914. Although gold coins were minted in 1920 and 1925, they were not widely circulated and were mainly used as gold reserves.[54] In June 1933 the krona was fixed to the British pound at 19.40 SEK (compared to 18.1–18.2 SEK under the previous international gold standard), and on 28th August 1939 to the US dollar at 4.20 SEK (compared to around 3.74 SEK under the previ-

50 Wiséhn (1995, pp. 224–6), and Lobell (2000, pp. 117–8).
51 Lobell (2000, p. 117).
52 *Nordisk familjebok* (1913).
53 Jonung (2000, p. 19).
54 Wettmark (1995, p. 256).

ous international gold standard). The legal price of gold was 20.67 USD per ounce up to 1933, when it was raised in stages to 35 USD per ounce in early 1934.[55]

Although during the Second World War a de facto fiat standard was in place, the dollar exchange rate (and therefore also the price of gold in SEK) was stable. In 1946 the krona was revalued by 14.3 percent (1 USD = 3.60), but in 1949 it was devalued by 30.5 percent (1 USD = 5.17 SEK),[56] which is discussed further by Jan Bohlin in Chapter 7.

Sweden joined the Bretton-Woods system formally on 31st August 1951,[57] when a gold exchange standard prevailed, but at a higher gold price than during the previous gold standard. Central bank currencies would remain convertible into US dollars, and only the US dollar was convertible on demand into gold.[58] During the Bretton Woods system, one US dollar was linked to gold at the rate of 35 USD per ounce or 1.12527 USD per gram. Since one dollar was equal to 5.17321 SEK, this implies that the fine gold content of one krona during the Bretton Woods system was 0.17178 grams, i.e. half of the fine gold content fixed in 1873.

Since the fall of the Bretton Woods system in 1971, Sweden has been on a fiat standard. A difference between the present and earlier fiat standards is that the link to precious metals has been completely severed and there are no plans to reintroduce a metallic standard. Only from the 1990s onwards has the fiat standard been accompanied by price stability. This international price stability is based on the inflation targets of central banks, where inflation is measured by the Consumer Price Index. However, the commodity aspect of money has not been completely abandoned. Since the unit of account is backed by the commodities constituting the Consumer Price Index, the present fiat standard possesses some features of a non-metallic multi-commodity standard, resembling what Stanley Jevons called a 'tabular standard'.[59] Although the unit of account is backed by a decreasing amount of commodities over time (i.e. allowing some inflation), even during the metallic standard the amount of metal backing the unit of account (at least before the 19th century) tended to decrease over time.

55 Friedman (2000, p. 86).

56 Jonung (1975, pp. 182–4), and Jonung (2000, p. 19).

57 Ahlström and Carlsson (2006, p. 64).

58 Redish (2001, p. 247).

59 In the late 19th century, Stanley Jevons (1875, Ch. xxv) favoured a 'tabular standard', under which a multiple legal tender would be adjusted in accordance with the general price level. He asked whether 'the progress of economical and statistical science might not enable us to devise some better standard of value'.

**Table 2.2.** *Monetary standards in Sweden since the 12th century.*

| Period | 'Long-term standard' | 'Short-term standard' | | | |
|---|---|---|---|---|---|
| | | **Official monetary standard** | **De facto monetary standard** | **Main currency unit** | **Other currency units (on a floating market rate with the main unit)** |
| 12th century to 1624 | Silver standard linked to the mark | Mostly full metallic, multi-currency, silver standard (different currencies were predominant in different regions) | | Mark (penningar). Before 1300, different penny coins in Götaland and Svealand. | Mark silver/lödig*, mark gutnisk, Danish mark, gammal örtug, rhensk gyllen, noble |
| 1534–1624 | | Mostly full metallic, mono-currency, silver standard (at some periods multi-currency standard based on silver, in 1590-1592 partly a fiat standard based on token coins) | | | Daler/rdr, gyllen (gold), krongyllen |
| 1624–33 | Copper and silver standard linked to daler kopparmynt and daler silvermynt as units of account | Copper standard | Full metallic, multi-currency, copper and silver, standard | Öre in copper coins | Öre in silver coins, mark in silver coins, rdr |
| 1633–43 | | Silver standard | In the 1630s, full bimetallic, copper and silver, standard. In the early 1640s parallel standard. | Dsm/dkm | Rdr |
| 1643–65 | | Copper standard | Initially bimetallic and later multi-currency standard | Dsm/dkm linked to plates, initially also to silver coins | Mark in silver coins, öre in silver coins, rdr, ducat, Palmstruch's credit notes |
| 1665–74 | | Silver standard | Multi-currency standard | Dsm/dkm linked to plates and öre courant | Carolin, rdr, ducat, Palmstruch's credit notes |
| 1674–81 | | Copper standard | Full metallic, multi-currency, copper and silver, standard | Dsm/dkm linked to plates | Öre courant, carolin, rdr, ducat |
| 1681–86 | | Silver standard | Full metallic, multi-currency, copper and silver, standard | Dsm/dkm linked to plates and öre courant | Carolin, rdr, ducat |
| 1686–1709 | | | Initially bimetallic copper and silver standard, later mono-metallic, silver standard | Dsm/dkm linked to öre courant and carolins, initially also plates | Rdr, ducat |
| 1709–16 | | Copper standard | Bimetallic, copper and silver, standard | Dsm/dkm linked to plates, öre courant and carolins | Rdr, ducat |

**Table 2.2 (cont.).** *Monetary standards in Sweden since the 12th century.*

| Period | 'Long-term standard' | 'Short-term standard' | | | |
|---|---|---|---|---|---|
| | | **Official monetary standard** | **De facto monetary standard** | **Main currency unit** | **Other currency units (on a floating market rate with the main unit)** |
| 1716–19 | Copper and silver standard linked to daler kopparmynt and daler silvermynt as units of account | Suspended copper specie standard | Fiat standard (multi-currency, fiat, copper and silver standard) | Dsm in token coins | Dsm in plates, Görtz' carolin, carolin, öre courant, rdr, ducat |
| 1719–45 | | Copper specie standard | Multi-currency, copper and silver, standard | Dsm/dkm linked to plates | Öre courant, carolin, rdr, ducat |
| 1745–66 | | Suspended copper specie standard | Fiat standard (multi-currency, fiat, copper and silver standard) | Dsm/dkm, officially in plates, de facto in notes | Öre courant, carolin, rdr, ducat |
| 1766–76 | | Silver standard | | Officially rdr specie, de facto notes in dsm/dkm | Öre courant, carolin, ducat |
| 1776–89 | Silver standard linked to riksdaler specie/ riksmynt | Silver specie standard | | Rdr specie | Ducat |
| 1789–1803 | | Silver specie standard (banco) | Fiat standard (multi-currency, fiat and silver specie standard) | Rdr riksgälds | Rdr banco, ducat |
| 1803–09 | | Silver specie standard | | Rdr banco/riksgälds | Ducat |
| 1809–34 | | Suspended silver standard | Fiat standard | | Rdr specie, ducat |
| 1834–55 | | Silver specie standard | | Rdr banco/riksgälds/ specie | Ducat |
| 1855–73 | | | | Rdr riksmynt | Ducat, carolin (gold) |
| 1873–14 | Gold standard linked to krona as a unit of account | Gold specie standard | | Krona | |
| 1914–1922/24 | | Suspended gold standard | Fiat standard | | |
| 1922/24–1931 | | Gold bullion standard (de facto from 1922, de jure from 1924) | | | |
| 1931–51 | | Suspended gold standard | Fiat standard | | |
| 1951–71 | | Gold exchange standard | | | |
| 1971– | Fiat standard (gold standard abandoned de jure in 1974, de facto in 1971) | | | | |

Sources: Fregert and Jonung (2003, p. 225), Jonung (2000, p. 19), and Wallroth (1918).
Abbreviations: d.s.m. – daler silvermynt, d.k.m. – daler kopparmynt, rdr – riksdaler
*Not a currency unit.

**Table 2.3.** *Exchange rates between Swedish currencies from the Middle Ages to the present.*

| Period | Official rates of conversion | Market rates |
|---|---|---|
| Before 1290 | 1 mark = 8 öre = 24 örtug = 192 penningar (Svealand) = 384 penningar (Götaland) | 1 mark silver = 2 or 3 to 4.56 mark penningar<br>1 mark gutnisk of somewhat lower value than the mainland Swedish mark |
| c. 1290–c. 1400 | 1 mark = 8 öre = 24 örtug = 192 penningar | 1 mark silver = 3 to 8 mark penningar (in proper coins) |
| c. 1400–c. 1450 | | 1 mark penningar = 1 to 4.5 mark gutniska<br>1 revalsk (Livonian artig) = 4 to 6 Swedish pennies<br>1 mark lödig = 6 to 11 mark penningar |
| c. 1450–1534 | 1 mark = 8 öre = 24 örtug = 192 penningar<br>From 1523 1 öre = 2 minted örtugs<br>1 mark dansk = 3 mark gutniska = ¾ mark svensk = 6 Swedish öre (1450-1550) | 1 mark lödig = 8 to 24 mark penningar (in proper coins) |
| 1534–60 | 1 mark = 8 öre = 192 penningar | 1 silver daler = 3 to 4.125 marks |
| 1560–76 | | 1 silver daler = 3.75 to 32 marks |
| 1576–89 | | 1 slagen daler = 4 to 4.5 marks |
| 1589–92 | | 1 slagen daler = 4.5 to 18 marks |
| 1592–1624 | 1 mark = 8 öre = 192 penningar<br>1 (svensk daler) = 4 mark<br>1 slagen daler/rdr = 4.5 marks in 1607–19 and 6.5 marks in 1619–33. | 1 slagen daler/rdr = 4.5 to 6.75 marks |

**Table 2.3 (cont.).** *Exchange rates between Swedish currencies from the Middle Ages to the present.*

| Period | Official rates of conversion | | | Market rates |
|---|---|---|---|---|
| 1624–33 | 1 daler = 4 marks = 32 öre | 1 öre in copper coins = 1 öre in silver coins<br>1 rdr = 6.5 marks | | 1 rdr = 6.5 to 17.5 marks in copper coins<br>1 rdr = 6.5 to 12.8 marks in öre silver coins<br>1 rdr = 6.5 to 8 marks in mark silver coins |
| 1633–43 | | 1 d.s.m. = 2 d.k.m.<br>1 rdr = 12 marks k.m. = 1.5 d.s.m. | | 1 rdr= 12 to 17.5 marks k.m. |
| 1643–65 | | 1 d.s.m. = 2.5 d.k.m.<br>1 rdr = 15 marks k.m. = 1.5 d.s.m. | | 1 rdr = 15 to 21.75 marks k.m.<br>1 öre in silver coins = 2.5 to 3 öre k.m.<br>1 daler carolin = 2.5 to 3 d.k.m. |
| 1665–81 | | 1 d.s.m. = 3 d.k.m. | 1 carolin = 16 öre s.m.<br>1 rdr = 19.5 marks k.m. = 1.625 d.s.m.<br>1 ducat = 100 öre s.m. ≈ 1.923 rdr | 1 rdr = 21 to 27.3 marks k.m.<br>1 öre courant = 3 to 3.5 öre k.m.<br>1 carolin = 16.5 to 20.8 öre s.m.<br>1 ducat = 40 to 54 marks k.m. = 1.92 to 2.06 rdr |
| 1681–86 | | | 1 carolin = 18 2/3 öre s.m.<br>1 rdr = 24 marks k.m. = 2 d.s.m.<br>1 ducat = 128 öre s.m. = 2 rdr | 1 rdr = 22.6 to 27.3 marks k.m.<br>1 öre courant = 3 to 3.1 öre k.m.<br>1 carolin = 18 2/3 to 20 öre s.m.<br>1 ducat = 48 to 52 marks k.m. = 1.91 to 2.08 rdr |
| 1686–1716 | | | 1 carolin = 20 öre s.m.<br>1 rdr = 24 marks k.m. = 2 d.s.m.<br>1 ducat = 128 öre s.m. = 2 rdr | 1 rdr = 24 to 27.1 marks k.m.<br>1 ducat = 47 to 60 marks k.m. = 1.88 to 2.29 rdr |
| 1716–19 | | | 1 carolin = 25 öre s.m.<br>1 görtz' carolin = 16 öre s.m.<br>1 rdr = 3 d.s.m. (1718–76)<br>1 ducat = 2 rdr | 1 d.s.m. in token coins = 0.5 to 1 d.s.m. in proper coins<br>1 rdr= 26 to 140 marks k.m.<br>1 ducat = 1.99 to 2.03 rdr |
| 1719–45 | | | | 1 rdr = 34 to 43 marks k.m.<br>1 öre courant = 3 to 3.4 öre k.m.<br>1 carolin = 25 to 31 öre s.m.<br>1 ducat = 68 to 90 marks k.m. = 1.97 to 2.06 rdr |
| 1745–76 | | | | 1 rdr = 38 to 108 marks k.m.<br>1 öre courant = 3.1 to 6.5 öre k.m.<br>1 carolin = 29.5 to 57.5 öre s.m.<br>1 ducat = 76 to 200 marks k.m. = 1.84 to 2.04 rdr |

**Table 2.3 (cont.).** *Exchange rates between Swedish currencies from the Middle Ages to the present.*

| Period | Official rates of conversion | | Market rates |
|---|---|---|---|
| 1777–89 | 1 rdr = 48 skillings<br>1 skilling = 12 run-stycken | 1 rdr = 72 marks k.m. = 6 d.s.m.<br>1 ducat = 94 skillings ≈ 1.958 rdr | |
| 1789–1803 | | 1 ducat = 94 skillings specie | 1 rdr banco = 1 to 1.67 rdr riksgälds |
| 1803–09 | | 1 rdr banco = 1.5 rdr riksgälds<br>1 ducat = 94 skillings specie | |
| 1809–34 | | 1 rdr banco = 1.5 rdr riksgälds<br>1 ducat = 94 skillings specie (102 skillings specie from 1830) | 1 rdr specie = 1 to 2 2/3 rdr banco |
| 1834–55 | 1 rdr specie = 2 2/3 rdr banco = 4 rdr riksgälds<br>1 ducat = 102 skillings specie | | |
| 1855–73 | 1 rdr riksmynt = 100 öre<br>1 rdr specie = 4 rdr riksgälds<br>1 ducat = 8.25 riksdaler riksmynt<br>1 carolin (gold) = 7.1 riksdaler riksmynt | | |
| 1873– | 1 krona = 100 öre | | |

Abbreviations: s.m. – silvermynt, k.m. – kopparmynt, d. – daler, rdr – riksdaler

## 2.6. Conclusions and summary

Monetary standards can be classified in various ways. A monetary standard refers to the objects that serve as the unit (or units) of account and that back the objects that are used as accepted means of payment. In this chapter, a distinction is made between a mono-currency standard, based on a single currency, and a multi-currency standard, based on several units of account that are not fixed in value relative to each other.

Under a commodity standard, the unit of account is backed by a fixed amount of a commodity, or by several commodities under a multi-commodity standard. In Sweden, gold, silver and copper have been used for this purpose. Under a monometallic standard, only one metal backs the unit of account. Under a bimetallic standard two different metals back the same unit of account, which therefore presupposes (according to a narrow definition) a fixed exchange rate between coin types made from the two metals. A parallel standard involves a fluctuating exchange rate between currencies made of different metals. Under a multi-currency standard, the market exchange rate between currencies of the same precious metal can fluctuate as well. Although Gresham's Law states that cheap money drives out dear money, one condition for that Law is a fixed exchange rate between the two. The existence of a premium on dear money allows it to remain in circulation alongside cheap money, which on numerous occasions in Swedish monetary history led to the formation of new currencies.

Under a fiat standard, the unit of account is some abstract value not linked to any commodity. The means of exchange consist of token coins or bank notes. While fiduciary money is convertible into specie or bullion, fiat money is not.

The difference between various monetary standards is not always clear-cut, and there is often a discrepancy between the official and the de facto monetary standard. Definitions of various monetary standards should not be applied too rigidly.

Up to 1624 Sweden was on a silver standard, with the mark as the main currency unit. In 1624–1776 a combined silver and copper standard was in place, with daler silvermynt and daler kopparmynt forming a common system of account, although a fiat standard was de facto in place in 1745–1776. In 1777 the sole silver standard was introduced, with the riksdaler as the main currency unit; this lasted only up to 1789 and was followed by a fiat standard with the riksdaler riksgälds as the main currency unit. The silver standard was reintroduced in 1803, was abandoned again in 1809 and reintroduced once more in 1834. In 1873 Sweden went from a silver to a gold (specie) standard. The krona replaced the riksdaler riksmynt as the main currency unit. Since the fall of the Bretton Woods system in 1971, Sweden has been on a pure fiat standard.

## Appendix A2: Historical money terms

This list presents various money terms that have historically been in use in Sweden (as well as in Finland up to the early 19th century). Some foreign currency units are also included that have been used as means of payment in Sweden. The main sources are Wallroth (1918), *Kulturhistoriskt lexikon för nordisk medeltid från vikingatid till reformationstid* (1956-1978), and Lagerqvist and Nathorst-Böös (1968). For other sources see footnotes and various chapters of this book.

**Abo:** A coin that circulated in Finland in the 15th century and was worth 4–6 penningar.[60] It was the same, or of equal value, as the Livonian artig (revalsk).

**Adolphin:** During the reign of Adolf Fredrik (1751–71) the term 'adolphin' was sometimes used instead of carolin, equal to two marks in minted silver coins. One 'dubbel adolphin' was two carolins.

**Albertustaler or Albertusdaalder:** A silver coin first minted in 1612 in the Spanish Netherlands, with a fine silver content of 24.65 grams. See korsdaler.

**Amsterdam rijksdaalder courant:** One of the most quoted foreign currencies in Sweden during the 17th, 18th and 19th centuries. It was equal to 2.5 guilders. On the 25th of December 1681 the gulden was set equal to 9.613 grams of fine silver (having been 10.28 grams in 1620–59 and 9.74 grams in 1660–81). In 1845 the fine silver content of one guilder was decreased to 9.45 grams fine silver.[61]

**Bondemark:** A currency unit in Finland in the 15th century, equal to 24 abo or ¾ mark örtug.[62]

**Carolin (early 17th century):** A round gold coin minted in 1606–24 with the face value of 16 marks. It contained 4.8524 grams fine silver.

**Carolin (1665–1776):** A term used officially from the mid-1660s to designate two marks in actual silver metal coins. In the period 1665–1776 one carolin had the unchanged fine silver content of 7.2228 grams. Another term for carolin was 'halv svensk daler' (half Swedish daler). During the reign of Fredrik I (1720–51) the term 'fredrik' and during the reign of Adolf Fredrik (1751–70) the term 'adolphin' were sometimes used instead of carolin. One carolin was officially equal to 16 öre silvermynt up to 1681, 18⅔ öre silvermynt in 1681–86, 20 öre silvermynt in 1686–1716 and 25 öre silvermynt in 1716–76, although the market exchange rate was often higher.

**Carolin (19th century):** A gold coin minted in 1868–72. One carolin was equal to 10 French francs (or units of the Latin Monetary Union) and to 7.1 riksdaler riksmynt. Its fine gold content was 2.9032 grams.

**Carolin (Görtz):** 'Görtzka caroliner' were minted in 1718. One of Görtz' carolins

60 *Kulturhistoriskt lexikon för nordisk medeltid från vikingatid till reformationstid* (1956-1978), 'Abo'.

61 See Chapter 5.

62 Hyötyniemi, (2000, p. 50).

was equal to 16 öre courant (the official value of one carolin before 1681), or 16/25 of one 'old' carolin.

**Christin:** 8-mark silver coin (later 4 carolins) that was minted in 1649 with the portrait of Queen Christina. It had the same face value as the later dukaton, although the christin had a higher fine silver content, namely 31.6997 grams.

**Daler:** A silver coin minted in Sweden from 1534 to imitate the German Joachimdaler. Up to 1776 (when the riksdaler became the main currency unit), this coin was not much used in domestic trade. Its fine silver content was stable throughout its existence; in 1534–36: 28.0593 grams, in 1537–41: 27.6245 grams, in 1542–1638: 25.5957 grams, in 1639–75: 25.2739 grams, in 1676–1830: 25.6973 grams and in 1831–73: 25.5045 grams. From the 1570s, 'daler' also came to refer to the unit of account, equal to 4 marks. To distinguish between these two types of daler, the silver daler was called 'slagen daler' (minted daler), later riksdaler, and the unit of account 'svensk daler' (Swedish daler). In the 17th century, several different counting systems arose based on daler silvermynt, daler kopparmynt, daler courant and daler carolin.

**Daler carolin:** A term used after the mid-1660s up to 1776, equal to 2 carolins or 4 marks in silver coins. Another term for daler carolin was 'svensk daler' (Swedish daler). One daler carolin was officially set equal to one daler silvermynt up to 1681, to 1 1/6 daler silvermynt in 1681–86, to 1.25 daler silvermynt in 1686–1716 and to 1 9/16 daler silvermynt in 1716–76, although the market exchange rate was often higher.

**Daler courant silvermynt:** Before 1777, the same as 32 öre courant. Officially one daler courant silvermynt was equal to one daler silvermynt, but in some periods the market rate was higher.

**Daler klippingmynt (1590s):** A term for 4 marks in debased klipping coins.[63] In the late 1592, one daler klippingmynt was set equal to ¼ daler in proper mark coins.

**Daler kopparmynt:** A unit of account that arose in the 17th century to distinguish it from daler silvermynt, although it formed the same system of account. 1 daler kopparmynt = 4 mark kopparmynt = 32 öre kopparmynt.

**Daler penningar (late 16th century):** The same as Swedish daler, equal to 4 marks.[64]

**Daler silvermynt:** A unit of account that arose in the 17th century to distinguish it from daler kopparmynt. In 1624, when the first copper coins were minted, one daler in copper coins was supposed to equal one daler in silver coins. However, the copper coins soon fell in value relative to silver coins. One daler silvermynt was equal to two daler kopparmynt in 1633–43, to 2.5 daler kopparmynt in 1643–65 and to 3 daler kopparmynt in 1665–1776. 1 daler silvermynt = 4 mark

63 Used, for example, in 1592 in *Stockholms stads tänkeböcker från år 1592*, part 1 (1939, pp. 70 and 90).

64 Used, for example, in 1596 in *Vadstena stads äldsta tänkeböcker 1577–1610* (1952, p. 226).

silvermynt = 32 öre silvermynt. Although the fixed relation between the daler silvermynt and daler kopparmynt was supposed to establish a fixed relation between silver and copper coins, in some periods there was a deviation between the two types of coin in the market, implying that actual silver coins did not follow daler silvermynt. 1 daler in actual silver coins was, therefore, termed daler courant or daler carolin. After 1776, daler silvermynt continued to be used as a term for 1/6 riksdaler or 8 skillings, and later for 12 skillings riksgälds.[65]

**Daler silvermynt in specie or daler silvermynt i vitt mynt:** Around the mid-17th century, a term for daler silvermynt when payment was made in actual silver coins. From the mid-1660s, the terms 'daler courant' and 'daler carolin' were used instead.

**Dubbel pjes (double pjes):** In 1739–76, a term for coins that were minted as 10 öre, but had the nominal value of 12 öre courant. Also called '12-styver'.

**Dubbel slant:** From the late 17th century the same as two öre silvermynt in copper coins. In 1777–1803 it had the nominal value of ½ skilling (banco).

**Ducat or florin:** First minted in Venice in 1285. A gold coin that was imported to, and from 1654 also minted in, Sweden. The fine gold content of one Swedish ducat was 3.3431 grams in 1654–64, 3.3966 grams in 1665–1835 and 3.4006 grams in 1836–68. One Swedish ducat was worth around two riksdaler (specie).

**Dukaton or dubbel svensk daler (double Swedish daler):** Coin with the face value of 4 carolins. It was minted in 1664–1704 and had the same face value as the earlier christin, although the dukaton had a lower fine silver content, namely 28.8985 grams.

**Engelot:** A gold coin minted in France and England (in England under the name of angel) that was imported to Sweden. In the 16th century it weighed 5.18 grams, but less after 1601. In 1541, one engelot was valued 7.5 marks.

**Engelsk or själländsk engelsk (English):** A Danish 3-penny coin (1/64 Danish mark), minted as an English sterling. It was common in Götaland in the early 15th century, and circulated then as 1/4 Swedish öre (6 Swedish penningar). It initially contained 0.66 grams fine silver (which was less than for the English sterling).

**Enkel daler:** In the 16th century the same as the silver daler.

**Enskilling:** In 1834–55 a copper coin with the nominal value of 2/3 skilling banco (= 1 skilling riksgälds).

**Enstyver:** In 1799–1855, a copper coin with the nominal value of 1/4 skilling riksgälds.

**Florin:** The same as ducat.

**Fredrik:** During the reign of Fredrik I (1720–51) the term 'fredrik' was sometimes used instead of carolin, equal to two marks in minted silver coins.

**Fyrk:** Equal to ¼ öre. Fyrks were minted in silver in 1523–1601 and in copper in

65 Talvio (1995, p. 205).

1624–60. Also called 'halvöre' (half öre), since from 1633 ½ öre in copper coins was set equal to ¼ öre in silver coins.

**Gammal örtug (old örtug):** The örtug minted before 1478. In the late 15th century a premium arose on 'gammal örtug': 1 'gammal örtug' = 9 penningar = 1.125 new örtugs in 1481; 1 'gammal örtug' = 10 penningar = 1.25 new örtugs around 1500; and 1 'gammal örtug' = ¾ öre = 1.5 new örtugs after 1523. The 'gammal örtug' was also minted in 1589–90 to the nominal value of ¾ öre.

**Gote or gute:** A coin minted in Gotland between 1320–40 and the mid-15th century, originally the Gotlandic örtug. In the 15th century, 1 öre gutnisk was set equal to 4 gote, so that 1 mark gutnisk = 32 gotar, but the relation 1 öre gutnisk = 3 gote is also known.

**Gros tournois:** A French silver coin that circulated widely in Sweden during the late 13th century and the first half of the 14th century, valued at 17–20 penningar. The gros tournois initially weighed 4.22 grams and had 23/24 fineness. Its weight and fineness were unchanged until 1322. After 1329, its weight changed frequently; the coin was no longer minted after 1364. The sterling was reckoned as one third of the gros tournois. [66]

**Gyllen (silver coin):** A currency unit in silver minted in the 1520s.

**Gyllen (gold coin):** The name of several gold coins that circulated in Sweden in the 15th, 16th and 17th centuries. It was supposed to have the same fine gold content as the florin or the ducat, but later the gyllen (gulden) was debased, and several types of gyllen coins circulated at various values. The 'rhensk gyllen' (Rhine gulden) had a lower fine gold content than the ducat and the 'lätte gyllen' (light gyllen) had an even lower content than the rhensk gyllen, whereas the 'ungersk gyllen' followed the ducat.[67]

**Halv carolin (1665-1776):** Half carolin, the same as one mark silver coin.

**Halvanstyver (one and a half styver) or bankovitten (19th century):** In 1802–55, the copper coin with the nominal value of ¼ skilling (banco). Equal in value to one and a half styver.

**Halvöre:** After 1633, the same as ½ öre kopparmynt.[68]

**Hamburger reichstaler banco:** The most quoted foreign currency in Sweden in the 18th and early 19th centuries. One Hamburger reichstaler banco was equal to 3 mark banco. In 1622, the fine silver content of one mark banco was 8.66 gram and of one reichstaler banco 25.98 grams, in accordance with the Leipzig convention establishing the reichstaler in 1566. From 1790 the issue rate of a reichstaler banco was 9.25 per mark of fine silver and the mark banco 27.75 per mark of fine silver. Since the mark of fine silver in Hamburg was equal to 233.855 grams, one reichstaler banco was the equivalent of 25.2816 grams fine silver. Although the

66 Spufford (1986, pp. 184–6).
67 Hildebrand (1983, pp. 910–1 and 947).
68 Stiernstedt (1863, pp. 61–2).

Hamburger reichstaler banco was often used as an equivalent for the riksdaler specie, the value of the Swedish riksdaler specie was normally somewhat higher.

**Hvid:** A Danish coin, minted from mid-14th to the late 17th centuries. Circulated in parts of Sweden in various periods. 1 hvid = 4 (Danish) penningar = 1/3 skilling. In 1451, the Danish hvid was set equal to 3 Swedish penningar. It was also used at that value (also called albus) when counting was done in mark danska (= 48 hvid).

**Joachimstaler:** Minted since 1518 in Joachimsthal in Bohemia. From 1534 the Joachimdaler was minted in Sweden and called daler, later slagen daler, riksdaler and riksdaler specie.

**Kopparrunstycke:** A term used from 1719 to 1776 (previously only runstycke) for coins with the face value of one öre kopparmynt that were minted from 1719 onwards.[69]

**Korsdaler:** Probably the same as the Albertustaler (kreutztaler). A coin with a slightly smaller silver content than the riksdaler that was imported to and quoted in the exchange rate markets in 17th century Sweden. In the mid-1660s, the legal value of one korsdaler was set to 50 öre silvermynt, which can be compared to 52 öre silvermynt for one riksdaler.[70]

**Kreutzer:** A copper coin minted by Swedish monarchs in the 17th century for circulation in Germany.

**Krona:** The currency unit introduced in Sweden in 1873 to replace the riksdaler when the Scandinavian Monetary Union was formed. One krona was set equal to one riksdaler riksmynt, but was linked to gold instead of silver. The fine gold content of one krona was 0.4032258 grams. The krona of Sweden, Norway and Denmark, respectively, were equal. After the Scandinavian Monetary Union was definitely abolished in 1924, the krona continued to be the currency unit of Sweden. During the Bretton Woods system, one US dollar was linked to gold at the rate of $35 per ounce or $1.12527 per gram. Sweden joined the Bretton Woods system in 1951.[71] Since one dollar stood at 5.17321 kronor, this would imply that the fine gold content of one krona during the Bretton Woods system was 0.17178 grams, i.e. half of the amount fixed in 1873. 1 krona = 100 öre. The international code is SEK.

**Krongyllen:** A gold coin minted in 1569–73 and 1598–99. One krongyllen was equal to 1.25 slagen daler and its fine gold content was 3.0395 grams.

**Mark (unit of account):** A unit of account used in Sweden up to 1776, equal to ¼ daler or 8 öre. During the 17th century, mark kopparmynt and mark silvermynt became two different units, although forming the same system of account.

**Mark danska:** A unit of account used in Sweden (mainly Götaland) around 1450–1550. In 1451, the official rate of the Danish hvid was fixed to 3 Swedish pen-

69 Stiernstedt (1863, p. 62).
70 Starbäck (1886, p. 563).
71 Ahlström and Carlsson (2006, p. 64).

ningar. Since one mark danska = 16 skillings = 48 hvider (or albus), one mark danska was equal to 144 Swedish penningar, i.e. 1 mark danska = 6 Swedish öre = ¾ mark svenska. This became purely a unit of account, and counting in mark danska was done in Swedish coins and not in actual Danish coins (i.e. one mark danska was not necessarily equal to one actual Danish mark). Another term was 'mark danska i svenskt mynt' (Danish marks in Swedish coins).

**Mark grossa:** Mark in Gotlandic 'grossa'.[72] Probably the same as mark gutnisk.

**Mark guld (mark in gold):** During the Middle Ages, the same as gold weighing one mark (around 210 grams, gross weight).

**Mark gutnisk:** The mark gutnisk was originally the mark of Gotland, which had its own monetary system in the 12th and 13th centuries. In the 13th century Gotlandic coins were also used as the main currency in Öland, Småland and Östergötland. In that century: 1 mark gutnisk = 24 örtug = 288 penningar. Some time before the 1340s, Gotland adopted the Hansaetic system, where one Gotlandic örtug or gote was set equal to 3 pennies of Lübeck or 6 Swedish penningar. According to one theory, the Gotlandic mark silver was the same as the mark of Lübeck counted in gotar, originally equal to 64 gotar or 2⅔ traditional Gotlandic marks.[73] In the early 14th century, 1 mark in Götaland was counted as 32 gotar (based on 1 gote = 6 penningar). Since gotar deteriorated in value, this mark, called tysk mark in the 1410s and mark gutnisk from the 1420s, came to be worth less than the mark örtug.[74] Mark gutnisk was worth only ½ mark örtug in the 1420s and early 1430s, and around ¼ mark örtug in the 1440s. Gotland is believed to have adopted the Danish monetary system in 1449, when the gote was replaced by the hvid (= 4 penningar = 1/16 skilling = 1/48 mark), but the old gotar continued to dominate circulation in Gotland and Götaland in the second half of the 15th century. After the mid-15th century the term 'mark gutnisk' probably referred to different types of currency. In the 1530s, in Götaland the mark gutnisk was used as a pure unit of account, equal to ¼ mark örtug or ⅓ mark dansk.

**Mark härdalsk:** A unit of account used in Härjedalen during the Middle Ages; it was probably the same as the mark jämtsk.

**Mark jämtsk:** A unit of account used in Jämtland and known from 1346 to the late Middle Ages, probably linked to Norwegian coins from the 14th century. In 1437, 1 mark jämtsk = 1 13/35 Swedish mark.

**Mark kalmarsk:** The same as mark stackota or mark gutnisk.

**Mark karlgill and köpgill:** These two mark currencies are mentioned in Upplandslagen, written in the late 13th century. 1 öre karlgill was equal to 12 penningar and 1 öre köpgill to 8 penningar. Mark karlgill has been interpreted as mark sil-

72 Sjögren (1944, p. 354).
73 Hyötyniemi (1999).
74 Hyötyniemi, (2000).

ver, which is unconvincing since one mark silver was valued at 3–4.5 mark penningar at the time when the Upplandslagen was written.

**Mark klipping (1570s):** Mark in debased klipping coins.[75] In 1575, one mark in proper coins was set equal to 6.5 marks in debased klipping coins. In 1576, one mark klipping was reduced to one öre (1/8 mark in proper coins).

**Mark klipping or klippingmynt (1590s):** Mark in debased klipping coins.[76] In late 1592, one mark in proper coins was set equal to 4 marks in debased klipping coins, and in May 1594 one mark klipping was further reduced to ¾ öre (0.09375 mark in proper coins).[77]

**Mark kopparmynt:** A unit of account that was never minted. 1 mark kopparmynt = 8 öre kopparmynt = ¼ daler kopparmynt. Foreign exchange rates were often quoted in mark kopparmynt. When the riksdaler was introduced as the main currency unit in 1777, it was set equal to 72 mark kopparmynt.

**Mark kölnisk (Cologne mark):** A silver weight unit used in large parts of Europe. Equal to 233.8 grams of silver in gross weight, although the fineness could vary.

**Mark lybsk:** Lübeck coins were particularly common in Götaland during the 14th and 15th centuries. 1 mark of Lübeck = 16 skilling = 48 Witten = 192 pennies. 1 mark of Lübeck circulated as 2 Swedish marks in the early 14th century, but deteriorated to 1 mark or somewhat above later during the century. The fine silver content of the mark of Lübeck, equal to 48 Witten, was 50–55 grams in the late 14th century; it was reduced to 46 grams in 1401, to 40 grams in 1411, to 28 grams in 1424, to 25 grams in 1433 and to 20 grams in 1461.

**Mark lödig:** The same as mark silver, a silver weight unit (as opposed to "mark penningar", which was a currency unit), used in the Middle Ages and the 16th century. The term 'mark lödig' is known from 1341 onwards. Before that, the term mark silver was used instead. In the 16th century it was equal to 210.616 grams of silver, although there is uncertainty concerning the fineness of this silver. Assuming that the fineness could vary between 85 and 95 percent, the mark lödig probably contained between 180 and 200 grams fine silver. Mark penningar depreciated continually relative to mark lödig during the Middle Ages.

**Mark penningar (mark in pennies):** A currency unit, in contrast to mark lödig. Up to the late 13th century, 1 mark penningar was equal to 192 penningar in Svealand, but to 384 penningar in Götaland. From the late 13th century, 1 'mark penningar' = 192 penningar in both Svealand and Götaland. The equivalent term 'mark örtug' was in use from the late 15th century onwards.

**Mark rigisk or revalsk:** The currency unit in Livonia, composed of present-day Estonia and Latvia (Reval was the Swedish and German name for Tallinn). In the 13th century the mark rigisk was equal to 24 artig of Riga. In the 14th century

75 Used, for example, in *Vadstena stads äldsta tänkeböcker 1577–1610* (1952, p. 98).

76 Used, for example, in 1592 in *Stockholms stads tänkeböcker från år 1592*, part 1 (1939, pp. 51 and 62).

77 *Stockholms stads tänkeböcker från år 1592*, part 1 (1939, p. 218).

another mark rigisk came into use, set equal to 144 artig, originally at par with the mark silver.[78] In the 1420s a third mark rigisk came into use, set equal to 36 old artig (or new schilling). The Riga way of counting in coins was common in Finland during the 15th and first half of the 16th centuries. In the 1520s and '30s, 1 'mark rigisk' = 9 öre in Swedish penningar. Probably also used as a unit of account for Swedish coins.[79]

**Mark silver (marcha argenti puri):** The same as mark lödig. Up to the 14th century the weight of mark silver could differ between regions. In Stockholm the weight was 209 grams, in Skara 215 grams and in Uppsala 218 grams.[80] The Danish mark silver was 3-4 percent heavier than the Stockholm weight. The term marcha argenti could also refer to units with a much lower fine silver content than the marcha argenti puri, although in Sweden the two terms were often used synonymously.

**Mark (silver coins):** Coins with this denomination were minted in Sweden in 1536–1755. From around 1660, the term carolin was used to refer to minted two-marks. The fine silver content of a minted one-mark coin was 8.854 grams in 1534–35, 8.2272 grams in 1536–40, 6.0176 grams in 1541–61, 5.8296 grams in 1562, 4.1371 grams in 1563–68, 2.0568 to 3.0852 grams from late 1568 to early 1571, 1.0284 grams from July 1571 to 1574/75, 6.0176 grams in 1576–89 (based on half-mark coins), 2.9971 grams from 1590 to early 1591, 0.6473 to 1.1753 grams from May 1591 to 1592, 4.2311 grams in early 1593, 6.399 grams in late 1593, 6.0522 grams in 1594–1603 (based on half-mark coins), 4.0503 grams in 1604–33, 3.9003 grams in 1634–38, 4.1297 grams in 1639–49, 3.9003 grams in 1649–63 and 3.6114 grams in 1664–1776. The one-mark coin was last minted in 1721, the two-mark coin in 1754 and the four-mark coin in 1755.

**Mark silvermynt:** A unit of account. 1 mark silvermynt = ¼ daler silvermynt = 8 öre silvermynt. Around the mid 17th century a difference in market value arose between the mark silvermynt as a unit of account and the mark silver coin, called 'halv carolin' (half carolin), even though their official values were the same up to 1681. The official value of a 'halv carolin' was raised to 1 1/6 mark silvermynt in 1681, to 1.25 mark silvermynt in 1686 and to 1 9/16 mark silvermynt in 1716.

**Mark skånsk:** The mark of Skåneland (Scania, Halland, Blekinge and Bornholm), which in the first half of 14th century was different from both the Danish and the Swedish mark. In this period, 1 mark skånsk was valued around 2 Danish marks and around 1.2 Swedish marks.[81] 1 mark skånsk = 240 penningar.

**Mark stackota:** A currency unit common in Götaland from the 1440s up to the late 15th century. There is evidence that the term was used as a synonym for mark

78 Hyötyniemi, (1999).
79 Hallenberg (1798, p. 233).
80 Hildebrand (1894, p. 757).
81 See Chapter 3.

gutnisk, but some authors argue that the mark stackota was the traditional Gotlandic mark, equal to 24 gotar or ¾ mark gutnisk.[82]

**Mark sterling:** In the 13th and 14th centuries, the same as one mark silver in sterling coins. In 1272, one mark sterling was counted as 144 sterling coins, which contained 193 gram fine silver. In 1267 one mark sterling in Cologne weight was counted as 160 sterlings, which, in turn, was equal to two thirds of a pound sterling.[83]

**Mark svenska (Swedish mark):** Could refer to two different coins in the 15th and 16th centuries: (1) The same as mark örtug used in Sweden, as distinguished from mark dansk, gutnisk and jämtsk. (2) The same as mark danska in Swedish coins, and hence equal to ¾ mark örtug. Another term was 'mark danska i svenskt mynt'.[84]

**Mark stockholmsk or holmsk:** The same as mark örtug.[85]

**Mark västgötsk:** The same as mark stackota or mark gutnisk.

**Mark örtug:** The same as mark penningar.

**Mark östgötsk:** The same as mark stackota or mark gutnisk.

**Myntsedel (coin note):** Inconvertible notes issued in 1716 and 1717 with face values of 25, 10 and 5 daler silvermynt. These notes never circulated as widely as 'mynttecken' (coin tokens).

**Mynttecken (coin tokens) or nödmynt (emergency coins):** The coin tokens issued in 1716–19 at the face value of one daler silvermynt (except for the last coin token, 'Hoppet', issued at the face value of two öre silvermynt in 1719). A premium arose on proper coins relative the coin tokens.

**Noble:** An English gold coin imported to Sweden in the late Middle Ages and the 16th century. Its weight was 7.78 grams from 1354 and 7 grams from 1412. From 1464 the 'rosenobel' was minted, weighing 7.78 grams, the same as the noble before 1412. In the second half of the 15th century, 1 noble was worth 3–4 mark örtug.[86]

**Palmstruchska kreditivsedlar (Palmstruch's credit notes):** Initially convertible notes issued in 1661–64 by Stockholm Banco (forerunner of Sveriges Riksbank); the first banknotes in Europe in a proper sense. They were made inconvertible in 1664 and fell below their par values. After 1667 the notes were exchanged at their full nominal values.

**Penning (Swedish penny):** A currency unit from the Middle Ages to 1776. Up to the late 13th century, in Svealand 1 penning = 1/192 marks, in Götaland 1 penning = 1/384 marks (i.e. 1 Svealand penning = 2 Götaland penningar), and in

82 Hyötyniemi (2000).

83 See Chapter 3.

84 Hallenberg (1798, pp. 35–6).

85 Used, for example, in *Stockholms stads tänkebok under vasatiden*, part 1, 1524–1529 (1915, pp. 82, 107 and 110).

86 See Chapter 3.

Gotland (and eastern Götaland) 1 penning = 1/288 Gotlandic marks (≈ 1 Götaland penning). From the late 13th century, 1 penning = 1/192 marks in both Svealand and Götaland (but not Gotland). The penning was not minted after the 16th century, but continued to exist as a unit of account up to 1776.

**Penning bla/blå:** A monetary term used in Västergötland in the mid-12th century. The penning bla was most likely a foreign coin. According to one theory the term referred to a silver penny minted by the house of Blois in France, weighing 1.36 gram.[87]

**Pjes/pjäs or enkel pjes:** In 1719–76 a term for the silver coin that was minted as 5 öre (up to 1684 minted as 4 öre) but had the nominal value of 6 öre courant. It was also called 'sexstyver' and 'tolförestycke'. Its fine silver content was 1.5601 grams.

**Plåt (plate):** After 1715, two daler silvermynt in copper plates (later also 6 daler kopparmynt in notes). Before 1715, the term riksdalerplåt was used.[88] After 1776, the term referred to 16 skillings (since 2 daler silvermynt = 1/3 riksdaler = 16 skillings), and later to 24 skillings riksgälds.[89]

**Plåtmynt (plate coin):** Copper coins minted as plates weighing between 0.378 and 19.7 kg and accepted as means of payment 1644–1776. They were denominated in daler silvermynt.

**Pound sterling:** The quoted currency unit for the exchange rate on London. One pound sterling was equal to 20 shillings or 240 pence. The fine silver content of one pound sterling (if counted in pennies) was reduced from 321.1 to 319.7 grams in 1278, and was further reduced to 308.4 grams in 1335, to 291.1 grams in 1344, 259 grams in 1351, 215.8 grams in 1412, 172.6 grams in 1465, 153.4 grams in 1524, 143.9 grams in 1542, 115.1 in 1552, 111.4 grams in 1601, and 104.6 grams in 1816. Britain went over to the gold standard in 1816. The gold content of the sovereign was fixed at 7.32 grams.[90]

**Portugalös:** The Swedish term for portuguezen, a gold coin. Some were minted during the reign of Johan III (1568–92). One Swedish portugalös weighed 34.4 grams and was set equal to 10 ducats or 4 rosenobel.

**Reichstaler:** The later term for the joachimthaler in Germany. The standard was introduced in 1566 by the Leipzig convention, which set the reichstaler as a coin containing 1/9 of a Cologne mark silver. In 1754, the Reichstaler was replaced by the Conventionsthaler, containing 1/10 of a Cologne mark silver.

**Revalsk or räflisk (Livonian artig):** The coins of Livonia that dominated circulation in Finland during the 15th century. The artig, minted from 1343, was initially valued at 3 pennies of Lübeck or 6 Swedish penningar. In the 15th century, 1 revalsk was valued at 4–6 Swedish penningar. In the early 15th century, the

87 Bjurling (1950).
88 Stiernstedt (1863, p. 62).
89 Talvio (1995, p. 205).
90 See Chapter 5.

term 'revalsk örtug' was also common; by the 16th century it had been replaced by the term 'rigisk skilling'.

**Rhensk gyllen (Rhinish gulden):** A gold coin imported to Sweden during the Middle Ages and the 16th century. Its fine gold content decreased from 3.4 grams in the late 14th century to 2.53 grams in the late 15th century. In the second half of the 15th century and the early 16th century 1 rhensk gyllen was valued around 1.5 mark örtug or 2 mark danska.[91] In 1533, 1 rhensk gyllen = 2/3 ungersk gyllen = 4/5 Joachimthaler.

**Riksdaler:** From the late 16th century the term used for the silver daler ('slagen daler'), in contrast to the Swedish daler, which was used as a unit of account and was equal to 4 marks. Later on the riksdaler could also denote other types of currency.

**Riksdaler banco:** In 1777–1809 the Riksbank notes were convertible into riksdaler specie and therefore linked to a fixed silver content. In 1809 the banco notes were made inconvertible and the riksdaler banco started to fall in value relative to the riksdaler specie. In 1834, the riksdaler banco (which in 1803 had been set equal to 1.5 riksdaler riksgälds) was fixed in value so that 1 riksdaler banco = 3/8 riksdaler specie.

**Riksdaler carolin:** The same as 3 carolins or 6 marks in silver coins. In 1633–65 the official value of one riksdaler was 6 marks or 48 öre in actual silver coins. The riksdaler counted in actual mark silver coins was termed 'riksdaler carolin', in actual öre silver coins 'riksdaler courant' and in actual riksdaler coins 'riksdaler specie'. The market value of the riksdaler specie rose and in 1665 its official value was set equal to 6.5 marks or 52 öre silvermynt. The counting of riksdaler in 6 marks in silver coins, riksdaler carolin, remained, but had a lower value than the riksdaler specie. When the carolin was appreciated in 1681 relative to öre courant, the official value of riksdaler carolin became higher than of the riksdaler courant. After 1665, one riksdaler carolin had the unchanged fine silver content of 21.6684 grams.

**Riksdaler courant:** In the 17th century equal to 48 öre courant, which towards the end of the century was the same as 48 öre silvermynt. In the 18th century it became a pure unit of account equal to 1.5 daler silvermynt (48 öre silvermynt). Up to 1681, 3 carolins were officially equal in value to 48 öre courant. However, in 1681 carolins appreciated relative to öre courant. From then on the riksdaler courant was probably not the same as the riksdaler carolin, although further investigation is needed on this issue.

**Riksdaler riksgälds:** A war with Russia led to the formation of the Riksgäldskontoret (National Debt Office), which started to issue riksgälds notes in 1789. These notes became inconvertible and soon dominated trade, replacing the Riksbank

91 See Chapter 3.

(banco) notes. Riksdaler rikgälds fell in value relative to riksdaler banco. In 1803 the relation 1 riksdaler riksgälds = 2/3 riksdaler banco was fixed.

**Riksdaler riksmynt:** The main currency unit in 1855–73. Replaced riksdaler riksgälds at the same face value. 1 riksdaler riksmynt = 100 öre = ¼ riksdaler specie.

**Riksdaler specie:** The riksdaler with a stable fine silver content of 25.3-25.7 grams. The term was already being used in the first half of the 17th century. See daler.

**Riksdalerplåt:** In 1681–1715 a term for the copper plates with a nominal value of two daler silvermynt. In 1681, the official value of the riksdaler was set equal to two daler silvermynt. In 1715 copper plates were revalued by 50 percent, and in 1718 the official value of one riksdaler was set equal to 3 daler silvermynt. From 1715 the term 'plåt' was used for two daler silvermynt in copper plates, and later for Riksbank notes of 6 daler kopparmynt.

**Rosenobel:** A gold coin imported to Sweden, above all in the 16th century, weighing 7.78 grams. A double rosenobel (set equal to ½ portugalös or 5 ducats) was minted in Sweden during the reign of Johan III (1568–92) and weighed 15.3 grams.

**Runstycke (before 1777):** A term used from the early 1630s for one öre in copper coins,[92] while one öre in silver coins was termed (h)vitrunstycke. From 1719, the term kopparrunstycke was used.

**Runstycke (1777–1855):** 1/12 skilling. Coincided in value with the kopparrunstycke or öre kopparmynt of the currency system before 1777 (since 1 riksdaler = 6 daler silvermynt = 576 öre kopparmynt according to the conversion rate from old to new currency and 1 riksdaler = 48 skillings = 576 runstycken according to the new currency system of 1777).

**Räknedaler:** Daler that began to be used in the 1570s as a unit of account, in contrast to the silver daler.

**Sessling or sexling:** From the mid-1660s the same as the copper coin with the designated value of 1/6 öre silvermynt. From the early 1680s the term 'halvöre' (half öre) was used instead, since 1/6 öre silvermynt = ½ öre kopparmynt.

**Sexskilling:** In 1849–55, a term for the copper coin with a nominal value of 4 skillings banco (= 6 skillings riksgälds).

**Sexstyver (18th century):** In 1719–76 the same as pjes.

**Sexstyver (19th century):** In 1802–55, a term for the copper coin with a nominal value of one skilling banco.

**Skilling:** Introduced in 1777, when the riksdaler became the main currency unit in Sweden. 1 riksdaler = 48 skillings and 1 skilling = 12 runstycken. Later a difference arose between skilling banco, riksgälds and specie.

**Skilling banco:** 1 riksdaler banco = 48 riksdaler banco. From 1803, 1 skilling banco = 1.5 skilling riksgälds.

**Skilling (Danish):** 1 skilling = 1/16 mark = 3 hvids. A currency unit also used in

92 Stiernstedt (1863, p. 61), and Hayes (2001 [1740], p. 337).

parts of Sweden (mainly Götaland) around 1450–1550, where 1 Danish skilling = 1/16 mark danska = 3/64 mark svenska = 3/8 Swedish öre.

**Skilling riksgälds:** Equal to 1/48 riksdaler riksgälds.

**Skilling specie:** Equal to 1/48 riksdaler specie. This was rather a unit of account; no coins were ever minted in this denomination.

**Skilling svenska penningar (skilling Swedish penningar):** A term used before 1550 when accounting was done in mark danska in Götaland. There were no Swedish skilling coins in this period. Neither was payment made in Danish skillings (i.e. one 'skilling svenska pengar' was not necessarily equal to one skilling in actual Danish coins); it was purely an accounting system based on Swedish coins. One 'skilling svenska penningar' was equal to 1/16 mark danska, 3/64 mark örtug or 3/8 Swedish öre.

**Slant:** From the mid-1660s the same as the copper coin with the designated value of one öre silvermynt. In 1777–1803 it had a nominal value of ¼ skilling (banco), since in 1777 1 riksdaler = 48 skillings was exchanged for 192 öre silvermynt (6 daler silvermynt). Another term was 'enkel slant'.

**Styver (from the late 1710s to 1776):** The same as one öre courant.[93]

**Styver (1777–1855):** A term for skilling coins, where one styver was initially equal to ¼ skilling (banco),[94] and later (from around 1800) ¼ skilling riksgälds or 1/6 skilling banco. This custom arose since the old copper coins continued to circulate in 1777–1803 at the nominal value of ¼ skilling (banco) per one öre silvermynt. The term styver was usurped by the coins in skilling riksgälds that were minted from 1799 onwards.

**Svensk daler (Swedish daler):** A unit of account used from the 1570s to designate 4 marks in silver coins, in contrast to slagen daler, which fluctuated in value relative to the minted mark coins. Later the term 'svensk daler' referred to two carolins.

**Tjugostyver (twenty styver):** The name for 10 öre after 1855. The value of 'tjugostyver' from 1855 onwards was somewhat less than the value before that of 20 styver, which was equal to 5 skilling riksgälds or 10/96 riksdaler riksgälds.

**Tolvörestycke (twelve-öre piece):** The same as pjes. Up to 1684, these coins were minted as 4 öre (from 1690 as 5 öre), which initially had the nominal value of 12 öre kopparmynt (since one öre silvermynt = 3 öre kopparmynt).[95] In 1717 the nominal value of this coin was increased to 6 öre silvermynt.

**Tolvskilling (twelve-skilling):** From 1834 the same as 1/16 riksdaler specie (since 1 riksdaler specie = 192 skillings riksgälds in 1834–55). After 1855, a term for 25 öre (since 1 riksdaler specie = 400 öre).

**Treskilling (three-skilling):** In 1834–55 a term for the copper coin with a nominal value of 2 skillings banco (= 3 skillings riksgälds).

93 Stiernstedt (1863, p. 62).
94 Talvio (1995, p. 205).
95 Stiernstedt (1863, p. 62).

**Tvåstyver (two-styver):** In 1799–1855, a term for the copper coin with a nominal value of ½ skilling riksgälds.

**Trestyver (three-styver):** In 1802–55, a term for the copper coin with a nominal value of ½ skilling banco.

**Tysk mark:** In the 1410s in Götaland, the name for the mark counted as 32 gotar. From the 1420, the term mark gutnisk was used instead.

**Tunna guld (barrel of gold):** A unit of account for larger sums of money, a term borrowed from Germany.[96] First used in the late 16th century. Equal to 100,000 daler silvermynt, originally 100,000 silver daler. Since the daler silvermynt fell in value relative to the riksdaler, one tunna guld expressed in riksdaler fell over time. In 1777 it was equal to 16,666⅓ riksdaler specie (since one riksdaler specie was exchanged for 6 daler silvermynt), and in the 19th century the same as 16,666⅓ riksdaler banco (from 1834 equal to 6250 riksdaler specie). Although the term gives the impression of a specific weight of gold, the amount of gold that one tunna guld could buy fell over time: it could buy around 200 kg gold in the late 16th century, 28–29 kg gold in 1777 and around 10 kg gold in 1834.

**Ungersk gyllen (Hungarian gulden):** A gold coin that was imported as well as minted in 1568–73. One ungersk gyllen minted in Sweden was valued at 1.5 slagen daler and its fine gold content was 4.1245 grams. Internationally the coin was equal to one ducat, but in Sweden the minted ungersk gyllen had a higher fine gold content and was, therefore, not equal to one ducat.

**Vit penning or Witten (white penny):** A German 4-penny coin (1/48 mark of Lübeck) that was common in Götaland in the late 14th and early 15th centuries. In this period it circulated as 1/3 Swedish öre (= 1 örtug = 8 penningar).

**Vitrunstycke:** A term used in 1633–1776 for one öre courant.[97]

**Vitten:** Before 1777 a term for one öre silvermynt, in 1777–1855 for ¼ skilling (riksgälds from 1799) in copper (since in 1777, 1 riksdaler = 48 skillings was exchanged for 192 öre silvermynt), and in 1855–73 for ½ öre in bronze.

**Åbo-mark:** A currency unit used in Finland during the 15th century, equal to the Swedish mark but counted in coins of Riga (usually 32–48 revalska).

**Öre (from 1855 onwards):** The öre unit was reintroduced in 1855, although it only shared the name with the old öre. 1 riksdaler riksmynt (from 1873, 1 krona) = 100 öre. For comparison, while in 1777 one riksdaler specie was exchanged for 576 öre kopparmynt, in 1855 one riksdaler specie was set equal to 400 öre.

**Öre (up to 1776):** In the Middle Ages one öre was equal to 1/8 mark and 3 örtug. From the 1290s, 1 öre = 24 penningar in both Svealand and Götaland, but not in Gotland. In the 17th century a difference arose between öre silvermynt, öre kopparmynt and öre courant. The öre was abolished as a currency unit on the 1st of January 1777.

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96 *Nordisk Familjebok* (1892). See also Heckscher (1941, p. 11).

97 Stiernstedt (1863, p. 61), and Hayes (2001 [1740], p. 337).

**Öre courant:** The term for öre in actual silver coins. In some periods, for example 1686–1715, one öre courant was equal to one öre silvermynt, but in other periods there was a premium on öre courant.

**Öre kopparmynt:** A unit of account in 1633–1776. 1 öre kopparmynt = 1/8 mark kopparmynt = 1/32 daler kopparmynt.

**Öre silvermynt:** A unit of account in 1633–1776. 1 öre silvermynt = 1/8 mark silvermynt = 1/32 daler silvermynt. In 1624, when the first copper coins were minted, one öre in copper coins was supposed to be equal to one öre in silver coins. However, one öre minted in copper soon fell in value relative to one öre minted in silver. One öre silvermynt was set equal to 2 öre kopparmynt in 1633–43, to 2.5 öre kopparmynt in 1643–65 and to 3 öre kopparmynt in 1665–1776.

**Örtug:** A currency unit in Sweden in the Middle Ages and the 16th century. As a unit of account, 1 örtug = 1/3 öre = 1/24 mark. In 1523, the fine silver content of the öre was reduced, and thereafter 1 minted örtug = ½ öre. In 1589–90, the 'gammal örtug' was minted to the value of ¾ öre (in proper coins). This was also the last time örtugs were minted in Sweden. The örtug continued to exist during the 16th century as a unit of account (1 mark = 24 örtugs), which became different from the minted örtug. Furthermore, one 'mark dansk' (used in Götaland as a unit of account around 1450–1550) was also divisible into 24 örtugs. Therefore, the örtugs of the two different systems of account in Götaland and Svealand were different (hence, around 1450–1550, one öre was equal to 3 örtugs in Svealand, but to 4 örtugs in Götaland).[98]

98 Hallenberg (1798, p. 175).

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# 3.
# Swedish Payment Systems 995–1534[1]

**Rodney Edvinsson, Bo Franzén and Johan Söderberg**

## 3.1. Introduction

In principle, a market economy could be based on barter – a simple exchange of commodities and services for other commodities or services (i.e. goods). But it is difficult to imagine a sizeable market in the absence of money. Money was, of course, a commodity just like other goods initially, but it has the property of being acceptable as payment for almost all other goods. This property makes it much easier for a buyer and a seller to conclude a deal, at least when people have confidence in the monetary system. In a pre-industrial society such a general trust may exist if the pennies are roughly of the same size and carry the same quantity of intrinsic value. During the Swedish Middle Ages this intrinsic value consisted of silver in the pennies.

In times of monetary stability, medieval pence could readily be used as units of account (price tags) when goods needed to be valued, making exchange even easier. Some people believe that price stability is a modern idea, but many a medieval source makes it clear that keeping money stable was considered to be an important virtue for the regent.[2] In Sweden, as in other European countries, there were periods of stable money that helped market exchange to flourish, as well as periods of royal counterfeiting and economic decline. Many medieval economic problems can be attributed to the swings between stability (trust) and money debasement (distrust).

In Sweden, the basic currency unit during the Middle Ages was the mark, which existed up to 1776. There was a difference between the silver mark and 'mark penningar' (the mark in pennies). A silver mark was a weight measure, while the mark penningar was the currency unit. In the Middle Ages, the mark penningar was a unit of account. It was not until the 16th century that a coin was minted with the value of one mark penningar.

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1 We want to thank especially Lars O. Lagerqvist and Cecilia von Heijne for comments on this chapter.

2 Spufford (2000, p. 59), and Franzén (2006, p. 66).

When discussing the medieval payment system in Sweden it is also important to problematise the concept of Sweden. The boundaries of Sweden changed during the Middle Ages and they differed from what they are today. Finland was conquered in the 12th and 13th centuries. Scania (Skåne), Blekinge and Halland in the south belonged to Denmark for most of the Middle Ages, apart from a brief period in the 14th century (Scania was part of Sweden in 1332–66). Gotland in the Baltic Sea belonged to Sweden up to the 1360s, when it was lost to Denmark. During the 14th century there were several personal unions between Nordic countries, for example between Sweden and Norway in 1319–55 and 1362-63. They eventually lead up to the Kalmar Union, which is a term for a series of personal unions between Sweden (including Finland), Denmark and Norway in 1397–1523, although technically the countries did not relinquish their sovereignty. The Union split into two parts – Denmark-Norway and Sweden (including Finland) – in the early 1520s. There were also important differences within the borders of the Swedish realm, reflecting a feudal decentralisation of the monetary system.

## 3.2. Coins, Cash and Credit in Medieval Sweden

The first Swedish coins were made in the town of Sigtuna on Lake Mälar (north of present-day Stockholm), probably in the year 995,[3] and at roughly the same time in Norway. Those coins were minted in as pure silver as was possible a thousand years ago and they were produced by a Christian king in surroundings that were still rather pagan. But since the mint die prototype was of Anglo-Saxon origin, the monarch depicted on the pennies was the English king Ethelred, not the Swedish king Olof Skötkonung. This early minting occurred at the end of what we today call the Viking Age. In neighbouring Denmark, minting had already been practiced on and off since the 820s. But unlike the more advanced Denmark and Norway, Sweden discontinued minting sometime in the 1030s. This is indeed an economically puzzling lacuna that lasted for more than a century. The Viking Age, with its networks of international exchange, came to an end in the middle of the 11th century; together with other signs of diminishing external trade, one is tempted to see this long interruption in Swedish minting as part of a period of economic stagnation.[4]

We do not have a single written contemporary record that mentions the Sigtuna pennies. Thus, we do not know how (or even whether) they were tallied. In fact we do not know if they were used at all in market transactions. The first minted coins played just a marginal role, and circulating silver was completely dominated by foreign coins.[5] When minting restarted in the 12th century, it did so in the southern parts of the realm. That is to say, first on the island of Gotland in the 1140s and in the province of Västergötland (West Gothland) in the 1150s (Geatish pennies).

3 Lagerqvist (1970, p. 16).
4 Heckscher (1941, pp. 65–6).
5 Jonsson (1995).

*A model of Birka, a Viking town 1200 years ago, at the Museum of National Antiquities in Stockholm. Birka in Lake Mälar was established in the 8th century and became an important international trading port. As far as we know, no Swedish coins were minted at that time but foreign coins, mostly Arabic, circulated widely.*

These two kinds of new penny were very different in appearance from the Sigtuna coins and were (up to roughly the year 1300) sometimes minted on one side only. What is more, the appearance of the new Swedish pennies varied according to where in the kingdom they were minted, reflecting that European society was characterised by political and economic decentralisation, including the introduction of monetary systems that were based on local institutions, rather than on institutions of a centralised monarchy.

A *provincially based monetary system* had already been introduced in the late 1020s in Denmark, when Cnut the Great abandoned his uniform money for the whole of Denmark in favour of two monetary systems – for the eastern and western parts of the country, respectively. German patterns may have inspired the Danish king,[6] and such a decentralized monetary structure was to become a characteristic sign of the *feudal system*. The Danish and Scanian marks were still valued differently in the 14th century (see Table A3.3).[7] Later, Sweden became a typical feudal example with more than one monetary system in use well up to the early 16th century. Not only did the different pennies in Sweden have different intrinsic values, they were also tallied in different ways.[8]

6 Hybel and Poulsen (2007, p. 327).
7 Hybel and Poulsen (2007, p. 333).
8 Klackenberg (1992, pp. 180–1), and Jonsson (2002, p. 46)

*Silver coins and other silver objects from the late Iron Age.*
*Photo: Gabriel Hildebrand/Museum of National Antiquities (in Stockholm).*

Up to at least the end of the 13th century, five different types of penny were minted inside what are Sweden's borders today and each type was tallied in its own way. There were Geatish pennies, Svealand pennies, Gotlandic pennies, Scanian pennies and pennies from the county of Jämtland. The last two types of penny were part of Danish and Norwegian minting, respectively, while the first two types – Geatish and Svealand pennies – were united into a single mainland monetary system, Swedish pennies, sometime around the year 1300. Gotlandic pennies have been found in many places round the Baltic Sea and played an important role in the south-eastern part of mainland Sweden up to at least the 1260s,[9] but also later in the 15th century.

Thus, up to the late 13th century there were regional variations in the currency system. The following relation: 1 mark = 8 öre = 24 örtug, held everywhere in Sweden. However, while one mark was equal to 192 Swedish pennies or penning (plural: penningar) in Svealand, in Götaland/Geatland/Gothland (mainly in Värmland, Dalsland and Västergötland) it equalled 384 penning (i.e. 1 penning of Svealand = 2 penning of Götaland) and in Gotland it equalled 288 penning (the coins of Gotland also circulated in Öland, Småland and Östergötland). What is now the south of

9 Klackenberg (1992, p. 183).

Sweden (Skåne, Blekinge and Halland) belonged to the Danish system, where initially one örtug was equal to 10–12 penning.[10]

When the Swedish mainland got the same currency system around 1300, the Svealand system was adopted, i.e. 1 mark = 192 penning also in Götaland. This transition to a common monetary system was part of the state formation process. However, Gotland (which Denmark conquered in the 1360s) retained its own system.[11] The Gotlandic mark (mark gutnisk) was of the same or lower value than the Swedish mainland mark (see Table A3.2).[12] From 1340 a coin of higher denomination called gote was minted in Gotland.

Initially, the division into mark, örtug and penning was a common Nordic system. In the 14th century Denmark and Norway adopted the German system, where 1 mark = 16 skilling = 192 pennies. Gotland and Götaland adopted the Danish counting system from around 1450.[13]

All through the Middle Ages (as well as later) foreign coins were also in use in Sweden. This phenomenon can be seen as a typical feudal trait. One use of foreign money was for trade in export harbours such as Stockholm and Kalmar or cross-border trade in the regions that were close to Norway and Denmark. Thus, Danish and German coins were often in use in the forested province of Småland.[14] Foreign money was also in use when the domestic coin was debased (see below) and when the Crown for one reason or another ceased to mint, as seems to have been the case in Sweden in several years around 1400.[15]

There are many examples of exchange rates on foreign coins. The most frequently mentioned up to the mid-14th century were English and French silver coins. In Denmark in 1332–52, the gros tournois functioned more or less as an official norm for the monetary system.[16] After 1350, German coins and various foreign gold coins came to play a larger role. No gold coins were minted in Sweden during the Middle Ages.

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The Swedish pennies have not left many traces in the written sources from the mid-12th up to the mid-13th century. This silence, together with the fact that the coins – like their Viking Age forerunner – were still made of almost pure silver, raises the question of how they were used in an economic context. Contemporary sources mention that pennies were weighed out, indicating that they were treated as bullion

10 Hildebrand (1894, vol. I:2, p. 773).
11 Franzén (2006, p. 40).
12 Franzén (2006, pp. 156–8).
13 Jonsson and Östergren (1998) and Hallenberg (1798).
14 Klackenberg (1992, pp. 183–4).
15 Hildebrand (1894, vol. I:2, p. 842), and SDhk 16586.
16 Fauerholdt Jensen (1990, p. 16).

rather than money (including foreign coins).[17] In the second half of the 13th century the production of coins increased in the realm, and references in the sources indicate that they were in regular use in the expanding markets. Archaeological evidence suggests that at the turn of the 14th century money was commonly used not only among aristocrats and burghers, but also among peasants in the countryside. Only the far-northern part of Sweden, with its populated river valleys, was still outside this modernization.[18]

There was undoubtedly a trend towards using more and more money in economic transactions in Sweden. This tendency was intensified during the Late Middle Ages (1350–1527), albeit with periods of severe monetary setbacks. From the mid-13th century – even earlier on the island of Gotland[19] – the trend in Sweden was for new coins to have less and less intrinsic value; in other words, Swedish pennies included more and more copper at the expense of their silver content. This was not confined to Sweden. The same phenomenon is clearly evident in the more advanced regions in western Europe. Older coins with a higher intrinsic value were melted down or tallied in a higher nominal than the new coins.[20]

Under such circumstances – when a coin's debasement was characterized by transparency – it was a modernizing step (towards today's money, which has no intrinsic value). Another point to note is the importance of money in the special function of *legal tender,* that is, when the regent accepts his coins as payment of taxes. Such a benevolent royal attitude can be seen as a way of raising the market value of money and helping trade to expand.

This was clearly the case during long periods in the Middle Ages, but there were times when a fiat type of money appeared. This was not uncommon in states of crisis, such as during wars and outbreaks of the plague, or simply as a result of royal incompetence. In the 1350s, 1360s, 1510s and early 1520s emergency coins, consisting almost entirely of copper, were minted in Sweden. Archaeological finds have shown that several types were covered with a thin layer of silver in an attempt to make them look much more precious than they really were.[21] Such a swindle could possibly result in large profits for the Crown, but not for long. The disclosure of such a fraud severely undermined confidence in the monetary system.

Goods other than coins were also used for transactions in medieval Sweden. Primitive barter, where one good was simply exchanged for another good, was still practiced in Sweden but there was also an exchange of goods against goods in the markets that were part of what we might call a *monetarised economy*. Since money is just one good among other goods (see above), it was often not possible for a buyer to provide the seller with coins. But medieval man created several witty methods of solving this

17 Klackenberg (1992, p. 185).
18 Klackenberg (1992, p. 179).
19 Myrberg (2008, p. 181).
20 Hildebrand (1894, vol. I:2, p. 936), and Franzén (1998, p. 222).
21 Malmer (1980, p. 58), and Franzén (2006, pp. 77–8).

problem. One was the construction of credit institutions such as pawns and guarantors. Another was to use goods other than money as if they were money, so called *intermediary goods*.[22] In fact, intermediary goods can be regarded as money if they are valued in monetary terms. Silver spoons and iron are two examples of popular substitutes for coins and they were often given a price tag in monetary terms when used as cash or credits (pledges) in the markets.[23] Charters that can be described as mortgage deeds expressed in monetary terms are known from as early as the second half of the 13th century (when real property was pawned).[24] *All in all, payments in ready money, in mints, were an exception rather than a rule in medieval economic transactions.*

## 3.3. The exchange rate between mark penningar and mark lödig

For the 16th century, the gross weight of one silver mark (*mark lödig*) is generally assumed to have been 210.616 grams of silver, which amounted to 9/10ths of the Cologne mark (233.8 grams). Up to the 14th century, it was not uncommon for purchases of land and other relatively large transactions to be made in silver marks, that is, in weighed silver. The fact that the payment was in weighed silver was sometimes explicitly recorded.[25]

Payment could also be in weighed gold; this was not rare in early transactions. In what may be the earliest recorded purchase of any kind in Sweden, King Knut announced that he had exchanged one of his farms for landed property in the province of Södermanland owned by a monastery. In this transaction, which took place some time between 1167 and 1185, the monks also paid 12 marks in gold.[26] Another early document, from the province of Småland, records the purchase of fishing water by the Nydala monastery for three marks in gold. This transaction was confirmed by the King in about 1192.[27] Payment in weighed gold became less common after the mid-13th century.

Due to successive debasement of the coin, the mark penningar deteriorated relative to the silver mark during the Middle Ages, from 1:3 in the second half of the 13th century to 1:16 in the late 1510s.[28] As mentioned above, no mark coins were minted until the 16th century.

The term 'mark lödig' is known from 1341 onwards. Before that the Latin term 'marchas argenti puri' (mark pure silver) was commonly used. Although we know roughly how much silver these terms referred to, there is some uncertainty about the

22 Heckscher (1941, pp. 45–6).
23 Franzén (1998, pp. 257–261).
24 Franzén (2006, pp. 50–1).
25 See, e.g., SDhk 761, and Hildebrand (1894, vol. I:2, pp. 938–9).
26 SDhk 214.
27 SDhk 268. See also SDhk 287.
28 Hildebrand (1894, p. 933) and Thordeman (1936, p. 92).

*A scale from the late Iron Age. Various medieval monetary units – such as mark, öre, örtug and penning – developed from weight measures with the same names.*
*Photo: Museum of National Antiquities (in Stockholm)*

gross weight, the fineness and whether it was minted or unminted silver. During the Middle Ages there seems to have been a shift in the meaning of this term. Mark lödig came to denote a gross weight rather than (almost) pure silver.[29]

During the early Middle Ages the mark silver, which was a common Scandinavian measure, probably varied somewhat between regions. According to Hans Hildebrand, the mark was 209 grams in Stockholm, 215 grams in Skara and 218 grams in Uppsala.[30]

One uncertainty concerns the purity of mark lödig or marchas argenti puri. Chemically pure silver was not available before modern times. The maximum purity of silver in the Middle Ages was probably 95–96 per cent. If the silver mark contained only 85–95 per cent pure silver, its fine silver content would then be only 180–205 grams.[31] To complicate matters, the term mark silver (Latin: marcha argenti) could differ in meaning from marcha argenti puri and refer to a significantly lower unit of value[32] (for example, the mark silver of Riga and Gotland in the 14th

29 *KHL*, 'mark'.
30 Hildebrand (1894, p. 757).
31 *KHL*, 'mark'.
32 Hyötyniemi (1999, p. 8).

century, discussed below). In Sweden, however, the term mark silver (marcha argenti) was mostly synonymous with marcha argenti puri.[33]

In 1272, a source from Forsheda in Småland counted the mark silver or mark sterling as 144 sterling coins. Since the fine silver content of the sterling was 1.338 grams,[34] this mark silver contained 193 grams fine silver. In another source, from Lübeck in 1267, the mark sterling is counted as 160 sterlings (see Table A3.7). From these two sources it can be established that the Swedish mark silver or mark sterling was 90 percent of the mark sterling used in Lübeck, which is exactly the relation between mark lödig and the Cologne mark in the 16th century. However, this determination of the mark silver is not consistent with all sources. Moreover, the exchange rate in Sweden probably differed from that abroad.

In 1282, the Vatican put the Swedish silver mark as equal to 0.8532934 marks of Troy weight, which in turn was valued 160 sterlings, implying that the Swedish mark silver was set equal to only 136.5 sterlings or 182 grams fine silver in sterling coins (1.332 grams fine silver per sterling). According to the same source, the Danish mark silver was 4 per cent larger than the Swedish.[35]

In 1334, 1 mark silver was set equal to 5 marks penningar, and 15 marks penningar to 160 gros tournois (see Table A3.6).[36] Since the fine silver content of 1 gros tournois was 3.6 grams, the relation would imply that 1 mark silver contained 192 grams fine silver in gros tournois.

Brita Malmer shows that the fine silver content of the penning-coins in the early 14th century was 0.21 grams for group Kr H Ä I and 0.23 grams for group E H L S.[37] The exchange rate for the mark silver in the early 14th century was in the range 1:4.5 – 1:5. Assuming that the lighter coins, group Kr H Ä I, circulated at the exchange rate of 1:5, that would imply that 1 mark silver was equivalent to around 200 grams pure silver, or 210 grams silver of 95–96 per cent fineness.[38]

While during the 13th century and the first half of the 14th century the mark silver probably referred to minted silver of close to 90–95 per cent purity with a gross weight of 210–220 grams, in the 15th century the term mark lödig probably referred to unminted silver, which could be somewhat less pure. The value of unminted silver was lower than that of minted domestic coins in the late 14th and early 15th centuries (see Figure 3.2), i.e. free minting must have been restricted in one way or another, increasing the seignorage rate. Although Hans Forssell argues that in 15th century Lübeck the fine silver was of 98 to 99.5 per cent purity,[39] i.e. as fine as silver could

33 For an example, see SDhk 2506.

34 Lindert (2006).

35 SDhk 1207. See also Fauerholdt Jensen (1990, pp. 32 and 81).

36 See also Franzén (2006, p. 157, table 5:5).

37 Malmer (1980, pp. 15-19 and 242).

38 The coins containing a larger amount of silver, belonging to group E H L S, must have circulated at a somewhat better exchange rate than 1:5, since assuming such a rate for these coins implies that the mark silver contained 220 grams pure silver, which seems rather unlikely.

39 Forssell (1872, p. 35).

be made at that time, the Swedish mark lödig probably referred to silver of much lower purity. In 1479, goldsmiths were obliged to use silver of 14.5/16 (90.625 per cent) fineness (16 so-called lod = 100 per cent pure silver). In Västerås in 1524, a document refers to the mark lödig of 14/16 fineness (87.5 per cent pure silver), and in 1523 the melting of one mark lödig showed that its silver was of 13.75/16 fineness (85.9375 per cent pure silver).[40]

In accordance with these sources, the assumption in the present study is that the silver mark was of 15/16 fineness up to 1350 and then linearly decreased to 14.5/16 fineness in 1479 and to 14/16 fineness in 1524. This implies that the silver mark contained 197 grams fine silver in 1350, 191 grams in 1479 and 184 grams in 1524 (see Table A3.1).

In 1375–1400, the mark lödig was valued around 6 mark örtug, which contained around 150 grams fine silver in örtug coins. In 1420–40, the exchange rate of the mark lödig was quite stable at around 8.25 marks örtug, which contained around 170-175 grams fine silver in örtug coins.[41] In 1528, 1 mark lödig was worth around 20 marks örtug, which contained 177 grams fine silver in öre coins.[42] This implies that örtug coins usually circulated significantly above their intrinsic metal value.

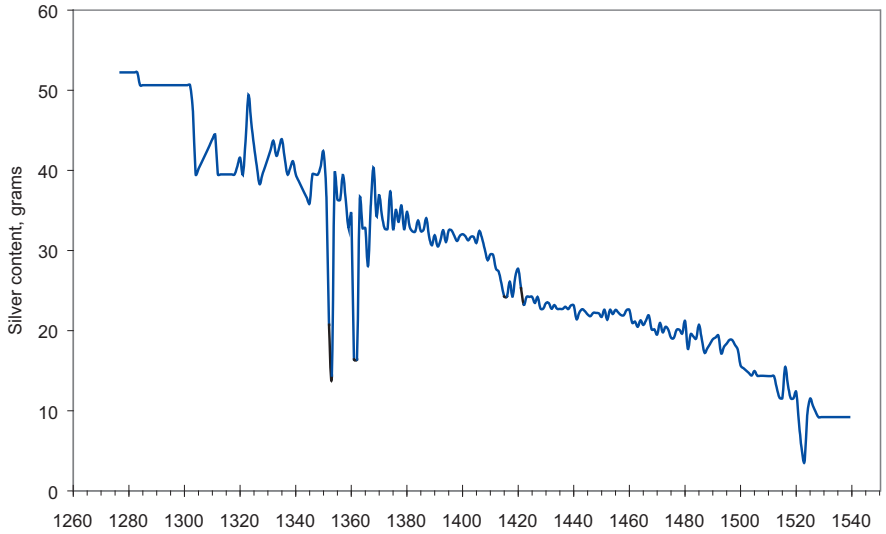
During the late Middle Ages many foreign silver coins seem to have circulated at a lower value per unit of silver than the domestic coins, or at roughly the same value as unminted silver, a clear difference with the situation in the early Middle Ages. For example in 1460, 1 mark lödig was worth around 7.7 marks of Lübeck, which contained around 180 grams fine silver. In 1484, 1 mark lödig was worth around 10 marks of Lübeck, which contained around 200 grams fine silver.[43]

From the late 13th century, the downward trend in the fine silver content of the mark penningar was practically continuous and particularly notable in three periods: the decades around 1300, the early 15th century and the early 16th century. In addition, temporary dips occurred in the 1350s, 1360s and early 1520s. These periods of debasement were characterized by war and civil strife, presumably pressing the rulers to use less silver in the coins.

Figure 3.1 describes the fine silver equivalent of one mark penningar in 1277–1539. By the latter date, the mark penningar held only one tenth of the amount of silver it had contained in the late 13th century. The graph is based on around 800 quotations stating the value of the mark penningar relative to the silver mark. With the exception of land prices, this is probably the densest economic series available for medieval Sweden. The large number of quotations indicates the importance that was attached to documenting the relationship between mark silver and mark penningar in economic transactions. Most of these transactions concern sales of landed prop-

40 *KHL*, 'mark'.
41 Thordeman (1936, p. 39), and Table A3.1.
42 Wallroth (1918, p. 19).
43 Forssell (1872, p. 35).

**Figure 3.1.** *Silver equivalence (grams) of one Swedish mark (mark penningar), 1277–1539, based on the exchange rate on mark silver (mark lödig).*




Source: Table A3.1.

erty, which of course represented relatively large sums of money at the time. The annual values are found in Table A3.1.

Specifying the exchange rate of the mark penningar relative to the silver mark eliminates one source of uncertainty in economic transactions. The seller was assured that he/she would not receive payment in debased money, and the buyer could be confident that there could be no future claims for payment.

## 3.4. Exchange rates in the 12th and 13th centuries

The second half of the 12th century and the 13th century (mainly the latter) saw a monetarisation of the economy. While coins played hardly any role in the life of an ordinary peasant around the year 1200, a century later this was no longer the case.[44] A large part of the economy had been monetarised, even though barter still dominated exchange.

The silver coins that circulated up to the 12th century were not fully monetary objects.[45] They had to be weighed and were worth just their value as silver metal.

44 Klackenberg (1992), and Holmberg (1995, p. 64).
45 Klackenberg (1992, p. 185).

They were not distinct from other silver objects.[46] These coins served as a medium of exchange, but only in limited contexts (i.e. they were only special-purpose money).[47] In contrast, in the more developed parts of Europe (Western and Central Europe) the coins were counted since their face value was guaranteed by the ruler. As late as in the second half of the 13th century, a payment of 20 marks silver was made by weighing up pennies of Sweden and Gotland,[48] although there are also examples of Swedish coins being counted from this century.

The earliest evidence of exchange rates refers to the last decades of the 13th century. Petter Dijkman wrote in 1686 that he had access to old sales documents stating that 1 mark silver was worth 3 mark penningar in the years 1277–83, 1289 and 1298.[49] For 1335 and 1350, he puts the exchange rate at 1:4.5. The sales documents from 1277–89 no longer exist, but it is quite likely that Dijkman did have access to documents that have now been lost. Dijkman was careful only to use direct sources as evidence of early exchange rates. The exchange rates he reports from the 1290s onwards are confirmed by other sources that still exist. For the period 1277–82, the Vatican valued 1 mark in Troy weight at 5.344 Swedish mark penningar, and (as mentioned above) 1 Swedish mark silver at 0.8532934 marks of Troy weight, implying: 1 Swedish mark silver = 4.56 Swedish marks penningar.[50] In 1291, two different sources valued the mark silver at 3 and 4.25 marks penningar, respectively.[51] Another source sets the value of 1 mark penningar at 10.2 gros tournois in 1291, implying that the fine silver content of 1 mark penningar was just 41 grams (see Table A3.6). Assuming that 1 mark silver contained 197 grams fine silver, this would entail an exchange rate of 1:4.8 between mark silver and mark penningar in 1291. Thus both Dijkman's and the Vatican's exchange rates for the 1270s and 1280s were still prevalent in the early 1290s.

The large differences in exchange rates in the late 13th century were most likely due to the parallel circulation of older and newer pennies that contained different amounts of fine silver. By the early 14th century, the older higher-valued coins had been withdrawn from circulation.

No written sources seem to exist on the exchange rate before the 1270s. Opinions about the development of the exchange rate between mark silver and mark penningar during the course of the 12th and 13th centuries fall into two main categories.

46 See Spufford (1988, p. 67). Stanley Jevons (1875, ch. Ix) describes this as a 'system of currency by weight'. He also points out that such a system was practiced in his own time (the 19th century). He writes: 'In all large international transactions, again, currency by weight is the sole method. The regulations of a state concerning its legal tender have no validity beyond its own frontiers; and as all coins are subject to more or less wear and uncertainty of weight, they are received only for the actual weight of metal they are estimated to contain.'

47 Thurborg (1989).

48 SDhk 761.

49 Dijkman (1686, pp. 78-79).

50 SDhk 1207. See also Fauerholdt Jensen (1990, pp. 81 and 85).

51 Franzén (2006, p. 294).

Some researchers, for example Hildebrand and Bengt Thordeman, assume that the mark penningar was equal to the silver mark in the 12th century, when minting was resumed in Sweden, and the beginning of the 13th century.[52] This view presupposes successive debasements during the 12th and 13th centuries. The other view is that there was no such equivalence in the 12th century.

Brita Malmer argues that the deterioration in the value of mark penningar took the form of decreasing fineness rather than a reduction of the coin's weight. This is logical since a decrease in weight is easier to detect than a decrease in fineness. A decrease in fineness can be observed during the course of the Middle Ages, while the weight of the Swedish pennies remained stable. While the gross weight of Swedish coins was unchanged during the 13th century, their fineness decreased by around 15–20 per cent.[53]

To argue for equivalence between mark silver and mark penningar in the 12th century, Thordeman has to assume that the 12th century coins were ¼ penning coins. However, it is also likely that the relation between mark silver and the mark in penning coins was initially adjusted to international conditions. In Denmark, the relation between mark silver and mark penningar was 1:2 to 1:3 (see Table A3.3). It is entirely possible that this was also the relation in Sweden when minting was resumed in the 12th century. This is consistent with evidence that the intrinsic metal value of Swedish coins did not decrease substantially during the course of the 12th and 13th centuries and that the relation 1:3 can be confirmed by written sources in the late 13th century.

The provincial law of Uppland, confirmed by the King in 1296, mentions two different mark currencies: mark karlgill and mark köpgild. 1 öre karlgill was equal to 12 penning and 1 öre köpgild to 8 penning. Mark karlgill has been interpreted as mark silver, implying that the exchange rate between mark silver and mark penningar was 1:1.5 not long before the Uppland law had been written. Dovring argues quite convincingly that this is unlikely considering the much larger value difference between mark silver and mark penningar in this period.[54] The existence of a better mark, not equal to the marcha argenti puri, alongside the mark in common circulation was a frequent phenomenon during the Middle Ages (not least as a safeguard against the deteriorated currency). For example, in Norway the term mark forngild was used in the 14th century and had the same value as the 13th century mark in pennies.[55] In late 13th century Sweden, the exchange rate of mark silver for mark penningar varied from 1:3 to 1:4.5 (both exchange rates are confirmed by written sources, as mentioned above), i.e. the ratio between the lowest and the highest rates was the same as between mark karlgild and mark köpgild. During the Middle Ages it was not unusual for various fines (more fixed in time) to be paid in better currency,

52 Hildebrand (1894, vol I:2, p. 933), and Thordeman (1936).
53 Malmer (1980), and Hemmingsson (2005).
54 KHL, 'mark', and Dovring (1951).
55 Hyötyniemi (1999, p. 8).

while market transactions (which were more variable) were allowed to be made in the deteriorated currency; the latter occurred, for example, in Götaland during the 1410s when the debased Gotlandic coins drove out the better Swedish mainland coins (see below).[56]

## 3.5. The debasement cycles of the 14th century

In Sweden, periods of high inflation caused by debasement cycles are not documented prior to the 16th century but there are certain indications that debasement cycles did occur earlier. Most notably in the 1350s and 1360s (following the Black Death), the fine silver content of minted coins decreased substantially.

A Swedish coin is mentioned in 1358 that was reduced to one-third of its value against the Norwegian coin, whereas it had recently been at par with the latter. In Kalmar, 1,919 mark penningar were minted in inferior coins in 1361–3 and 785 mark penningar in better coins in 1364–5.[57] Hence it is possible that two debasement cycles occurred, one in the 1350s and the other in the early 1360s. Another source relates that the payment of Peter's pence in 1356–62 was made in a coin that was 'bad, and of no or inferior value'. When the peasants in 1363 wanted to pay the tax to the Pope in the same bad coins, the tax collectors refused to accept a coin that had been withdrawn from circulation.[58] A better coin was introduced in that year.

Bengt Thordeman and Brita Malmer have studied two different types of penning: ME II:1 (Th XX) and ME II:2 (Th XXI), which were minted at end of the reign of King Magnus IV Ericson (1319–64).[59] Both were substantially debased compared to earlier coins. While the fine silver content of the one penning coin minted during the 1340s (ME I:2 or Th XIX) is, on average, 0.22 grams (implying that 1 mark penningar contained 42 grams of fine silver), the fine silver content of ME II:1 varies between 0.02 and 0.17 grams and of ME II: 2 between 0.05 and 0.1 grams. Assuming that both ME II: 1 and ME II: 2 were one penning coins, 1 mark penningar of ME II: 1 contained 4 to 33 grams of fine silver, while 1 mark of ME II: 2 contained 10 to 19 grams of fine silver.

Thordeman concludes that ME II: 1 and ME II: 2 were, in fact, half-penning coins. However, Malmer disagrees; the very large variation in the fine silver content of ME II: 1 rather indicates a gradual deterioration of the coin, which is typical for a debasement cycle (for example, during the 16th century in Sweden). According to Malmer, an ME II: 1 coin had a fine silver content that at its highest, 0.17 grams, was 20–25 per cent less than that of the previously minted 1-penning coins, and therefore it could not have been a half-penning-coin.

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56 See footnote 102.

57 Golabiewski Lannby (1995, pp. 93–4), Rasmusson, (1943, p. 271), Hildebrand (1894, vol. I:2, p. 935), and SDhk 8633.

58 Hildebrand (1894, vol. I:2, pp. 830–1).

59 Malmer (1980, pp. 22–3), and Thordeman (1936, pp. 33–4).

*A minted örtug from Åbo in Finland in the second half of the 14th century; it contained around one gram of fine silver. At that time, one örtug was a male unskilled labourer's pay for around four hours' work in Stockholm (its equivalent in the late 1990s would be a 500-kronor note). It could buy around 0.9 kg of butter or four litres of beer.*
*Photo: The Royal Coin Cabinet, Stockholm.*

The circulation of the worst coins would imply a tenfold increase in prices, assuming that prices followed debasement. However, prices are missing for several years.[60] Although direct exchange rates between mark silver and mark penningar are missing for the years when the deterioration in value most likely took place (1352–3 and 1361–2), there are two notations on foreign coins. Using cross exchange rates, these two notations provide information about the value of mark silver in mark penningar. The two quotations show that the exchange rate deteriorated substantially, although not as much as the decrease in the fine silver content of the most debased coins.

In March 1351, one mark silver in Cologne weight was still valued at 6 marks penningar (i.e. 1 mark silver in Swedish weight = 5.4 marks penningar).[61] In July 1353, 50 Flemish marks groschen were valued at as much as 950 marks penningar, i.e. 1 Flemish mark groschen = 19 marks penningar.[62] The mark groschen was equal to 120 groschen or ½ pound groschen. In 1353, 1 mark groschen was valued at 6.2882 gold florins or 3.875 marks of Lübeck.[63] Since the mark silver was usually worth 4.5 gold florins[64] or 45 schillinge of Lübeck, this would imply that in 1353, 1 mark silver was valued at 13.6 or 13.8 marks penningar, 13.7 being the average. This

60 Franzén (2006, pp. 77 and 232).
61 Fritz and Bäärnhielm (1990, no. 759).
62 SDhk 6594.
63 Spufford (1986, pp. 215 and 227).
64 In 1363, 1000 marks silver in Cologne weight were valued at 5000 gold florins, i.e. 1 mark silver Swedish weight = 4.5 florins. See Fritz and Bäärnhielm (1990, no. 1295).

exchange rate is consistent with the notation that the debased coins were later reduced to one-third of their nominal value.

Papal sources show that a new coin was introduced on February 22nd 1354 and they clearly distinguish between coins collected before and after that date. The old coin was collected throughout the period 1351–3, which shows that the debased coins could have been in circulation during that time.[65] The new coin must have been a better one, since in both 1355 and 1356, one mark silver in Cologne weight was valued at 6 marks penningar (i.e. 1 mark silver Stockholm weight = 5.4 marks penningar).[66]

Sources from 1352 and 1353 refer to mark penningar as paid in either proper coins (prompta pecunia) or common coins now in circulation (vsualis monete nunc currentis), which shows that older, better coins probably circulated at a premium alongside debased coins.

In December 1361, the fee to Vadstena monastery was set at ½ penny of Lübeck or at one or several Swedish pennies, depending on the current value of the coins ('pro qualitate monete tunc currentis').[67] During the stable currency, 1 Swedish penny was equal to ½ penny of Lübeck. This example clearly shows that various coins circulated at quite different exchange rates, and that 1 mark silver was valued at maybe between 5.5 (since 1 mark silver was worth around 2.75 marks of Lübeck) and 10–20 marks penningar, depending on the rate.

The only price quotation from when the debasements took place (1352–3 and 1361–2) is for copper in 1361, when copper was valued at 50 marks per ship pound,[68] the highest notation in the whole of the Middle Ages. By way of comparison, in 1366–7 copper was sold for 25 marks per ship pound and in 1333 for 10 marks per ship pound. Assuming that the exchange rate between mark lödig and mark penningar stabilised at 1:6 after 1363, the price of copper in 1361 indicates an exchange rate of (at least) 1:12.

The newer coins that circulated during the reign of Albert of Sweden (1363–89) had a lower fine silver content than the better coins which circulated before the mid-14th century. During this period the örtug was struck as a coin for the first time, copying the German Witten.[69] Earlier the örtug had existed only as a unit of account equal to 8 penning. Its fine silver content was 1.05 grams, implying that the fine silver content of 1 mark penningar had decreased to just 25 grams,[70] a decline of around 60 per cent since the first half of the 14th century. However, the exchange rate of the mark silver in mark penningar decreased by only around 20 per cent from the level in the first half of the 14th century, an indication that coins circulated at a

65 Fritz and Bäärnhielm (1990, no. 909), and SDhk 6799.
66 Fritz and Bäärnhielm (1990, no. 952 and 969).
67 Fritz and Bäärnhielm (1990 no. 1243).
68 SDhk 8007.
69 Malmer (1980, p. 33).
70 Thordeman (1936, p. 90).

value significantly above their intrinsic metal content, allowing a substantial increase in the seignorage rate.

## 3.6. The gold:silver exchange rate

Silver and gold were both considered to be scarce in Sweden. In the early 1320s, papal emissaries reported that the money they had collected in Sweden had to be kept in the form of the domestic currency, since the scarcity of gold and silver prevented its swift exchange. Some of the money had been transformed into useful things ('res utiles'), such as horses.[71]

Foreign gold coins were readily accepted in Sweden. The florin (Latin: floreni), the Florentine gold coin with a weight of 3.53 grams, began to be minted in 1252 and quickly became the dominant international trading coin. It is mentioned in Swedish sources from the end of the 13th century and appears frequently during the 14th century, especially in connection with the activities of papal emissaries.[72] During the 15th century, use of the Florentine florin seems to have declined in Sweden; it was partly replaced by the Hungarian florin, which held the same weight and fineness as its Italian counterpart.[73]

*A florin from 1347.*
Source: Wikipedia, 'Italian coin florin'.

71 Fritz and Bäärnhielm (1990, no 37).

72 The earliest mention in Sweden appears to be in a letter from 1297 which records a payment of 500 florins by the archbishop at Uppsala; SDhk 1760.

73 Hildebrand (1894, vol. I:2, pp. 906 and 911).

*Hungarian florin struck in 1353–7.*
Source: Wikipedia, 'Guilder'.

English gold coins were in frequent use in Sweden during the 15th century. The large coins, nobles, minted during the reign of Edward III, were particularly popular.

*A noble, minted in London in 1354–5. The obverse (left) depicts the king standing in a ship.*
Source: Wikipedia, 'Noble (English coin)'.

During the latter part of the 15th century, nobles were increasingly replaced by German gyllen or gulden. These coins were minted in several parts of Germany. The

most widely used type in Sweden was the Rhinish gulden (Latin: floreni rinenses; Swedish: rhensk gyllen). As these coins became widespread during the late 15th and early 16th centuries, it became more common to specify the exchange rate between mark penningar and the Rhinish gulden, rather than the rate of the domestic coin to the silver mark.[74]

*A Rhinish gulden from Mainz, minted between 1399 and 1402.*
Source: Wikipedia, 'Guilder'.

The earliest information on the exchange rate between gold and silver (the bimetallic ratio) dates from the first part of the 13th century, when the provincial law of Västergötland stipulated that the price for freeing a slave should be 2 öre in gold or 2 marks in silver.[75] Since 8 öre made 1 mark, this amounts to a gold:silver exchange rate of 1:8. However, there is no information as to whether or not this rate was used in actual transactions.

In large parts of Europe, between 1250 and 1330 the gold:silver ratio rose from about 1:9 to 1:15. After about 1330, the ratio in Continental Europe and England declined to between 1:10 and 1:11 at the time of the Black Death, reaching a minimum in the early 15th century. During the course of the 15th century, gold became more scarce, and the bimetallic ratio rose somewhat. In central and southern Europe it often fell to between 1:11 and 1:12 during the latter half of the 15th century.[76] There are, however, some areas where the relative price of silver was higher. In northern Germany, Hamburg often exhibits higher gold:silver ratios. During the latter

74 Hildebrand (1894, vol. I:2, p. 910).
75 Hildebrand (1894, vol. I:2, p. 948).
76 Day (1978, pp. 34, 40), and Spufford (1986, pp. lxi, lxiii).

half of the 15th century the average was about 1:12, fluctuating between 1:10 and 1:15.[77]

Bimetallic ratios can be calculated for Sweden if the specie contents of mark penningar and foreign gold coins are known, as well as the exchange rates of these coins. For the period 1328–1534 we have found over 100 exchange rate quotations between various gold coins and Swedish mark penningar. Based on the value of florins (see Table A3.11), it appears that the bimetallic ratio in Sweden was remarkably high around 1330 (at 1:15 to 1:18) and went into a long-term decline thereafter.

For a long time, Swedish exchange rates were rather favourable for owners of foreign gold coins. Compared to most European bimetallic ratios, the amount of silver that had to be paid for minted gold in Sweden was high, at least up to the mid-15th century. This may reflect the confidence and status that were associated with the foreign coins, which for long periods held a constant weight of gold.

The value of gold coins could fluctuate significantly. Obviously, contemporaries did not always agree about exchange rates, which were set in a local context. High costs of information and transport may have contributed to a considerable disparity in exchange rates, which could also have been affected by variability in the age and specie content of the coins. The term 'florin', for example, does not necessarily refer to the original Florentine coin since florins were copied at many places in Europe, with varying specie content. Wear and tear of the individual coins was no doubt also taken into account in transactions.

This suggests a lack of monetary integration, which is not unexpected, given that the Hanseatic area was a rather backward economic zone compared to highly developed regions such as the Netherlands. A recent study reveals that money markets between Lübeck and Prussia were not well integrated in the 14th and 15th centuries.[78] Sweden could be expected to be a peripheral region of the Hanseatic area.

Gold always had to be imported to Sweden, pushing its price up. Little is known about how gold flowed into Sweden but international trade was clearly a major source. In 1369, for example, Edward III of England allowed a London burgher to send 200 pounds in gold or silver in order to buy herring in Scania (which was then part of Denmark).[79] Churches in Sweden were prominent buyers of expensive goblets and other gold objects, nearly all of which were melted down at the time of the Reformation around 1530, or even earlier. Much of the gold came from the Low Countries.[80]

Bringing gold to Sweden, then, would normally require sea transport. A major risk associated with maritime transports was piracy. Pirates were a serious threat to trade in the Baltic area during several medieval periods. One example is Eric XIII (Erik of Pomerania), who turned to piracy after he was deposed as king of the Nordic

77 Volckart (2007, p. 51).
78 Volckart and Wolf (2006, pp. 123–4).
79 SDhk 9491.
80 Rasmusson (1962, pp. 177–81), and Källström (1939).

countries in 1439. Based on a fortress on the island of Gotland, he successfully raided many ships. In 1446, he lost a ship off the province of Småland carrying a valuable cargo of gold and silver, as well as other costly goods, that had been collected as taxes in Sweden. Baltic piracy was still a problem at the end of the Middle Ages.[81]

Transporting money, as well as other valuables, by land could also be rather risky. The papal emissaries to Sweden faced these dangers when they had to transport and protect the large sums of money they collected in the form of taxes and contributions. On one occasion in 1328, the emissaries sent a monk, escorted by twelve armed horsemen, to fetch a sizeable sum of money that had been deposited at the towns of Uppsala and Strängnäs. Despite his escort, he did not dare to take the money further than to the monastery of Riseberga in the province of Närke, about 80 kilometres from Strängnäs, where it was left on the advice of the bishop of Strängnäs. Later, the emissaries and the bishop sent an escort of 40 horses to collect the money that had been left at Riseberga. The treasure was further transported to the town of Lödöse on Sweden's west coast. During this journey, the risk of ambush made the emissaries drive their horses so hard that the animals were injured and had to be sold at a substantial loss on their arrival at Lödöse. From Lödöse, the money was shipped to the Netherlands.[82]

The emissaries had every reason to be cautious. Some years earlier, in 1318, a sum of money collected by papal emissaries had been stolen from the cathedral of Växjö in the province of Småland when a band of robbers broke into the chests where the money was stored.[83] After a robbery in the province of Västergötland about a century later, a clergyman reported to the pope that the money collected had to be taken out of the country in secret.[84]

The threat could come not only from robbers but also from the king himself. In about 1460, a papal emissary asked two monks to bring a sum of silver from Skara in Västergötland to the monastery of Julita in the province of Södermanland. The emissary instructed the monks to do this in secret and hide the silver in a bottle of beer; according to him, if the king learnt about the silver he would seize all of it.[85]

Three silver mines seem to have been worked in medieval Sweden. Two of them were in the province of Dalecarlia (Dalarna). One was Väster Silvberg, a place name meaning 'western silver mountain' ('de monte argenti' in a Latin document from 1367); the earliest reference to it is from 1354. There were plans to establish a mint there in 1375, which may indicate a fairly substantial output of silver. However, this

81 *Vadstenadiariet* (1996, no. 564, p. 251). For a description of various periods of more or less intense piracy, see Hildebrand (1894, vol. I:2, pp. 605–15).

82 Brilioth (1915, pp. 157-159), and Fritz and Bäärnhielm (1990, no. 136d). See also Hildebrand (1879, vol. I:1, p. 36), for an example of robbery of money in the forests between the provinces of Östergötland and Småland in the late 14th century.

83 Brilioth (1915, p. 158).

84 Beckman (1954, p. 32).

85 SDhk 27528.

mine fell into disuse long before the end of the Middle Ages. The other Dalecarlian mine, Öster Silvberg ('eastern silver mountain'), was started in about 1480 and seems to have fallen into disuse around 1510, when a larger deposit was detected at Sala in the province of Västmanland.[86]

The Crown was always eager to control silver mining. In 1489 the government stipulated that all the silver that was produced in the mines had to be sold to the master of the royal mint at the town of Västerås. The stated reason for this measure was that the amount of coin in the country should increase and not be taken abroad, as had been the case up to now. Even the goldsmiths were now obliged to buy their silver only from the master of the royal mint.[87]

Silver spoons are often mentioned in late medieval documents, and have also been uncovered in archaeological investigations. They were an important form of savings, as well as status objects, for peasants as well as for townspeople. These spoons could also be used as a means of payment, as their weight appears to have been rather standardized.[88]

Taking into account the supply of specie in Sweden, then, it is not surprising that gold was expensive relative to silver. Even so, the exchange rates on gold coins indicate a declining trend over time in the bimetallic ratio in Sweden.[89] Most of the few florin exchange rates available date from the years around 1330, whereas noble exchange rate quotations are most common in the period 1420–60. The Rhinish gulden occurs most frequently during the decades around 1500. There is a remarkable lack of data from about 1365 up to 1420. This could indicate that foreign gold coins played a minor role in the Swedish economy during this period, most of which was characterized by demographic decline in the wake of the Black Death. In 1363 one gold florin was valued 0.2 marks silver in Cologne weight, which would imply a gold:silver value ratio of roughly 1:12 to 1:13. The exchange rate on nobles (see Table A3.8) in the first half of the 15th century seems to imply a higher gold:silver ratio (at 1:12 to 1:14) than the average internationally. The exchange rates on the Rhinish gulden (Table A3.9) in the late 15th and early 16th centuries are more problematic since it is not clear whether the mark in Götaland referred to mark örtug or mark danska (equal to 0.75 marks örtug), but these rates do suggest a lower gold:silver ratio than in the first half of the 15th century.

How is the gradual improvement in the position of silver over gold to be explained? Although Swedish silver coins continued to be debased, over time each gram of silver in them tended to fetch increasing amounts of gold when exchanged against foreign coins.

86 Hildebrand (1894, vol. I:2, pp. 718 and 732), and Ekström (1948). Silver was probably not produced continuously at Silvberg. As late as 1511, however, the Crown purchased silver at Silvberg for minting purposes; SDhk 36922.

87 Hildebrand (1894, vol. I:2, pp. 732 and 916).

88 Franzén (1998, pp. 113–4), and Myrdal and Söderberg (1991, p. 95).

89 Information on the gold content of the coins is found in Volckart (2006).

It is possible that the supply of foreign gold coins in Sweden increased, which would have tended to alleviate the scarcity of gold. This cannot be determined with any certainty. We know, however, that gold possessions in the form of rings or Rhinish gulden are often recorded in the towns of Stockholm and Arboga during the latter part of the 15th century and the early 16th.[90]

Another indication that gold became less scarce in Sweden is the frequency with which foreign gold coins are mentioned, compared to other coins, in medieval documents. The digital database *Svenskt Diplomatariums huvudkartotek* (SDhk), produced by the National Archive of Sweden, presently contains summaries of texts of about 41,000 charters from the medieval era. Table 3.1 summarizes some information on how often various types of coin are mentioned in this database (note, however, that the possibility that some evidence in the charters is missing in the database cannot be ruled out).

**Table 3.1.** *Number of documents (or summaries of documents) in which the most common foreign gold coins are mentioned compared to 'mark'.*

| Period | Total number of documents | Documents mentioning foreign gold coins | Documents mentioning 'mark' | Foreign gold coins in per cent of 'mark' |
|---|---|---|---|---|
| 1340–1419 | 15,286 | 294 | 3,143 | 9 |
| 1420–99 | 15,103 | 376 | 1,859 | 20 |

Source: SDhk.

Note: The gold coins included are florins, nobles, and gulden.

Not all references to 'mark' denote the Swedish mark; they could also indicate Lübeck marks, Danish marks etc. The right-hand column of Table 3.1 thus informs us about the frequency with which the most common foreign gold coins (florins, nobles, and gulden) are mentioned compared to Swedish as well as other silver (or sometimes copper) coins. The role of foreign gold coins appears to have increased. They are mentioned more frequently in the period 1420–99 than during the preceding period 1340–1419, particularly compared to references to 'mark', which became less frequent. The greater availability of gold coins could to some extent explain why the bimetallic ratio in Sweden changed in the favour of silver during the late medieval period.

According to Table 3.1, the number of documents referring to 'mark' decreased over time. This should not be taken as an indication of de-monetization in the 15th century (although that possibility cannot be excluded, either). The smaller number of references to 'mark' may be due to the fact that in the SDhk database, many docu-

90 Franzén (1998, pp. 107, 112), and Rasmusson (1962, p. 181).

ments after 1420 are available only as short summaries omitting details of payment, whereas documents prior to 1420 are often published in full.

## 3.7. Mark gutnisk and dansk during the 15th century

During the 15th century, different mark currency units were used concurrently in Sweden – mark gutnisk, mark jämtsk, mark svensk, mark stockholmsk, mark dansk, mark östgötsk, mark rigisk, mark stackota, etc. Moreover, Finland developed its own counting system. There is some confusion as to what exactly some of these terms denoted. Meanings often differed even within the same period. This situation reflects the fact that the monetary system was not fully unified, and that significant regional differences persisted, a kind of monetary refeudalisation. Partly due to the Kalmar Union, Danish and Gotlandic coins circulated widely in Götaland. It was not until the reign of Gustavus Vasa, and the end of the Kalmar Union, that the monetary systems of Götaland, Svealand and Finland were unified once more.

In the second half of the 14th and the early 15th centuries the Nordic countries and the Wendish towns de facto formed a monetary system, where attempts were made to fix the exchange rates between different coins.[91] The Hanseatic towns started to mint a coin of higher denomination, named Witten, equal to 4 pfennings or 1/48 mark. In Sweden, the larger örtug coins were minted with the same weight (1.3 grams) and fineness as the German Witten. Since the örtug was equal to 1/24 mark örtug, this implies that one Swedish örtug was roughly equal in value to the Witten. The German Witten coin could also be referred to as German örtug.[92] Denmark followed the Wendish towns and minted Witten coins of its own, called hvid. The relation: 1 Lübeck mark = 2 marks örtug is confirmed by written sources in 1349–75. In Götaland in the early 15th century, German, Danish and Gotlandic coins dominated the circulation.

A source from Småland in 1417 discusses a mark currency unit for which the following relation applied (1 mark = 8 öre):[93]

1 öre = 4 ‘gutnyska’ = 4 ‘ængliska’ = 3 ‘hwyte pænnia’

A similar relation is documented from other sources during the 1410s for the Götaland region.[94] The common application of the relation shows the dominance of for-

91 Lundholm (1956, pp. 211–5).

92 SDhk 17811.

93 SDhk 18918.

94 In Östergötland 1411 (Danmarks riges breve 310): 1 øre = 3 ‘hvide tyske penge’ = 4 ‘gotlandske penge’ = 4 ‘engelske’. In Småland 1412 (SDhk 17811): 1 ‘øre’ = 3 ‘thydiska ørtogher’ = 4 ‘siælenske ængliske’ = 4 ‘gotniske’. In Östergötland 1415 (SDhk 18646): 1 ‘øre’ = 4 ‘ængliske’ = 3 ‘thyske hwite’ (the omission of Gotlandic coins shows that the öre referred to better coins in this case).


*Lübeck in the late middle ages. In the second half of the 14th century the Nordic countries and the Wendish towns formed a monetary system with fixed exchange rates between various coins.*
Source: http://en.wikipedia.org/wiki/File:Lubeka_kolorowa_litografia_ksi%C4%85%C5%BCkowa_XIVw.jpg

eign coins in this region at the time. The 'hwyte pænnia' (white penny) referred to the German (and to a lesser extent the Danish) Witten coin, with the nominal value of 4 penning or 1/48 of a Lübeck (or Danish) mark. The 'ænglisk' (engelsk) mostly referred to the Danish 3-penny coin, equal to 1/64 of a Danish mark or one English sterling. Thus the relation states that one mark örtug was equal in value to 32 gotar or gutniska, or to half a Lübeck or a Danish mark.

This relation was consistent with the fine silver contents of the various coins, although the German coins may have been undervalued. The Danish engelsk (sterling) minted in the late 14th and early 15th centuries had a fine silver content of 0.66 grams, implying that a Danish mark engelsk had the fine silver content of 42 grams (1 Danish mark engelsk = 16 skilling = 64 engelsk). In comparison, the fine silver content of 24 Swedish örtug, equal to one Swedish mark örtug, was 25 grams in the 14th century and 21 grams after 1405. The fine silver content of one mark gutnisk, equal to 32 gutar, was around 22 grams in 1340–1400, but was reduced significantly during the course of the 15th century. The fine silver content of the mark of Lübeck, equal to 48 Witten, was 50–55 grams in the late 14th century.[95] In 1401 it was reduced to 46 grams and in 1411 to 40 grams.[96] The relation 4 engelsk for 1 öre, half a Danish mark in engelsk for one Swedish mark, would be reasonable, given the silver contents of the Danish engelsk and the Swedish örtug.

Yrjö Hyötyniemi argues convincingly that the relation 1 mark = 8 öre = 32 gotar was not a part of the Gotlandic monetary system, but was initially the counting of one Swedish mark in Gotlandic coins. The gote was originally a Gotlandic örtug, where 1 mark was equal to 24 gotar, and one gote to 12 Gotlandic pennies. However, at times during the first half of the 14th century, Gotland adopted the mone-

95 *KHL*, 'engelsk' and 'hvid', and Thordeman (1936, pp. 38 and 57).
96 Nordström (1850, p. 129).

tary system of Lübeck, where 1 gote was set equal to 3 pennies of Lübeck. The Gotlandic mark was replaced by the silver mark of Gotland, which was equal to the mark of Lübeck, but counted in Gotlandic coins. One Gotlandic mark silver was initially set equal to 64 gotar or 768 Gotlandic pennies or 2⅔ of the traditional Gotlandic mark. The counting of 1 mark = 32 gotar was only possible because 1 Swedish mark was fixed at ½ mark of Lübeck. According to Hyötyniemi , the Gotlandic mark continued to exist as a local custom.[97] Hyötyniemi's hypothesis is supported by a source from 1343 stating that one Gotlandic silver mark was worth 30 groats of Flanders, which in the international markets was paid 0.9–1.1 marks of Lübeck (see Table A3.2).

By the late 14th century, the fixed relations between various Nordic and German coins could no long be maintained. Other Danish coins were not as good as the sterling coins. For example, in 1386 the Danish mark was valued at only 0.625 marks of Lübeck and in 1406 at 0.75 marks of Lübeck. Although in 1405 the Gotlandic and Swedish marks were set equal in value, in 1389 1 Swedish mark was valued at 1.2 Gotlandic marks. In 1402, the Gotlandic silver mark was set equal to 32 öre, implying (given that the öre was equal to 3 gotar in accordance with the traditional Gotlandic system) that the gote was valued at only 2 pennies of Lübeck.[98] It was probably the old gotar with a higher fine silver content that was still valued at 6 penning (Swedish pennies) or 3 pennies of Lübeck in the early 15th century.

Around 1410, Gotlandic coins seem to have deteriorated significantly compared to the Swedish. When a differentiation occurred between the Swedish mark and the mark of 32 gutar, the latter was initially called 'tysk mark' (German mark), which according to Hyötyniemi shows the connection to the Hansaetic monetary system. It was not until the 1420s that this mark was labelled mark gutnisk, but according to Hyötyniemi this was not a Gotlandic but a mainland Swedish mark.[99] By 1413, 1 Swedish mark was valued at 1.5 tyska marks (see Table A3.2). By 1424, 1 mark of Lübeck was worth 4 marks gutnisk/tysk and 2 Danish marks.[100] Since the 1 mark örtug was worth 2 or more marks gutnisk/tysk, this implies that by the 1420s the Danish mark was of an equal or even lower value than the Swedish mark. In 1453, one Swedish öre was set equal to 8 'old' and 12 'new' Danish engelsk.

During the course of the 15th century, the fine silver content of the mark of Lübeck more than halved; it was reduced to 28 grams in 1424, to 25 grams in 1433 and to 20 grams in 1461.[101] The mark örtug was quite stable throughout the 15th century, and was reduced only slightly, from 20–21 grams in the first half of the century to 17–19 grams in the second half. Table A3.4 also shows that the exchange

97 Hyötyniemi (1999).
98 Hyötyniemi (1999, p. 9).
99 Hyötyniemi (2000, p. 47).
100 Lundholm (1956, p. 212).
101 Forssell (1872, p. 39), and Lundholm (1956, p. 213).

rate of mark of Lübeck decreased from 2 marks örtug in the late 14th century to just 1 mark örtug in the second half of the 15th century.

During the course of the 1410s the debased Gotlandic coins drove out the better Swedish örtug as well as the Danish engelsk and German Witten coins from circulation in Götaland. The force of Gresham's Law is indicated by the Växjö Statute of 1414, which decreed that fines connected to honour, manslaughter and wounds must be paid in the better Swedish mainland coins, while all other transactions were to be made in Gotlandic coins of lower value.[102] However, in Svealand the premium on örtug-coins relative to Gotlandic allowed them to dominate circulation. During the first half of the 15th century a split occurred between counting in mark gutnisk in Götaland and in mark örtug in Svealand. During the second half of the century, when Gotland introduced the Danish monetary system, there was a gradual shift towards counting in mark danska, although this unit came to be linked to the Stockholm mark. In the first half of the 16th century, mark gutnisk and mark danska first became pure units of account of Swedish coins, and then disappeared as such.

During the uprisings in Sweden and Norway, Eric XIII fled to Gotland in 1436 and ruled the island up to 1449, when Denmark regained control. During his reign in Gotland, the fine silver content of the mark gutnisk was reduced significantly, to between 2.2 and 6.5 grams,[103] which was between 1/10 and 1/3 of the mark in Swedish örtugs.[104] This is clearly visible in the exchange rates of mark gutnisk in Table A3.2. While one mark örtug was worth around 2 mark gutnisk in the period 1420–34, it increased to 4 or more in the 1440s.

Although the relation 1 öre gutnisk = 4 gotar is the best known, the relation 1 öre = 3 gotar can also be documented for the 1440s and 1450s. According to Paul Sjögren, mark stackota was the same as mark gutnisk, and öre stackota the same as öre gutnisk.[105] Dovring and Hyötyniemi argue against this, claiming that 1 mark stackota = 0.75 marks gutnisk.[106] According to Hyötyniemi, the mark stackota was the traditional Gotlandic mark, equal to 24 Gotlandic örtug, and mark östgötsk and mark västgötsk were only other names for this currency unit, while mark kalmarsk was the same as mark gutnisk. According to Dovring, the difference between the two marks would explain why the öre östgötsk was equal to 3 gotar, while one öre gutnisk was equal to 4 gotar. The problem with Dovring's and Hyötyniemi's argument is that there are also sources which confirm that 1 öre gutnisk was set equal to 3 gutar.[107] Hildebrand shows that one source uses mark stackota and mark gunniska as

102 Hallenberg (1798, p. 13).
103 Thordeman (1936, p. 57).
104 The debasement could have been implemented some years before Eric came to Gotland. See Hyötyniemi (2002).
105 Sjögren (1944, p. 349).
106 Dovring (1947, pp. 195–7), and Hyötyniemi (2000, pp. 47–9).
107 SDhk 24756 (year 1445) and 26053 (year 1452).

Valdemar Atterdag Holding Visby to Ransom, 1361, *signed in 1882 by Carl Gustaf Hellqvist (1851–90), a Swedish history painter. The Danish king Valdemar IV (Valdemar Atterdag) is depicted collecting taxes from the inhabitants of Visby on the island of Gotland in 1361. The townspeople were required to fill three large barrels with gold, silver and other valuables. Gotland had previously been part of the Swedish kingdom; the island suffered an economic decline in the late Middle Ages, probably due to long-term structural factors rather than to the Danish invasion. Some details in the painting are incorrect. For example, the man on the right appears to be Jewish, but there were no Jews at that time in Visby. The dachshund is another anachronism since the first dachshunds were bred in the 16th century.*
Source: Nationalmuseum.

synonyms.[108] If there was a difference between the mark of 32 gotar and the mark stackota of 24 gotar, where the latter was worth ¾ of the former, it is clear that mark gutnisk was used as a term for both.

Another possibility for the counting in 3 and 4 gutar per öre gutnisk is that gutar of different values circulated so that the better-valued gutar appreciated. Hyötyniemi shows that better coins were minted towards the end of Eric XIII's rule in Gotland, 1444–8.[109] After this period the gote is commonly referred to as 'grossus'. In the Swedish mint regulation of 1453, one örtug was set equal to 8 'old and new' gotniska or 4 grossa,[110] the last probably referring to a Gotlandic coin as well. This implies that the grossa was valued at twice as much as the gotniska. Counting 4 gotniska to one öre

108 Hildebrand (1894, vol. I:2, p. 942).
109 Hyötyniemi (2002).
110 Liedgren (1967, p. 15).

gutnisk, it would imply that one mark örtug would be set equal to 6 mark gutniska in the lower-valued coins. Although such a low exchange rate for the mark gutnisk is not known from other sources, it is possible that the mint regulation attempted to set a value below the actual market rate. Counting 3 grossa to one öre gutnisk, it would imply that one mark gutnisk would be set equal to ¼ mark örtug, which during the second half of the 15th century in Götaland developed into a unit of account also for Swedish coins.

From the mid-15th to the mid-16th centuries, Götaland used mark danska as a unit of account, which gradually replaced mark gutnisk. In 1453, the official value of the Danish hvid was set to 3 Swedish penning. Since one Danish mark was 16 skilling or 48 hvid, one mark danska was equal to 144 Swedish penning, i.e. one mark danska was set to 6 Swedish öre or ¾ mark örtug. Later this became an account identity linked to the Swedish money, not to actual Danish coins. Both systems could be used in the same transaction. Accounts were sometimes specified in mark örtug, but the total sum could be written in mark danska, without indicating that mark örtug was converted into mark danska.[111] To make matters even more confusing, the term 'mark svensk' could have two different meanings, either mark örtug (mostly in Svealand) or mark dansk in Swedish coins (mostly in Götaland).[112] The term 'mark stockholmsk' was also commonly used instead of mark örtug.

Hallenberg shows that mark gutnisk was a unit of account in the 1530s, equal to 1/3 mark danska or ¼ mark örtug, and no longer referred to actual Gotlandic coins. It is not entirely clear whether such a unit of account already existed in the 15th century. Although the relation 1 svensk mark = 3 mark gutnisk was quite common in the second half of the 15th century, the mark svensk probably referred to the mark dansk, which was equal to ¾ of the mark örtug.[113]

During the 1540s, counting in mark danska and gutniska was gradually replaced by the Swedish system. During this transitional period the terms 'skillingar svenska penningar' (shillings Swedish pennies) and 'mark danska i svenskt mynt' (Danish marks in Swedish coins) were common. Here, there was no Swedish skilling, neither was the payment made in Danish skilling (i.e. one 'skilling svenska pengar' was not necessarily equal to one skilling in actual Danish coins). It was purely an accounting system based on Swedish coins. For example, in 1545 one mark in Danish coins was exchanged for 1⅔ marks danska in Swedish coins, which in turn was equal to 1¼ marks örtug.[114]

Majvor Östergren and Kenneth Jonsson (1998) point out that although a transformation into a Danish monetary system is considered to have taken place in Gotland after the mid-15th century, where the gote was replaced by the hvid (= 4 penning = 1/16 skilling = 1/48 mark), the old gutar continued to dominate the circulation of

111 Hallenberg (1798, pp. 84 and 155).
112 Hallenberg (1798, pp. 35–6).
113 Dovring (1947, pp. 195–6).
114 Hallenberg (1798, pp. 169 and 302–7).

the island during the second half of the 15th century. One reason for this was probably that the minted amount of hvids was quite small in relation to the gutar minted before the mid-15th century. Table A3.2 shows that one mark lödig was, with a few exceptions, valued consistently at 30-40 marks gutnisk in the whole period 1445–1513. When the exchange rate of 1.4 mark gutniska for 1 mark örtug is mentioned in 1480, the coins are referred to as 'gutniska vita',[115] while in the 1430s and 1440s the term 'svarta gutniska' was used.[116]

The fine silver content of the Gotlandic mark in hvids (1 mark = 48 hvids) deteriorated, from 9.5–11 grams in 1455–80, to 5.5–5.9 grams in 1480–1500, 5–6.1 grams in 1510 and 4.9 grams around 1530.[117] The fine silver content in 1480–1510 would roughly entail an exchange rate of 30–35 marks gutniska for one mark silver. This corresponds quite well to the estimated exchange rate for 1513 in Table A3.2, where one mark gutnisk is probably valued at 2–2.5 marks örtug, which shows that mark gutnisk in 1513 most likely referred to Gotlandic hvids minted in 1480–1510. The example from 1513 shows that, in Götaland, mark gutnisk could still refer to actual Gotlandic coins.

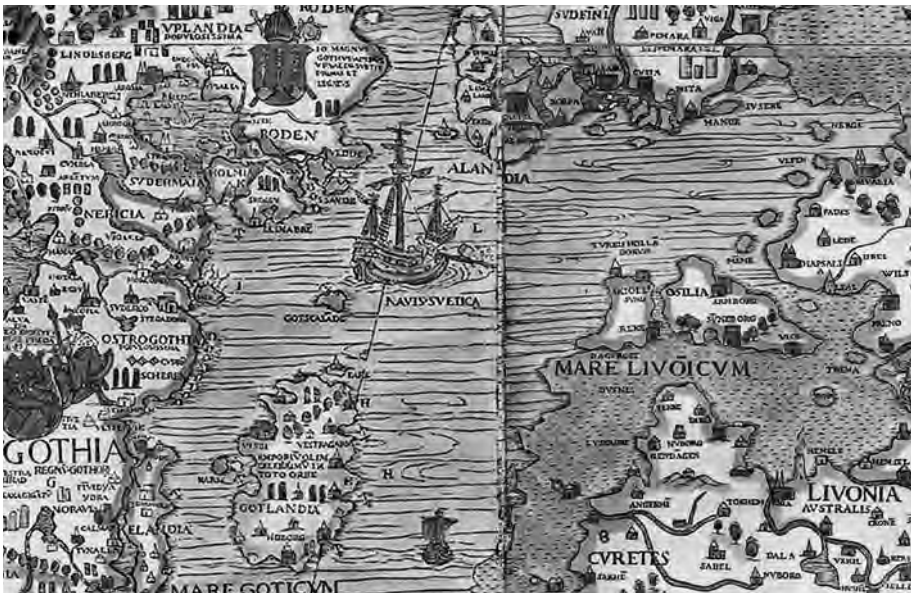
Hence it is clear that especially after the mid-15th century, but possibly also earlier, the term 'mark gutnisk' referred to different types of currency. Exactly how the term mark gutnisk was used in the 15th century, and whether it differed from the term mark stackota, still calls for further research.

## 3.8. Mark rigisk and revalsk

During the Middle Ages, the Livonian currency (mark of Riga and Reval) was strongly integrated with the Nordic and Hanseatic monetary system. As early as in 1211, Riga decided to mint its currency at the same exchange rate with the mark silver as in Gotland.[118] In Finland, which had been conquered by Sweden, artig coins of Riga and Reval were more common than Swedish coins during the 15th century, and were called revalsk or räflisk [örtug].

The fixed relation between mark rigisk and mark gutnisk was broken in the early 14th century. While 1 mark silver was worth 7 marks gutniska in 1312, it was worth 6 marks rigiska in 1315–16 (see Table A3.2 and Table A3.5). Hyötyniemi argues that it was in this period that 1 mark silver of Riga was set equal to 6 old marks rigisk or 144 artig of Riga (since 1 old mark rigisk = 24 artig). The counting in this silver mark, also called mark rigisk, continued even though the silver content of the artig deteriorated. In 1343, the Livonian artig was minted at the same value as the Gotlandic örtug (gote), which in turn had the same value as 3 pennies or 1/4 schilling of

115 Dovring (1947, p. 197).
116 See, for example, SDhk 23731, Dovring (1947, p. 197), and Hallenberg (1798, p. 17).
117 *KHL*, 'hvid'.
118 Myrberg (2008, p. 88).




*Parts of the Baltic Sea according to Carta Marina, created by Olaus Magnus (1490–1557). The coins of Gotland ('Gotlandia'), lower left, were also used in Götaland ('Gothia'). Riga (capital of present-day Latvia) in Livonia, lower right, minted coins according to the standard of Gotland in the 13th century. In Åbo in Finland (to the right of 'Alandia'), coins of Riga and 'Rivalia' (present-day Tallinn in Estonia), visible to the right, were circulating in the 15th century. The currency of the Swedish realm was sometimes denominated as 'mark stockholmsk' or 'mark holmsk'. 'Holmia', upper left, is present-day Stockholm.*

Lübeck.[119] The mark silver of Riga was, therefore, at par with 36 schilling or 2¼ marks of Lübeck, implying that 1 artig of Riga or revalsk was at par with 6 Swedish pennies (penningar) in the second half of the 14th century.

During the 15th century Finland counted the Swedish mark in coins of Livonia. Since the Livonian coins that circulated in Finland were of a different fine silver content, the artig coins were valued differently, mostly varying from 4 to 6 Swedish pennies (see Table A3.5). For example, in 1414, 5 revalska was set equal to 23 penning (23/24 öre) of the Åbo mark. The Åbo mark was not a variant of mark rigisk, but the Swedish mark counted in coins of Riga (however, örtug coins were also minted at Åbo[120]). Similarly, in Viborg one öre was set equal to 4 revalsk in 1415. Since there was no fixed relation between öre and revalsk, no separate mark currency unit developed at that time in Finland comparable to the mark gutnisk in Götaland.

119 Hyötyniemi (1999).
120 Thordeman (1936, p. 39).

In the 1420s a third mark rigisk came in use, which was set equal to 36 old artig (new schilling) or revalska (i.e. 1 mark silver of Riga = 4 new marks of Riga), which put the mark rigisk roughly equal to the mark örtug.

As late as the 1530s and 1540s the mark rigisk was used as a counting unit in Finland, where 1 mark rigisk = 9 Swedish öre. The Swedish mark was counted as 32 skilling of Riga, while 1 mark of Riga was equal to 36 skilling.[121]

## 3.9. Mark jämtsk and härdalsk

Jämtland and Härjedalen belonged to Norway in the Middle Ages but had close contacts with Sweden (for example, Jämtland was then part of the episcopate of Uppsala). The term 'mark jämtsk' is documented earliest in 1346 and was used at least up to the early 16th century.[122] The same source often mentions both mark jämtsk and mark svensk, which shows that two different currency units were used. The term 'mark härdalska' is also mentioned, although it is not clear whether it was the same as the mark jämtsk.[123] Neither Jämtland nor Härjedalen minted their own coins.

The only known exchange rate is from 1437, when 1 mark jämtsk = 1 13/35 (≈ 1.37) Swedish marks, i.e. 1 mark silver ≈ 6 marks jämtsk at the time.[124]

How the term mark jämtsk came to be used is not clear, but it could have to do with the monetary union between Sweden and Norway in the 1340s and 1350s. In 1340 Norway started to mint coins with the value of 5 marks penningar to one mark silver, instead of 4 marks penningar hitherto. This was an adjustment to the Swedish mark penningar.[125] It is possible that the mark jämtsk was based on the Norwegian currency from the 14th century (or the better currencies of Denmark in the early 15th century). Norway stopped minting its own coins after the late 14th century. In the second half of that century the mark lödig was worth 6 Norwegian marks, which is the same rate as for mark jämtsk in 1437. However, no definite conclusions should be drawn.

## 3.10. Parallel örtug units

The continual reduction of the fine silver content of coins implied that coins of the same nominal value could contain different amounts of silver. While the older, better coins often tended to be withdrawn from circulation (in accordance with Gresham's Law), they were often at a premium relative to inferior coins, which allowed them to stay in circulation. This happened with the older örtug coins in the late 15th

121 Hallenberg (1798, p. 233).
122 SDhk 5259 and 36939.
123 Ahnlund (1948, pp. 484-486).
124 *KHL*, 'mark'.
125 Rasmusson (1943, p. 269).

century, after the fine silver content of the new örtug coins was reduced from 1478 onwards.

The örtug minted before 1478 was called 'gammal örtug' (old örtug) and its successor was called 'ny örtug' (new örtug). In 1481, 1 gammal örtug = 9 penning = 1.125 new örtug, while the nominal value of the örtug was supposed to be equal to 8 penning.[126] In 1493–1509, 1 gammal örtug stood at 10 penning, in the early 1510s at 12 penning and in the late 1510s at 16–18 penning.[127]

Thordeman points out that gammal örtug functioned as a stable currency unit in this period, similarly to the role of the daler/riksdaler after 1534.[128] Although Rhinish gulden and mark lödig also functioned as stable units during monetary instability, gammal örtug could be more convenient to use since it was of a lower value.

In 1523, the fine silver content of öre was reduced. Thereafter one minted örtug was equal to ½ öre, i.e. 12 penning. The minted örtug was later called 'halvöre' (half öre). After 1523, one gammal örtug was equal to ¾ öre (i.e. 18 penning according to the highest exchange rate, reached in the late 1510s). From the late 1520s onwards, gammal örtug became a unit of account equal to ¾ öre, and no longer referred to the old örtug-coins minted before 1478.[129]

In 1589–90 a gammal örtug was minted with the value of ¾ öre (in proper coins). This was the last time örtug coins were minted in Sweden. The coin contained 0.27 grams fine silver, which was less than a third of the örtug minted before 1478.[130]

The örtug continued to exist during the 16th century as a unit of account, when one mark = 24 örtug, which became different from the minted örtug. Furthermore, one mark dansk was also divisible into 24 örtug, and the örtug units of Götaland and Svealand differed in value. Hence, before 1550 one öre was equal to 3 örtug in Svealand but to 4 örtug in Götaland.[131]

## 3.11. The debasement cycle in the first quarter of the 16th century

During the first two decades of the 16th century, a substantial debasement of the circulated coins led to inflation. This reached a high in the early 1520s, when 'klipping' coins were brought into circulation.

The exchange ratio of mark lödig to mark penningar rose from 1:10 in 1499 to 1:13 in the first decade of the 16th century and to 1:16 in the late 1510s. In a letter dated 1510 to the Archbishop, the Swedish Regent Svante Nilsson complained about the monetary disturbances. He proposed that the nominal value of the old örtug

126 Sandbergska samlingen, O:1, f. 63, RA.
127 Forssell (1982, pp. 22–5).
128 Thordeman (1936, p. 51).
129 Hallenberg (1798, pp. 189–99).
130 Lagerqvist and Nathorst-Böös (1968, p. 146), and Wallroth (1918, pp. 44–7).
131 Hallenberg (1798, pp. 175 and 189–99).

The Entry of King Gustav Vasa of Sweden into Stockholm*, 1523, painted in 1908 by Carl Larsson (1853-1919), representative of the Arts and Crafts Movement. The minting of large amounts of debased klipping coins, to finance the war against the Danish king, caused substantial inflation in 1523.*
Source: Nationalmuseum.

(minted before 1478, see above) would be increased from 10 to 12 penning, the new örtug from 8 to 10 penning, and fyrkar (half-örtug) from 4 to 5 penning. In this way the better coins would not be driven out of circulation and exported, as had occurred hitherto (in accordance with Gresham's Law).[132] Figure 3.2 also shows that there was a negative seignorage on (the heavier) silver coins at this time.

The örtug coins minted in the early 16th century had a fine silver content that was only slightly lower than that of the coins minted in the late 15th century. What caused the monetary disarray was the minting of coins of lower denominations which contained significantly less fine silver per mark than the örtug coins. After 1512 the minting of örtug coins ceased for the rest of the decade.[133]

In 1521–3 Gustavus Vasa led a rebellion against the Danish King Christian II, who also ruled over the Swedish territories. Both Christian II and Gustavus Vasa minted klipping coins with a very low silver content compared to their face value,

132 SDhk 36678. See also Hammarström (1956, p. 130).
133 Thordeman (1936, p. 90), Malmer (1980, p. 43), and Wallroth (1918).

which led to price increases when goods were paid for in klipping coins.[134] The klipping coins of Christian II were not minted in Sweden, but were imported in huge volumes. The face value of the klipping coin minted by Gustavus Vasa was 18 penning (the contemporary market value of the gammal örtug). While the rate between mark lödig and mark penningar was 1:16 in 1514–20, the market rate between mark lödig and mark klippingar was according to one source as high as 1:50.[135]

Lagerqvist and Nathorst-Böös write that today the klipping of Gustavus Vasa is very rare compared to the klipping of Christian II. One theory is that Gustavus Vasa simply replicated the klipping of Christian II on a large scale, and in this way could blame him for the problems with inferior coins.[136]

At a meeting in Vadstena on 1st January 1524 it was decided that the klipping coin would be devalued by 1/3, i.e. to 12 penning. Shortly afterwards the klipping coins were demonetised. There are indications that already in April 1524 the klipping coins were only worth their metal content.[137] Another problem arose briefly when the Danish klippings were decreed to be invalid in Denmark but continued to be valid as means of payment in Sweden, which caused an inflow of Danish klippings to Sweden[138] (later the latter were also decreed to be invalid[139]). The rate between mark lödig and mark penningar stabilised at 1:16 to 1:20 in 1523–35.

## 3.12. Seignorage

As long as the face value of a coin exceeded the cost of producing it, the ruler made a profit, commonly labelled *seignorage*. Too little is known about the cost of producing silver coins to establish any tendencies over time. Gross seignorage includes these costs of production.[140] Furthermore, information on the actual mint price is very scarce. Another mode of calculation consists in relating the market value of the mark penning, expressed as the exchange rate against the silver mark, to the metallic silver content of the coins representing one mark.

An example may clarify the procedure. Information on the specie content of the

134 The term 'klipping' was used because the coins were clipped directly in a square shape to save time. Klipping coins were minted on several occasions during the 16th and 17th centuries.

135 'Myntz och Sölfwers Werdering', Riksarkivets ämnessamlingar, Misc. 26 Myntväsen, vol. 4. The fine silver content of one klipping coin with the nominal value of 18 penning was, according to Wallroth (1918, p. 14), 0.4456 grams and 0.382 grams, respectively. According to Thordeman (1936, p. 51), in reality, many klipping coins probably had a lower silver content. See also *KHL*, 'klipping'.

136 Lagerqvist and Nathorst-Böös (1968, pp. 130–1).

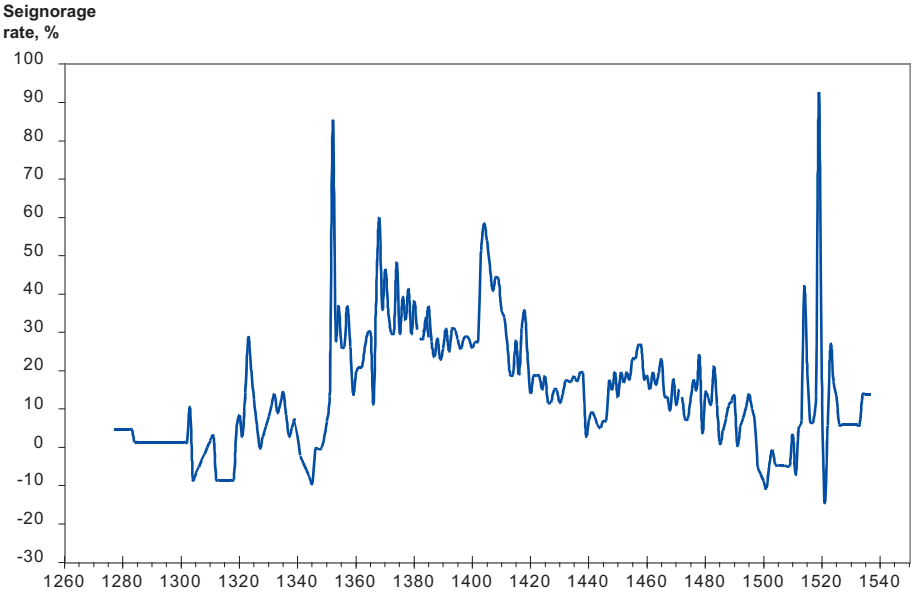
137 *KHL*, 'klipping'.

138 Hallenberg (1798, pp. 88–9).

139 In the latter part of the 1520s, 4 marks in Danish klipping coins were worth 1 Swedish mark in new coins. See *Stockholms stads tänkebok 1524–29* (1929–40, p. 245).

140 Redish (2000, p. 27).

**Figure 3.2.** *The gross seignorage rate (in per cent) 1277–1539 based on the market value of mark silver in mark penningar and the fine silver content of the coins representing one mark.*




Sources: Table A3.1, Malmer (1980), Thordeman (1936) and Wallroth (1918).

coins is based on numismatic studies.[141] In 1425, for instance, the measured silver weight of mark penningar was 20.7 grams. The market value of mark penningar in grams of silver, on the other hand, is the ratio between the fine silver content of the mark lödig (194 grams in 1425 according to Table A3.1) and the market rate of exchange between the silver mark and the mark penning (in 1425 it took 8 mark penningar to buy one silver mark, so the rate was 8). The value of the mark penningar in grams of silver was then 194/8 = 24.2 grams.

The gross seignorage can now be calculated as the market value of mark penningar (24.2 grams) less the metallic silver content of the coins representing one mark (20.7 grams). The market value of the minted coin thus exceeded its specie content. This is expected, given the cost of minting and the ruler's profit on minting. Disregarding the cost of minting, it would have paid to buy silver marks at the going exchange rate and strike them into new coins – but minting was the sole and carefully guarded privilege of the regent. In this case, the excess amount of silver was 3.5

141 Thordeman (1936), and Malmer (1980). Malmer's estimated silver weights, combined with her assumptions regarding wear and tear, tend to give unrealistically high silver values of the penning.

grams (24.2 less 20.7 grams). The gross seignorage rate is estimated as the ratio of gross seignorage to the metallic silver content of the coins representing one mark, in our example (24.2 less 20.7)/20.7 = 17 per cent.

Figure 3.2 shows that our measure of the seignorage rate fluctuated in the period 1277–1350. Initially the gross seignorage rate was close to zero per cent, i.e. coins circulated in accordance with their fine silver content. There were times when gross seignorage was negative, which is counter-intuitive and implies that the ruler minted coin with too high a silver content, or rather that the market did not appraise the coin at its full specie content. The results for this period should be regarded with scepticism until further numismatic studies have been carried out.

After the mid-14th century the curve looks quite different. The inflation coins of the 1350s and 1360s temporarily increased the seignorage rate. As mentioned above, in the early 1360s King Albert, coming from Mecklenburg in Germany, introduced a new type of coin, the Witten, later called the örtug (1 örtug = 8 penning or 1/3 öre). Coins of this type were in general use in the Hanseatic towns of northern Germany. Although Albert's reign was characterized by war and civil conflict in Sweden, there was remarkable monetary stability as measured by the exchange rate between mark silver and mark penning, which for several years stood at 1:6.[142] The high level of seignorage during this period suggests that, besides being profitable for the ruler, the introduction of new and better coins was appreciated by the people. Conversely, the inferior coin introduced in the early 15th century by King Erik of Pomerania during a period of financial disorder quickly resulted in a deteriorating seignorage rate.

With the exception of a few years around 1500, our measure of the seignorage rate is always positive after the mid-1360s, which seems reasonable. The broad trend over time is that the seignorage rate decreased during the late Middle Ages, up to about 1500. This could be due to several factors. First, people may successively have learnt more about the true specie content of the coins and become more aware of the ongoing debasement. Second, the long demographic decline after the Black Death, continuing well into the 15th century, should have served to reduce demand for money.

At the same time, what was perceived as a general scarcity of silver and silver coin probably tended to counteract the long-term decline in the seignorage rate. In 1453, King Karl Knutsson complained of a shortage of domestic currency in the country, leading to the use of bad foreign coin. He mentioned in particular the Gotlandic [gutnisk] coin, which was used to buy Swedish coin. Thus, according to the King, the small amount that was minted in Stockholm was taken away and melted down. The King aimed to expand domestic minting, but these plans were only partly realized.[143]

142 Hildebrand (1894, vol. I:2, pp. 831–6).
143 Liedgren (1967, p. 14), and Hildebrand (1894, vol. I:2, p. 850).

Sometimes the rulers were active in taking specie out of the country. King Christian I reportedly took large sums of silver and gold (in the form of English nobles) with him when he left the country in 1461, in order to pay for his purchase of Holstein.[144] In the 1520s, King Gustavus Vasa arranged for large amounts of silver, much of it confiscated from churches and monasteries, to be shipped to Lübeck in order to pay his war debt.[145]

The scarcity of silver continued throughout the medieval era. Exports of silver and coin were prohibited by the Government in 1474 and again by the Chancellor in 1486, arguing that the domestic coin must be improved.[146] The melting down of domestic coin was banned in 1478, and at the same time restrictions were placed on bringing Danish coin into Sweden.[147] Yet the problem remained. This is indicated by the fact that the ban on silver exports was repeated in 1493, 1498, and 1499.[148] As mentioned above, in 1510 the ruler, Svante Nilsson, observed that silver coin was being taken out of the country.[149] Figure 3.2 also shows that the gross seignorage rate was significantly negative at the time. A negative profit from minting implies that there is a positive profit on turning coins into bullion. Gresham's law seems to have been at work, according to which debased coin will replace coin with a higher specie content. Despite the fact that mark penningar were successively debased, it was apparently still profitable to take these coins out of the country to have them melted down.

Great hopes were placed on increasing output from the silver mine at Sala in the province of Västmanland, which was started in about 1509. However, there is no record of a substantial increase in silver production at Sala until about 1530.[150]

There were other ways by which the ruler could profit from minting, apart from the fact that the market value of mark penningar usually exceeded the metallic silver content. A 1497 contract between King Hans and the master of the Mint stipulated that the King would receive one gulden for each gold mark and 0.5 marks for each Cologne mark in silver (worth 10/9 of the Swedish mark) that was minted. The master of the Mint was also obliged to mint 20 gold marks and 20 silver marks for the King every year. The King agreed to deliver the necessary gold and silver and to pay for the metal that was lost in the melting process; otherwise the mint master was not to be paid for making these coins.[151]

The reign of Gustavus Vasa was characterized by a strengthening of both central state power and the monarch's personal power. One consequence of this probably

144 *Vadstenadiariet* (1996, no. 719, pp. 302–4).
145 Källström (1939, pp. 30 and 76), and Hammarström (1956, pp. 407–9).
146 1474: Hildebrand (1894, vol. I:2, p. 917. The 1486 prohibition: *Stockholms stads tänkeböcker 1483–1492* (p. 133).
147 Liedgren (1967, p. 16).
148 Hildebrand (1894, vol. I:2, pp. 917-918), and SDhk 33742 (April 3, 1499).
149 SDhk 36678 (Västerås 16 February, 1510).
150 Hammarström (1956, pp. 276 and 305).
151 Hildebrand (1894, vol. I:2, p. 925).

was that minting became more profitable for the King. When the King purchased silver for the mint in the beginning of 1529, he paid 16 marks for one silver mark in the mining district; he complained at that time that silver had become so expensive that he had no 'profit' from it anymore. He made an agreement with the silver miners that the price would be reduced to 12 marks by August, 1529.[152] At this time one mark of pure silver was minted into 24 marks penning. This was also the case in the following year, 1530, when we have some information as to the remuneration of the mint master. According to the contract with the King, the mint master would strike one mark of pure silver into 24 marks penningar and the King would receive 19.375 marks.[153] The mint master was to keep the difference, 4.625 marks, as his payment, which was also meant to cover the cost of minting. The King of course had to pay for transports and other costs.

As long as these prices applied, minting should have given the King a handsome profit. Even though the seignorage in Figure 3.2 appears to be modest in the late 1520s, this example reminds us that there were other ways in which the King could profit from minting. This profit probably increased further in the 1530s. In 1536, for instance, the Crown raised the taxes on silver production and in reality paid only 5 marks penningar for each silver mark delivered from the Salberget mine. At the same time, 22 marks were minted from each silver mark.[154] The beginning of the early modern era in Sweden thus produced a very handsome seignorage to the ruler.

## 3.13. Concluding remarks

The medieval system of payments in Sweden, as described above, was complex. The foregoing discussion has aimed to clarify some essential features in a way that may facilitate further study of medieval Swedish economic history by international researchers. For instance, the presentation of the exchange rate between the silver mark and mark penningar provides information that is indispensable to anyone who wishes to convert nominal Swedish prices into silver prices, which in turn is necessary for international comparisons. The exchange rate series in Table A3.1, based on around 800 observations, is arguably one of the longest and most reliable economic series that can be produced for the Swedish medieval era.

Part of the complexity of the monetary system is due to the lack of a country-wide monetary standard for most of the medieval era. Several currencies existed alongside mark penning. The exchange rates between these various currencies and mark penning (or the silver mark) are sometimes not known at all. In addition, various foreign gold coins circulated at a floating rate. Still, we have tried to summarize the available information in several tables. Using these, it should be possible to use many nominal price quotations expressed in currencies other than mark penning.

152 Hildebrand (1894, vol. I:2, p. 917).
153 Forssell (1872, p. 54).
154 Hammarström (1956, p. 312).

One of the most promising roads for future research into economic conditions in medieval Sweden is the use of modern database technology. A particularly valuable resource is the ongoing construction of *Svenskt Diplomatariums huvudkartotek över medeltidsbreven* (SDhk). This publicly available database provides almost endless possibilities of studying many economic (as well as non-economic) phenomena over time and space. As this database expands to include more complete documents, especially from the period after 1420, an increasingly powerful tool will be available to researchers.

## Appendix A3: Summary tables

**Table A3.1.** *Exchange rate of mark silver/lödig in mark penningar/örtug 1277–1541.*

| Year | Fineness of silver mark, assumption | Fine silver content of silver mark, grams | Exchange rate, likely mean | Exchange rate, likely median | Exchange rate, lowest recorded | Exchange rate, highest recorded | Fine silver content of mark in grams, based on exchange rate |
|---|---|---|---|---|---|---|---|
| 1277 | 0.938 | 197 | *3.78* | *3.78* | 3.00 | 4.56 | *52.2* |
| 1278 | 0.938 | 197 | *3.78* | *3.78* | 3.00 | 4.56 | *52.2* |
| 1279 | 0.938 | 197 | *3.78* | *3.78* | 3.00 | 4.56 | *52.2* |
| 1280 | 0.938 | 197 | *3.78* | *3.78* | 3.00 | 4.56 | *52.2* |
| 1281 | 0.938 | 197 | *3.78* | *3.78* | 3.00 | 4.56 | *52.2* |
| 1282 | 0.938 | 197 | *3.78* | *3.78* | 3.00 | 4.56 | *52.2* |
| 1283 | 0.938 | 197 | *3.78* | *3.78* | 3.00 | 4.56 | *52.2* |
| 1284 | 0.938 | 197 | *3.90* | *3.90* | | | *50.6* |
| 1285 | 0.938 | 197 | *3.90* | *3.90* | | | *50.6* |
| 1286 | 0.938 | 197 | *3.90* | *3.90* | | | *50.6* |
| 1287 | 0.938 | 197 | *3.90* | *3.90* | | | *50.6* |
| 1288 | 0.938 | 197 | *3.90* | *3.90* | | | *50.6* |
| 1289 | 0.938 | 197 | *3.90* | *3.90* | 3.00 | 3.00 | *50.6* |
| 1290 | 0.938 | 197 | *3.90* | *3.90* | | | *50.6* |
| 1291 | 0.938 | 197 | *3.90* | *3.90* | 3.00 | 4.80* | *50.6* |
| 1292 | 0.938 | 197 | *3.90* | *3.90* | | | *50.6* |
| 1293 | 0.938 | 197 | *3.90* | *3.90* | | | *50.6* |
| 1294 | 0.938 | 197 | *3.90* | *3.90* | | | *50.6* |
| 1295 | 0.938 | 197 | *3.90* | *3.90* | | | *50.6* |
| 1296 | 0.938 | 197 | *3.90* | *3.90* | | | *50.6* |
| 1297 | 0.938 | 197 | *3.90* | *3.90* | | | *50.6* |
| 1298 | 0.938 | 197 | *3.90* | *3.90* | 3.00 | 3.00 | *50.6* |
| 1299 | 0.938 | 197 | *3.90* | *3.90* | | | *50.6* |
| 1300 | 0.938 | 197 | *3.90* | *3.90* | | | *50.6* |

**Table A3.1 (cont.).** *Exchange rate of mark silver/lödig in mark penningar/örtug 1277–1541.*

| Year | Fineness of silver mark, assumption | Fine silver content of silver mark, grams | Exchange rate, likely mean | Exchange rate, likely median | Exchange rate, lowest recorded | Exchange rate, highest recorded | Fine silver content of mark in grams, based on exchange rate |
|---|---|---|---|---|---|---|---|
| 1301 | 0.938 | 197 | *3.90* | *3.90* | | | *50.6* |
| 1302 | 0.938 | 197 | *3.90* | *3.90* | | | *50.6* |
| 1303 | 0.938 | 197 | 4.15 | 4.15 | 3.88 | 4.42 | 47.6 |
| 1304 | 0.938 | 197 | 5.00 | 5.00 | 5.00 | 5.00 | 39.5 |
| 1305 | 0.938 | 197 | *4.91* | *4.91* | | | 40.2 |
| 1306 | 0.938 | 197 | *4.83* | *4.83* | | | 40.9 |
| 1307 | 0.938 | 197 | *4.74* | *4.74* | | | 41.6 |
| 1308 | 0.938 | 197 | *4.66* | *4.66* | | | 42.4 |
| 1309 | 0.938 | 197 | *4.58* | *4.58* | | | 43.1 |
| 1310 | 0.938 | 197 | 4.50 | 4.50 | 4.50 | 4.50 | 43.9 |
| 1311 | 0.938 | 197 | 4.45 | 4.45 | 3.89 | 5.00 | 44.4 |
| 1312 | 0.938 | 197 | 5.00 | 5.00 | 5.00 | 5.00 | 39.5 |
| 1313 | 0.938 | 197 | *5.00* | *5.00* | | | 39.5 |
| 1314 | 0.938 | 197 | *5.00* | *5.00* | | | 39.5 |
| 1315 | 0.938 | 197 | *5.00* | *5.00* | | | 39.5 |
| 1316 | 0.938 | 197 | *5.00* | *5.00* | | | 39.5 |
| 1317 | 0.938 | 197 | 5.00 | 5.00 | 5.00 | 5.00 | 39.5 |
| 1318 | 0.938 | 197 | 5.00 | 5.00 | 5.00 | 5.00 | 39.5 |
| 1319 | 0.938 | 197 | *4.88* | *4.88* | | | 40.5 |
| 1320 | 0.938 | 197 | 4.75 | 4.75 | 4.75 | 4.75 | 41.6 |
| 1321 | 0.938 | 197 | 5.00 | 5.00 | 5.00 | 5.00 | 39.5 |
| 1322 | 0.938 | 197 | *4.50* | *4.50* | | | *43.9* |
| 1323 | 0.938 | 197 | 4.00 | 4.00 | 4.00 | 4.00 | 49.4 |
| 1324 | 0.938 | 197 | *4.29* | *4.26* | | | *46.0* |
| 1325 | 0.938 | 197 | *4.58* | *4.53* | | | *43.1* |
| 1326 | 0.938 | 197 | *4.87* | *4.79* | | | *40.6* |
| 1327 | 0.938 | 197 | 5.16 | 5.05 | 4.50 | 6.00 | 38.3 |
| 1328 | 0.938 | 197 | 5.01 | 5.00 | 4.98 | 5.11 | 39.4 |
| 1329 | 0.938 | 197 | *4.88* | *4.88* | | | 40.5 |
| 1330 | 0.938 | 197 | *4.76* | *4.76* | | | 41.5 |
| 1331 | 0.938 | 197 | 4.64 | 4.64 | | | 42.6 |
| 1332 | 0.938 | 197 | 4.52 | 4.52 | 4.52 | 4.52 | 43.7 |
| 1333 | 0.938 | 197 | 4.72 | 5.00 | 4.44 | 5.00 | 41.8 |
| 1334 | 0.938 | 197 | *4.61* | *4.61* | | | 42.8 |
| 1335 | 0.938 | 197 | 4.50 | 4.50 | 4.50 | 4.50 | 43.9 |
| 1336 | 0.938 | 197 | *4.75* | *4.75* | | | 41.6 |
| 1337 | 0.938 | 197 | 5.00 | 5.00 | 5.00 | 5.00 | 39.5 |
| 1338 | 0.938 | 197 | *4.90* | *4.90* | | | 40.3 |

**Table A3.1 (cont.).** *Exchange rate of mark silver/lödig in mark penningar/örtug 1277–1541.*

| Year | Fineness of silver mark, assumption | Fine silver content of silver mark, grams | Exchange rate, likely mean | Exchange rate, likely median | Exchange rate, lowest recorded | Exchange rate, highest recorded | Fine silver content of mark in grams, based on exchange rate |
|---|---|---|---|---|---|---|---|
| 1339 | 0.938 | 197 | 4.80 | 4.80 | 4.80 | 4.80 | 41.1 |
| 1340 | 0.938 | 197 | 5.00 | 5.00 | 5.00 | 5.00 | 39.5 |
| 1341 | 0.938 | 197 | *5.10* | *5.10* | | | 38.7 |
| 1342 | 0.938 | 197 | *5.20* | *5.20* | | | 38.0 |
| 1343 | 0.938 | 197 | *5.30* | *5.30* | | | 37.3 |
| 1344 | 0.938 | 197 | *5.40* | *5.40* | | | 36.6 |
| 1345 | 0.938 | 197 | 5.50 | 5.50 | 5.00 | 6.00 | 35.9 |
| 1346 | 0.938 | 197 | 5.00 | 5.00 | 5.00 | 5.00 | 39.5 |
| 1347 | 0.938 | 197 | 5.00 | 5.00 | 5.00 | 5.00 | 39.5 |
| 1348 | 0.938 | 197 | 5.00 | 5.00 | 5.00 | 5.00 | 39.5 |
| 1349 | 0.938 | 197 | *4.87* | *4.87* | | | 40.5 |
| 1350 | 0.938 | 197 | 4.67 | 4.50 | 4.50 | 5.00 | 41.6 |
| 1351 | 0.937 | 197 | 5.34 | 6.00 | 5.01 | 7.00 | 36.9 |
| 1352 | 0.937 | 197 | *9.52* | *9.85* | | | *20.7* |
| 1353 | 0.937 | 197 | 13.70* | 13.70* | 13.70* | 13.70* | 14.4* |
| 1354 | 0.937 | 197 | 5.00 (15**) | 5.00 (15**) | 5.00 | 5.00 | 39.3 (13.1**) |
| 1355 | 0.936 | 197 | 5.42 | 5.42 | 5.42 | 5.42 | 36.2 |
| 1356 | 0.936 | 197 | 5.42 | 5.42 | 5.42 | 5.42 | 36.1 |
| 1357 | 0.936 | 197 | 5.00 | 5.00 | 5.00 | 5.00 | 39.1 |
| 1358 | 0.936 | 197 | 5.42 | 5.42 | 5.42 | 5.42 | 36.0 |
| 1359 | 0.935 | 197 | 6.00 | 6.00 | 6.00 | 6.00 | 32.5 |
| 1360 | 0.935 | 197 | 5.71 | 5.71 | 5.42 | 6.00 | 34.1 |
| 1361 | 0.935 | 197 | 12* | 12* | 5.5* | 12-20* | 16.2* |
| 1362 | 0.935 | 197 | *12* | *12* | | | 16.2 |
| 1363 | 0.934 | 197 | 5.42 (12**) | 5.42 (12**) | 5.42 | 5.42 | 35.8 (16.2**) |
| 1364 | 0.934 | 197 | 6.00 | 6.00 | 6.00 | 6.00 | 32.3 |
| 1365 | 0.934 | 197 | 6.00 | 6.00 | 6.00 | 6.00 | 32.2 |
| 1366 | 0.934 | 197 | 7.00 | 8.00 | 5.00 | 8.00 | 27.6 |
| 1367 | 0.933 | 197 | 5.50 | 5.50 | 5.00 | 6.00 | 35.0 |
| 1368 | 0.933 | 197 | 4.88 | 4.50 | 4.50 | 6.00 | 39.5 |
| 1369 | 0.933 | 196 | 5.72 | 6.00 | 4.50 | 6.00 | 33.6 |
| 1370 | 0.933 | 196 | 5.32 | 5.50 | 4.50 | 6.00 | 36.0 |
| 1371 | 0.932 | 196 | 5.69 | 6.00 | 4.50 | 6.00 | 33.7 |
| 1372 | 0.932 | 196 | 6.00 | 6.00 | 6.00 | 6.00 | 31.9 |
| 1373 | 0.932 | 196 | 6.00 | 6.00 | 6.00 | 6.00 | 31.8 |
| 1374 | 0.932 | 196 | 5.25 | 5.25 | 4.50 | 6.00 | 36.3 |
| 1375 | 0.931 | 196 | 6.00 | 6.00 | 6.00 | 6.00 | 31.7 |
| 1376 | 0.931 | 196 | 5.59 | 6.00 | 4.50 | 6.00 | 34.0 |

**Table A3.1 (cont.).** *Exchange rate of mark silver/lödig in mark penningar/örtug 1277–1541.*

| Year | Fineness of silver mark, assumption | Fine silver content of silver mark, grams | Exchange rate, likely mean | Exchange rate, likely median | Exchange rate, lowest recorded | Exchange rate, highest recorded | Fine silver content of mark in grams, based on exchange rate |
|---|---|---|---|---|---|---|---|
| 1377 | 0.931 | 196 | 5.84 | 6.00 | 4.50 | 7.20 | 32.5 |
| 1378 | 0.931 | 196 | 5.50 | 6.00 | 4.50 | 6.50 | 34.5 |
| 1379 | 0.930 | 196 | 6.00 | 6.00 | 6.00 | 6.00 | 31.5 |
| 1380 | 0.930 | 196 | 5.63 | 6.00 | 4.50 | 6.00 | 33.6 |
| 1381 | 0.930 | 196 | 5.95 | 6.00 | 4.50 | 6.50 | 31.7 |
| 1382 | 0.930 | 196 | 6.05 | 6.00 | 6.00 | 6.50 | 31.2 |
| 1383 | 0.930 | 196 | 6.05 | 6.00 | 4.50 | 7.00 | 31.1 |
| 1384 | 0.929 | 196 | 5.80 | 6.00 | 4.50 | 6.50 | 32.4 |
| 1385 | 0.929 | 196 | 6.03 | 6.00 | 5.00 | 6.50 | 31.1 |
| 1386 | 0.929 | 196 | 6.00 | 6.00 | 5.00 | 6.50 | 31.2 |
| 1387 | 0.929 | 196 | 5.75 | 6.00 | 5.00 | 7.00 | 32.5 |
| 1388 | 0.928 | 196 | 6.17 | 6.00 | 6.00 | 6.50 | 30.3 |
| 1389 | 0.928 | 195 | 6.38 | 6.25 | 6.00 | 7.00 | 29.2 |
| 1390 | 0.928 | 195 | 6.13 | 6.00 | 6.00 | 7.00 | 30.4 |
| 1391 | 0.928 | 195 | 6.40 | 6.00 | 6.00 | 7.00 | 29.0 |
| 1392 | 0.927 | 195 | 6.25 | 6.00 | 6.00 | 7.00 | 29.7 |
| 1393 | 0.927 | 195 | 6.00 | 6.00 | 6.00 | 6.00 | 30.9 |
| 1394 | 0.927 | 195 | 6.29 | 6.00 | 6.00 | 7.00 | 30.0 |
| 1395 | 0.927 | 195 | 6.00 | 6.00 | 6.00 | 6.00 | 30.8 |
| 1396 | 0.926 | 195 | 6.00 | 6.00 | 6.00 | 6.00 | 30.7 |
| 1397 | 0.926 | 195 | *6.12* | *6.12* | | | 30.1 |
| 1398 | 0.926 | 195 | 6.25 | 6.00 | 6.00 | 7.00 | 29.4 |
| 1399 | 0.926 | 195 | 6.13 | 6.00 | 6.00 | 7.00 | 30.0 |
| 1400 | 0.925 | 195 | 6.08 | 6.00 | 6.00 | 7.00 | 30.1 |
| 1401 | 0.925 | 195 | 6.13 | 6.00 | 6.00 | 7.20 | 29.9 |
| 1402 | 0.925 | 195 | 6.23 | 6.00 | 6.00 | 7.00 | 29.3 |
| 1403 | 0.925 | 195 | 6.14 | 6.00 | 6.00 | 7.00 | 29.7 |
| 1404 | 0.924 | 195 | 6.14 | 6.00 | 6.00 | 7.00 | 29.7 |
| 1405 | 0.924 | 195 | 6.29 | 6.00 | 6.00 | 8.00 | 28.9 |
| 1406 | 0.924 | 195 | 6.00 | 6.00 | 6.00 | 6.00 | 30.3 |
| 1407 | 0.924 | 195 | 6.17 | 6.00 | 6.00 | 7.00 | 29.4 |
| 1408 | 0.923 | 194 | *6.45* | 6.45 | | | 28.1 |
| 1409 | 0.923 | 194 | 6.75 | 6.50 | 6.00 | 8.25 | 26.8 |
| 1410 | 0.923 | 194 | 6.58 | 6.50 | 6.00 | 7.50 | 27.4 |
| 1411 | 0.923 | 194 | 6.60 | 6.00 | 6.00 | 8.00 | 27.3 |
| 1412 | 0.922 | 194 | 7.00 | 7.00 | 6.00 | 8.00 | 25.7 |
| 1413 | 0.922 | 194 | 7.10 | 7.00 | 6.00 | 8.50 | 25.3 |
| 1414 | 0.922 | 194 | 7.50 | 8.00 | 6.00 | 8.50 | 23.9 |

**Table A3.1 (cont.).** *Exchange rate of mark silver/lödig in mark penningar/örtug 1277–1541.*

| Year | Fineness of silver mark, assumption | Fine silver content of silver mark, grams | Exchange rate, likely mean | Exchange rate, likely median | Exchange rate, lowest recorded | Exchange rate, highest recorded | Fine silver content of mark in grams, based on exchange rate |
|---|---|---|---|---|---|---|---|
| 1415 | 0.922 | 194 | 8.00 | 8.00 | 8.00 | 8.00 | 22.4 |
| 1416 | 0.922 | 194 | 8.00 | 8.00 | 8.00 | 8.00 | 22.4 |
| 1417 | 0.921 | 194 | 7.43 | 8.00 | 6.00 | 8.50 | 24.0 |
| 1418 | 0.921 | 194 | 8.00 | 8.00 | 8.00 | 8.00 | 22.3 |
| 1419 | 0.921 | 194 | 7.25 | 7.50 | 6.00 | 8.00 | 24.6 |
| 1420 | 0.921 | 194 | 7.00 | 7.00 | 6.00 | 8.00 | 25.4 |
| 1421 | 0.920 | 194 | 7.67 | 7.50 | 6.00 | 9.00 | 23.2 |
| 1422 | 0.920 | 194 | 8.33 | 8.00 | 8.00 | 9.00 | 21.3 |
| 1423 | 0.920 | 194 | 8.00 | 8.00 | 8.00 | 8.00 | 22.2 |
| 1424 | 0.920 | 194 | 8.00 | 8.00 | 8.00 | 8.00 | 22.2 |
| 1425 | 0.919 | 194 | 8.00 | 8.00 | 8.00 | 8.00 | 22.2 |
| 1426 | 0.919 | 194 | 8.25 | 8.25 | 8.00 | 8.50 | 21.6 |
| 1427 | 0.919 | 194 | 8.00 | 8.00 | 8.00 | 8.00 | 22.2 |
| 1428 | 0.919 | 193 | 8.50 | 8.50 | 8.00 | 9.00 | 20.9 |
| 1429 | 0.918 | 193 | 8.50 | 8.50 | 8.50 | 8.50 | 20.9 |
| 1430 | 0.918 | 193 | 8.25 | 8.25 | 8.00 | 8.50 | 21.6 |
| 1431 | 0.918 | 193 | 8.25 | 8.25 | 8.00 | 8.50 | 21.6 |
| 1432 | 0.918 | 193 | 8.50 | 8.50 | 8.50 | 8.50 | 21.0 |
| 1433 | 0.917 | 193 | 8.33 | 8.50 | 8.00 | 8.50 | 21.4 |
| 1434 | 0.917 | 193 | 8.50 | 8.50 | 8.50 | 8.50 | 21.0 |
| 1435 | 0.917 | 193 | 8.50 | 8.50 | 8.50 | 8.50 | 21.0 |
| 1436 | 0.917 | 193 | 8.50 | 8.50 | 8.50 | 8.50 | 21.0 |
| 1437 | 0.916 | 193 | 8.40 | 8.50 | 8.00 | 8.50 | 21.2 |
| 1438 | 0.916 | 193 | 8.50 | 8.50 | 8.50 | 8.50 | 21.0 |
| 1439 | 0.916 | 193 | 8.33 | 8.50 | 8.00 | 8.50 | 21.4 |
| 1440 | 0.916 | 193 | 8.33 | 8.50 | 8.00 | 8.50 | 21.4 |
| 1441 | 0.915 | 193 | 9.00 | 9.00 | 8.50 | 9.50 | 19.8 |
| 1442 | 0.915 | 193 | 8.67 | 8.50 | 8.50 | 9.00 | 20.6 |
| 1443 | 0.915 | 193 | 8.50 | 8.50 | 8.00 | 9.00 | 21.0 |
| 1444 | 0.915 | 193 | 8.58 | 8.50 | 8.00 | 9.50 | 20.8 |
| 1445 | 0.914 | 193 | 8.75 | 9.00 | 8.00 | 9.00 | 20.4 |
| 1446 | 0.914 | 193 | 8.83 | 9.00 | 8.50 | 9.00 | 20.2 |
| 1447 | 0.914 | 193 | 8.67 | 8.50 | 8.00 | 9.00 | 20.6 |
| 1448 | 0.914 | 192 | 8.67 | 8.50 | 8.50 | 9.00 | 20.6 |
| 1449 | 0.914 | 192 | 8.68 | 8.50 | 8.50 | 9.00 | 20.6 |
| 1450 | 0.913 | 192 | 8.86 | 8.50 | 8.00 | 11.00 | 20.2 |
| 1451 | 0.913 | 192 | 8.50 | 8.50 | 8.00 | 9.00 | 21.0 |
| 1452 | 0.913 | 192 | 9.00 | 9.00 | 9.00 | 9.00 | 19.9 |

**Table A3.1 (cont.).** *Exchange rate of mark silver/lödig in mark penningar/örtug 1277–1541.*

| Year | Fineness of silver mark, assumption | Fine silver content of silver mark, grams | Exchange rate, likely mean | Exchange rate, likely median | Exchange rate, lowest recorded | Exchange rate, highest recorded | Fine silver content of mark in grams, based on exchange rate |
|---|---|---|---|---|---|---|---|
| 1453 | 0.913 | 192 | 8.51 | 8.50 | 8.10 | 9.00 | 21.0 |
| 1454 | 0.912 | 192 | 8.70 | 9.00 | 8.00 | 9.00 | 20.6 |
| 1455 | 0.912 | 192 | 8.50 | 8.50 | 8.00 | 9.00 | 21.0 |
| 1456 | 0.912 | 192 | *8.63* | *8.63* | | | 20.7 |
| 1457 | 0.912 | 192 | 8.75 | 8.75 | 8.50 | 9.00 | 20.4 |
| 1458 | 0.911 | 192 | 8.75 | 9.00 | 8.00 | 9.00 | 19.9 |
| 1459 | 0.911 | 192 | 8.50 | 8.50 | 8.50 | 8.50 | 21.1 |
| 1460 | 0.911 | 192 | 8.50 | 8.50 | 8.00 | 9.00 | 21.1 |
| 1461 | 0.911 | 192 | 9.14 | 9.00 | 8.50 | 9.50 | 19.6 |
| 1462 | 0.910 | 192 | 9.07 | 9.00 | 8.50 | 10.00 | 19.7 |
| 1463 | 0.910 | 192 | 9.36 | 9.00 | 9.00 | 10.00 | 19.1 |
| 1464 | 0.910 | 192 | 9.00 | 9.00 | 9.00 | 9.00 | 19.9 |
| 1465 | 0.910 | 192 | 9.25 | 9.25 | 9.00 | 9.50 | 19.4 |
| 1466 | 0.909 | 192 | 9.00 | 9.00 | 9.00 | 9.00 | 19.9 |
| 1467 | 0.909 | 191 | 8.75 | 8.75 | 8.50 | 9.00 | 20.5 |
| 1468 | 0.909 | 191 | 9.50 | 9.50 | 9.00 | 10.00 | 18.9 |
| 1469 | 0.909 | 191 | 9.50 | 9.50 | 9.00 | 10.00 | 18.9 |
| 1470 | 0.908 | 191 | 9.80 | 10.00 | 9.00 | 10.00 | 18.3 |
| 1471 | 0.908 | 191 | 9.13 | 9.00 | 8.50 | 10.00 | 19.7 |
| 1472 | 0.908 | 191 | 9.67 | 10.00 | 9.00 | 10.00 | 18.6 |
| 1473 | 0.908 | 191 | 9.33 | 9.00 | 9.00 | 10.00 | 19.2 |
| 1474 | 0.907 | 191 | 9.50 | 9.50 | 9.00 | 10.00 | 18.9 |
| 1475 | 0.907 | 191 | 10.00 | 10.00 | 10.00 | 10.00 | 17.9 |
| 1476 | 0.907 | 191 | 10.00 | 10.00 | 10.00 | 10.00 | 17.9 |
| 1477 | 0.907 | 191 | 9.50 | 10.00 | 8.50 | 10.00 | 18.9 |
| 1478 | 0.906 | 191 | 9.50 | 9.50 | 9.00 | 10.00 | 18.9 |
| 1479 | 0.906 | 191 | 9.71 | 10.00 | 9.00 | 11.00 | 18.5 |
| 1480 | 0.906 | 191 | 9.00 | 9.00 | 9.00 | 9.00 | 20.0 |
| 1481 | 0.905 | 191 | 10.75 | 10.75 | 9.50 | 12.00 | 16.7 |
| 1482 | 0.904 | 190 | 9.75 | 9.75 | 9.50 | 10.00 | 18.4 |
| 1483 | 0.903 | 190 | *9.88* | *9.88* | | | 18.2 |
| 1484 | 0.903 | 190 | 10.00 | 10.00 | 10.00 | 10.00 | 18.0 |
| 1485 | 0.902 | 190 | 9.17 | 9.00 | 8.50 | 10.00 | 19.6 |
| 1486 | 0.901 | 190 | 10.00 | 10.00 | 10.00 | 10.00 | 18.0 |
| 1487 | 0.901 | 190 | 11.00 | 11.00 | 11.00 | 11.00 | 16.3 |
| 1488 | 0.900 | 190 | *10.66* | *10.66* | | | 16.9 |
| 1489 | 0.899 | 189 | *10.32* | 10.32 | | | 17.4 |
| 1490 | 0.899 | 189 | 10.00 | 10.00 | 10.00 | 10.00 | 18.0 |

**Table A3.1 (cont.).** *Exchange rate of mark silver/lödig in mark penningar/örtug 1277–1541.*

| Year | Fineness of silver mark, assumption | Fine silver content of silver mark, grams | Exchange rate, likely mean | Exchange rate, likely median | Exchange rate, lowest recorded | Exchange rate, highest recorded | Fine silver content of mark in grams, based on exchange rate |
|---|---|---|---|---|---|---|---|
| 1491 | 0.898 | 189 | 9.88 | 9.88 | 9.50 | 10.00 | 18.2 |
| 1492 | 0.897 | 189 | 9.75 | 9.75 | 9.50 | 10.00 | 18.5 |
| 1493 | 0.897 | 189 | 11.00 | 11.00 | 11.00 | 11.00 | 16.4 |
| 1494 | 0.896 | 189 | 10.50 | 10.50 | 10.50 | 10.50 | 17.1 |
| 1495 | 0.895 | 189 | 10.25 | 10.25 | 10.00 | 10.50 | 17.6 |
| 1496 | 0.894 | 188 | 10.00 | 10.00 | 10.00 | 10.00 | 18.0 |
| 1497 | 0.894 | 188 | 10.00 | 10.00 | 10.00 | 10.00 | 18.0 |
| 1498 | 0.893 | 188 | *10.33* | *10.50* | | | 17.6 |
| 1499 | 0.892 | 188 | 10.67 | 11.00 | 10.00 | 11.00 | 17.2 |
| 1500 | 0.892 | 188 | 12.00 | 12.00 | 12.00 | 12.00 | 15.0 |
| 1501 | 0.891 | 188 | *12.24* | *12.24* | | | 14.7 |
| 1502 | 0.890 | 188 | *12.49* | *12.49* | | | 14.4 |
| 1503 | 0.890 | 187 | *12.74* | *12.74* | | | 14.2 |
| 1504 | 0.889 | 187 | 13.00 | 13.00 | 13.00 | 13.00 | 13.9 |
| 1505 | 0.888 | 187 | 12.50 | 12.50 | 12.00 | 13.00 | 14.4 |
| 1506 | 0.888 | 187 | 13.00 | 13.00 | 13.00 | 13.00 | 13.9 |
| 1507 | 0.887 | 187 | 13.00 | 13.00 | 13.00 | 13.00 | 13.9 |
| 1508 | 0.886 | 187 | 13.00 | 13.00 | 13.00 | 13.00 | 13.9 |
| 1509 | 0.885 | 186 | 13.00 | 13.00 | 13.00 | 13.00 | 13.9 |
| 1510 | 0.885 | 186 | 13.00 | 13.00 | 13.00 | 13.00 | 13.9 |
| 1511 | 0.884 | 186 | 13.00 | 13.00 | 13.00 | 13.00 | 13.9 |
| 1512 | 0.883 | 186 | 13.00 | 13.00 | 13.00 | 13.00 | 13.9 |
| 1513 | 0.883 | 186 | *14.50* | *14.50* | | | 12.5 |
| 1514 | 0.882 | 186 | 16.00 | 16.00 | 16.00 | 16.00 | 11.3 |
| 1515 | 0.881 | 186 | 16.00 | 16.00 | 16.00 | 16.00 | 11.3 |
| 1516 | 0.881 | 185 | 12.00 | 12.00 | 12.00 | 12.00 | 15.1 |
| 1517 | 0.880 | 185 | 14.00 | 14.00 | 14.00 | 14.00 | 12.9 |
| 1518 | 0.879 | 185 | 16.00 | 16.00 | 16.00 | 16.00 | 11.3 |
| 1519 | 0.878 | 185 | 16.00 | 16.00 | 16.00 | 16.00 | 11.3 |
| 1520 | 0.878 | 185 | 15.00 | 15.00 | 14.00 | 16.00 | 12.1 |
| 1521 | 0.877 | 185 | 22.00 | 22.00 | 22.00 | 22.00 | 8.2 |
| 1522 | 0.876 | 185 | *36.00* | *36.00* | | | *5.0* |
| 1523 | 0.876 | 184 | 50.00 | 50.00 | 16.00 | 50.00 | 3.6 |
| 1524 | 0.875 | 184 | 19.25 (50**) | 19.25 (50**) | 19.25 | 19.25 | 9.4 (3.6**) |
| 1525 | 0.875 | 184 | 16.00 | 16.00 | 16.00 | 16.00 | 11.3 |
| 1526 | 0.875 | 184 | *17.33* | *17.33* | | | *10.4* |
| 1527 | 0.875 | 184 | *18.67* | *18.67* | | | *9.7* |

**Table A3.1 (cont.).** *Exchange rate of mark silver/lödig in mark penningar/örtug 1277–1541.*

| Year | Fineness of silver mark, assumption | Fine silver content of silver mark, grams | Exchange rate, likely mean | Exchange rate, likely median | Exchange rate, lowest recorded | Exchange rate, highest recorded | Fine silver content of mark in grams, based on exchange rate |
|---|---|---|---|---|---|---|---|
| 1528 | 0.875 | 184 | 20.00 | 20.00 | 20.00 | 20.00 | 9.0 |
| 1529 | 0.875 | 184 | *20.00* | *20.00* | 18.00 | 24.00 | 9.0 |
| 1530 | 0.875 | 184 | *20.00* | *20.00* | 24.00 | 24.00 | 9.0 |
| 1531 | 0.875 | 184 | *20.00* | *20.00* | 16.00 | 20.00 | 9.0 |
| 1532 | 0.875 | 184 | *20.00* | *20.00* | | | 9.0 |
| 1533 | 0.875 | 184 | *20.00* | *20.00* | | | 9.0 |
| 1534 | 0.875 | 184 | *20.00* | *20.00* | | | 9.0 |
| 1535 | 0.875 | 184 | *20.00* | *20.00* | 16.00 | 24.00 | 9.0 |
| 1536 | 0.875 | 184 | *20.00* | *20.00* | 18.00 | 20.00 | 9.0 |
| 1537 | 0.875 | 184 | *20.00* | *20.00* | | | 9.0 |
| 1538 | 0.875 | 184 | *20.00* | *20.00* | 20.00 | 24.00 | 9.0 |
| 1539 | 0.875 | 184 | *20.00* | *20.00* | 24.00 | 24.00 | 9.0 |
| 1540 | 0.875 | 184 | *20.00* | *20.00* | 24.00 | 24.00 | 9.0 |
| 1541 | 0.875 | 184 | *20.00* | *20.00* | 19.33 | 19.33 | 9.0 |

* Cross rates based on foreign exchange rates or prices.

** Debased coins.

Comment: Values in italics are intrapolations or guesstimates.

Sources: *Arvid Trolles jordebok 1498* (1938, pp. 186, 194–5, 200 and 205), *Dalslands diplomatarium* (1996, pp. 131, 203, 230 and 245), *Diplomatarium dalekarlicum, vol. 3* (1846, pp. 197–8), *Diplomatarium Norvegicum, vol. 16* (1903, no. 169, 189, 209, 211 and 323), Dijkman (1686), Dovring (1947, p. 194), Forssell (1872, pp. 22–4, 52 and 90–1), Franzén (2006), Gillingstam (1996, pp. 129 and 135–6), Lönnroth (1940, pp. 145–6, 192, 196–7, 200 and 203–4), *Närkes medeltida urkunder 1. Riseberga kloster* (1935, pp. 67 and 106), *Raven van Barnekows räkenskaper för Nyköpings fögderi 1365–1367* (1994), SDhk, *Stockholms stads jordebok 1420–1474* (1876, pp. 16, 25, 38, 52, 69, 73, 107, 113–4, 245, 253, 257 and 418–20), *Stockholms stads tänkeböcker 1474–1483 samt burspråk* (1917, p. 327), *Stockholms stads tänkeböcker 1483–1492* (1944, p. 84), Styffe (1875, pp. cxxvi n 2, cxxxvii n 2), *Svenska medeltidsregester 1434–1441* (1937, pp. 160, 330 and 506), *Svenska riksarchivets pergamentsbref: från och med år 1351. D. 1, 1351–1382, D. 2, 1383–140*, and Thordeman (1936). See also the main text.

**Table A3.2.** *Value of mark silver and the Swedish mark in mark gutnisk/stackot/tysk/östgötsk 1211–1538.*

| Year | 1 silver mark in mark gutnisk/ stackot/ tysk/ östgötsk | 1 Swedish mark in mark gutnisk/ stackot/ tysk/ östgötsk | Relation | Source |
|---|---|---|---|---|
| 1211 | 4.5 | | 1 mark silver = 4.5 mark gutnisk. | Myrberg (2008, p. 88) |
| 1265 | 6 | | 1 mark silver = 6 mark rigisk. We assume: 1 mark gutnisk = 1 mark rigisk. | Table A3.5 |
| 1312 | 7 | 1.4 | 1 mark silver = 5 mark svensk = 7 mark gutnisk | SDhk 2506 |
| 1333 | | | 1 mark Skara weight [215 gram] Gotlandic coins = 38 $^{2}/_{3}$ gros tournois [= 3.4-4 mark penningar] | Fritz and Bäärnhielm (1990, no. 234) |
| 1343 | | | 1 Gotlandic mark silver = 30 groat of Flanders (= 0.9-1.1 mark of Lübeck). | Fritz and Bäärnhielm (1990, no. 461), and Spufford (1986, pp. 226-227) |
| 1351 | | 0.9? | 44 mark silver, 9 öre and 1 örtug in Gotlandic coins = 132 mark and 6 öre in Swedish coins, i.e. 1 mark silver of Gotland (=2 $^{2}/_{3}$ mark gutnisk?) ≈ 3 mark örtug | Hyöyniemi (1999, p. 8) |
| 1354 | | | Gotlandic pennies were evaluated to the old Swedish coin | SDhk 6802 |
| 1364 | 7.75 | (1.3) | 1 mark silver = 7.75 mark in Gotlandic coins | Hyötyniemi (1999, p. 15) |
| 1389 | (7.7) | 1.2 | 1 gotnisk penning [= 1/32 mark tysk/ gutnisk] = 5 svenska penningar. | Hildebrand (1894, p. 941) |
| 1402 | | | 1 Gotlandic silvermark = 32 [Gotlandic] öre | Hyötyniemi (1999, p. 9) |
| 1405 | (6.3) | 1 | 'swænska pæninga' [örtug] = 8 'pæninga' and 'gutniscan pæning' = 6 'pæninga'. We assume: 1 öre gutnisk = 4 gutniska penningar | SDhk 16470 |
| 1408 | (8) | (1.25) | 2 'artinge gotländisch' [= 2/32 mark gutnisk] = 1/60 Prussian mark. We assume: 1 Prussan mark = 3 mark örtug | Joachim (1896, p. 450) |
| 1411 | | (1) | 1 öre (gutnisk) = 4 'gotlandske penge' = 3 'hvide tyske penge' [i.e. 1 mark lybsk = 2 mark gutnisk]. We assume: 1 mark örtug = ½ mark lybsk. | Danmarks riges breve, 4. række, bind 12, 1410–12, no. 310 |
| 1413 | (11) | 1.5 | 24 mark 'thyst tal, ok tho i gotniskom pæningom' = 16 mark 'swenska pæninga' | SDhk 18147 |
| 1420 | 15 | (1.9) | 1 mark lödig = 15 mark (Östergötland) | SDhk 19573 |
| 1420 | 15 | (1.9) | 1 mark lödig = 15 mark 'her i Østergøtlande' | SDhk 19579 |

**Table A3.2 (cont.).** *Value of mark silver and the Swedish mark in mark gutnisk/stackot/tysk/östgötsk 1211–1538.*

| Year | 1 silver mark in mark gutnisk/ stackot/ tysk/ östgötsk | 1 Swedish mark in mark gutnisk/ stackot/ tysk/ östgötsk | Relation | Source |
|---|---|---|---|---|
| 1422 | 14 | (1.7) | 1 mark lödig = 14 mark gutniska | Dovring (1947, p. 195) |
| 1424 | | | 1 gute = 3/8 German Witten, i.e. [i.e. 1 mark of Lübeck = 4 mark gutnisk] | Lundholm (1956, p. 212) |
| 1426 | 15 | (1.8) | 1 mark lödig = 15 mark (Skänninge, Östergötland) | B.E. Hildebrands samlingar, vol 5 |
| 1426 | 20 | (2.4) | 1 mark lödig = 20 mark in Östergötland | Hildebrand (1894, p. 941) |
| 1427 | (16) | 2 | 1 mark gutnisk = ½ mark svensk | Dovring (1947, p. 195) |
| 1430 | 20 | (2.4) | 1 mark lödig = 20 penningemarker in Östergötland | Hildebrand (1894, p. 941) |
| 1431 | 20 | (2.4) | 1 mark lödig = 20 mark (Hanekind, Östergötland) | B.E. Hildebrands samlingar, vol 5 |
| 1432 | 18 | (2.1) | 1 mark lödig = 18 mark gutniska | Dovring (1947, p. 195) |
| 1434 | (21) | (2.5) | 1 noble = 10 mark gutniska. We assume: 1 noble = 4 mark örtug. | Hallenberg (1798, p. 17) |
| 1440 | 28 | (3.4) | 1 mark lödig = 28 mark (Linköping) | Lappkatalogen nr 46 |
| 1440 | 30 | (3.6) | 1 mark lödig = 30 mark (Linköping) | Lappkatalogen nr 64 |
| 1444 | 40 | (4.6) | 1 mark lödig = 40 mark (Linköping) | Lappkatalogen nr 152 |
| 1445 | 40 | (4.5 ) | 1 mark lödig = 40 mark (Skänninge, Östergötland) | B.E. Hildebrands samlingar, vol 5 |
| 1446 | (36) | 4 | 1 öre (gutnisk) = 6 penningar = 3 'svarta gutar'. | Dovring (1947, p. 197) |
| 1450 | 40 | (4.5 ) | 1 mark lödig = 40 mark (Skänninge, Östergötland) | B.E. Hildebrands samlingar, vol 5 |
| 1453 | (51?) | (6? ) | 8 'gotniska bode nye oc gamble gongen' = 1 örtug. We assume: 4 'gotniska' = 1 öre gutnisk = 1/8 mark gutnisk. | Liedgren (1967, p. 15) |
| 1453 | (34? ) | (4? ) | 8 'gotniska bode nye oc gamble gongen' = 4 'grossa' = 1 örtug. Hyötyniemi assume: 3 grossa = 1 öre gutnisk. | Liedgren (1967, p. 15), and Hyötyniemi (2002) |
| 1455 | | 3 or 4? | 1 mark svensk = 3 mark gutnisk. | Dovring (1947, p. 195) |
| 1456 | (35) | 4 | 1 öre (gutnisk) = 6 penningar = 2 danska vita. | Dovring (1947, p. 197) |
| 1457 | | 3 | 1 mark stockholmsmynt = 3 mark grossa. | Sjögren (1944, p. 354) |
| 1459 | 30 | (3.5) | 1 mark lödig = 30 mark gutnisk | Dovring (1947, p. 195) |
| 1461 | 40 | (4.4) | 1 mark lödig = 40 mark in 'Vadstena östgötska penningar' | RA, pergamentsbrev 1461-01-03 |
| 1464 | (36) | 4 | 1 öre gutnisk = 6 penningar | Dovring (1947, p. 196) |
| 1472 | (39) | (4) | 1 gyllen = 6 mark gunniska/stackota (the two were used as synonyms). We assume: 1 gyllen = 1.5 mark örtug | Hildebrand (1894, p. 942) |
| 1473 | | 3 or 4? | 1 mark svensk = 3 mark gutnisk. | Dovring (1947, p. 195) |

**Table A3.2 (cont.).** *Value of mark silver and the Swedish mark in mark gutnisk/stackot/tysk/östgötsk 1211–1538.*

| Year | 1 silver mark in mark gutnisk/ stackot/ tysk/ östgötsk | 1 Swedish mark in mark gutnisk/ stackot/ tysk/ östgötsk | Relation | Source |
|---|---|---|---|---|
| 1474 | | 3 or 4? | 1 mark svensk = 3 mark gutnisk. | Dovring (1947, p. 195) |
| 1479 | | 3 or 4? | 1 mark svensk = 3 mark gutnisk. | Dovring (1947, p. 195) |
| 1480 | 16 | 1.4 | 1 mark lödig = 16 mark 'gutniska vita' = 12 mark 'Stockholms halvörtugar' = 11.5 mark 'nya Stockholms örtug'. Probably relates to the metallic contents of coins rather than actual value relations. | Dovring (1947, p. 197) |
| 1482 | | 3 or 4? | 1 mark svensk = 3 mark gutnisk. | Dovring (1947, p. 195) |
| 1482 | (53) | 5 ⅓ | 1 öre stackot = ½ skilling [= 1/32 mark dansk] | Lundholm (1956, p. 212) |
| 1487 | (40) | 4 | Mark gutnisk was probably here used as a unit of account. | Sjögren (1944, pp. 120–1) |
| 1487 | | 3 | 4×18 örtugar = 9 mark gutniska | Sjögren (1944, p. 354) |
| 1496 | | 3 or 4? | 1 mark svenska = 3 mark stackota | Hyötyniemi (2000, p. 51) |
| 1513 | (< 39) | < 2⅔ | Flour was purchased for 2 marks danska and sold for 4 marks gutniska [probably Gotlandic hvids, containing 0.1-0.13 grams fine silver per hvid]. Two other goods were sold for 16 and 33 per cent, respectively, above the purchase price. We assume 2 marks danska = 1.5 mark örtug. | SDhk 37475 |
| 1514 | 48 | (3) | 1 mark lödig = 48 mark gutnisk | Dovring (1947, p. 195) |
| 1515 | (64) | 4 | Mark gutnisk was probably here used as a unit of account. | Lundholm (1956, p. 229) |
| 1533 | (68) | 4 | Mark gutnisk was here a unit of account | Hallenberg (1798, pp. 170–2) |
| 1535 | (68) | 4 | Mark gutnisk was here a unit of account | Hallenberg (1798, pp. 172–3) |
| 1536 | (72) | 4 | Mark gutnisk was here a unit of account | Hallenberg (1798, pp. 173–4) |
| 1537 | (76) | 4 | Mark gutnisk was here a unit of account | Hallenberg (1798, pp. 174–5) |
| 1538 | (80) | 4 | Mark gutnisk was here a unit of account | Hallenberg (1798, pp. 181–7) |

Comments: The numbers in parentheses are our own estimates based on cross exchange rates (mainly through mark lödig in mark örtug); a question mark signifies a very uncertain interpretation of the sources.

**Table A3.3.** *Value of mark silver and the Swedish mark in marks of other Nordic regions.*

| Year | 1 silver mark in Nordic marks | 1 Swedish mark in Nordic marks | Relation/mark currency | Source |
|---|---|---|---|---|
| 1231 | 3 | | Danish mark | Fauerholdt Jensen (1980, p. 88) |
| 1240 | 2 | | 1 mark silver = 2 Danish mark penningar [older coins] | Fauerholdt Jensen (1980, p. 88) |
| 1256 | 3.71 | | Danish mark | KHL, 'Myntförsämring' |
| 1263-1266 | 4.44 | | Danish mark | KHL, 'Myntförsämring' |
| 1275 | 3 | | Norwegian mark | KHL, 'Myntförsämring' |
| 1275/1280 | 4 | | Norwegian mark | KHL, 'Myntförsämring' |
| 1285 | 3 | | Norwegian mark | Nordström (1850, p. 38) |
| 1274-1282 | 4.8 (5 in Danish weight) | 1 | 1 mark silver Danish weight = 1.04 mark silver Swedish weight = 5 Danish mark = 5 Swedish mark | Fauerholdt Jensen (1980, pp. 30 and 81-86), and SDhk 1207 |
| 1282 | | | 1 mark in Swedish weight = 0.96 mark in Danish weight | Fauerholdt Jensen (1990, p. 81) |
| 1296 | 6.67 | (1.3-2.2) | Danish mark | KHL, 'Myntförsämring' |
| 1298 | 5.33 | (1-1.5) | Danish mark | KHL, 'Myntförsämring' |
| 1299 | 4.5 | (1) | Norwegian mark | KHL, 'Myntförsämring' |
| 1306 | 8 | (2) | Danish mark | KHL, 'Myntförsämring' |
| 1311 | 4.5 | (0.9) | Norwegian mark | KHL, 'Myntförsämring' |
| 1313 | 4.07 | (0.8) | Scania mark | KHL, 'Myntförsämring' |
| 1313-1314 | 10-10.67 | (2) | Danish mark | KHL, 'Myntförsämring' |
| 1325 | 4.5 | (0.9) | Scania mark | KHL, 'Myntförsämring' |
| 1326 | 4.5 | (0.9) | Norwegian mark | KHL, 'Myntförsämring' |
| 1332-1334 | (4.5) | 8/9 | 1 mark of Scania = 1 mark 1 öre of Sweden | Franzén (2006, p. 157) |
| 1332-1334 | (4.5) | 8/9 | 1 Swedish mark = 10 2/3 gros tournois and 1 mark of Scania = 12 gros tournois | Fritz and Bäärnhielm (1990, no. 146) |
| 1334 | 4.5 | (0.8-0.9) | 1 mark of Scania = 1 skilling (12) gros tournois. We assume: 1 mark penningar = 9.6-11.3 gros tournois. | Fauerholdt Jensen (1980, p. 20), Table A3.6 |
| 1338 | 10 | (2) | Danish mark | KHL, 'Myntförsämring' |
| 1348 | (5) | 1 | Monetary union between Sweden and Norway | Rasmusson (1943, p. 270) |
| 1350s | 4.44-5 | (0.8-1) | Norwegian mark | KHL, 'Myntförsämring' |
| 1355 | (5-6) | 1 | Monetary union between Sweden and Norway | Rasmusson (1943, p. 270) |
| 1358 | (5-6) | 1 | Monetary union between Sweden and Norway | Rasmusson (1943, p. 270) |
| 1350-1360 | 5 | (0.8-1) | Scania mark | KHL, 'Myntförsämring' |
| 1357 | 4.3 | (0.8-0.9) | Scania mark | Fauerholdt Jensen (1980, p. 23) |
| 1357 | (4) | (0.8) | 1 Danish mark = 10 schillinge of Lübeck. We assume: 1 Swedish mark = 8 schillinge of Lübeck. | Spufford (1986, p. 283) |

**Table A3.3 (cont.).** *Value of mark silver and the Swedish mark in marks of other Nordic regions.*

| Year | 1 silver mark in Nordic marks | 1 Swedish mark in Nordic marks | Relation/mark currency | Source |
|---|---|---|---|---|
| 1358 | 5 | (0.9) | 1 mark silver = 5 new mark of Scania | Fritz and Bäärnhielm (1990, no. 1080) |
| 2nd half of 14th century | 6 | (1) | Norwegian mark | KHL, 'Myntförsämring' |
| 1360 | (4.8) | 0.83 | 5 mark of Scania = 6 mark 1 öre of Sweden | Franzén (2006, p. 157) |
| 1369 | 5.625 | | Scania mark | KHL, 'Myntförsämring' |
| 1380 | (4.5) | (0.6) | 12 Witten of Flensborg = 10 Witten of Lübeck. We assume: 1 Swedish mark = 24 Witten of Lübeck. | KHL, 'Hvid' |
| 1386 | (4.8) | (0.8) | 1 Danish mark = 10 schillinge of Lübeck. We assume: 1 Swedish mark = 8 schillinge of Lübeck. | Spufford (1986, p. 283) |
| 1406 | (4) | (0.67) | 1 Danish mark = 12 schillinge of Lübeck. We assume: 1 mark of Lübeck = 2 mark örtug. | Spufford (1986, p. 283) |
| 1420 | 3 | (0.375) | 4 'ænglisca' [= 1/64 Danish mark, although this may have not been Danish money] = 1 'øre', 8 'øra' = 1 mark, 1 'lødhogh mark' = 6 mark | SDhk 19466 |
| 1424 | | | 1 Danish Witten = ½ Witten of Lübeck and 1 Danish penning = ½ lybsk penning, i.e. 1 mark of Lübeck = ½ Danish mark. | Lundholm (1956, p. 212) |
| 1437 | (6.1) | 0.73 | 17 mark jämtsk 4 öre = 24 mark svenska | Ahnlund (1948, p. 482) |
| 1453 | (11.3) | 4/3 | 1 'dansk hwit' [4-penning-coin] = 3 'peninga' | Liedgren (1967, p. 15) |
| 1453 | (10.2) | 1.2 | 1 'dansk Skilling' = 10 'peninga' | Liedgren (1967, p. 15) |
| 1453 | (12.8) | 1.5 | 1 'ny dansk Ängilsk' [new 3-penning-coin] = 2 'peninga' | Liedgren (1967, p. 15) |
| 1453 | (8.5) | 1 | 1 'gammal Ängilsk' [old 3-penning-coin of Denmark = 1/64 Danish mark] = 3 'peninga' | Liedgren (1967, p. 15) |
| 1456 | (35) | 4/3 | 6 penningar = 2 danska vita [= 2/48 Danish mark]. | Dovring (1947, p. 197) |
| 1480 | 14 | 1.19 | 1 mark lödig = 14 mark 'kung Kristians vita' = 12 mark Stockholms halvörtugar = 11.5 mark Stockholms örtugar. | Dovring (1947, p. 197) |
| 1480 | 13.6 | 1.15 | 1 mark lödig = 13.5 mark and ½ öre 'danska vita' = 12 mark Stockholms halvörtugar = 11.5 mark Stockholms örtugar. | Dovring (1947, p. 197) |
| 1493 | (13.3) | 4/3 | 2 'danska gamla vita mark' = 1 Rhinish gulden. We assume: 1 Rhinish gulden = 1.5 mark örtug | *Arvid Trolles jordebok 1498* (p. 249, no. 174) |
| 1539 | | 4/3 | 1 Danish mark = 6 öre | Hallenberg (1798, p. 150) |
| 1541 | | 0.9 | 1 joakimsdaler = 3 mark danskt mynt. We assume: 1 joakimsdaler = 3.5 mark in Swedish coins | SS, O:1, f. 74 |
| 1545 | | 0.8 | 3 mark danska penningar = 5 mark danska i svenska penningar = 3 mark 6 öre mark örtug | Hallenberg (1798, p. 307) |
| 1602 | | 1 | 1 Danish mark = 8 öre | SS, O:1, f. 141 |
| 1618 | | 0.8 | 1 Danish mark = 10 öre | SS, OO, f. 597 |

**Table A3.4.** *Value of mark silver and the Swedish mark in mark of Lübeck.*

| Year | 1 silver mark in mark of Lübeck | 1 Swedish mark in mark of Lübeck | Relation | Source |
|---|---|---|---|---|
| 1307 | 2.75 | (0.55) | 1100 mark lübska penningar = 400 mark lödigt silver | SDhk 2227 |
| 1342 | 2.8 | (0.56) | 1 mark silver = 45 schillinge of Lübeck. | Fauerholdt Jensen (1990, p. 21) |
| 1349 | (2.5) | 0.5 | 165 'mark lybskt mynt' = 330 'mark gängse svenskt mynt' | SDhk 5862 |
| 1361 | ? | <0.5 | 'en eller flera penningar i nu gängse mynt' = 'högst ½ penning lybskt mynt' | SDhk 8044 |
| 1364 | (3) | 0.5 | 2600 mark penningar = 1300 mark lybska | Franzén (2006, p. 287) |
| 1367 | (2.5) | 0.5 | 1 penning = ½ lybsk penning | SDhk 9056 |
| 1375 | (3) | 0.5 | 1 lybsk penning = 2 svenska penningar | SDhk 10692 |
| 1376 | (3) | 0.5 | 5 lybska mark = 10 mark svenska penningar | SDhk 40742 |
| 1390 | (3.1) | 0.5 | 1 mark of Lübeck = 2 Swedish mark | SRP 2499 |
| 1398 | (4) | (0.625) | 1 Prussian mark = 3 Swedish mark, and 1 Prussian mark = 30 schillinge of Lübeck (1399) | Hirsch (1858, p. 243), and Sattler (1887, p. 144) |
| 1400 | (2.6) | (0.43) | 1 Prussian mark = 4 Swedish mark, and 1 Prussian mark = 27.25 schillinge of Lübeck | Hirsch (1858, p. 243), and Sattler (1887, p. 144) |
| 1400 | 2.8 | (0.46) | 1 mark lödig = 45 schillinge of Lübeck | Fauerholdt Jensen (1990, p. 26 |
| 1411 | 2.8 | (0.43) | 1 mark lödig = 45 schillinge of Lübeck | Fauerholdt Jensen (1990, p. 26) |
| 1413 | 2.8 | (0.4) | 1 mark lödig = 45 schillinge of Lübeck (good ones) | Fauerholdt Jensen (1990, p. 27) |
| 1424 | (4) | 0.5 | 4-penning coin minted in Åbo = 2 holenpfennings of Lübeck | Hallenberg (1798, p. 15) |
| 1424 | (5.25) | (0.66) | 1 noble = 42 schillinge of Lübeck and 1 noble = 4 mark penningar | Hallenberg (1798, p. 15), and Hildebrand (1983, p. 946) |
| 1425 | 2.8 | (0.35) | 1 mark lödig = 45 schillinge of Lübeck (probably older, better ones) | Fauerholdt Jensen (1990, p. 27) |
| 1453 | (9.3) | 1.09 | 1 'Städer Skilling' = 11 'peninga' | Liedgren (1967, p. 15) |
| 1453 | (8.5) | 1 | 8 'Städer peninga' = 1 örtug | Liedgren (1967, p. 15) |
| 1460 | (7.7) | 0.96 | 1 mark = 23 solidi lub. [= 23/24 mark of Lübeck] | SDhk 27668 |
| 1484 | (10) | 1 | 1 mark of Lübeck = 1 Swedish mark | *Stockholms stads skottebok 1516–1525* (p. 307) |
| 1524 | (11) | 0.67 | 1 mark of Lübeck = 1.5 Swedish mark | Hammarström (1956, p. 405) |
| 1531 | (8.5) | 0.5 | 1 mark of Lübeck = 2 Swedish mark | Hammarström (1956, p. 405) |
| 1532 | (10.6) | 0.625 | 1 mark of Sweden = 10 schillinge of Lübeck | * |
| 1539 | | 0.5 | 1 mark lybsk = 2 mark örtug | Hallenberg (1798, p. 150) |
| 1541-1543 | | 0.65 | 1 daler = 3 mark örtug = 31 sk Lybsk. We assume: 1 mark lödig = 20 mark örtug. | SS, OO, f. 173. |
| 1544 | | 0.5 | 1 mark lybsk = 2 mark örtug | Hallenberg (1798, p. 285) |

* http://www.histosem.uni-kiel.de/lehrstuehle/land/waehrung/Katalog.html.

**Table A3.5.** *Value of mark silver and the Swedish mark in mark rigisk/revalsk.*

| Year | 1 silver mark in mark rigisk/ revalsk | 1 Swedish mark in mark rigisk/ revalsk | Relation | Source |
|---|---|---|---|---|
| 1211 | 4.5 | | 1 mark rigisk = 1 mark gutnisk (=1/4.5 mark silver). | Myrberg (2008, p. 88) |
| 1265 | 6 | | 1 mark silver (Danish weight) [= 1.04 mark silver Swedish weight = 1.04 mark silver in the weight of Reval] = 6 mark revalsk 1 öre | Fauerholdt Jensen (1990, pp. 81–4) |
| 1282 | | | 1 mark silver in Swedish weight = 1 mark silver in the weight of Reval | Fauerholdt Jensen (1990, p. 81) |
| 1315 | 6 | | 1 mark silver = 6 mark rigiska | Hyötyniemi (1999, p. 6) |
| 1316 | 6 | | 1 mark silver = 6 mark rigiska | Hyötyniemi (1999, p. 13) |
| 1343 | | | The coins of Riga were to be equal to Gotlandic coins. | Hauberg (1891) |
| 1401 | (7) | 1.11* | 1 öre = 5 räfliska | Nordström (1850, p. 161) |
| 1404 | (7) | 1.11* | 5 'ræflisk' = 1 öre | KHL, 'Baltiska mynt' |
| 1409 | (6) | 0,89* | 4 'Ræfflisca' = 1 'øra' | KHL, 'Baltiska mynt' |
| 1409 | (4) | 0.59* | 'en Ræuelisc ortogh fore IX peninga' | Åbo domkyrkas svartbok no. 322 |
| 1411 | (7) | 1.11* | 5 revalska = 1 öre | De la Gardiska archivet 16 (1842, p. 181) |
| 1414 | (7) | 0.89* | 1 old (Åbo-)örtug = 6 penningar | KHL, 'Baltiska mynt' |
| 1414 | (8) | 1.07* | 1 revalsk = 5 svenska småpenningar | FMU 1426 |
| 1414 | (8) | 1.07* | 1 revalsk = 5 svenska småpenningar | Åbo domkyrkas svartbok no. 345 |
| 1414 | (13) | 1.78* | 1 revalsk = 3 penningar [official rate, probably not a market rate] | Åbo domkyrkas svartbok no. 349, KHL, 'Baltiska mynt' |
| 1414 | (9) | 1.16* | '89 Åbo-mark (5 revalska = 1 öre – 1 penning)' | SDhk 18390 |
| 1415 | (7) | 0.89* | '40 mark viborgsmynt (4 revalska = 1 öre)' | SDhk 18543 |
| 1416 | (9) | 1.11* | 1 revalsk skilling = 1/5 öre | Åbo domkyrkas svartbok no. 364 |
| 1416 | (11) | 1.33* | 6 revalska örtug = 1 öre | Åbo domkyrkas svartbok no. 366 |
| 1418 | (9) | 1.07* | 1 revalsk = 5 svenska småpenningar | FMU 1521 |
| 1431 | (9) | 1.11 | 5 revalska örtug = 1 öre | Åbo domkyrkas svartbok no. 435 |
| 1436 | (11) | 1.33 | Åbosk penning [= 1/36 mark rigisk] = 4 penningar (according to the source, worth 6 penningar earlier) | Nordström (1850, p. 161) |
| 1447 | 9 | (1.04) | 1 mark lödig = 9 mark rigisk | FMU 2698 |
| 1451 | (8.5) | 1 | 3 skilling rigiska = 2 örtug | KHL, 'Baltiska mynt' |

**Table A3.5 (cont.).** *Value of mark silver and the Swedish mark in mark rigisk/revalsk.*

| Year | 1 silver mark in mark rigisk/ revalsk | 1 Swedish mark in mark rigisk/ revalsk | Relation | Source |
|---|---|---|---|---|
| 1453 | (11) | 1.33 | 1 öre = 6 aboskor | Stockholms stads jordebok 1420–1474 (p. 226) |
| 1477 | (8) | 8/9 | 1 abo = 6 penningar | KHL, 'abo' |
| 1505-1506 | (14) | 1.11 | | KHL, 'Baltiska mynt' |
| 1527 | (16) | 8/9 | 1 mark rigisk = 9 öre | Hammarström (1956, p. 426) |
| 1533 | (16) | 8/9 | 1034 mark revalska = 1163.25 mark örtug | *Handlingar till belysande af Finlands kamerala förhållanden på 1500-talet*, 1 (1892, p. 21) |
| 1535 | (16) | 8/9 | 1298 mark rigiska = 1460 mark örtug | Hallenberg (1798, pp. 237–8) |
| 1539 | | 8/9 | 1548 mark 12 skilling rigiska = 1741.25 mark örtug | *Handlingar rörande Finlands kamerala förhållanden på 1500-talet*, 2 (1899, p. 1) |
| 1541 | | 8/9 | 1 mark [örtug] = 32 skylling [of Riga, 1 mark of Riga = 36 skilling] | Hallenberg (1798, pp. 238–9) |

* See comment below.

Comment: There seem to be three different countings of mark rigisk in the Middle Ages. Up to the early 14th century the mark rigisk was set equal to 24 artig; during the 14th century up to the 1420s the mark silver of Riga was counted as 144 artig; from 1420s the mark of Riga was set equal to 36 old artig or new schillings. To present a consistent series, the table counts one mark rigisk as 36 revalsk for the first two decades of the 15th century as well (to estimate the value of the mark silver and Swedish mark in the higher-valued mark rigisk for this period, the data must be divided by four).

**Table A3.6.** *Value of the Swedish mark in gros tournois***.**

| Year | Assumed fine silver content in 1 gros tournois (gram) | Swedish mark in gros tournois | Implied fine silver content of the mark (gram) | Relation | Source |
|---|---|---|---|---|---|
| 1291 | 4.044 | 10.2 | 41 | 25.5 gros tournois = 20 öre | SDhk 1499 |
| 1328 | 3.6 | 9.6 | 34.6 | 1 gros tournois = 20 penningar | Franzén (2006, p. 288) |
| 1332 | 3.6 | 11.3 | 40.7 | 1 gros tournois = 17 penningar | Franzén (2006, p. 288) |
| 1333 | 3.6 | 10⅔ | 38.4 | 4 solidus [12] gros tournois = 4 ½ mark | SDhk 3956 |
| 1334 | 3.6 | 10⅔ | 38.4 | 15 mark penningar = 13 solidus 4 gros tournois [=160 gros tournois], and 1 mark silver = 5 penningar | Fauerholdt Jensen, 1990 (pp. 82-83) |
| 1339 | 3.6 | 9.6 | 34.6 | 1 solidus [12] gros tournois = 10 öre | SDhk 4541 and 4543 |
| 1357 | 3.6 | | | 1 mark silver Cologne weight = 5 skilling [12] gros tournois (old) | SDhk 7186 |

Comment: The gros tournois initially weighed 4.22 grams and had 23/24 fineness (*KHL*, 'grossus'), which deteriorated in the 14th century. In Denmark 1332–52, the circulating gros tournois weighed 3.888 grams with 25/27 fineness (Fauerholdt Jensen, 1990, p. 17).

**Table A3.7.** *Other exchange rates for foreign silver coins.*

| Year | Relation | Specified in the source/comments | Source |
|---|---|---|---|
| 1267 | 1 mark sterling = 160 sterling | Mark sterling probably refers to the Cologne mark silver. | SDhk 873 |
| 1272 | 1 mark silver/sterling = 144 sterling | Mark sterling probably refers to the Swedish mark silver. | SDhk 919 |
| 1282 | 1 mark silver in Swedish weight = 0.8533 mark in troy weight | 167 mark silver in Swedish weight = 142 mark 4 ounce in troy weight [1 mark in troy weight = 8 ounces] | SDhk 1207, and Fauerholdt Jensen (1990, p. 81) |
| 1328 | 1 pound sterling = 7.4 mark | 67 pound 167 sterlings = 500 mark 6 ½ öre. | SDhk 3554 |
| 1328 | 1 pound sterling = 8 1/3 mark | 3 skilling sterling = 10 öre | Fritz and Bäärnhielm (1990, no. 135d) |
| 1328 | 1 Bohemian penny = 20 Swedish pennies | 1 Bohemian solidi = 10 öre | Fritz and Bäärnhielm (1990, no. 135c) |
| 1398 | 1 Preussian mark = 3 mark | | Styffe (1864, p. 57) |
| 1414 | 1 Preussian mark = 2.5 mark | 1 Preussian schillinge [=1/60 Preussian mark] = 8 penningar | Åbo domkyrkas svartbok nr 349 |
| 1416 | 1 Preussian mark = 2.5 mark | 1 Preussian schillinge [=1/60 Preussian mark] = 1/3 öre | Åbo domkyrkas svartbok nr 364 |
| 1529 | 1 Preussian mark ≈ 1.3 mark | 2968 Preussian mark ≈ 3900 mark örtug | Hammarström (1956, p. 426) |

**Table A3.8.** *Exchange rate of noble in öre.*

| Year | Noble in öre | Region | Source |
|---|---|---|---|
| 1395 | 24 | Uppland | Styffe (1864, p. 19) |
| 1400 | 32 | Östergötland | SDhk 15507 |
| 1410 | 40 | Finland | FMU 1393 |
| 1421 | 16 | Uppland | Handlingar rörande Helga Lekamens gille i Stockholm, I (1921) |
| 1422 | 32 | Finland | FMU 1709 |
| 1423 | 32 | Finland | Åbo domkyrkas svartbok nr 403 |
| 1424 | 32 | Finland | Åbo domkyrkas svartbok no. 415 |
| 1425 | 32 | Finland | Åbo domkyrkas svartbok no. 418 |
| 1425 | 31 | Uppland | Stockholms stads jordebok 1420–1474 (p. 32) |
| 1426 | 32* | Finland | Åbo domkyrkas svartbok no. 421 |
| 1426 | 32 | Södermanland | SDhk 20741 |
| 1430 | 32 | Finland | FMU 1935 |
| 1431 | 33* | Finland | Åbo domkyrkas svartbok no. 437 |
| 1431 | 22 | Uppland | Handlingar rörande Helga Lekamens gille i Stockholm, I (1921, p. 29: 32) |
| 1431 | 32 | Närke | Kumla kyrkas räkenskapsbok, p. 180 |
| 1432? | 33* | Finland | Åbo domkyrkas svartbok no. 443 |
| 1433 | 32* | Finland | Åbo domkyrkas svartbok no. 444 |
| 1433 | 32* | Finland | Åbo domkyrkas svartbok no. 446 |
| 1434 | 32 | Finland | FMU |
| 1434 | 80*** | Finland | Nordström (1850, p. 157) |
| 1437 | 36* | Finland | Åbo domkyrkas svartbok no. 464 |
| 1438 | 36* | Finland | Åbo domkyrkas svartbok no. 474 |
| 1439 | 36* | Finland | Åbo domkyrkas svartbok no. 477 |
| 1439 | 34 | Finland | Åbo domkyrkas svartbok no. 485 |
| 1440 | 34 | Uppland | Handlingar rörande Helga Lekamens gille i Stockholm, I (1921, p. 43: 32) |
| 1440 | 28 | Uppland | Handlingar rörande Helga Lekamens gille i Stockholm, I (1921, p. 44: 28) |
| 1441 | 36** | Finland | Åbo domkyrkas svartbok no. 464 |
| 1441 | 36 | Finland | FMU 2388 |
| 1441 | 30 | Uppland | Handlingar rörande Helga Lekamens gille i Stockholm, I (1921, p. 45: 6) |
| 1441 | 28 | Uppland | Handlingar rörande Helga Lekamens gille i Stockholm, I.(1921, p. 45: 11) |
| 1441 | 24 | Uppland | Handlingar rörande Helga Lekamens gille i Stockholm, I (1921, p. 45: 16) |
| 1442 | 32** | Finland | FMU 2455 |
| 1442 | 32 | Uppland | Handlingar rörande Helga Lekamens gille i Stockholm, I (1921, p. 46: 15) |
| 1443 | 36* | Finland | Åbo domkyrkas svartbok no. 515 |
| 1443 | 36 | Finland | FMU 2547, probably Åbo marks |
| 1448 | 36* | Finland | Åbo domkyrkas svartbok no. 540 |
| 1449 | 36* | Finland | Åbo domkyrkas svartbok no. 551 |

**Table A3.8 (cont.).** *Exchange rate of noble in öre.*

| Year | Noble in öre | Region | Source |
|---|---|---|---|
| 1450 | 36* | Finland | Åbo domkyrkas svartbok no. 556 |
| 1452 | 32 | Finland | FMU 2901 |
| 1454 | 36* | Finland | Åbo domkyrkas svartbok no. 566 |
| 1454 | 34 | Närke | Kumla kyrkas räkenskapsbok, p. 180 |
| 1454 | 32 | Finland | Nordström (1850, p. 157) |
| 1455 | 36 | Närke | Kumla kyrkas räkenskapsbok, p. 180 |
| 1456 | 32* | Finland | Åbo domkyrkas svartbok no. 566 |
| 1456 | 35 | Västmanland | Arboga stads tänkebok 1 (p. 60) |
| 1456 | 32 | Närke | Kumla kyrkas räkenskapsbok (p. 180) |
| 1458 | 32 | Finland | FMU 3068 and 3069 |
| 1477 | 38 | Finland | FMU 3675 |
| 1478 | 40 | Uppland | Funbo kyrkas räkenskapsbok, E 216, UUB |
| 1527 | 72 | Uppland | Räntekammarböcker, vol 1, RA |

* Refers to Åbo-coins. ** Refers to Swedish coins. *** Refers to Gotlandic coins.

**Table A3.9.** *Exchange rate of Rhinish gulden in mark.*

| Year | Rhinish gulden in mark | Region | Source |
|---|---|---|---|
| 1444 | 6* | Östergötland | Lappkatalogen, RA |
| 1444 | 6* | Östergötland | SDhk 24505 |
| 1477 | 2** | Östergötland | Lars Sparres kopiebok B 15 f 218, RA |
| 1482 | 2** | Östergötland | Lappkatalogen, no. 121, RA |
| 1482 | 2** | Östergötland | B.E. Hildebrands samlingar, vol 5, Lappkatalogen no. 139 |
| 1485 | 2** | Östergötland | Petersson (1973, p. 325 n 22) |
| 1486 | 2** | Östergötland | Lappkatalogen, RA |
| 1489 | 2** | Stockholm | Petersson (1973, p. 325 n 22), SDhk 32241 |
| 1491 | 2** | Östergötland | Petersson (1973, p. 325 n 22) |
| 1491 | 2** | Östergötland | Lappkatalogen, RA |
| 1492 | 2** | Östergötland | Forssell (1872, p. 22) |
| 1492 | 1⅔ | Uppland | Stockholms stads tänkeböcker 1483–1492 (p. 512) |
| 1492 | 1.5 | Uppland | Stockholms stads tänkeböcker 1492–1500 (p. 10) |
| 1492 | 1.5 | Uppland | Sjögren (1944, p. 263) |
| 1493 | 2** | Småland | Arvid Trolles jordebok 1498 (p. 249) |
| 1493 | 2** | | Petersson (1973, p. 325) |
| 1493 | 1.5 | Östergötland | Petersson (1973, p. 325) |
| 1493 | 2** | Östergötland | SDhk 32853, Rääf (1856, p. 281) |
| 1494 | 2** | Småland | Arvid Trolles jordebok 1498 (p. 249) |
| 1495 | 2** | Östergötland | Petersson (1973, p. 325 n 22, Forssell (1872, p. 23) |
| 1497 | 1.5 | Uppland | KHL, 'Gyllen' |
| 1498 | 2** | Östergötland | B.E. Hildebrands samlingar, vol 5 |

**Table A3.9 (cont.).** *Exchange rate of Rhinish gulden in mark.*

| Year | Rhinish gulden in mark | Region | Source |
|---|---|---|---|
| 1498 | 2** | Östergötland | Petersson (1973, p. 325 n 22) |
| 1500 | 2** | Östergötland | B.E. Hildebrands samlingar, vol 5 |
| 1501 | 2** | | Lappkatalogen, RA |
| 1503 | 2** | | Forssell (1872, p. 23) |
| 1505 | 2** | Östergötland | B.E. Hildebrands samlingar, vol. 5 |
| 1505 | 2** | Östergötland | B.E. Hildebrands samlingar, vol. 6 |
| 1506 | 2** | Östergötland | B.E. Hildebrands samlingar, vol. 7 |
| 1506 | 2** | Östergötland | B.E. Hildebrands samlingar, vol. 8 |
| 1507 | 2** | Östergötland | B.E. Hildebrands samlingar, vol. 9 |
| 1508 | 2** | Östergötland | B.E. Hildebrands samlingar, vol. 10 |
| 1508 | 2** | Östergötland | B.E. Hildebrands samlingar, vol. 11 |
| 1508 | 2** | Östergötland | B.E. Hildebrands samlingar, vol. 12 |
| 1508 | 2** | Östergötland | B.E. Hildebrands samlingar, vol. 13 |
| 1509 | 2** | Östergötland | B.E. Hildebrands samlingar, vol. 14 |
| 1509 | 2** | Östergötland | B.E. Hildebrands samlingar, vol. 15 |
| 1509 | 2** | Östergötland | B.E. Hildebrands samlingar, vol. 16 |
| 1510 | 2** | Östergötland | B.E. Hildebrands samlingar, vol. 17 |
| 1510 | 2** | Östergötland | B.E. Hildebrands samlingar, vol. 18 |
| 1512 | 2** | Östergötland | Forssell (1872, p. 23) |
| 1518 | 1.625 | Uppland | Historiska handlingar 40:1 (1977, p. 20 onwards). |
| 1518 | 2 | Uppland | Handlingar rörande Helga lekamens gille II-IV, p. 92 |
| 1519 | 2 | Uppland | Stockholms stads skottebok 1516–1525 (p. 119) |
| 1525 | 2.5** | Östergötland | SDhk 38656 |
| 1529 | 2.25 | Viborg | FMU 6478 |
| 1529 | 3 | | Sandbergska samlingen OO, f. 26 |
| 1529 | 4 | | Hildebrand (1894, vol I:2, p. 947) |
| 1530 | 4 | | Räntekammarböcker vol 1, RA |
| 1534 | 2.25 | Västergötland | Hallenberg (1798, p. 127) |

* Most likely mark gutnisk. 6 mark gutnisk ≈ 1.5 mark örtug.
** Most likely expressed in mark danska. 2 mark danska = 1.5 mark örtug.

**Table A3.10.** *Exchange rate of the Hungarian gulden.*

| Year | Hungarian gulden in öre | Region | Source |
|---|---|---|---|
| 1489 | 72** | Småland | RA, lappkatalogen no. 92 |
| 1492 | 18 | Uppland | Stockholms stads tänkeböcker 1492–1500 (p. 10) |
| 1500 | 22 | Uppland | Stockholms stads tänkeböcker 1492–1500 (p. 475) |
| 1509 | 32.3 | | Forsell (1872, p. 23) |
| 1512 | 32.4 | | Hildebrand (1894, vol I:2, p. 947) |
| 1516 | 24 | Uppland | Helga lekamens gille II–IV (pp. 46–7) |
| 1527 | 76 | Stockholm | Räntekammarböcker vol 1, RA |
| 1529 | 36 | Viborg | FMU 6478 |
| 1534 | 30 | Västergötland | Hallenberg (1798, p. 127) |
| 1538 | 40 | | Hallenberg (1798, p. 140) |

** Expressed in öre gutnisk. 72 öre gutnisk = 18 Swedish öre.

**Table A3.11.** *Exchange rate of other gold units in öre.*

| Year | Value in öre | Type of gold unit | Region | Source |
|---|---|---|---|---|
| 1328 | 12 | gold florin | Östergötland | Fritz and Bäärnhielm (1990, no. 135c) |
| 1328 | 577 | mark gold | Östergötland | Fritz and Bäärnhielm (1990, no. 135c) |
| 1332-1334 | 12 | gold florin | | Fritz and Bäärnhielm (1990, no. 146) |
| 1333 | 11.62 | gold florin | Uppland | Fritz and Bäärnhielm (1990, no. 231a) |
| 1334 | 10 | gold florin | | Fritz & Bäärnhielm (1990, nr 265b and Bilaga 7) |
| 1363 | 1 gold florin = 0.2 mark silver Cologne weight | | Uppland | Fritz and Bäärnhielm (1990, no. 1295) |
| 1432 | 7 1/3 | gulden | Uppland | Örebro stads medeltidsurkunder 1 (1993, p. 19) |
| 1432 | 7 1/3 | arnisk gyllen | Uppland | de Brun (1924, no. 390) |
| 1434 | 16* | arnoldsk gyllen | Västergötland | SDhk 22089 |
| 1436 | 8 | arnoldsk gyllen | Finland | FMU |
| 1441 | 16.8 | arnoldsk gyllen | Finland | Åbo domkyrkas svartbok no. 492 |
| 1449 | 7 | arnoldsk gyllen | Finland | Åbo domkyrkas svartbok no. 551; refers to Åbo marks |
| 1450 | 6.5 | arnoldsk gyllen | Finland | Åbo domkyrkas svartbok no. 556; refers to Åbo marks |
| 1453 | 6 | light gulden | Uppland | 1453-10-11 B.E. Hildebrands samlingar, vol. 5 |
| 1460 | 8 | gulden | Uppland | Stockholms stads skottebok 1460–1468 (p. 2) |
| 1492 | 6 | arnoldsk gyllen | Uppland | KHL, 'Gyllen' |
| 1510 | 20 | gulden | Västmanland | Arboga stads tänkebok 3: 244 |
| 1520 | 20 | gulden | | Sandbergska samlingen, O:1, f. 35 |

**Table A3.11 (cont.).** *Exchange rate of other gold units in öre.*

| Year | Value in öre | Type of gold unit | Region | Source |
|---|---|---|---|---|
| 1521 | 16 | gulden | Uppland | Stockholms stads skottebok 1516–1525 (p. 195) |
| 1526 | 12 | gulden of Lübeck | Uppland | Stockholms stads tänkebok 1524–29 (p. 104) |
| 1527 | 15 | probably gulden of Lübeck | Uppland | Stockholms stads tänkebok 1524–29 (p. 235 n 1) |
| 1535 | 15 | probably gulden of Lübeck | | Sandbergska samlingen, O:1, f. 70 |
| 1538 | 15 | probably gulden of Lübeck | | Hallenberg (1798, p. 139) |

* Probably expressed in öre gutnisk. 16 öre gutnisk ≈ 7 Swedish öre.

## Abbreviations

FMU: Finlands medeltidsurkunder.
KHL: Kulturhistoriskt lexikon för nordisk medeltid från vikingatid till reformationstid (1956–78).
RA: Riksarkivet, Stockholm.
SDhk: Svenskt diplomatariums huvudkartotek över medeltidsbreven.
SRP: *Svenska riks-archivets pergamentsbref*.
SS: Sandbergska samlingen, RA.

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# 4.
# The multiple currencies of Sweden-Finland 1534–1803[1]

**Rodney Edvinsson**

## 4.1. Introduction

This chapter discusses the currency system of Sweden-Finland in 1534–1803. What characterises most of the period was the perplexing parallel use of several domestic currencies. Exchange rates fluctuated not only on foreign currencies (see Chapter 5) but also between these domestic currencies. Such a monetary system is here termed a multi-currency standard, in contrast to the mono-currency standard with a single domestic currency (see Chapter 2) that is typical of the modern age.

The axiomatic law of identity says that 'A' is always equal to 'A'. The modern capitalist economy presumes such an identity, so that any two 'American dollars' are always equal. However, such identities cannot automatically be assumed for the pre-industrial era, since the meaning of a monetary term could differ between contexts and periods, creating confusion and occasionally also disputes about how to interpret contracts. Over time, a monetary term could bifurcate, multiplying the number of monetary units in use that shared the same name. Rationalisation of monetary relations was part of the transformation from a pre-industrial to an industrial, capitalist economy.

From the 16th century, Sweden-Finland had two silver currencies, the main one based on the mark, which was equal to 8 öre or 192 penningar (pennies), and the other one based on the silver daler (dollar), with a floating exchange rate between them. The silver daler was an international coin and was minted in Sweden-Finland from 1534 (see Chapter 5). Additional currencies, based on silver, copper and gold, came into use in the following centuries.

1 For many insightful comments and suggestions, I want to thank especially Göran Ahlström, Claes Berg, Bo Franzén, Klas Fregert, Göran Hansson, Lars Jonung, Lars O Lagerqvist, Håkan Lobell and Johan Söderberg.

Figure 4.1 shows how the term 'daler' went through several semantic bifurcations in 1534–1873, giving rise to multiple types of monetary units with a historical origin in the silver daler of the 16th century. The first bifurcation occurred in the late 16th century between the silver daler as a coin with a stable silver content and the daler as a unit of account equal to 4 marks or 32 öre. The silver daler was termed slagen daler and later riksdaler (rix-dollar) and riksdaler specie, which continued to exist as a stable monetary unit up to 1873, with about the same fine silver content as the reichstaler according to the Leipzig convention of 1566 and later the Hamburger reichstaler banco. In the 17th century further bifurcations occurred for the terms daler and riksdaler.

In 1777 the riksdaler became the sole currency unit (if one disregards the gold ducat) but after only twelve years this mono-currency standard gave way to two different currencies, one based on the riksdaler banco and the other on the riksdaler riksgälds. When the riksdaler riksgälds was fixed at 2/3 riksdaler banco in 1803, the period of multiple currencies was essentially over. The riksdaler specie [i silver] and the ducat did continue to exist as separate currencies at a floating exchange rate but they were of minor importance as domestic currencies. However, it was not until 1873, when the gold standard was introduced and the riksdaler riksmynt was replaced by the krona as the main unit of account, that Sweden finally got a true mono-currency standard.

The geographic spread of Swedish currency is a challenging issue. The boundaries of the kingdom of Sweden changed during the period studied here (see map below). Finland was a part of Sweden until 1809, when it was conquered by Russia, so Finland's monetary history coincided with Sweden's in this period. The term Sweden-Finland is sometimes used to describe the kingdom of Sweden from the Kalmar Union up to the Napoleonic wars. Scania, Blekinge, Halland, Jämtland, Härjedalen and Gotland belonged to Denmark-Norway in the 16th century, but were conquered by Sweden during the course of the 17th century and are part of Sweden today. Sweden also had other possessions in this period, mainly in northern Germany and the Baltic region. The German possessions (for example, Swedish Pomerania, which is further discussed in Chapter 5) had their own monetary systems and did not usually use Swedish currencies. In 17th century Estonia, coins were minted according to the Swedish standard. Livonia, Estonia and Ingria were transferred to Russia in 1721.[2]

The main disposition of the chapter is chronological. Section 4.2 examines the period 1521–1624, section 4.3 the period 1624–1719, the first period with the copper and silver standard, section 4.4 the period 1719–76, and section 4.5 the period after 1776 when riksdaler became the main currency unit in Sweden-Finland. Section 4.6 summarises the main results.

Since the same monetary label could have different meanings in different circumstances and in different periods, most of the monetary terms in this chapter are not

2 Lagerqvist and Nathorst-Böös (1968, pp. 186–207).

translated into English because that could be misleading. For example, the Swedish currency unit 'daler silvermynt' could be translated into 'dollar silver coin' or 'dollar silver specie', which would give the impression of a dollar existing in the form of a silver coin. However, daler silvermynt was a unit of account in which copper plate coins were denominated as well. Furthermore, after around 1665, actual silver coins were counted in daler courant and daler carolin rather than in daler silvermynt (see Figure 4.1).

Both primary and secondary sources are used to estimate exchange rates between currencies.

Wallroth's *Sveriges mynt 1449–1917* (1918) presents data on the minting, fine metal content and exchange rates between monetary currencies in Sweden from the late Middle Ages to the First World War. Its data on the legally fixed relations between currencies in Sweden are readily accessible and have been used in this study. Its data on the market exchange rate for the riksdaler are used only when there are gaps in other sources. A problem with Wallroth's exchange rate data is that he does not always present his sources. For some periods he calculates the exchange rate between two coins on the basis of their fine silver contents. However, circulation by weight (i.e. in accordance with the coins intrinsic metal value) cannot simply be assumed (see Chapter 2).

Sveriges Riksbank (1931) presents annual exchange rates from 1740 onwards. The annual figures are calculated as averages of the daily market exchange rates in *Stockholm stads priscourant*[3] and *Post- och Inrikes tidningar* (some of these primary sources are missing today). These daily exchange rates were never published by the Riksbank, but are available in handwritten form at the Riksbank archive. This material also provides information on the daily market exchange rates in the period 1705–36.[4]

In his study on copper minting in 1624–1714, Wolontis (1936) presents monthly market exchange rates for the 17th century.

The Sandbergska samlingen at the Riksarkivet contains some important information on the exchange rates from the Middle Ages to the 19th century.[5] The material varies in quality but a check with other sources suggests that it is quite reliable.

Other sources have also been used and are discussed below.

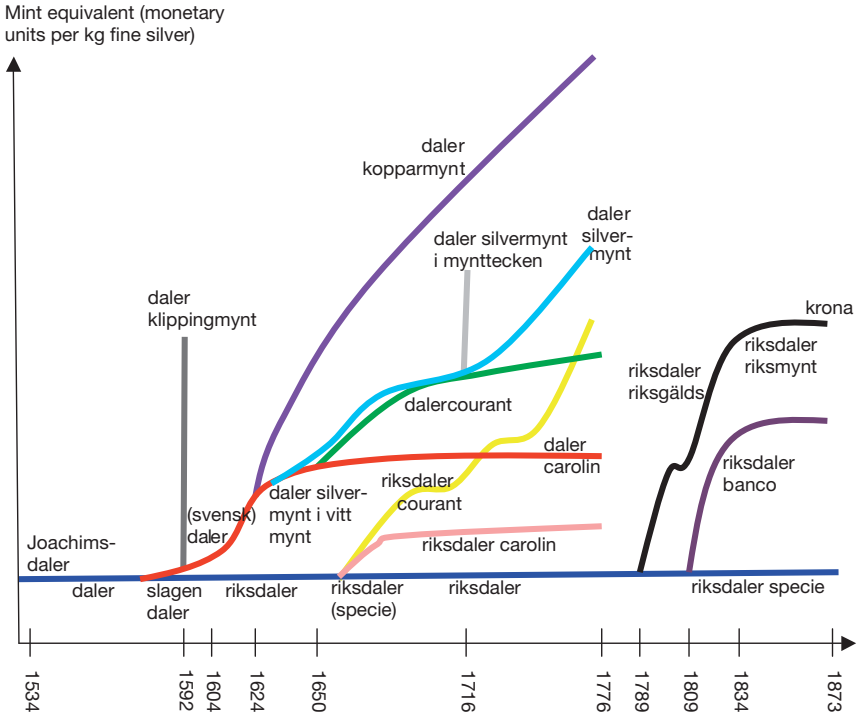
The further back in time one goes, the less reliable are the exchange rates. One

3 *Stocholms stads priscourant* were published weekly from the early 18th century. The first known issues are from 1705. Initially the prices were handwritten on pre-printed formulas, but from March 1740 the price courants were published as a numbered paper. See *Svenska folket genom tiderna: vårt lands kulturhistoria i skildringar och bilder. 5, Den karolinska tiden* (1939, p. 33).

4 Riksbankens arkiv, 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' and untitled volume with exchange rates 1804–89.

5 Sandbergska samlingen, vol. O:1, O:2 and OO (Riksarkivet).

**Figure 4.1.** *The bifurcations of the term 'daler' 1534–1873.*




Note: This type of figure of semantic bifurcations has been proposed by Klas Fregert. The left scale is ordinal, and the differences between levels should not be interpreted as exact measures. Each colour denotes a particular monetary unit, though its name could change over time:
- Dark blue: Joachimsdaler/daler/slagen daler/riksdaler/riksdaler specie (1534–1873).
- Red: (svensk) daler/daler silvermynt i vitt mynt/daler carolin (1576–1776). Bifurcated from daler.
- Dark grey: Daler klippingmynt (1591–93). Bifurcated from (svensk) daler.
- Purple: Daler kopparmynt (1624/1633–1776). Bifurcated from (svensk) daler.
- Light blue: Daler silvermynt (1624/1633–1776). Bifurcated from (svensk) daler.
- Green: Daler courant (1650s–1776). Bifurcated from daler silvermynt i vitt mynt.
- Pink: Riksdaler carolin (1660s–1776). Bifurcated from riksdaler (specie).
- Yellow: Riksdaler courant (1660s–1776). Bifurcated from riksdaler (specie).
- Light grey: Daler silvermynt i mynttecken (1716–19). Bifurcated from daler silvermynt.
- Brown: Riksdaler banco (1789/1809-1855/1873). Bifurcated from riksdaler (specie).
- Black: Riksdaler riksgälds/riksdaler riksmynt/krona (1789–present). Bifurcated from riksdaler (specie).


*Picture. The kingdom of Sweden around 1661.*
Source: *Cambridge Modern History Atlas* (1912).

specific problem is that the reported exchange rates were not always relevant for the whole of Sweden and the regional differences could be considerable.[6]

Various methods are used to calculate central measures of exchange rate data.[7]

## 4.2. The period 1534–1624

Up to 1624, Sweden-Finland had a de facto mono-metallic silver standard (see Chapter 2), albeit with some deviations. Most notably, individuals did not possess the right to turn bullion into coins, i.e. free minting was restricted (see Chapter 2).[8] This was used by the Crown in attempts to raise the value of coins above their intrinsic metal value, and thus to increase seignorage from minting. These attempts could succeed only if the quantity of minted coins was restricted, which was done only in some periods and with limited success. The 16th century thus saw elements of an inconvertible currency, although it was not until the 18th century that such currencies were introduced on a larger scale.

In the period 1534-1624 there were two major debasement cycles: 1561–76 and 1590–93. Both coincided with a need to finance a war effort by increasing seignorage. Some of the inferior coins were called clippings because they were cut into a square form to speed up minting. After some delay, the value of the debased coins fell towards their intrinsic metal value. The two debasement phases were followed by recoinage and the reintroduction of better coins (with the same, or nearly the same, fine silver content as before the debasement). The face value of the debased coins was reduced.

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6 Hegardt (1975, p. 222).

7 When data are reliable, the geometric average is used, especially when annual averages are calculated from monthly data. The geometric average of data expressed as a percentage (mainly various premiums) is calculated by transforming the data into ratios, then calculating the geometric average of the data in ratio form, and finally transforming the average ratio into a percentage.

The advantages of a geometric average as opposed to an arithmetic average are the former's symmetry and the fact that exchange rates tend to change geometrically rather than arithmetically. For example, if an annual geometric average is calculated from the monthly data on *one pound in dollars*, the inverse of this value would be the same as the annual geometric average calculated for the monthly data of *one dollar in pounds* using the same data set. The arithmetic average does not gurantee such automatic equality. For example, say that during a year one pound is variously worth one and two dollars, respectively, during equal lengths of time. The arithmetic average exchange rate is 1.5 dollars per pound, and the inverse value is 0.667 pounds per dollar, which expresses the value of one dollar in pounds. However, calculating the arithmetic average of the exchange rate of one dollar in pounds (one dollar is worth one pound and half a pound, respectively), is 0.75 pounds per dollar. The geometric average is 0.707 pounds per dollar.

When data are less reliable, the median is used. The median is especially effective to eliminate extreme values. Occasionally, the arithmetic average is also used.

8 Heckscher (1935, vol. I:1, p. 202).

There were also two minor debasements in this period, in 1540 and 1604, but they were not followed (within the next 1–2 decades) by further debasements or recoinage and were therefore not part of a debasement cycle.

The two major debasement cycles followed the pattern in other countries. During the Great Debasement in England 1542–51, seignorage rose to as much as 57 per cent of government revenue, whereas the typical level under normal circumstances was less than two per cent.[9] Sussman and Zeira stress that in time people found ways to protect themselves from the consequences of debasement and debasement policy became less effective.[10] There was a limit to the extent to which the fineness of coins could be reduced. The lower the fineness, the greater the probability of recoinage. Expectations rose that the debased coins would be soon worth only their fine metal content. As a result, minting often declined towards the end of a debasement cycle.

Rolnick, Velde and Weber (1996) write that the profitability of debasement is still a puzzle. From empirical evidence that lags in prices and exchange rates due to debasement were, at most, only a matter of weeks, they concluded that gold coins circulated by weight (i.e. in accordance with their intrinsic metal value) and that silver coins did so, too, at least some of the time. However, they also find that minting and seignorage increased dramatically in the wake of debasement, which would be illogical if coins did indeed circulate by weight (at least under free minting). Peter Spufford similarly upholds, in relation to Medieval Europe, that when 'the debasements or strengthenings of a currency were very large, the exchange rates, as with modern devaluations, altered radically within weeks or even days'.[11]

In their study of the debasement cycles in France during the 14th and 15th centuries, Nathan Sussman and Joseph Zeira maintain that debasement was an effective instrument of public finance.[12] In everyday life, debased coins circulated by tale (i.e. in accordance with their face value), not by weight. This was so because determining fineness required the specialised assistance of silversmiths, which was costly.[13] As Sussman and Zeira put it: 'people did not go to an expert before each transaction at the marketplace, but they did go to an expert after a debasement to check which coins to remint'.[14] According to them, there was a lag of up to several years before the price level adjusted to debasement. While the mint price was disclosed, the mint equivalent (the nominal value minted from a fixed weight of a metal) was not necessarily known to the general public. This could be used in the short term to increase the mint equivalent much more than the mint price, and thus to increase the rate of

9 Velde, Weber and Wright (1999, p. 293).

10 Sussman and Zeira (2003).

11 Spufford (1988 p. 293).

12 Sussman (1993) and Sussman and Zeira (2003).

13 In his study of the Swedish Middle Ages, Hans Hildebrand (1983, p. 935) also argues that the general public was well informed about the weight of coins but not so about the percentage of fine silver.

14 Sussman and Zeira (2003, p. 1776).

seignorage (the ratio of the profit from minting to the mint price). Despite the high seignorage, merchants voluntarily provided the mint with more bullion than previously. The price level tended to follow the mint price rather than the mint equivalent, at least in the short term.[15]

In her study, Angela Redish concludes that the effect of undervaluation was ambiguous.[16]

The high seignorage rate during a debasement (which was typical[17]) partly constitutes a temporary deviation from free minting in the proper sense and introduces elements of a fiat standard. If debasement policy is successful, the debased coins, at least temporarily, de facto function as token coins. For example, assuming a gross seignorage rate of 300 per cent, when coins are converted into bullion, only 25 per cent of their nominal value is recovered.

In Sweden-Finland, there were periods when the fine silver content per unit of value of coins of lower denomination was lower than that of coins of larger denomination, which opened up for the possibility of a fluctuating exchange rate between coins of various denominations (so that one mark in coins of higher denomination could temporarily be worth more than 8 öre in coins of lower denomination, even though officially 1 mark = 8 öre). Such a multi-currency standard (see Chapter 2) probably existed temporarily in the early 1570s, early 1590s and a few years after 1604, but was more common later, in the 17th and 18th centuries.

Better coins minted earlier continued to circulate after the mint equivalent had been increased. The coins of King Gustav Eriksson (Vasa) (minted up to 1560) and King Erik XIV (minted 1561–8) continued to circulate in the last two decades of the 16th century. However, these older coins did not necessarily circulate by weight.[18] Loans were often paid back in the same coins (for example, silver daler or gold coins[19]) as those in which they were originally made, thus safeguarding the creditor from inflation. These are clear examples of a multi-currency standard and an economy where money was not fully a generalised unit of account.

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15 Sussman (1993, pp. 55 and 61).

16 Redish (2000, p. 33).

17 Velde, Weber and Wright (1999, p. 292).

18 In 1576, 1.25–1.625 marks in the coins of King Erik XIV (Wallroth, 1918, p. 23) were exchanged for one mark in new coins. The exchange rate, 1.625 marks in coins of King Erik XIV for one mark in new coins, is also reported for 1583 (see *Vadstena stads äldsta tänkeböcker 1577–1610* (1952, p. 79). Coins of King Gustav Eriksson (Vasa) circulated after 1576 at their nominal value, despite having a higher silver content than the coins minted after 1576. According to one source, marks of King Gustav Eriksson (Vasa) were exchanged at half their nominal value in 1598 (*Vadstena stads äldsta tänkeböcker 1577–1610* (1952, p. 271), which was significantly below their intrinsic metal value.

19 One example of a loan in engelots can be found in *Stockholms stads tänkeböcker 1568–1575* (1941, p. 624).


*Riksdaler coins from 1542 (top left), 1631 (top right), and 1829 (bottom). The silver daler minted in the 16th century was still valid as a means of payment three centuries later. Its fine silver content was stable but the purchasing power of metallic silver fell over time. In terms of what a male unskilled labourer could earn in Stockholm, one silver daler represented wages for around 12 days in 1542, around 6½ days in 1631 and around 3½ days in 1829. Photo: The Royal Coin Cabinet, Stockholm.*

### 4.2.1. The first silver daler coins

It was during the 16th century that the first larger silver coins were minted, an indication that trade in larger volumes was becoming more common. So-called gyllen coins were minted in the 1520s but were superseded later by the daler coins.

The first daler coin was minted in 1534[20] after the German taler, which had been introduced in the late 15th century.[21] At first the fine silver content of one daler was 28.06 grams. From 1540 it was reduced to 25.6 grams, after which, with some minor changes, it had this stable silver content up to 1873 (when the krona was introduced).

From 1593 the slagen daler was also called riksdaler[22] (earlier the term riksdaler mainly referred to foreign coins) and this became the only label for these coins from the early 17th century.

The minted daler or riksdaler must be distinguished from the daler as the unit of account, which was set equal to 4 marks from the 1570s onwards. The daler as the unit of account depreciated continually relative to the riksdaler during the 17th and 18th centuries.

Later the term riksdaler also came to refer to various currency units of different values. A riksdaler with a stable silver content was named riksdaler specie.

The daler with a stable silver content is referred to here as a silver daler (daler/slagen daler in the 16th century, riksdaler/riksdaler specie in the 17th, 18th and 19th centuries). Since the fine silver content of a silver daler was stable over time, it provides a reference for prices to be expressed in grams of silver.

Several sources are used to estimate the exchange rate of the silver daler in marks in the period 1534–1624 (see Figure 4.3). When values differ in the course of a year, a median value has been calculated.[23] Some interpolations are made for years when no reliable sources are available, although most years could be covered.

In the 1530s, one silver daler was worth between 3 and 4 marks (see Table A4.7), which was in accordance with the theoretical exchange rate based on the silver contents of the two coins. In 1540 the silver content of both coins was reduced, but more for the mark coins.

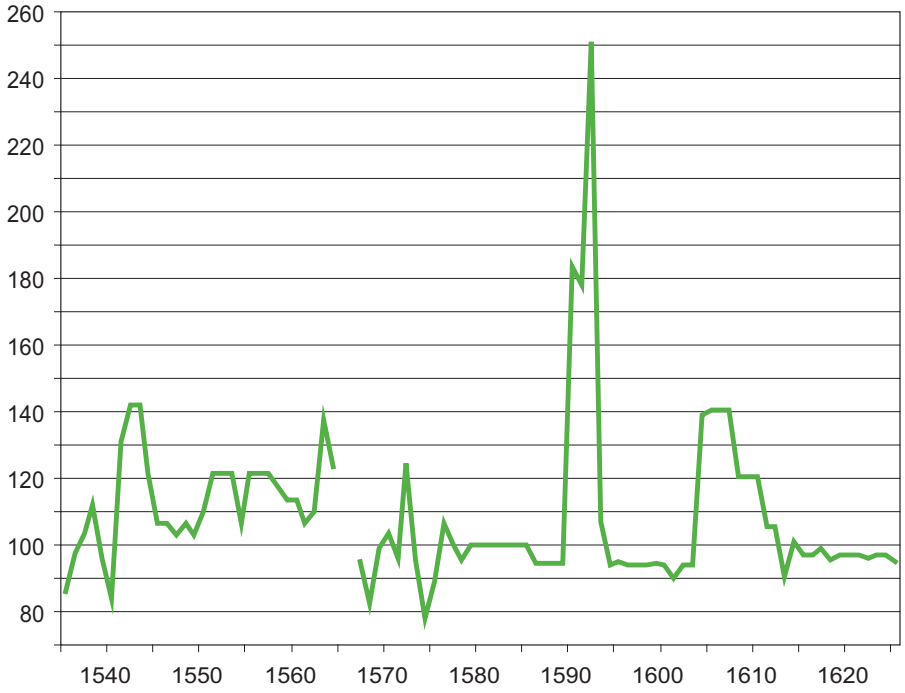
The Crown wanted the mark coins to circulate at the old exchange rate, but initially this failed. The exchange rate of the silver daler rose to 4–4.5 marks in the latter half of the 1540s (the theoretical exchange rate was 4.25 marks). King Gustav Eriksson complained about this. According to him, the exchange rate should have been 3 marks for one silver daler. A deliberate attempt was made to reduce minting. The mint in Svartsjö was closed in 1550 and in 1551–5 it seems that no coins were

20 Wallroth (1918).
21 Shaw (1895, p. 363).
22 Heckscher (1935, vol. I:1, p. 219).
23 Sandbergska samlingen, Riksarkivet, Heckscher (1935, pp. 211–2), Odén (1955), Odén (1960) and Wallroth (1918).

minted in Sweden-Finland.[24] The reduced quantity of minted coins partly had the desired effect. The exchange rate of the silver daler fell to 3.5–3.75 marks in the latter half of the 1550s, although not as low as the 3 marks desired by the king.

Figure 4.2 presents the value ratio (in per cent) of one gram fine silver in mark coins to one gram fine silver in silver daler coins. A value of 100 per cent denotes that the actual exchange rate of the mark was equal to the theoretical rate. A value above 100 per cent indicates that mark coins were overvalued in relation to silver daler coins, and that the seignorage rate was higher for mark coins than for riksdaler coins. Under circulation by weight, the value could fall somewhat below 100 per cent, as can be observed for some periods, since mark coins were more exposed to wear and tear and silver daler coins were used in international trade. Seignorage could be positive at a level slightly below 100 per cent, since the unminted silver was worth some-

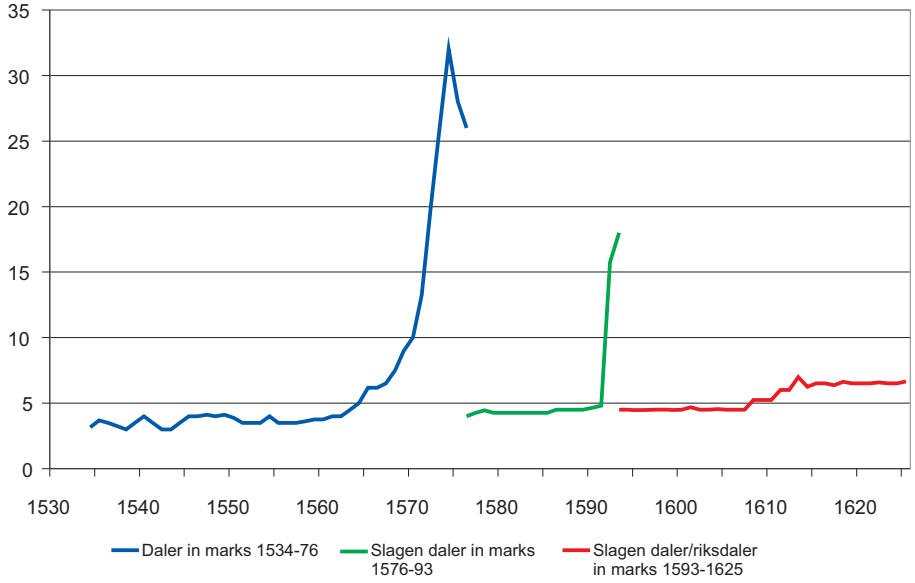
**Figure 4.2.** *Value ratio (in per cent) 1535–1625 of one gram fine silver in mark coins to one gram fine silver in riksdaler coins.*




Sources: Based on Table A4.7 and Wallroth (1918).

24 Lagerqvist (1995, p. 142).

**Figure 4.3.** *Daler/slagen daler/riksdaler i marks 1534–1624, market rate.*




Sources: See Table A4.7. Two breaks occur. In 1575/6, one new mark was exchanged for 6.5 debased mark coins. In 1593, one new mark was exchanged for 4 debased marks.

what less than silver in the form of silver daler coins. The figure shows that the amount of seignorage was significant in the periods 1541–60, 1590–92 and 1604–10, which coincided with debasements. However, the debasement in the early 1570s was probably not as successful in generating substantial seignorage to the Crown.

### 4.2.2. *The debasement cycle of 1561–76*

During and after the Northern Seven Years' War 1563–70 there was a continuous depreciation of the mark, causing rampant inflation. In 1561–62, one silver daler stood at 4 marks. In 1563 the rate stood at 4.5 marks, in 1566–67 at 6–7 marks, and in 1568 at 7–8 marks. The depreciation was worst after the war. Sweden had to pay a ransom of 150,000 daler for the Älvsborg fortress. The price of one silver daler was at most 32 marks, in 1574.[25]

Various measures were taken to enforce the face value of the coins and prevent the older, better coins from being melted down into bullion by others than the Crown. Although the Crown was initially able to exchange debased coins at par with the old coins (or at least at a better rate than suggested by their intrinsic metal content),[26]

25 Wallroth (1918, pp. 28–9 and 36–7).
26 Heckscher (1935, vol. I:1, p. 205).

prices and exchange rates quickly adjusted in response to debasement. The annual Consumer Price Index presented in Chapter 8 closely followed debasement.

A decision on 12th May 1575 enabled the public to exchange the debased coins for new, better coins. However, the exchange rate varied. While the official price of one silver daler was 4 marks in new money, it was 9.5–11 marks in coins of 1569, 13 marks in coins of 1570, and 26 marks in coins of 1571–74 (somewhat better than the market exchange rate in 1574).[27] Hence, at least towards the end of the debasement cycle, the various coins seem to have circulated by weight, not by tale.

Since coins were minted in 1571–74 on a much larger scale than in the previous period, it can probably be assumed that it was the coins of 1571–74 which dominated domestic trade (the Crown's exchange operations also reduced the supply of older coins). The value of the mark klipping-coin was later reduced to one öre (1/8 of a mark), i.e. below its official exchange rate in 1575 as well as its intrinsic metal value.

### 4.2.3. The daler becomes two different monetary units

The distinction between money as a unit of account and as a commodity (intrinsic value coins) increases the likelihood of terminological bifurcations of monetary units (see Figure 4.1).

After the inflation episode in the first half of the 1570s, King Johan III wanted the silver daler to equal 4 marks, but that could not be maintained. The fine silver content of one silver daler was 4.25 times the fine silver content of the mark coin. According to Birgitta Odén, it was in this period that the daler came to refer to two different currencies: the unit of account equal to 4 marks and the silver daler. Odén argues that Heckscher was wrong in claiming that these two different meanings of daler did not arise until the 1590s. Still, it was not until the 1590s that a substantial difference can be observed between prices expressed in slagen daler (minted daler) and in räknedaler (daler as unit of account).

In the second half of the 1570s and the early 1580s the silver daler stood at 4.25 marks (hence, 1 silver daler = 1.0625 räknedaler); the rate then increased to 4.5 marks in the late 1580s.[28]

### 4.2.4. The debasement cycle of 1590–93

The Northern Seven Years' War was followed almost immediately by a war with Russia, which continued up to 1595. After the introduction of the new mark, there was a period when the currency was quite stable. In the closing years of the reign of Johan III the value of the Swedish mark then deteriorated rapidly. The rampant

27 Wallroth (1918, p. 23).
28 Odén (1955, p. 241).

inflation caused much confusion and confidence in money weakened. The exchange rate between the silver daler and marks was probably varied, depending on the coins in which the mark was counted.

According to Wallroth, in 1592 the exchange rate for one silver daler rose to 38 marks in one-mark coins and to 84 marks in ¼-öre coins.[29] The difference can be explained by the much lower silver content of the ¼-öre coin per unit of value relative to coins of higher denominations. However, Wallroth does not refer to any empirical sources. His exchange rates for 1592 rather seem to be based on the fine silver metal contents of the minted coins (a method he uses elsewhere in his work), not on prevailing market rates.[30] In the present study, no empirical sources have been found to support such high exchange rates. Therefore, Wallroth's assumptions for 1592 are not used.

The empirical material gives a somewhat confusing picture of prices and exchange rates in the early 1590s.

The price material, for example in *Handlingsräkenskaperna*, often indicates a remarkable stability in the early 1590s, which suggests that the debased coins were accepted at their face value and did not cause any substantial inflation. However, Birgitta Odén argues that the prices in *Handlingsräkenskaperna* in 1591–93 are fictitious, since they were used as the basis for barter trade to register relative prices between goods.[31] The old price level could, therefore, be retained, in spite of the rampant inflation when it came to actual monetary transactions.

Although minting shows that the debased coins dominated circulation compared to coins minted earlier,[32] according to Eli Heckscher, most trade during the height of monetary disarray in the early 1590s was probably conducted by barter or was discontinued, since people no longer trusted the coin as a means of exchange. Barter trade was also common under normal circumstances.[33]

In 1593 and 1594 the inferior coins were exchanged for new coins. As in 1575, the rate varied between different debased coins (see Table 4.1). However, whereas in the mid-1570s debased coins were exchanged largely in accordance with their intrinsic metal value, in 1593–94 they were exchanged at a much better rate than their fine silver content implied. The fine silver content of the most inferior klipping-mark in 1592 was almost one-tenth of that of the new silver mark minted in 1593, but it was devalued to ¼ of the face value. It was not until May 1594 that the klipping mark

29 The minting statistics show that mark coins probably dominated circulation over coins of the lowest denomination.

30 Wallroth (1918, pp. 44–5). The fine silver content of the round one-mark coin was 0.6758 gram, the one-mark klipping coin 0.6473 gram, and the ¼-öre coin 0.0095 gram. Since the fine silver content of the one-daler coin was 25.5957 grams, the exchange rate based on relative silver contents would be 37.9 marks in round one-mark coins, 39.5 marks in mark klipping coins and 84.2 marks in ¼-öre coins.

31 Odén, (1960, p. 207).

32 Wallroth (1918, p. 42–7).

33 Heckscher, (1935, vol. I:1, p. 82).

was devalued further, to ¾ öre (=3/32 mark), in accordance with its fine silver content.[34]

In 1593, confidence in money had not yet been restored. According to *Stockholms stads tänkeböcker,* klipping coins as well as proper coins were often rejected as payment.[35]

The debasement in the early 1590s could be seen as an attempt, in an emergency, to de facto introduce token coins that were supposed to circulate by tale. The attempt to de facto introduce a fiat currency was initially successful. Price regulations were imposed to ensure this. In January 1591, King Johan III solemnly promised that one year later the debased coins would be exchanged at their full nominal value in better coins.[36] According to Eli Heckscher, arguing against a 'metallic viewpoint' that the value of money is completely determined by its intrinsic metal content, the attempt only failed because too many of the inferior coins were minted. He therefore insists that the quantity theory of money is of some relevance for explaining inflation in the 16th century.[37]

There was a time lag before debasement affected prices and exchange rates. *Stockholms stads tänkeböcker* is filled with reports of high prices and exchange rates in 1592, but there are none in 1590 or 1591.

At a meeting between the King's representatives and the commons on 5th June 1592, it was announced that the mark klipping coin would be reduced to two öre (¼ mark), in accordance with the prevailing market rate, and that prices would be freed. Next day, however, the decision was revoked and it was decreed that the mark coin must be accepted at its full face value. A few days later traders were urged to sell at better prices and prices were imposed on beer and bread but the traders refused to conform.[38]

It is likely that during the second half of 1592 the exchange rate stabilised at four debased marks for one mark in proper (older) coins, and that inflation during the debasement cycle in the early 1590s amounted to not more than 300 per cent, not 800 per cent (or more) as suggested by the silver content of the debased coins. For example, there is a report from July 1592 that iron was sold for 24 daler per ship pound in debased coins, but would be paid for at 6 daler per ship pound in older, better coins.[39]

Since the exchange rate of the debased coins, even at its lowest in 1592, was more than twice their intrinsic metal value, they continued to de facto function as token coins up to 1593 or early 1594. This is a clear difference from the debasement cycle of 1561–76. One explanation could be that the earlier debasement cycle was more

34 *Stockholms stads tänkeböcker från år 1592* (1939, part I, 1592–95, p. 218).
35 *Stockholms stads tänkeböcker från år 1592* (1939, part I, 1592–95, p. 118).
36 *Stockholms stads tänkeböcker 1589–1591* (1948, p. 239).
37 Heckscher (1935, vol I:1, p. 227).
38 *Stockholms stads tänkeböcker från år 1592* (1939, part I, 1592–95, pp. 51–3 and 63).
39 *Stockholms stads tänkeböcker från år 1592* (1939, part I, 1592–95, p. 72).

**Table 4.1.** *The official conversion rates for various domestic currencies 1534–1624.*

| Date | Official conversion rates | Assumption in this study |
|---|---|---|
| 1568 | 1 ungersk gyllen = 1.5 slagen daler<br>1 krongyllen = 1.25 slagen daler | |
| 12/5 1575 | 1 daler = 4 marks in new money (valid up to 1589)<br>1 new mark exchanged for 6.5 marks in coins of 1571–74<br>1 new mark exchanged for 3.25 marks in coins of 1570<br>1 new mark exchanged for 2.375–2.75 marks in coins of 1569<br>1 new mark exchanged for 2.125 marks in coins from Vadstena of 1568<br>1 new mark exchanged for 1.25–1.625 marks in coins of King Erik XIV<br>1 mark of coins of King Gustav Eriksson (Vasa), no change in nominal value*<br>After 6/3 1576, for klipping coins not exchanged previously: 1 new mark = 8 marks in klipping coins | 1 new mark = 6.5 old marks |
| 12/1 1593 | 1 new mark = 4 marks in 1-mark- and 2-öre coins of 1591 and 1592 (1-mark klipping reduced to 2 öre already on 8/12 1592)<br>1 new mark exchanged for 2 marks in ½-öre coins of 1591 and 1592<br>1 new mark exchanged for $1^1/_3$ mark in coins of 1590 (including gold coins), and 2-mark and 1/2-mark coins of 1591 and 1592<br>1 new mark = 1 mark in coins minted before 1590<br>1 (Swedish) daler = 4 marks (unit of account used up to 1776)<br>1 silver daler (slagen daler) = 4.5 marks = 1.125 Swedish daler<br>8/5 1594, 1 mark klipping further devalued to ¾ öre.** | 1 new mark = 4 old marks |
| 22/3 1604 | 1 (Swedish) daler = 4 marks (valid up to 31/12 1776) | |
| 1607 | 1 riksdaler = 4.5 marks = 1.125 daler | |
| 7/9 1619 | 1 riksdaler = 52 öre = 6.5 marks = 1.625 (Swedish) daler (valid up to 16/8 1633) | |

Sources: Wallroth (1918), *Kulturhistoriskt lexikon för nordisk medeltid från vikingatid till reformationstid* (1956–78), Sandbergska samlingen (Riksarkivet), Lagerqvist and Nathorst-Böös (1968) and Franzén (2006).

* According to a royal decree in January 1575. See *Stockholms stads tänkeböcker 1568–1575* (1941, p. 544).

** *Stockholms stads tänkeböcker från år 1592*, part 1 (1939, p. 218).

protracted, so that agents had more time to come to terms with the true value of the inferior coins.

### 4.2.5. The minor debasement in the early 17th century

In the period 1593–1604 one silver daler was roughly equal to 4.5 marks. In 1604 the silver content of the mark coin was reduced. According to Wallroth,[40] this led to the exchange rate of one riksdaler being 6 marks from 1604 onwards. However, according to the Sandbergska samlingen, one riksdaler was worth 4.5 marks as late as 1610. Wallroth's 'metallistic' assumptions must again be questioned. In 1607, the official value of the riksdaler was fixed at 4.5 marks.[41] The exchange rate probably rose gradually from 4.5 marks to 6 marks in this period. For example, in *Stockholms stads tänkeböcker*, an exchange rate of 5 marks and 2 öre for one riksdaler is reported for early 1608.[42] Such a rate suggests circulation neither by weight nor by tale, but something in between. Rather than being immediate, the adjustment of the exchange rate was probably a drawn-out process lasting several years.

In this study it is assumed that the exchange rate of the riksdaler was 4.5 marks up to 1607, 5.25 marks in 1608–10, and 6 marks in 1611 (see Table A4.7).

One reason for the exchange rate's slow adjustment after 1604 was that the new, lighter two-öre and one-öre coins did not come into circulation on a sizeable scale until 1608 and 1609.[43] It is possible that in the period 1605–9 the exchange rate for a riksdaler in mark coins differed from that in öre coins. It must be borne in mind that it was the öre coins which dominated money supply. It is also possible that the new mark coins were accepted initially at the same or almost the same face value as the older mark coins and thus at significantly above their intrinsic metal value.

### 4.2.6. Gold coins

The circulation of gold coins in Sweden-Finland in the period 1534-1624 implied that there was not a pure silver standard. However, since domestic transactions were overwhelmingly conducted in mark silver coins, the monetary standard should be described predominantly as a monometallic standard in this period (see Chapter 2).

The first gold coin minted in Sweden-Finland was the ungersk gyllen. It was struck in 1568-1573.[44] Another gold coin, minted in 1569-1573 and 1598-1599, was the krongyllen.[45] The fine gold content of one ungersk gyllen was 4.1245 grams

40 Wallroth (1918, p. 60).
41 Sandbergska samlingen (Riksarkivet), O:1 , folio 1434.
42 *Stockholms stads tänkeböcker från år 1592* (1963, vol. VI, 1605–08, p. 302).
43 Wallroth (1918, pp. 62–3). The 2-öre coins were minted on a small scale in 1605 and then annually from 1608 onwards. The lighter one-öre coins were not minted until 1609.
44 Tingström (1972, p. 77).
45 Forssell (1872, pp. 84–8).

and of one krongyllen 3.0395 grams. One ungersk gyllen was equal to 1.5 silver daler and one krongyllen to 1.25 silver daler. Since the fine metal content of one silver daler was 25.5957 grams, this would imply that the gold-silver (value) ratio during the 1570s was 9.31:1 based on the ungersk gyllen and 10.53:1 based on the krongyllen. According to one source, one ungersk gyllen was equal in value to 1⅔ daler in 1570 or the late 1560s,[46] implying a gold-silver (value) ratio of 10.3, which is closer to the estimated value ratio based on the krongyllen.

Alongside the ungersk gyllen and krongyllen, various other foreign gold coins circulated in Sweden-Finland in the second half of the 16th century.[47] The rosenobel was valued at around 4 silver daler, the engelot around 2.25 silver daler, the crona around 1.25 silver daler, the ducat 1.4–1.7 silver daler, the double ducat around 3.25 silver daler, the Rhine golden (rhensk gyllen) 0.75–1 silver daler, and the portugalös 12–15 silver daler.

In 1589–92, 1603 and 1606–26 gold coins were minted in the mark denomination, some of them as clippings since they were clipped in square form. The round gold coins struck in 1606–24 had a fine gold content of 0.303 grams per mark, and the klipping gold coins 0.285 grams per mark in 1610–11 and 0.273 grams per mark in 1626.[48] Since the silver mark at the time had the fine silver content of 4.05 grams, this would imply a gold-silver (value) ratio of 13.4-14.2 to 1 in 1606–24 and 14.8:1 in 1626. In comparison, the ratio was around 1:15 in the second half of the 17th century and the 18th century. Also the international gold-silver (value) ratio (see Chapter 2) shows a significant increase between the late 16th century and the mid 17th century.

## 4.3. The period 1624–1719

In 1624 the first copper coins were minted in Sweden-Finland. These were intrinsic value coins, since their face values were supposed to follow the values of their copper contents. From then on, Sweden-Finland had (to a greater or lesser extent) a combined copper and silver standard. This ended in 1777, when the sole silver standard was reintroduced. One reason for introducing copper coins was to manipulate the price of copper. Sweden was the dominant international producer of copper. When copper prices were low, it was thought that they could be increased by reducing copper exports and minting a large amount of copper coins for domestic circulation.

When the copper coins were introduced in 1624, the price of copper was high. After a few years, the price fell. In the late 1620s, copper coins were minted on an extremely large scale, so that they tended to fall towards their intrinsic metal value. However, the öre minted in silver also depreciated relative to the riksdaler, while the mark coin did not fall as much.

46 *Stockholms stads tänkeböcker 1568–1575* (1941, p. 96).

47 See Forssell (1872, pp. 86–7) and Sandbergska samlingen (Riksarkivet), O:1, folio 61.

48 Wallroth (1918).

During the first two decades of the copper standard, all copper coins were denominated in öre. Copper plates were struck in higher denominations from 1644 onwards.

A decision on 26th August 1633 reduced the official value of the öre copper coins by 50 per cent.[49] This gave rise to two different counting systems: one in daler silvermynt (daler silver coins), abbreviated d.s.m., and the other in daler kopparmynt (daler copper coins), abbreviated d.k.m. In 1633 the relation was: 1 d.s.m. = 2 d.k.m. 1 daler = 4 marks = 32 öre in the respective system.

In 1643 the copper öre coins were devalued by a further 20 per cent (for example, the one-öre copper coin from before 1633 was devalued to 2/5 öre silvermynt, while the copper coin minted as one öre silvermynt in 1635–41 was devalued to 4/5 öre silvermynt). Hence, 1 d.s.m. = 2.5 d.k.m.

In 1665 the copper coins were devalued by a further 1/6, so that 1 d.s.m. = 3 d.k.m. This was the last reduction, which lasted until 1776.[50]

The disinction between daler/mark/öre silvermynt and daler/mark/öre kopparmynt constituted a system of account and did not necessarily indicate whether the payments were made in coins of copper or of silver. In fact, some petty copper coins were minted in the denomination of öre silvermynt, while all copper plates were minted in the denomination of daler silvermynt.

When payment was made in actual silver coins, the terms 'daler/mark silvermynt in specie' or 'daler/mark vitt mynt' (daler/mark white coins) were often used initially.[51] From the 1660s, the term carolin came to refer to actual silver coins in mark denomination and the term courant to actual silver coins in öre denomination. One carolin was equal to two marks in actual silver coins, and one daler carolin to 4 marks in actual silver coins or to two carolins. One öre courant was the same as one öre in actual silver coins, and one daler courant was equal to 32 öre courant. In some periods, the öre courant was in fact equal to öre silvermynt, but in other periods the equality could not be upheld.

### 4.3.1. The currency units in Sweden-Finland 1624–1776

From around the mid-17th century up to 1776, Sweden-Finland de facto had five or six different currencies, three based on silver, one or two based on copper and one based on gold. There were some periods when additional currencies were in use.

From the 16th century there were three different types of currency based on silver: 1) silver daler/slagen daler/riksdaler (specie), 2) mark/carolins (1 carolin = 2 silver marks) and 3) öre.[52] Although 1 mark = 8 öre was maintained as an accounting identity, it was not valid between coins for all periods. Moreover, the fine silver con-

49 Stiernstedt (1863, p. 109).
50 Wallroth (1918, p. 57).
51 Hegardt (1975, p. 226).
52 Wolontis (1936, p. 183).

tent of 8 öre in silver coins in öre denomination was normally lower than the fine silver content of one mark in silver coins in mark denomination. In 1681 the mark coins were revalued relative to öre coins and this put an end to the equality between one daler carolin and one daler courant.

Copper coins also de facto formed two different systems, one in petty coins of lower denominations (termed 'slantar') and the other in copper plates of higher denominations.[53] After 1680, the mint equivalent became higher for petty coins than for copper plate coins. The difference was quite small in the late 17th and early 18th centuries (most likely motivated by the petty copper coins' higher production costs per unit of value), but became significant from 1719 onwards. Before 1719, both petty copper coins and copper plate coins (disregarding the coin tokens of 1716–9) could be described as intrinsic value coins, but after 1719 this was true only for copper plates.[54]

Alongside copper and silver coins, there were coins minted in gold. In a sense, there was a monetary standard based on three metals (trimetallism, at least de jure). The main minted gold coin after the mid 17th century was the ducat (imported ducats were already circulating in Sweden in the Middle Ages). The ducat was minted in Sweden in the period 1654–1868 (in foreign provinces also in earlier years). The legal value of the ducat was fixed in the mid-1660s. The exchange rate between the ducat and the riksdaler fluctuated but roughly followed the change in the gold-silver (value) ratio. Throughout the period, one ducat was worth about twice as much as one riksdaler.[55] The total amount of ducats minted was quite small. In the 18th century ducats probably did not account for more than a tiny fraction of the total minted stock.[56]

In addition, foreign coins were still used in domestic transactions, but their role declined in the course of the 17th century.[57]

How could this multi-currency system exist for so long and why did not one of the currencies replace the others, as suggested by Gresham's law?

Milton Friedman and Anna Schwartz point out that 'Gresham's law, that cheap money drives out dear money, applies only when there is a fixed rate of exchange between the two', and that the law has been misunderstood and misused because this requirement is often forgotten. For example, because greenback and gold dollars in the 1860s were not interchangeable at a fixed rate, the former did not drive out the

53 Davidson (1919, p. 121).

54 Stiernstedt (1863, pp. 418–9) and Talvio (1995, p. 203).

55 Wallroth (1918). The main source for the ducat's exchange rates before 1740 used in this study is the Sandbergska samlingen. In Wolontis (1936, p. 167), monthly exchange rates are available for 1686.

56 Own calculations based on Wallroth (1918).

57 Heckscher (1936, vol. I:2, pp. 638–9).


*A one-ducat coin from 1668, the year in which the Riksbank was founded. One ducat contained 3.4 grams of fine gold and was equivalent in 1668 to a male unskilled labourer's pay for around 12 days' work in Stockholm; it could buy around two hectolitres of grains or 14 kg of butter.*
*Photo: The Royal Coin Cabinet, Stockholm.*

latter and they could coexist for a time.[58] A premium (agio) on dear money allows it to stay in circulation.

Arthur Rolnick and Warren Weber go further and argue that while Gresham's Law relies on the 'existence of a fixed rate of exchange that is different from the market price', they 'have found no evidence that such a fixed rate of exchange ever existed, and that is not surprising since it is hard to believe it ever could exist'.[59] According to them, this does not imply that cheap money never drives out dear money, but it cannot constitute a law. There are transaction costs involved in using the dear money at a premium. Rolnick and Weber's hypothesis is that cheap money drives dear money out of circulation when the transaction costs involved in using the dear money as a means of payment at a premium are significant. Without such transaction costs, cheap money would never drive out good money. Since coins of small denominations are more expensive to use at a non-par premium than money of large denominations, it is often petty coins that are driven out of circulation, not coins of higher denominations.[60]

The relation between market and legal values is somewhat complicated. For example, a premium can reflect the costs involved in the exchange market. That is

58 Friedman and Schwartz (1963, p. 27).
59 Rolnick and Weber (1986, p. 186).
60 However, it should be taken into account that hoarding petty coins is more costly per unit of value than hoarding coins of higher denominations.

why exchange rates should be calculated as the average of the buying and selling rates, but information on these two types of rate is seldom available for earlier times. The premium on better coins could reflect other circumstances than the value relations of various currency units. For example, in Sweden-Finland in the 18th century, the high cost of transporting copper plates as means of payment resulted in a discount (negative premium) on copper plates. Copper plate coins, which were of higher denominations, therefore tended to be driven out of circulation (exported) when undervalued due to high copper prices.

The Swedish multi-currency standard was based on different systems of account. Debts in one type of currency had to be paid back in the same currency. Stockholm Banco, and later the Riksbank, had to be liquid in all domestic currencies.[61] Eli Heckscher argues that this was so because the monetary system was not fungible, an example of an economy based on self-subsistence and payments in kind.[62] Money existed as several types of commodity, and was not fully all-purpose money. Even when undervalued, various coin currencies were not driven out of circulation, since they could not be substituted within their sphere of circulation by other coin currencies.

In Sweden-Finland, it was during this period of multiple currencies circulating alongside each other that the fiat standard arose. The existence of several currencies based on the same precious metal presupposes a large 'fiat component' of the coins' face value (see Chapter 2). A very small fiat component, due to free minting, would in effect lead to fixed exchange rates between monetary units based on the same metal.

For the 1620s and '30s, annual exchange rates between domestic currencies are presented in Swenne (1933), although the figures are not very reliable for every year. Monthly exchange rates for the riksdaler exist for the period 1640–86[63] and are presented in Table A4.1. Monthly exchange rates for carolins and öre courant exist for the period 1670–81 and for 1686;[64] they are presented in Table A4.2 and Table A4.3.

### 4.3.2. The relation between copper and silver

While there is constant pressure for depreciation under a mono-metallic standard, in some respects the pressure is even greater under a bimetallic standard. With the latter, changes in the relative prices of the two metals imply that after some time, coins of one of the metals become undervalued. Angela Redish points out 'that undervaluation in a bimetallic standard could be removed either by depreciating the undervalued metal or by appreciating the overvalued metal. Yet in virtually all instances it was

61 Heckscher (1936, vol. I:2, p. 607) and Davidson (1919, pp. 117–20).
62 Heckscher (1936, vol. I:2, p. 638).
63 Wolontis (1936, pp. 167 and 310–1), and Sandbergska samlingen, O:1, folios 1475–88.
64 Wolontis (1936, pp. 167 and 313–4).

the former that occurred.'[65] This is especially relevant when analysing the double copper and silver standard in Sweden-Finland 1624–1776. There are also stabilising factors underpinning bimetallism. For example, when gold became cheaper relative to silver in the 1850s and 1860s, France, which was on a bimetallic standard at the time, absorbed more than half of world's total production of gold, thus counteracting the fall in the gold-silver (value) ratio.[66]

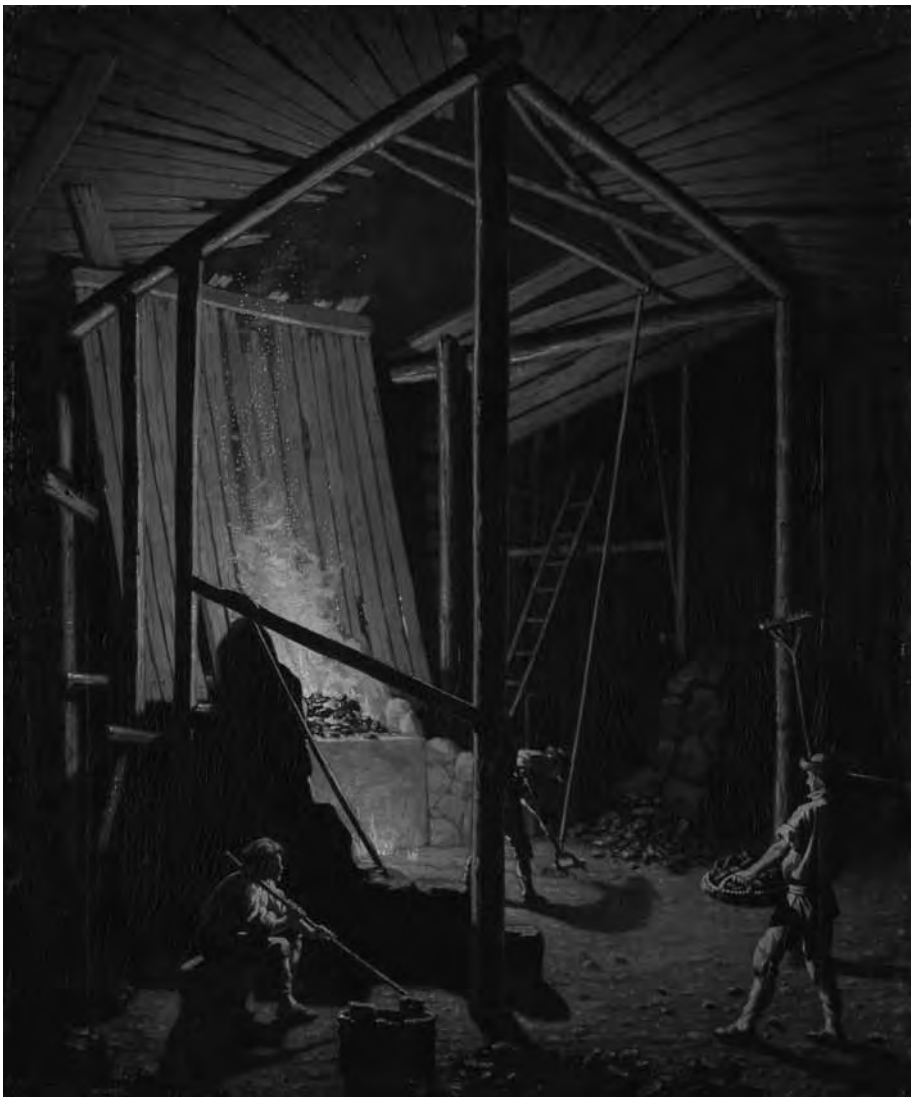
Although both silver and copper coins circulated widely in trade, in the period 1624–1776 the metals alternated as the official basis of the main currency unit. It was copper in 1624–33, silver in 1633–44, copper in 1644–64, silver in 1664–74, copper in 1674–81, silver in 1681–1709, copper in 1709–66 and silver in 1766–76.[67] In 1716–19 and 1745–76 there was de facto a fiat standard. See Chapter 2.

Wolontis questions the view that the alternation between the official silver and copper standards in the period 1624–1714 can be attributed to changes in the price of copper relative to silver, i.e. that high copper prices brought about a silver standard (since copper coins would then be driven out of circulation) and low copper prices brought about a copper standard (since silver coins would then be driven out of circulation). Other factors were also at work, according to him.[68]

The exchange rate between silver and copper coins was not fixed and it fluctuated during most of the period. Sweden's monopoly position in the copper market entailed that the price of copper could be affected by policy measures (not necessarily always profit maximising in the short-term) and was therefore not an independent variable. The relation between different currencies changed not only because the price of copper fluctuated relative to silver but also because the mint equivalent (the nominal value minted from a ship pound of copper or silver) of various coin currencies changed, too. In the 17th and 18th centuries, the mint equivalent of copper plates was increased on numerous occasions, mostly as a consequence of temporary increases in the price of copper. When the copper price subsequently fell, copper plates became overvalued, which was adjusted by increasing either the mint equivalent of silver coins (mainly öre coins) or the official value of existing silver coins relative to copper coins.

Minting was to a large extent conducted on government account.[69] Free minting did not apply to copper, so no upper bound existed for the price of copper money. The minting volume of private copper could be large but its maximum quantity was always predetermined.[70] In 1660, the (net) seignorage tax (slagskatt) on the minting of private copper was increased significantly, almost to the level of various charges on

65 Redish (2000, p. 33).
66 Friedman (1990, pp. 89–91), and Jevons (1875, Ch. xii).
67 Wallroth (1918, pp. 59 and 93).
68 Wolontis (1936, pp. 185–9).
69 Davidson (1919, pp. 125–6).
70 Heckscher (1936, vol. I:2, p. 606).



Copper Foundry at the Falun Mine*, by Pehr Hilleström the Elder (1732–1816).*
Source: Nationalmuseum.

shipping copper abroad.[71] Because free mining was restricted, there were periods when the face value of copper plate coins was significantly above their intrinsic metal value.

Free minting did apply, at least in some periods, to some silver and gold coins. To stimulate minting of silver and gold coins, in 1664 the (net) seignorage tax (slag-

71 Wolontis (1936, p. 133).

skatt) was abolished for them (except for silver coming from the Sala silver mine). No written permission was required to deliver silver and get silver coins in return. This did not apply to 1-öre and 2-öre silver coins, which contained less fine silver per unit of value than the carolins. In 1709, a restriction was imposed so that only one third of the silver delivered to the mint would be minted into 5-öre silver coins, while the other two-thirds would be seen as a loan to the Crown at 6 per cent interest.[72]

One problem is the existence of more than one market price for copper. There are also many gaps in the time series of the various copper prices.

Most notably, free and unfree copper differed in price and did so substantially after 1655. Their quality did not differ, only their legal status. Unfree copper that was shipped abroad was subject to various duties, while free copper was exempt from these taxes. Private copper was usually unfree.

Furthermore, the price of Swedish garcopper in Amsterdam was usually substantially higher than the free copper price in Stockholm, which can be explained by the high costs of transportation and the risks involved (which could account for 10–15 per cent of the price in Amsterdam). The difference varied. The higher the international price relative to the price of free copper, the stronger was the incentive to export copper from Sweden-Finland. Copper plate coins were usually exempt from duties when exported, except in the periods 1655–62 and 1666–73 (although the duties on copper plate coins were then lower than for unfree copper). There were also periods when the export of copper plate coins was banned, which led to additional transaction costs if copper plate coins were smuggled abroad.[73]

Furthermore, a fourth copper price could be estimated based on copper plate coins. For the period 1624–1715, such a price in riksdaler per ship pound of copper plates is calculated by Josef Wolontis from the exchange rate of the riksdaler and the mint equivalent of copper plates. This price is a measure of the value of copper plate coins as a means of exchange. For example, in 1677 the price of unfree copper was 36 riksdaler (specie) per ship pound, of copper plate coins 45.9 riksdaler per ship pound and of free copper 50 riksdaler per ship pound. The price of Swedish garcopper in Amsterdam in that year was 64.9 riksdaler per ship pound.[74] The price difference in Amsterdam between Swedish copper coin (plates) and Swedish garcopper was insignificant.[75]

In theory, the price of copper plate coins should be highly correlated with the prices of free copper in Sweden and garcopper in Amsterdam (with a deduction for transaction costs, including duties and smuggling costs in some periods). In reality,

72 *Nordisk familjebok* (1913).

73 Wolontis (1936, pp. 26–8 and 199).

74 Wolontis (1936, pp. 234, 244, 319 and 325). The mint equivalent of copper plates was 100 daler silvermynt per ship pound, while the riksdaler stood at 26.16 mark kopparmynt or 2.18 daler silvermynt (see Table A4.7). 1 ship pound copper = 136 kilograms.

75 Wolontis (1936, p. 193).

the prices of free copper in Sweden and garcopper in Amsterdam fluctuated sharply compared to the price of copper plate coins in Sweden. For example, while the Amsterdam copper price was very low in the early 1650s, the price of copper plate coins in riksdaler did not fall, and copper plates became worth much more as means of payment than as copper metal for export.[76]

With the exception of the 1760s and '70s (during the fiat standard at the time), the price of copper plates as means of payment was probably never below the unfree copper price (which would have induced the melting down of copper plates for domestic use). Thus, when there was a de facto metallic standard, copper plate coins were always worth more as means of payment than as copper for domestic use. When taken out of circulation, copper plate coins were almost exclusively either exported or saved as treasure.

### 4.3.3. The period 1624–33

During the period 1624–33, the copper coin was officially the main currency unit, although there was de facto a multi-currency (copper and silver) standard since silver coins circulated alongside copper coins at a floating exchange rate.

Although initially at the par rate of 6.5 marks (52 öre) per riksdaler, the value of öre kopparmynt soon fell. The market exchange rate of one riksdaler rose from 6.5 marks in copper coins in 1624, 1625 and early 1626 to 8 marks in late 1626, fell back to 6.5 marks in 1627 and increased to 9 marks in early 1628, 10 marks in late 1628 and 1629, and 14 marks in 1630–33 (see Figure 4.5 and Table A4.7).[77] These fluctuations are too large to be explained by the fluctuations in the copper price. Although the price of copper was high in 1624–25, the market value of copper öre in those years was significantly above the intrinsic metal value. In other words, the copper coins initially circulated by tale rather than by weight.

The öre silver coin fell in value against both the riksdaler and the mark coin. The öre in silver metal fell far below its intrinsic metal value, which is somewhat puzzling. If the value of öre silver coins had fallen to their intrinsic metal value, one riksdaler would have increased to 7.9 marks in one-öre silver coins. Instead, the riksdaler increased to as much as 12 marks in one-öre silver coins in 1631.[78]

One reason for the fall in the value of öre coins in silver was that the towns of Kalmar, Göteborg and Norrköping were given permission to mint their own öre silver coins in 1623, 1625 and 1626, respectively. These coins contained less than the stated amount of silver and were therefore declared invalid as means of payment as of 1st February 1632.[79] Another explanation could be that the excessive minting

76 Wolontis (1936, pp. 194–209).
77 Wolontis (1936, pp. 66–76).
78 Swenne (1933, p. 193).
79 Tingström (1995, p. 185).

*Sweden adopted a copper standard in 1624. In 1625, the 2 öre kopparmynt (left) weighed around 60 grams and was the equivalent of around two hours' wages for a male unskilled labourer in Stockholm. It could buy around 0.25 kg of butter or four litres of grains. Right, various copper coins minted in the late 1620s and recovered from the Vasa, a Swedish warship that sank in 1628.*
*Photo (left): The Royal Coin Cabinet, Stockholm.*
*Photo (right): Swedish National Maritime Museum, Stockholm.*

of copper coins in particular overcame the previous shortage of means of payment, which also affected the value of öre silver coins.[80]

The mark silver coin also fell in value relative to the riksdaler but not as much as the öre silver and copper coins.

Two kinds of öre copper coins were minted: klippings and round coins. In the late 1620s the copper klipping fell into disrepute and there was a premium on the round copper coin relative to the klipping coin. A decision to withdraw the klipping coin from circulation was taken on 12th January 1629 but it was exchanged at par for round copper coins with a percentage reduction.[81]

The relation between öre silver and copper coins seems to have been one-to-one at least up to 1628. After that the value of the öre copper coin fell more than that of the öre silver coin. Already in 1629 there were fluctuations in the exchange rates between the four main currencies in Sweden-Finland: öre silver and öre copper coins, mark silver coins and the riksdaler.

80 Wolontis (1936, pp. 94–5).
81 Wolontis (1936, p. 71).

### 4.3.4. The period 1633–44

During the period 1633–44 the silver coins were officially the main currency unit. However, Josef Wolontis argues that it was the copper coins that de facto dominated money supply, not least since the minting of copper coins was much larger than the minting of silver coins.[82]

A decision on 26th August 1633 officially devalued the öre copper coins by 50 per cent. The official value of one riksdaler was reduced to 48 öre silvermynt, i.e. 6 marks silvermynt (or 12 marks kopparmynt), from 6.5 marks previously.[83] However, the market exchange rate for the riksdaler was higher than 12 marks kopparmynt, namely 13–14 marks in the period 1634–39 and 15 marks in 1640–44.

The source material is not entirely reliable concerning the market exchange rate between copper and silver coins in the 1630s and '40s. For example, 'mark silvermynt' could refer either to the accounting unit (equal to 2 marks kopparmynt or ½ daler kopparmynt) or to actual mark coins in silver.[84] The relation 1 daler silvermynt = 2 daler kopparmynt seems to have been upheld at least up to 1639,[85] implying a de facto bimetallic standard. Silver coins, especially mark coins, became undervalued.[86] However, in the early 1640s, it seems that silver coins circulated by tale in some meetings and with a premium in other meetings (although not necessarily in full proportion to their weight). It is also possible that öre silver coins were more likely to circulate by tale than mark silver coins, although this cannot be confirmed from any sources.

On 24th March 1643 the official value of one riksdaler was increased to 15 marks kopparmynt, in accordance with the market rate.[87] At the same time the value of one daler silvermynt was increased a second time, to 2.5 daler kopparmynt. Thus the official value of öre and mark silver coins increased relative to the copper öre coins, the purpose being to reestablish the fixed relations that in theory should underpin bimetallism.

82 Wolontis (1936, p. 98).

83 Stiernstedt (1863, p. 109).

84 This is not fully considered in Swenne (1933, p. 190), in his account of the exchange rate of the riksdaler in mark silver coins.

85 According to Sandbergska samlingen (Riksarkivet), OO, folio 612, one riksdaler in 1639 stood at 7.5 marks in 'hwit mynt' (white coins). In copper coins one riksdaler stood at 14–15 marks kopparmynt.

86 In the early 1640s the riksdaler stood at around 7.5 marks (60 öre) in silver coins. The fine silver content of the riksdaler coin was 6.12 times higher than the fine silver content of the one-mark silver coin. The theoretical exchange rate based on the fine silver content of öre coins was 6.84 marks (55 öre) per riksdaler.

87 Stiernstedt (1863, p. 119).


*Queen Christina, portrait by David Beck in 1650.*
Source: Nationalmuseum.

### 4.3.5. The period 1644–64

In 1644–64 the copper coins were officially the main currency.

The first copper plates, minted in 1644, had the denomination 10 daler silvermynt and weighed 19.7 kg. These plates were mainly exported and not used as means of payment in domestic trade. The minting of copper plates was suspended in 1645, only to be resumed in 1649.[88] From then on, copper plates were also minted in lower denominations (1, 2, 4 and 8 daler silvermynt) that could be used more effectively as means of payment in domestic trade. At the same time the mint equivalent of copper plate coins (but not round copper coins) was increased by 14 per cent, which led to an increase in the exchange rate of the riksdaler during the 1650s, especially towards the end of the decade.

The mark and öre silver coins seem to have been at par with the copper coins at least up to 1655, notwithstanding a large fall in copper prices 1650–2. Copper prices were quite high in 1654 and 1655. After the mid-1650s there was a premium on the öre and mark silver coins relative to the copper coins.[89] The premium for mark silver coins was probably somewhat higher than for öre silver coins, but no reliable source for this could be found for the 1650s. The de facto bimetallic standard was transformed into a de facto multi-currency standard.

Due to higher copper prices, the mint equivalent was further increased in 1660 for both copper plates and round copper coins. The increase was so large that it led to subsequent increases in the riksdaler's exchange rate as well as in the premiums on mark and öre silver metal coins. The old copper coins minted at a lower mint equivalent were exported and largely disappeared from circulation, creating a shortage of money. There was also a premium on these coins.

When Stockholms Banco was established in 1657, with Johan Palmstruch as its director, large amounts of old copper plates of the mint equivalent before 1660 were deposited there. In 1661–4 the Bank therefore clipped the deposited copper plates to accord with the new higher mint equivalent established in 1660 and made huge profits from this operation.[90] This rather unusal way of increasing seignorage from debasement is an interesting example of how money as an abstract unit of account needs to be distinguished from money as a physical object circulating as means of payment.

In 1661 Stockholm Banco began to issue the first bank notes, partly in order to overcome the shortage of money that resulted from the increased mint equivalent in 1660. Initially, the bank notes were quite popular with the public, since they were more convenient means of payment than the metal coins (in particular the heavy copper plates). There was even a small premium on the notes relative to metal coins. The notes probably did not account for more than 10–20 per cent of the total money supply (according to Palmstruch, the total amount of issued notes was 2.7 million

88 Wolontis (1936, p. 114).
89 Wolontis (1936, p. 108).
90 Wolontis (1936, pp. 126–130).


*Stockholm Banco, forerunner of the Riksbank, issued the first bank notes in Europe in 1661. The picture shows a bank note issued five years later with the nominal value of 100 daler silvermynt. In 1666, 100 daler silvermynt was what a male unskilled labourer could earn in Stockholm for around 340 days' work (equivalent to half a million SEK in the early 21st century) and could buy around 360 kg of butter, 9 oxen or 47 hectolitres of grains, i.e., it was a very large sum of money.*
*Photo: The Royal Coin Cabinet, Stockholm.*

daler kopparmynt), although the circulation velocity of notes was most likely higher than that of copper plates. This was sufficient to reduce the value of the notes, although the discount was never more than 8–10 per cent. When the bank continued to exchange notes at their par value, note-holders made a run on the bank. Notes then became inconvertible in 1664. The Riksdag (the Diet of the Estates of the Realm) decided to withdraw the notes. This was done at their full value. The Riksdag took over Stockholms Banco and re-established it in 1668 as the Riksbank, the world's oldest central bank. After that, no bank notes were issued in the rest of the 17th century.[91]

91 Heckscher (1936, vol. I:2, pp. 629–30), and Wolontis (1936, pp. 130–3).

### 4.3.6. The period 1664–81

In 1664–74 silver coins were officially the main currency, although there was de facto a multi-currency, copper and silver standard.

On 7th October 1665, the official value of one daler silvermynt was increased for the third time, now to 3 daler kopparmynt, which was in accordance with the market exchange rate. This was a consequence of the previous increases in the mint equivalent of copper coins. The official value of one riksdaler was increased from 48 öre (6 marks) to 52 öre (6.5 marks) in silver metal coins,[92] and from 15 to 19.5 marks kopparmynt, although that was still below the market exchange rate. The official value of one ducat was set to 100 öre silvermynt, i.e. 1 ducat ≈ 1.923 riksdaler. Since the fine silver content of one riksdaler was 25.2739 grams and the fine gold content of one ducat was 3.3966 grams, the derived value ratio of gold to silver would be around 1:15, which was in accordance with the prevailing ratio in the international markets.

Even before the riksdaler's appreciation to 52 öre in 1665, there was a difference between a riksdaler expressed in different types of silver coin, i.e. between a riksdaler in actual specie coins, in mark silver coins equal to 6 marks and in öre courant equal to 48 öre. For example, in 1662, when the riksdaler's official value was 15 marks kopparmynt, the market value of one riksdaler in specie was 18.25 marks kopparmynt, of one riksdaler in mark silver coins 17.25 marks kopparmynt and of one riksdaler in 'smått mynt' (petty coins or öre courant) 17 marks kopparmynt.[93] After 1665, the practice of counting a riksdaler in 48 öre or 6 marks in silver coins continued, even though the official value of the riksdaler specie was increased to 52 öre or 6.5 marks in silver coins. A riksdaler equal to 6 marks in silver coins, or 3 carolins, was termed a riksdaler carolin (1 riksdaler carolin = 1.5 daler carolin). The term riksdaler courant was also used but up to 1681 it could probably refer to either 48 öre courant or to 3 carolins (further investigation is needed on this issue). This can cause some confusion.

The mint equivalent of copper plates was further increased in 1674, following high copper prices in the previous years. In the period 1674–81 the plate copper coins became the official currency unit, but de facto a multi-currency standard was in place, since there was a premium on both carolins and öre courant. Copper prices began to fall from 1674. Since the mint equivalent of petty copper coins was not increased until 1680, in the second half of the 1670s there was also a premium on round copper coins relative to copper plates, at least in some regions.[94]

Very few riksdaler coins were minted after the reign of Queen Christina, which ended in 1654. Only 791 riksdaler were minted in 1676, 2344 in 1707 and 9943 in

92 Stiernstedt (1863, p. 153).
93 Sandbergska samlingen, O:1 , folio 262.
94 Wolontis (1936, p. 159).

1713,[95] i.e. altogether no more than 13,078 riksdaler during a 60-year period! No exact figures are known, but a guesstimate is that maybe up to one million riksdaler coins had been minted during Queen Christina's reign.[96] The riksdaler coins of Queen Christina contained less fine silver, 25.2739 grams, than the coins minted from 1676 onwards, which contained 25.6973 grams of fine silver. However, since the riksdaler coins of Queen Christina probably continued to dominate circulation in the late 17th and early 18th centuries, the assumption in this study is that the riksdaler coin contained 25.2739 grams of fine silver in 1639–1718, and 25.6973 grams in 1719–1830.

The exchange rate on Swedish riksdaler can be compared with the exchange rates on two other types of rix-dollar, the Hamburger reichstaler banco and the Amsterdam rijksdaalder courant, which were the most quoted foreign currencies in Sweden in the 17th and 18th centuries (see Chapter 5).

In the period 1660–81 the median price of one Amsterdam rijksdaalder courant (estimated spot price) was 0.961 Swedish riksdaler. Since one Amsterdam rijksdaalder contained 24.35 grams of fine silver and one Swedish riksdaler 25.27 grams, the theoretical price should have been 0.963 Swedish riksdaler for one Amsterdam rijksdaalder courant, i.e. only 0.2 per cent above the actual median price during the period in question. This is a clear indication of relatively efficient markets.

In the latter half of the 17th century, the Swedish riksdaler's exchange rate seems to have been almost equal to the exchange rate on Hamburg, which is not surprising since the silver contents of the two currency units were almost identical.

### 4.3.7. The period 1681–1709

The silver standard was officially reintroduced in 1681 and lasted until 1709. Silver coins de facto became the main means of payment. On 19th March 1681, the official value of one riksdaler was increased from 19.5 to 24 marks kopparmynt, of one ducat to two riksdaler, and of one carolin from 6 to 7 marks kopparmynt. On 15th May 1686 one carolin was further increased to 7.5 marks kopparmynt, in accordance with the prevailing market exchange rates. However, the market exchange rates of the riksdaler and the carolin against copper coins implied that the copper plates had become undervalued in relation to the international price of copper.[97] When the official relations between silver coins and copper plates were adjusted to the market exchange rates, the undervaluation of copper plates (in terms of the international bullion price) became legally fixed. Copper plates became dear money, and in the coming period were exported and disappeared from circulation. There are also

95 Wallroth (1918).

96 In the year 1652 alone, 117,908.5 riksdaler were minted in riksdaler coins. This level was not surpassed until 1769. See Wallroth (1918).

97 Wolontis (1936, p. 161).

reports of a premium on copper plates in the late 18th century (for example, 8 per cent in 1697).[98]

One öre silvermynt continued to be equal to three öre kopparmynt, implying that the official value of one carolin was increased from 16 to 18⅔ öre silvermynt in 1681 and to 20 öre silvermynt in 1686. It was further increased to 25 öre silvermynt in 1716. One daler carolin (equal to two carolins or 4 marks in carolins) was no longer officially equal to one daler silvermynt or one daler courant. Up to 1681, the fine silver content per unit of value of the öre courant was 15 per cent below the fine silver content per unit of value of the carolin. This was recognized in the market exchange rate between courant öre coins and carolins. The increase in the official value of the carolin in 1681 therefore simply recognized the market situation, ensuring a stable relation between the two silver currency units. When the official value of one carolin was increased to 20 öre silvermynt in 1686, the fine silver content of the öre silver coin was simultaneously reduced, in order to retain the relation 1 daler silvermynt = 1 daler courant = 3 daler kopparmynt.

In 1686 there was still a premium on öre silver coins; it was somewhat higher for the 4-öre silver coin than for the 2-öre silver coin.[99] This premium disappeared during the course of the next two decades as the fine silver content of the newly minted öre coins was decreased[100] and the silver coins replaced the copper plates as the main currency.

The widening difference between the two silver currencies, daler carolin and daler courant, from the 1680s onwards was a consequence of the bimetallic copper and silver standard, and the attempt to make öre courant follow the copper currency, while not debasing carolins.

After 1681, the riksdaler courant and the riksdaler carolin definitely became two different units of account. After the legal appreciation of the carolin to 7.5 marks in 1686, the difference between the two units became quite large.[101] In 1686–1716, one riksdaler carolin was legally fixed to 22.5 (3 times 7.5) marks kopparmynt or 60 (3 times 20) öre silvermynt. This was 25 per cent above the level of one riksdaler

98 See footnote 104.

99 Wolontis (1936, p. 167).

100 The 5-öre silver coin that was minted from 1690 had the same fine silver content as the previous 4-öre silver coin; 4-öre coins were also reminted into 5-öre coins. See Wallroth (1918) and Wolontis (1936, p. 168).

101 Wolontis (1936, p. 156) argues that the two units 'riksdaler carolin' and 'riksdaler courant' were the same, both equal to 3 carolins, but this can be questioned. For example, there are two examples in Sandbergska samlingen, one from 1690 (Sandbergska samlingen, O:1, folio 774) and the other from 1697 (Sandbergska samlingen, O:1 , folio 779) where 1 riksdaler courant is set equal to ¾ riksdaler specie and to 1.5 daler silvermynt. This presupposes that 1 riksdaler courant is equal to 48 öre courant (which also confirms that the market rate was at par with the legal rate in the 1690s). Wolontis (1936, p. 156) quotes the same source, stating that 'effter som här i landet gemeligen plägar förstås RD courant till 6 m Smt', but here '6 m Smt' most likely refers to 1.5 daler silvermynt, not 3 carolins.

courant equal to 48 öre courant. Lars Herlitz writes that during the 18th century, at least in various official documents, the riksdaler courant became a pure unit of account, equal to 1.5 daler silvermynt (i.e. 48 öre silvermynt), and thereafter ceased to be linked to the courant coins. The term was used only sporadically after the mid-18th century.[102]

According to Wolontis, the market exchange rate of one riksdaler carolin was 22.5 marks kopparmynt or 60 öre silvermynt, its par value, throughout the period 1695–1709.[103] In this study it is assumed that no premium existed on carolins and öre courant throughout the period 1687–1715.[104]

According to Wolontis, in 1686–95 the exchange rate on Swedish riksdaler as well as on Hamburger reichstaler banco was quite stable at around 25 marks kopparmynt.[105] The riksdaler coins circulating in the late 17th and early 18th centuries were mainly those that had been minted during the reign of Queen Christina (and to a large extent also foreign taler coins).[106] The Riksbank's holdings of riksdaler specie decreased from 134,000 in 1696 to a few thousand in the 1710s.[107]

*Stockholms stads priscourant* contains weekly exchange rates for various currencies for the period 31st May 1705 to 9th February 1707.[108] These show that the Hamburger reichstaler banco (at 26.75–27.75 marks kopparmynt[109]) was valued at slightly above the Swedish riksdaler specie (at 26–26.5 marks kopparmynt).[110]

One explanation for the higher exchange rate of foreign currencies could be the greater demand on Sweden to finance its war efforts during the Great Nordic War 1700–21.[111] The exchange rate of the riksdaler specie also fluctuated around a nar-

102 Herlitz (1974, p. 127).

103 Wolontis (1936, p. 176).

104 In Sandbergska samlingen, O:1, folio 1780, one document reports that, in 1697, 1 riksdaler was sold for 72 to 73 öre silvermynt, i.e. 27–27⅜ marks kopparmynt, but for 25 marks kopparmynt in copper plates. However, copper plates had largely disappeared from domestic circulation in the late 1690s, and the only copper coins that were widely used were those of smaller denominations. Furthermore, in 1697 the riksdaler also stood higher than usual.

105 Wolontis (1936, pp. 175 and 322).

106 Of the coin treasures found for the period 1701–21, the few riksdaler coins (a total of 11 coins) were from the reigns of Gustav II Adolf and Queen Christina. Moreover, the foreign taler coins were more numerous than the Swedish riksdaler coins. No findings of riksdaler coins are reported for the period 1722–38. Mint treasures are often good indicators of which coins circulated during the time when the treasure was laid down (which can often be determined by the coin with the latest year of minting). See Sarvas (1969).

107 Sveriges Riksbank (1931, p. 35).

108 Riksbankens arkiv, 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803'.

109 Direct data; the spot rate would be slightly higher.

110 In December 1708 the exchange rate of the Hamburger reichstaler-banco was 27 marks and of the Swedish riksdaler specie 26.25 marks. See Sandbergska samlingen, O:1 , folio 335 (Riksarkivet).

111 Wolontis (1936, pp. 174–5).

rower band (0.5 marks kopparmynt) than the Hamburger reichstaler banco (1 mark kopparmynt).

The par value for the riksdaler stood at 24 marks kopparmynt, which was significantly lower than both the market exchange rate of the riksdaler and the Hamburger reichstaler banco. Since the carolins had become the main currency unit, at least from the 1690s onwards, the mark kopparmynt as a unit of account was linked to carolins. One riksdaler in specie was officially 3.2 carolins, which, in turn, had the fine silver content of 23.11 grams, 8.6 per cent below the fine silver content of one riksdaler in specie. Based on these relations of fine silver contents, a currency linked to the carolin motivated an exchange rate for the riksdaler specie of 26.25 marks kopparmynt. The average exchange rate of one riksdaler was also raised from 25 marks kopparmynt around 1690 to 26.25 marks kopparmynt in the early 18th century, almost exactly in accordance with the theoretical exchange rate. Given there was free minting of carolins, such circulation by weight is an expected outcome of an efficient market.

### 4.3.8. The reintroduction of the copper standard in 1709

During the period 1709–66 Sweden-Finland was officially on a copper standard, although a fiat standard was in place in 1716–19 and 1745–76. In 1710, copper plates were again minted on a larger scale. In a longer perspective this had a profound effect on the monetary system in Sweden-Finland and stimulated the rise of fiat monies. In this respect, there is some similarity with the effect of the introduction of copper plates in the 1640s and 1650s, which subsequently led to the issuing of the first bank notes in Europe in the 1660s.

When the minting of copper plates on a larger scale was resumed in 1710, the mint equivalent was increased. However, in the early 1710s the price of copper rose substantially from the previous decade. Copper plates became dear money and tended to be driven out. When the export of copper plates increased, it was temporarily banned in 1713–14.[112] On 17th May 1715 it was decided that copper plates would be revalued by 50 per cent, which required a stamp.[113] Copper plates once again became cheap money, and were more valuable as means of payment than as metal for export.

### 4.3.9. The experiment with token coins in 1716–9

Towards the end of the Great Nordic War, 1716–9, the monetary system was in disarray as a result of several changes, most notably the circulation of token coins, called 'nödmynt' (emergency coins) or 'mynttecken' (coin signs or coin tokens).

112 Wolontis (1936, pp. 180–1) and Tingström (1984, p. 48).
113 Hegardt (1975, p. 229).

The coin tokens minted in 1716–9 were de facto fiat money. The value of the copper metal from which these coins were minted was only 0.5 to 1 per cent of their face value.

From an international perspective, this was not the first instance of token coins being used to replace commodity money. For example, the metal value of the copper coins minted in the Spanish Low Countries in 1543 was around 20 per cent of their face value.[114] The debased coins that circulated in Sweden in the early 1590s also partly functioned as token coins (see section 4.2). Although the bank notes issued by Stockholm Banco in the 1660s were non-metallic money, they never came to dominate the money supply and mainly functioned as convertible fiduciary notes. Only briefly did they circulate as inconvertible fiat notes before being exchanged at their full value.[115]

Various measures were taken to ensure the use of coin tokens by the general public and to draw in proper money to the State. A decision on 20th December 1717 made the old carolins invalid as means of payment and exchanged for coin tokens,[116] but they were reinstated as legal means of payment on 18th April 1719. To replace the old carolins, the 'Görtz' carolin' was minted in 1718 with a lower fine silver content and a face value of 16 öre silvermynt (instead of 25 öre silvermynt), the old official value of the carolin (before 1681).

By a decree of 23rd April 1719, the circulated coin tokens valued at one daler silvermynt (32 öre silvermynt) were redeemed for another type of token coin, 'Hoppet' (The Hope), valued at 2 öre silvermynt, and a note worth 14 öre silvermynt that would be exchangeable later at its full value.[117] The exchange was carried out in June 1719. This implies that the coin token worth one daler silvermynt was in effect devalued by 50 per cent. In practice the devaluation was larger, since not all notes were exchanged at their full value (although a majority of them were repaid later on) and the value of the devalued coin tokens continued to depreciate. Despite this, the assumption in this book is that for 1719, the following relation holds: 1 daler silvermynt in coin tokens = ½ daler silvermynt in proper money (see also the construction of the Consumer Price Index in Chapter 8).

Initially the coin tokens did not significantly disturb the monetary system and were even welcomed for being easy to handle. Later, however, they contributed to inflation. During most of the period with coin tokens, the premium on better coins (mainly copper plates and öre courant) was less than 15 per cent, and only for a few months or half a year did it rise above 50 per cent.

According to Gösta Lindeberg, the premium was 4–8 per cent in the second half of 1716, 6–12 per cent in the first half of 1717, 12–36 per cent in the second half,

114 Sargent and Velde (2002, p. 228).
115 Heckscher (1936, vol. I:2, p. 634).
116 Wallroth (1918, p. 92).
117 Stiernstedt (1853, pp. 320–8).

2–5 per cent in the first half of 1718, 12–14 per cent in July–October 1718, and 20–80 per cent in October–December 1718.[118]

According to Hegardt, in January 1719 the Uppsala Academy sold rye for 26 marks kopparmynt per barrel when paid in copper plates, but for 40 marks when paid in coin tokens, implying a premium of 67 per cent on plates. Mixed grain was sold for 18 marks kopparmynt when paid in copper plates and 24 when paid in coin tokens, implying a premium of 33 per cent.

Although monthly exchange rates are not available for the late 1710s, there are some sources for monthly prices. One problem is that the sources can report prices in either proper coins or coin tokens, without explicitly stating which.

The best source for following monthly prices during this period is probably for Göteborg, found in the minutes of the city's Board of Commerce.[119] Figure 4.4 presents a weighted monthly price index for Göteborg based on 18 goods.[120] The index rose continually from July 1718 to March 1719 and then dropped 61 per cent from March to April 1719. The only reasonable explanation is that there was a change in the currency unit in which prices were expressed, from coin tokens up to March 1719 to proper coins in April.

Another source from Göteborg, the accounts of the hospital,[121] shows that butter was purchased for 16 öre silvermynt per Swedish pound (skålpund, equal to 425 g) from 27th January 1719 (12 öre silvermynt 22nd January) to 11th May the same year; from 27th May, butter was bought for 6 öre silvermynt, i.e. a 62 per cent reduction, which corresponds almost exactly to the change in the index based on the prices reported in the minutes of the Board of Commerce.

Both these sources indicate that the premium on better coins continued to increase in the early 1719 and may have been as much as 150 per cent in March to May that year, higher than implied by the official 50 per cent reduction of coin tokens announced in April 1719. This is an expected result, since the devaluation of the emergency coins, as explained above, was de facto greater than 50 per cent.

Another source of monthly prices is from Falun, where the salesman Erik Sjöberg sold rye for 36 marks kopparmynt per barrel in September 1718, February 1719 and March 1719, for 40 marks kopparmynt in May 1719 and for 48 marks kopparmynt in December 1719. Since this is in complete contrast to the concurrent change in monthly prices in Göteborg, it is highly likely that the prices in Falun were expressed throughout the period in proper coins rather than token coins.[122]

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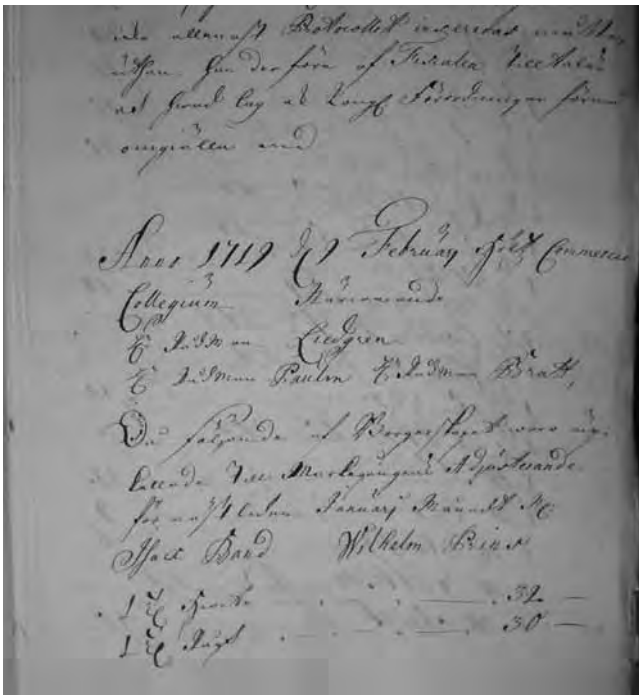
118 Lindeberg (1941, pp. 114, 146, 195 and 223).

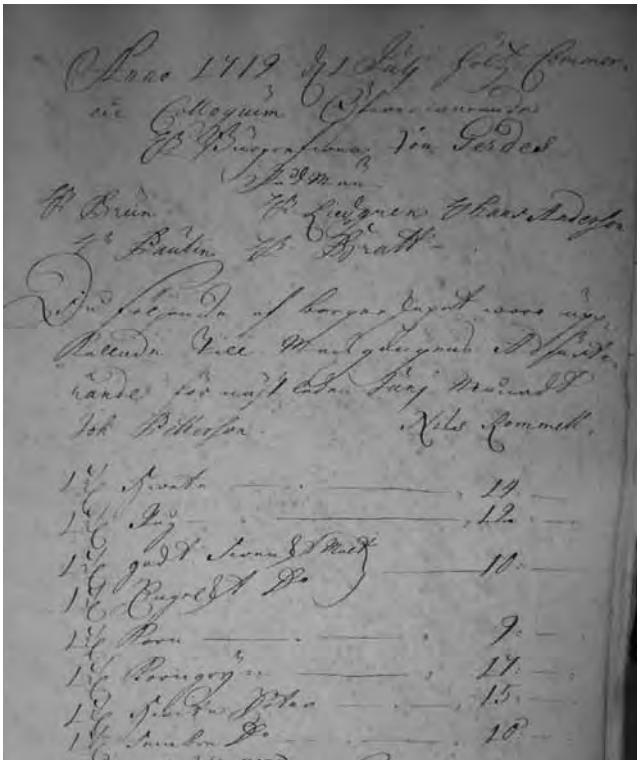
119 Göteborgs rådhusrätts och magistrats arkiv före år 1900, Signum L:I (Kollegiernas protokoll), vol. 4–6, Göteborgs landsarkiv.

120 The 18 goods are: wheat, rye, malt, barley, oats, peas, barley groats, meat, fish, salt, butter, cheese, pork, tallow, hops, twist tobacco, bread and beer.

121 Göteborgs rådhusrätts och magistrats arkiv före år 1900, Signum G:d (Handlingar angående hospitalet), vol. 20 and 22, Göteborgs landsarkiv.

122 'Priset på spannmålen i Fahlun från 1716 til 1723 inclusive, av Erik Sjöberg" in Äldre Kommissioner (Riksarkivet), 408, vol. 6, p. 390.





*Price notations in Göteborg in 1719, at the end of the Great Nordic Wars, showing the effect of inflation and the ensuing devaluation of coin tokens. Top, prices in January 1719 at the height of the circulation of coin tokens. Bottom, prices in June the same year, when the coin tokens had been replaced by proper coins. As can be seen, prices for wheat and rye more than halved between these two months (from 32 to 14 daler kopparmynt per barrel for wheat and from 30 to 12 daler kopparmynt per barrel for rye), which corresponds to the devaluation of the coin tokens.*
Sources: Göteborgs rådhusrätts och magistrats arkiv, Signum L I (Kollegiernas protokoll), vol. 4–6, Göteborgs landsarkiv.

The coin tokens officially circulated at their full value up to early June 1719. Thereafter they circulated at a reduced official value of 2 öre silvermynt. The problem of exchange rates did not disappear after mid-1719. The face value of the coin tokens was reduced but was still too high. The market value of coin tokens was well below 2 öre silvermynt after June 1719.[123] All these factors may have contributed to the high prices in late 1719.[124] The effect was probably greatest on prices for smaller transaction volumes. According to a decree from 4th May 1719, coin tokens at the reduced value of 2 öre silvermynt were to be accepted up to the sum of 10 daler silvermynt, and above this 10 daler per 100 daler.[125]

In 1719–20 large amounts of coin tokens were reminted to 1 öre kopparmynt (i.e. 1/3 öre silvermynt). Finally, on 18th February 1724 the face value of coin tokens still in circulation was officially reduced to 1 öre kopparmynt,[126] which was probably in accordance with the market rate.

In addition to the coin tokens, there were notes called 'myntsedlar' (coin notes) which circulated in the same period and fell in value even more than the coin tokens. According to Stiernstedt, these notes lost most of their credit worth. For example, Danish prisoners-of-war almost starved to death because the notes for their maintenance could not buy anything.[127]

For the period 1715–19, and particularly for 1718, it is especially difficult to calculate a mean exchange rate of the riksdaler in mark kopparmynt. The problem is partly connected with whether the mark kopparmynt is expressed in coin tokens or in copper plates. When the metal content of new copper plates was reduced by one third and the face value of old copper plates was increased by 50 per cent in 1715, the riksdaler was considered to be valued at 36 marks kopparmynt. However, it was not until 29th December 1718 that the official value of one riksdaler was changed to 36 marks kopparmynt.[128]

Stiernstedt gives one example for the first half of 1718, i.e. before the dramatic increase in the premium on better coins towards late 1718, when one riksdaler was registered (supposedly based on the average exchange rate on Hamburg) at the value of 58 marks kopparmynt and one ducat at 118 marks kopparmynt.[129]

The exchange rates reported for this period on Amsterdam and Hamburg are most probably noted in proper money (mainly copper plates), not in coin tokens or notes.[130] The use of coin tokens could most likely be enforced only on domestic

123 Stiernstedt (1867, p. 332) writes that in Autumn 1719, the coin token was not even accepted as one öre silvermynt.
124 Stiernstedt (1863, p. 324).
125 Stiernstedt (1863, p. 323).
126 Stiernstedt (1863, pp. 339–40).
127 Stiernstedt (1863, pp. 295–6).
128 Stiernstedt (1863, p. 270).
129 Stiernstedt (1863, p. 270).
130 Lindeberg (1941, pp. 21–3).

transactions, not on foreign exchange, though this matter is somewhat controversial.[131] Even so, the revaluation of older copper plates and carolins does suggest that the exchange rates should have already risen in 1716. However, such a rise did not occur until 1717.[132] One contributory factor could be high copper prices. Carolins had also been revalued (in 1716) but only by 25 per cent. One reason why foreign exchange rates did not increase in 1716 could be that much of the traffic to and from Sweden was controlled by foreigners.[133] Another explanation could be that the exchange rates, at least in 1716, were in units of account rather than actual market rates.[134]

The exchange rates on Hamburg and Amsterdam were well below 58 marks kopparmynt for most of 1718, which indicates that the reported 58 marks kopparmynt for one riksdaler was probably counted in coin tokens. Only for the late 1718 are there reports of an exchange rate of around 80 marks kopparmynt in proper coins and 140 in coin tokens on Amsterdam and Hamburg, respectively.[135] At the height of the monetary disarray, the fall in the exchange rate of Swedish relative to foreign currency affected not only coin tokens but proper coins as well.

To calculate the exchange rates in coin tokens, the estimated premium on better coins is used as an indicator. For 1718 this calculation yields an annual average estimate of 60 marks kopparmynt for one riksdaler in coin tokens, which is very close to Stiernstedt's example.

The confusion in the exchange rate market probably meant that some people were cheated. For example, the revaluation of old copper plates was announced on 17th May 1715 but was not enforced until the 22nd of that month. Some individuals used the opportunity to buy copper plates in the interval at the old rate from individuals who yet did not know about the revaluation.[136]

131 Lindeberg (1941, p. 197).

132 Hegardt (1975, p. 231).

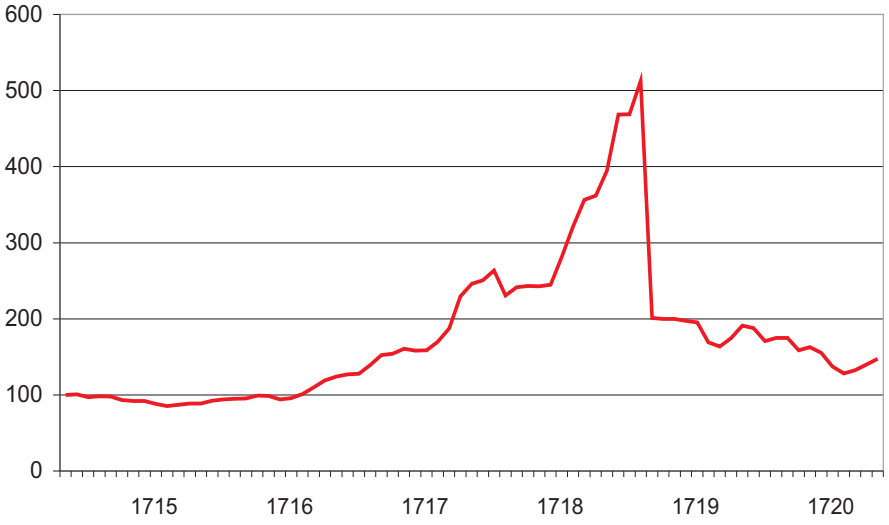
133 Stiernstedt (1863, p. 269).

134 Stiernstedt (1863, p. 270) argues that among the general public one riksdaler was seen to be valued at 36 marks kopparmynt already in 1716.

135 Lindeberg (1941, p. 22). This implies that the premium on better coins was 75 per cent. According to Riksarkivets ämnessamlingar (Riksarkivet), Handel och sjöfart, Ser. I, vol. 1 Järnhandel, the exchange rate on Amsterdam was 42–47 marks kopparmynt in early 1718 and 80 marks in November and December 1718, and according to Sandbergska samlingen (Riksarkivet), O:1, folio 364, the exchange rate on Hamburg varied between 43.75 and 83.75 marks in 1718. This is in accordance with the source stating that the exchange rate on riksdaler in the late 1718 was 80 marks kopparmynt in proper coins and 140 in coin tokens.

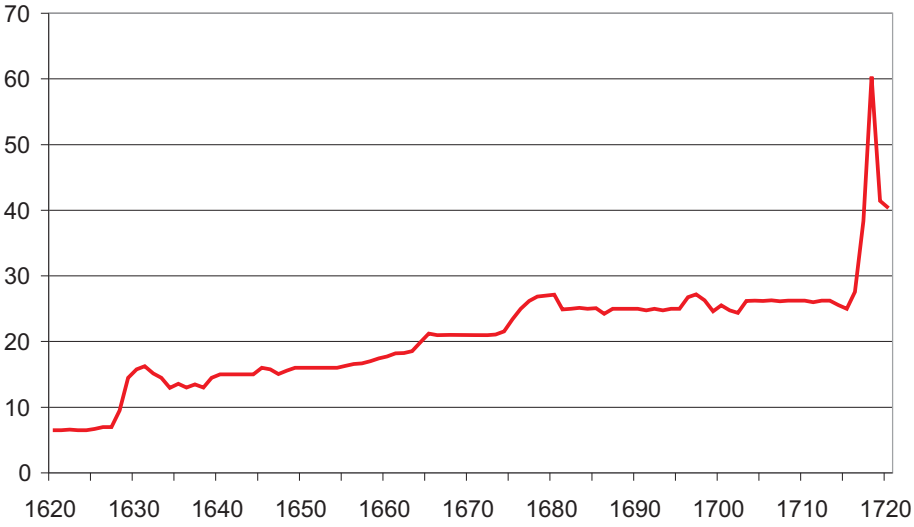
136 Stiernstedt (1863, p. 222).

**Figure 4.4.** *The Consumer Price Index for Göteborg, December 1714 (=100) to December 1720.*



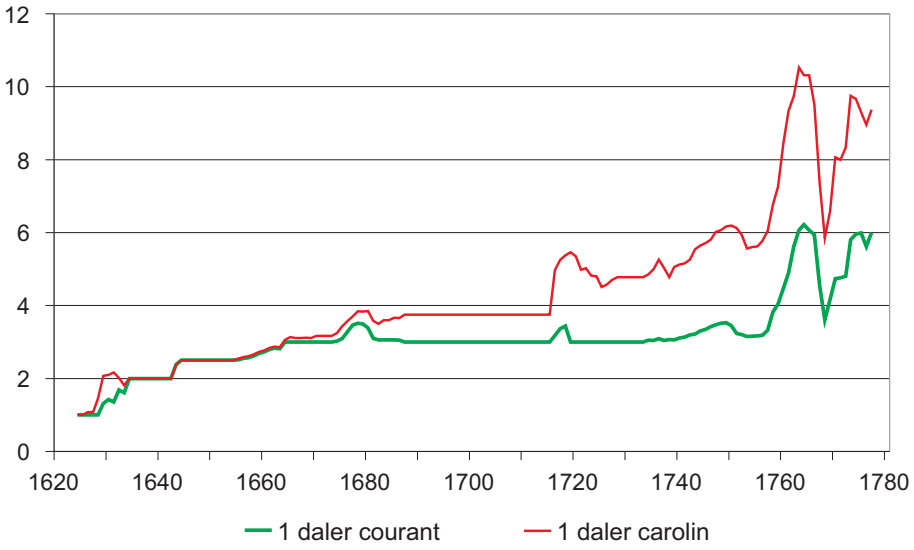

Sources: Göteborgs rådhusrätts och magistrats arkiv, Signum L I (Kollegiernas protokoll), vol. 4–6, Göteborgs landsarkiv.

**Figure 4.5.** *Riksdaler in marks (kopparmynt), market rate 1620–1720.*




Sources: See Table A4.7.
Marks kopparmynt in coin tokens 1716–18.

**Figure 4.6.** *1 daler carolin and 1 daler courant in daler kopparmynt 1624–1777.*




Sources: See Table A4.9 and Table A4.10.
Notes: Daler kopparmynt in coin tokens 1716–8.

**Table 4.2.** *The official conversion rates for various domestic currencies1624–1724.*

| Date | Official conversion rates |
|---|---|
| 1624 | 1 öre in copper coins = 1 öre in silver coins (valid to 16/8 1633) |
| 16/8 1633 | 1 d.s.m. = 2 d.k.m. (valid to 24/3 1643)<br>1 riksdaler = 12 marks k.m. = 48 öre s.m. = 1.5 d.s.m. (valid to 24/3 1643) |
| 24/3 1643 | 1 d.s.m. = 2.5 d.k.m. (valid to 7/10 1665)<br>1 riksdaler = 15 marks k.m. = 48 öre s.m. = 1.5 d.s.m. (valid to 7/10 1665) |
| 7/10 1665 | 1 d.s.m. = 3 d.k.m. (valid to 1776, for carolins to 19/3 1681)<br>1 riksdaler = 52 öre s.m. = 19.5 marks k.m. = 52 öre s.m. = 1.625 d.s.m. (valid to 19/3 1681)<br>1 ducat = 100 öre s.m. (valid to 19/3 1681) |
| 19/3 1681 | 1 daler carolin (= 2 carolins) = 3.5 d.k.m. = 1 1/6 d.s.m. = 37 1/3 öre s.m. (valid to 15/5 1686)<br>1 riksdaler = 24 marks k.m. = 64 öre s.m. = 2 d.s.m. (valid to 29/12 1718)<br>1 riksdaler = 1 5/7 daler carolins (valid to 15/5 1686)<br>1 ducat = 128 öre s.m. (valid to 29/12 1718) = 2 riksdaler (valid to 1776) |
| 15/5 1686 | 1 daler carolin = 3.75 d.k.m. = 1.25 d.s.m. = 40 öre s.m.<br>1 riksdaler = 1.6 daler carolins (valid to 23/1 1716) |
| 22/5 1715 | Copper plates minted before 1715 revalued 50 per cent (valid to 1776), although this did not apply to plates of cannon metal |
| 23/1 1716 | 1 daler carolin = 50 öre s.m. = 1.5625 d.s.m. = 4.6875 d.k.m. (valid to 1776, except from 20/12 1717 to 18/4 1719) |
| 18/3 1716 | 4-öre silver coins of 1665–84 and 5-öre silver coins of 1690–1715 revalued to 5 1/3 öre s.m. = 0.5 d.k.m. (valid to 20/12 1717) |
| 20/12 1717 | 4-öre silver coins of 1665–84 and 5-öre silver coins of 1690–1715 revalued to 6 öre s.m. (valid to 31/12 1776)<br>1- and 2-öre silver coins revalued by 100 per cent (valid to 4/5 1719)<br>Old carolins no longer legal means of payment (valid to 18/4 1719) |
| 1718 | 1 Görtz' carolin = 16 öre s.m. = 0.5 daler s.m. (valid to 31/12 1776) |
| 29/12 1718 | 1 riksdaler = 36 marks k.m. = 3 d.s.m. (valid to 1776)<br>1 ducat = 192 öre s.m. = 2 riksdaler (valid to 1/1 1777) |
| 18/4 1719 | 1 daler carolin = 50 öre s.m. = 1.5625 d.s.m. = 4.6875 d.k.m. (valid to 1776) |
| 23/4 1719 | Coin tokens devalued by 50 per cent (1 d.s.m = 32 öre s.m. of a token coin could be exchanged up to 16/6 for a new token coin of 2 öre s.m. and a debt note worth 14 öre s.m.)<br>Assumption in this study: 1 d.s.m. in proper coins = 2 d.s.m. in coin tokens |
| 4/5 1719 | 1- and 2-öre silver coins devalued to their actual face value |
| 18/2 1724 | Nominal value of remaining coin tokens reduced from 2 öre s.m. (6 öre k.m.) to 1 öre k.m. |

Sources: Wallroth (1918), Stiernstedt (1863) and Lindeberg (1941).

## 4.4. The period 1719–76

The period 1719–76 saw a continuation of the previous period's complicated multi-currency standard, although the monetary situation did become somewhat more stable during the 1720s and '30s. A fiat standard based on paper notes arose in the 1740s. The fiat currency existed alongside the five metallic currencies – öre courant, carolins, riksdaler, ducats and copper plates – at a fluctuating exchange rate. Plans were made to simplify the monetary system and introduce a mono-currency silver standard with the riksdaler as the main unit, but they were not realised until 1777.

### *4.4.1. Sources*

Annual exchange rates between various domestic currencies for the period 1740–67 are published in Sveriges Riksbank (1931). They are based on *Stockholms stads priscourant.* The background material for the work, which is kept in the Riksbank's archive, also contains weekly exchange rates between Swedish currencies for parts of the period 1705–67.[137] *Stockholms stads priscourant* provides weekly data on the exchange rates for the riksdaler and the ducat in the period 1768–76, and for some years also for carolins and öre courant; these data have been used in this study to estimate monthly and annual averages. Table A4.4 presents monthly exchange rates between Swedish currencies 1705–76.

The exchange rate on the Swedish riksdaler was of less importance than the exchange rates on Hamburger reichstaler banco and Amsterdam rijksdaalder courant (see Chapter 5). When the riksdaler exchange rate was mentioned without specifying the type of riksdaler, it commonly referred to the Hamburger reichstaler banco.[138]

Few sources exist for the annual exchange rates of the Swedish riksdaler and ducats in the 1720s and '30s. For the years where no data are available, the exchange rates on Hamburg and Amsterdam are used as indicators for the Swedish riksdaler. The gold-silver (value) ratio in Hamburg is used as an indicator to estimate the market rate of ducats in Swedish riksdaler when no other source exists.

### *4.4.2. The multi-currency, metallic standard of 1719–45*

Sweden's monetary system stabilised in 1719–20, and remained stable until the Swedish-Russian War in 1741–3. The official exchange rate of one riksdaler was 36 marks kopparmynt. The exchange rate of the Hamburger reichstaler banco was 38–41 marks kopparmynt in autumn 1719 and by January next year it had fallen to 37 marks kopparmynt (see Chapter 5). In the course of 1720 it then declined to 36 marks kopparmynt – the perceived par value.[139]

137 Riksbankens arkiv, 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803'.
138 Heckscher (1949, vol. II:2, p. 734).
139 Riksarkivets ämnessamlingar (Riksarkivet), Handel och sjöfart, Ser. I, vol. 1 Järnhandel.

In 1728–33 the market rate of the riksdaler was probably the same as the official rate, but a premium on the riksdaler arose during the latter 1730s.

The price level fell during the course of 1720 (a bad harvest in 1719 contributed to the high level in the first half of the year) and was quite stable in the 1720s and 1730s.[140]

While the legal value ratio of riksdaler to carolins was too low (based on the fine silver contents of the two coins) up to 1715, from 1719 onwards it became too high. This could have several effects: the riksdaler could fall below the par value of 36 marks kopparmynt, a premium could arise on carolins or there would be a move to melt down or hoard carolins. All three phenomena seem to have been present during the course of the 1720s and '30s.

In the period 1718–29 a total of around 75,000 riksdaler was minted, which can be compared to just 13,078 during the whole period 1655–1717.[141] For 1724–33, this study assumes that the market rate of carolins was at par with the copper coins. In the mid-1720s the riksdaler's exchange rate fell below its par value (36 marks kopparmynt),[142] but in the late 1720s it rose again to its par value. Since the silver content of the carolin was 8 per cent higher than the riksdaler according to the official relation between the two,[143] it was profitable to melt down carolins, given that there was no premium on them. Some sources indicate that in the three years preceding 1731, four million carolins were melted down in Danish and Holstein mints,[144] amounting to around one-third of the total stock of carolins.[145] An official report in 1731 stated that the weaker coin, the copper plate, had driven out the better coin, the carolin.[146] In the same year, free minting of silver coins was introduced on very favourable terms.[147]

Table A4.4 shows that at least from January 1734, a small premium was paid on carolins, which allowed them to stay in circulation, counteracting the mechanisms of Gresham's Law. At least up to 1757, the premium for carolins was larger than for riksdaler coins.

Important changes in the first decades of the 18th century created a pure circulation device, without any intrinsic value content.

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140 Lindgren (1971, pp. 330–3).

141 Calculations based on Wallroth (1918).

142 Sjöstrand (1908, p. 17).

143 In 1719–76, the official exchange rate of one riksdaler specie was 3.84 carolins. However, the fine silver content of 3.84 carolins was 27.74 grams, while the fine silver content of one riksdaler was 25.7 grams. In comparison, one riksdaler was officially equal to 96 öre courant, while the fine silver content of 96 öre courant was 22.34 grams in one-öre-coins and 24.96 grams in pjeser (in 5-öre and 10-öre coins with the legal values of 6 and 12 öre, respectively). Calculated from Wallroth (1918).

144 Sjöstrand (1908, p. 9).

145 Based on minting data, see Wallroth (1918).

146 Tingström (1984, p. 62).

147 Sjöstrand (1908, pp. 12–13).

In 1701, the Riksbank began to issue 'transportsedlar' (transferred notes). As the name indicates, these notes had to be 'transported', i.e. re-assigned from the old to the new owner. This obstructed a wider circulation in the early 18th century for various reasons: the procedure was time-consuming, people did not want to put their name on the notes, illiteracy was widespread among the peasantry and there were substitutes for notes ('assignationer' and 'kassasedlar') that functioned more efficiently. In time, people learnt to avoid transportation until the new owner wanted to cash the note in the bank.[148]

As mentioned in the previous section, the copper standard was officially reintroduced in 1709 and from 1710 copper plates were again minted on a larger scale. These plates were a very unpractical means of payment. The Crown had an interest in facilitating more convenient means of payment. The use of transferred notes expanded significantly after 1710 and this coincided with the reintroduction of the copper standard. A decree in 1726 ordained that the Riksbank's transferred notes would be accepted for payment of taxes.[149]

The total amount of outstanding notes increased from 12,219 daler silvermynt in 1722 to 1 million daler silvermynt in 1730 and to 5.3 million daler silvermynt in 1740, roughly from 0.01–0.02 per cent of GDP in 1722 to 1–1.5 per cent in 1730 and 5–6 per cent in 1740.[150]

The riksdaler's exchange rate was expressed in marks kopparmynt. The mark kopparmynt came to be linked to the market value of notes rather than of plates. Initially, the increase in notes did not cause a significant increase in the riksdaler's exchange rate. The notes were convertible into copper plates by the Riksbank. In 1730 there was, in fact, a premium of 1.5–2 per cent on notes relative to plates. There was also an additional charge ('remissage') of 6–7 per cent if plates were to be transported to the countryside.[151] Eli Heckscher estimates that the exchange rate had to rise at least 10 per cent above the value of copper plates (free copper) to make it profitable to export copper.[152] However, only after 1733 did the market rate of the riksdaler increase above the par value of 3 daler silvermynt. In the early 1740s, the exchange rate was, on average, only 5 per cent above the official par value (see Figure 4.7).

### 4.4.3. The fiat standard of 1745–76

After massive note issues during the war with Russia in the early 1740s, the exchange rate on riksdaler increased from an average of 3.17 daler silvermynt in 1741 to 3.46

148 Heckscher (1949, vol. II:2, p. 737–8), and Talvio (1995, p. 206).
149 Lagerqvist and Nathorst-Böös (1968, pp. 168–9).
150 Based on Sveriges Riksbank (1931) and Edvinsson (2005a) and (2005b).
151 Heckscher (1949, vol. II:2, p. 737–8).
152 Heckscher (1949, vol. II:2, pp. 746–7).

daler silvermynt in 1744 (see Figure 4.7).[153] In 1743, the total amount of outstanding notes increased to 9.5 million daler silvermynt, roughly 10–12 per cent of GDP. Since the bank notes were convertible, there was a massive drain on the Riksbank's metallic reserves.[154] A decree in October 1745 made the Riksbank's notes inconvertible into copper plates[155] and Sweden-Finland de facto introduced a fiat standard that remained in place until the coin reform of 1776. The Riksbank only converted notes into petty copper coins ('slantar')[156] but the latter's mint equivalent was 67 per cent higher that that of copper plates and they were de facto token coins. Since various coin currencies continued to circulate alongside the notes, the fiat standard was combined with the copper and silver standard, forming a multi-currency standard.

From the mid-1740s, non-metallic money came to constitute the largest part of the money supply in Sweden-Finland. Petty copper coins followed the bank notes in value, but there was an increasing premium on carolins, öre courant and later also copper plates. In the period 1768–76, the premium on copper plates was between 35 and 125 per cent (see Table A4.4).

In the early 1760s the paper notes fell to their lowest levels hitherto. In 1762–63 the riksdaler occasionally stood at over 100 marks kopparmynt. When the Cap Party ('mössorna') ousted the Hat Party ('hattarna') from power at the Riksdag of 1765/6, they attempted to reintroduce the riksdaler's former parity (36 marks kopparmynt or 3 daler silvermynt). Preparations were made to abolish the copper standard and reintroduce the silver standard, but the fiat standard was de facto in operation up to 1776.[157] Notes were supposed to be exchangeable into riksdaler specie but since they had been issued on a copper basis, the exchange rate would be determined by the value relation of silver to copper (and copper stood low at that time).[158] A decade passed before the great coin reform took place in 1776.

In 1766 it was not entirely clear how silver would be brought into circulation. The policy focused instead on the exchange rate.[159] The idea was that the return to the former parity would occur gradually over a ten-year period. Instead, there was severe deflation in the late 1760s, with falling exchange rates (see Figure 4.7). Eli Heckscher argues that the notes in circulation did not decrease as much as indicated by the fall in the exchange rate. Large amounts of notes were withdrawn from circulation and saved in the expectation of an increase in their value relative to the silver

153 Sjöstrand (1909, pp. 48–9).

154 However, according to *Stockholms stads priscourant* (Kungliga biblioteket), in the period 1741–53 (with data missing for 1743–46 and 1751–52), the price of free copper fluctuated around 180 daler silvermynt per ship pound, the mint equivalent of copper plates. In 1753, it still stood at 166 daler silvermynt per ship pound.

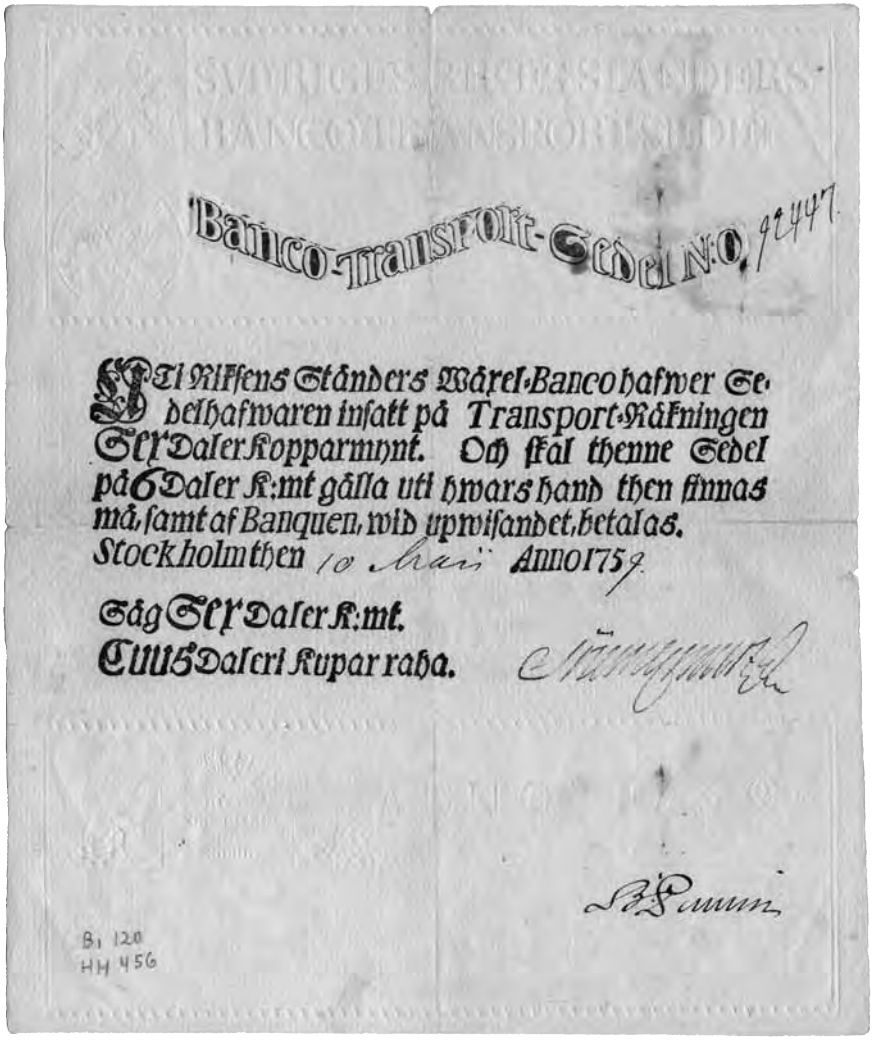
155 Wallroth (1918, p. 93).

156 Sjöstrand (1908, p. 63).

157 Stiernstedt (1863, p. 397).

158 Montgomery (1920, p. 46).

159 Montgomery (1920, pp. 37–48).




*A note issued as 6 daler kopparmynt; bank notes came to dominate the money supply in Sweden in the 18th century. In 1759, this sum was the equivalent of a male unskilled labourer's wages for around three day's work in Stockholm.*
*Photo: The Royal Coin Cabinet, Stockholm.*

currencies.[160] When the Hats regained power from the Caps in 1769, the exchange rate rose again. The par value of 36 marks kopparmynt had to be abandoned. Both the rise in the early 1760s and the fall in the late 1760s (see Figure 4.7) could be described as overreactions, or overshootings.[161] The Hats pressed on with the preparations for introducing a sole silver specie standard.[162]

In the period 1766–76, large amounts of riksdaler coins were minted; copper plates continued to be legal means of payment but were more used as commodities.

Based on the intrinsic metallic values, the Hamburger reichstaler banco should be worth 1.6 per cent less than the Swedish riksdaler, and the Amsterdam rijksdaalder courant 6.5 per cent less. In median terms, in 1740–76, the estimated spot rate of Hamburger reichstaler banco stood 2.7 per cent below the Swedish riksdaler and the Amsterdam rijksdaalder courant 7.7 per cent below, in both cases below the theoretical exchange rate (see also Chapter 5). It was mostly in the period 1766–76 that the exchange rate on Hamburg and Amsterdam was below the theoretical rate. In the period 1740–65, the spot exchange rate was mostly above the theoretical rate.

The discrepency between the exchange rates of the Swedish riksdaler and Hamburger reichstaler banco was largest during the deflation in the late 1760s (see Figure 4.7). While the Hamburger reichstaler banco decreased from its highest level of 89 marks kopparmynt in 1765 to 42 marks kopparmynt in 1768–9 (spot rates), the Swedish riksdaler stayed at 50.7 marks kopparmynt in 1768 and 60.6 marks kopparmynt in 1769.

For the period 1740–76 the correlation between the exchange rates of the Swedish riksdaler and ducats (+0.996) is, in fact, stronger than the correlation between the Swedish riksdaler and either the Hamburger reichstaler banco (+0.976) or the Amsterdam rijksdaalder courant (+0.977). This shows that the estimated spot rates on Hamburg and Amsterdam probably also reflected other factors than the price of silver (for example, fluctuations in the shadow interest rate of the bills of exchange). The exchange rate of the Swedish riksdaler should therefore be preferable for transforming nominal prices into silver prices, though the calculation of Swedish prices in Hamburger reichstaler banco and Amsterdam rijksdaalder courant could be useful for international comparisons.

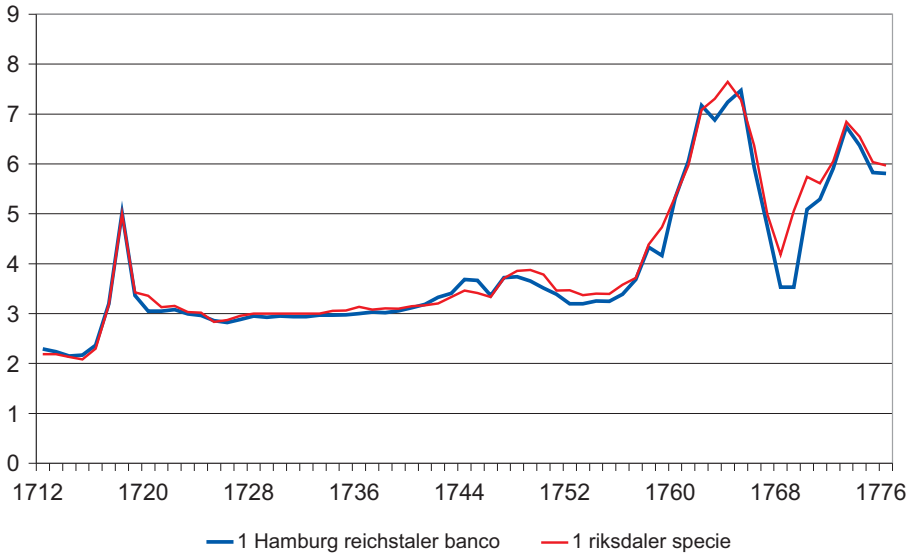
## 4.5. The period after 1776

### *4.5.1. The minting reform of 1776*

In 1776 a large minting reform amounted in principle to the abolition of the medieval division into marks, öre and penningar, the multi-currency, copper and silver

160 Heckscher (1949, vol. II:2, p. 783), and Jonung (1975, p. 181).
161 Lobell (2000, p. 9).
162 Montgomery (1920, p. 79).

**Figure 4.7.** *Hamburger reichstaler banco and Swedish riksdaler in daler silvermynt 1712–76, market rate.*




Sources: See Table A4.7 and Chapter 5.

Note: Daler silvermynt in coin tokens 1716–18. Counting in silvermynt and kopparmynt was abolished as of 1st January 1777. The riksdaler became the main currency unit in Sweden-Finland, set equal to 6 daler silvermynt in notes.

standard, and the counting in kopparmynt, silvermynt, öre courant and carolins. A mono-currency, silver specie standard was de facto introduced, with the riksdaler – the only stable means of payment that had existed in Sweden-Finland since the 16th century – as the sole unit of account (disregarding the ducat). One riksdaler was divided into 48 skillings, and one skilling into 12 runstycken.

The old currencies ceased to be legal means of payment as of 1777 and were exchanged for riksdaler coins and fiduciary notes (although notes in daler kopparmynt continued to circulate for some years).[163] The old silver coins were exchanged at their full value, i.e. one riksdaler for 3 daler courant or for 1.92 daler carolins. However, the Riksbank notes and the round copper coins were reduced in value by 50 per cent, i.e. 1 riksdaler = 6 daler silvermynt (72 marks kopparmynt), in accordance with the riksdaler's market rate. The metallic value of 6 daler silvermynt of copper plates was worth more than one riksdaler, and on 7th October 1777 it was decided that one riksdaler would be exchanged for 4 daler silvermynt in copper plates.[164]

163 Montgomery (1920, p. 221).
164 Wallroth (1918, p. 93).

Many of the old labels ('plåt', 'daler', 'styver', etc) for currency units continued to be used well into the 19th century.[165] For example, daler silvermynt continued to refer to 1/6 riksdaler or 8 skillings (later 12 skillings riksgälds).

### 4.5.2. The rise of three different riksdaler units after 1789

The reintroduced mono-currency, silver standard did not last long. As on many other occasions, it was the need to finance war efforts that reinstated the fiat standard for some time.

A war with Russia led to the establishment of Riksgäldskontoret (National Debt Office), which started to issue riksgälds notes in 1789. These notes soon dominated trade and replaced the Riksbank notes (banco riksdaler), which were still convertible into specie (so that the riksdaler banco was equal in value to the riksdaler specie coin), as the main notes in circulation. The legal status of riksgälds notes was initially somewhat unclear.[166] They began to fall in value compared to riksdaler banco. In 1789, the silver standard was de facto replaced by a multi-currency, combined fiat and silver standard, which lasted until 1803 (see also Chapter 2).

In the present study, the monthly premium on banco notes relative to riksgälds notes is estimated as an average of Stockholm and Göteborg notations.[167] The premium was 1–7 per cent in 1789 and the first half of 1790. Except for 1794 and early 1795 (when it increased to over 20 per cent), it was around 10–12 per cent up to 1797. In 1798 and 1799 it rose continuously to around 50 per cent. See figure 4.8.

The existence of two different currencies created some confusion as to the currency in which prices and exchange rates were recorded.

The foreign exchange rates presented in this study are based on Sveriges Riksbank (1931) and the background material to this work (see Chapter 5). From 19th May 1797 the exchange rate is expressed both in riksdaler riksgälds and in riksdaler banco. For the period 1789–96 it is not clear whether the exchange rates on foreign curren-

165 Talvio (1995, p. 205).

166 Ahlström (1974, pp. 32–8).

167 Based on Ahlström (1972, pp. 133–4) for Stockholm and Mårtensson (1958) for Göteborg. Ahlström presents two series; one is the reported agio (premium) from July 1789 to November 1798, and the other is based on the exchange rates on Hamburg, London and Amsterdam expressed in banco and riksgälds notes, covering the period May 1797 to August 1803. Mårtensson's series cover the whole period from March 1790 to December 1802. The reported agio in Stockholm corresponds quite well to the premium in Göteborg. However, the premium based on exchange rates in Stockholm is substantially underestimated in comparison to the reported agio in Stockholm and Göteborg up to November 1798. From December 1798, the premium based on foreign exchange seems to correspond quite well to the premium in Göteborg. The calculated premium of the present study is an arithmetic average of the reported agio in Stockholm and Göteborg up to November 1798, and from December 1798 an arithmetic average of the premiums based on foreign exchange and the Göteborg premium, with some minor adjustments for the months when data are missing in one of the series.

cies are expressed in riksdaler banco or in riksdaler riksgälds. In Sveriges Riksbank (1931) it is claimed that the exchange rates for this period were in riksdaler riksgälds.[168] Göran Ahlström questions this assumption, and argues that the exchange rate was most probably in riksdaler banco up to 1796.[169] No definite conclusions can be drawn from a perusal of daily exchange rates during May 1797, which can be found in the unpublished primary tables underpinning the work of Sveriges Riksbank (1931).[170] In Sandbergska samlingen there is a table that presents the exchange rate on Hamburg both in riksdaler banco och in riksgälds.[171] The exchange rate in riksdaler banco in the period 1789–96 seems to follow the rate presented in Sveriges Riksbank (1931), while the exchange rate in riksdaler riksgälds is significantly above the latter.[172] Ahlström therefore seems to be correct.

In this study, the foreign exchange data presented in Sveriges Riksbank (1931) are assumed to be expressed in riksdaler banco for the period 1789–96, while the premium calculated from the foreign exchange rates (which differs from the actually recorded premium) in Sandbergska samlingen is used to estimate rates in riksdaler riksgälds.

The difference between the foreign exchange rate in riksgälds and banco was quite small in 1797. The foreign exchange rate in riksgälds partly included the premium on banco notes. For example, according to Sandbergska samlingen, the premium on banco notes calculated from the foreign exchange was 2.9 per cent in 1797, but the 'noted agio' (the actually recorded premium) was 10 per cent.

The opposite situation prevailed in domestic trade when prices were quoted both in riksdaler riksgälds and in riksdaler banco. For example, the calculated premium on banco notes for 1797 based on grain prices at Kungsåra Church was 18.7 per cent, which was much higher than the noted agio. Ahlström argues that the type of transaction must be taken into account, and 'that the agio was used for purposes of price adjustment, i.e. that the stronger part in a transaction took out a higher agio instead of putting pressure on the prices'.[173]

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168 Sveriges Riksbank (1931, p. 158).

169 Ahlström (1972, p. 137).

170 "Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803" (Riksbankens arkiv). Furthermore, it is possible that the reported exchange rates during parts of the period 1789–97 are a mixture of payments in riksdaler banco and riksdaler riksgälds. This is particularly the case for the periods March to September 1791 and August 1793 to January 1794. For example, on 8th November 1793, one Hamburg reichstaler banco was paid 52.75, 53 and 57 skillings, respectively. The difference between 52.75 and 53 skillings on the one hand and 57 skillings on the other seems to be quite large for the same transaction day. The same large difference is reported in various periods for the exchange rate on Amsterdam.

171 Sandbergska samlingen (Riksarkivet), O:1, folio 364.

172 Compared with the level in Sveriges Riksbank (1931), the exchange rate in riksdaler banco in the period 1789–96 presented in Sandbergska samlingen was, on average (here geometric average), 0.9 per cent higher while the exchange rate in riksdaler riksgälds was, on average, 7.5 per cent higher.

173 Ahlström (1972, p. 140).

The First Battle of Svensksund on August 24, 1789, *by Johan Tietrich Schoultz. King Gustav III had riksgälds notes printed to finance the war against Russia (1788–90); they soon fell in value relative to banco notes, which could still be exchanged for silver coins in the Riksbank. War was often the main cause of monetary instability.*
Source: Nationalmuseum.

According to Sandbergska samlingen, the noted agio was, on average, 13.4 per cent in 1793–96, and the premium calculated from the exchange rates on Hamburg 9.1 per cent. In the same period, the premium calculated from price differences at Kungsåra Church was 17.5 per cent. In 1799–1802, the average premium calculated from the exchange rates noted in Stockholm was 44 per cent, while the premium calculated from the price differences at Kungsåra Church was 57 per cent. The noted agio presented by Sture Mårtensson for Göteborg was in the same period 49 per cent and the premium calculated from the exchange rates on Hamburg was 51 per cent. Thus, in Göteborg the premium on banco notes calculated from the foreign exchange was higher than the noted agio, which was the opposite of the situation in Stockholm. See Table A4.5.

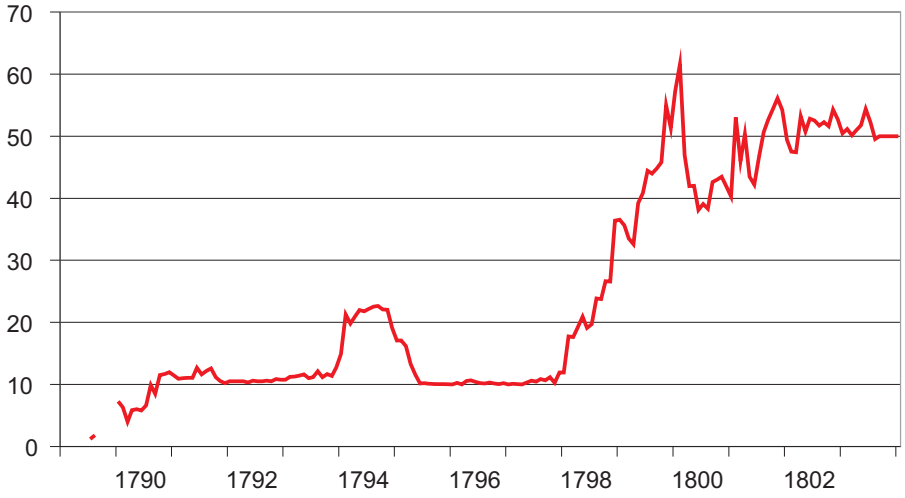
From 1799 the premium on banco notes centered on around 50 per cent, although it still fluctuated sharply. In Göteborg the premium was as high as 66.7 per cent in December 1801.[174]

Since the riksdaler banco was convertible up to 1808, this study assumes that 1 riksdaler specie [i silver] = 1 riksdaler banco = 48 skillings banco for the whole period 1777–1808 even though the Hamburger reichstaler banco was noted above 48 skillings (see Chapter 5).

In 1803 the relation between banco och riksgälds notes was fixed and the mono-

174 Mårtensson (1958, p. 25). See also Ahlström (1974, p. 28).

**Figure 4.8.** *Premium (agio) on banco notes (in per cent) relative to riksgälds notes 1789–1803, market rate based on monthly data.*




Sources: See Table A4.6.

currency, silver specie standard was briefly reintroduced. From then on, one riksdaler banco was equal to 1.5 riksdaler riksgälds. However, the exchange rate of the Hamburg reichstaler banco refused to bounce back to its par value, making it profitable to exchange notes for silver from the Riksbank. The war in 1808–10 led to a massive increase in Riksbank notes in circulation. In 1809, the banco notes were finally made inconvertible.[175] The fiat standard prevailed until 1834. The banco notes fell drastically in value relative to the riksdaler specie [i silver], and since the riksdaler riksgälds was fixed to the riksdaler banco, it also fell in value. Hence, a difference arose between riksdaler banco and riksdaler specie [i silver], and from then on there were three different riksdaler units. There were also three different skillings, which followed these three riksdaler units.[176] In 1834, when the mono-currency, silver specie standard was reintroduced once more, the relation between riksdaler specie and riksdaler banco was fixed so that: 1 riksdaler specie = 2⅔ riksdaler banco = 4 riksdaler riksgälds. In 1855 the riksdaler riksgälds was replaced by the riksdaler riksmynt; in 1873 the latter was replaced by the krona (SEK). The period after 1803 is further discussed by Håkan Lobell in Chapter 6.

175 Brisman (1931, pp. 9–15). Inconvertibility was de facto introduced in early 1809 but was not sanctioned until 1810.

176 The skilling specie was rather a unit of account; no coins with that denomination were ever minted.

**Table 4.3.** *The official conversion rates for various domestic currencies from 1777 onwards.*

| Date | Official conversion rates |
|---|---|
| 1/1 1777 | 1 riksdaler = 48 skillings<br>1 skilling = 12 runstycken<br>1 skilling = 4 öre s.m. in petty copper coins (i.e. twice the old par value, valid to 29/8 1803)<br>1 riksdaler exchanged for 6 d.s.m. in paper notes (i.e. twice the old par value)<br>1 riksdaler exchanged for 3 d.s.m. in courant silver coins (i.e. in accordance with old par value)<br>1 riksdaler exchanged for 1.92 daler carolins (i.e. in accordance with old par value)<br>1 ducat = 94 skillings (specie) = 1 23/24 riksdaler (valid to 7/4 1830) |
| 7/10 1777 | 1 riksdaler exchanged for 4 d.s.m. in copper plates |
| 29/8 1803 | 1 riksdaler banco = 1.5 riksdaler riksgälds = 72 skillings riksgälds<br>1 skilling banco = 1.5 skilling riksgälds<br>Öre s.m. in copper coins ceased to be legal means of payment |
| 19/6 1816 | 1 skilling (banco) = 2 öre s.m. in copper coins of 2- and 1-öre s.m. denomination minted up to 1778 |
| 7/4 1830 | 1 ducat = 2.125 riksdaler specie (valid to 1855) |
| 1/10 1834 | 1 riksdaler specie = 2 ⅔ riksdaler banco = 4 riksdaler riksgälds |
| 1855 | 1 riksdaler riksmynt = 100 öre = 32 skillings banco<br>1 riksdaler riksmynt = 1 riksdaler riksgälds<br>1 ducat = 8.25 riksdaler riksmynt = 2.0625 riksdaler specie |
| 29/12 1871 | 1 carolin (gold coin) = 7.1 riksdaler riksmynt |
| 30/5 1873 | 1 krona = 1 riksdaler riksmynt =100 öre |

Source: Wallroth (1918).

### *4.5.3. Transforming historical prices into a common currency unit*

One problem when comparisons are made over time is that the currency unit has changed. In some studies, the krona (SEK) is also used as a unit of account for the period before 1873. Within numismatic and economic-historical research at least two different methods have been applied.

Lennart Jörberg chooses to follow the nominal unit back to 1732. One krona is set equal to one riksdaler riksmynt 1855–73, to one riksdaler riksgälds 1789–55 and to one riksdaler specie 1776–89. Hence, one riksdaler specie was equal to 1 SEK in

1776 but to 4 SEK in 1873. Based on the relation 1 riksdaler = 6 daler silvermynt, Jörberg assumes that in 1732–76:

1 krona = 6 daler silvermynt = 18 daler kopparmynt = 72 marks (kopparmynt)

This, however, can only be applied to the round copper coins and the Riksbank notes. Since the Riksbank notes were de facto the main means of payment, Jörberg's assumption seems reasonable. His procedure is also advocated in Fregert and Gustafsson (2005).

Wallroth (1918) chooses a method that follows the riksdaler specie unit backwards in time. In contrast to Jörberg, Wallroth follows not the main currency actually used in trade, but the coin with a stable silver content (the silver content of riksdaler specie changed only slightly over time). The method assumes that one riksdaler specie de facto became 4 kronor. Hence, one riksdaler specie was always equal to 4 kronor. To estimate other currencies in SEK, Wallroth uses both the officially fixed and the market exchange rates of the riksdaler in those currencies.

## 4.6. Summary

This chapter deals with the history of currencies and exchange rates in Sweden-Finland in 1534–1803, a period that is notable and perplexing for its multiple domestic currencies. Since Finland belonged to the kingdom of Sweden up to 1809, in this period the two areas had the same monetary system.

In 1534–1624 Sweden-Finland was on a mono-metallic silver standard. Although gold coins circulated as well, they played a rather marginal role. The main currency unit was the mark, equal to 8 öre or 192 penningar (pennies). At times in the 16th and early 17th centuries the monetary system approached a mono-currency standard, but there were also currencies of minor or temporary importance in domestic trade that circulated alongside the main currency, most importantly the silver daler. The first silver daler coins were minted in 1534. Throughout its lifetime, 1534–1873, the fine silver content of the silver daler or riksdaler (specie) coin was stable (with only minor adjustments). In contrast, the fine silver content of the mark decreased over time.

In the 1570s the silver daler was officially fixed at 4 marks or 32 öre, but its market exchange rate was somewhat higher. A bifurcation then occurred between the silver daler and the daler as a unit of account, equal to 4 marks or 32 öre. The silver daler was later called riksdaler. When the fine silver content of the mark silver coin was lowered in the 17th century, the exchange rate of the riksdaler in marks increased.

In 1624, a copper standard was introduced; it lasted until 1776. The silver standard continued to exist alongside the copper standard. In this period, at least five or six domestic currencies were in use, three based on silver, one or two based on copper and one based on gold. In addition, fiat currency circulated in the mid-1660s,

1716–9 and 1745–76. Since attempts were made to fix the relations between various metallic currencies, the monetary system could be described as bi- or trimetallic. At times, however, the market exchange rates between these currencies floated and the official value relations had to be adjusted on numerous occasions.

Since the price of copper fluctuated relative to silver, there was a tendency to debase copper coins when copper prices were high; when copper prices fell back, the silver coins were undervalued. Initially, one daler in copper coins was supposed to be equal to one daler in silver coins. However, in expectation of rising copper prices, which were already high, the copper content of the copper coins was set too low in 1624. The market value of copper coins relative silver coins then fell quickly in the late 1620s and early 1630s. A multi-currency standard arose. One daler silvermynt was set equal to 2 daler kopparmynt in 1633–43, to 2.5 daler kopparmynt in 1643–65 and to 3 daler kopparmynt in 1665–76. Initially the daler kopparmynt was a unit for copper coins, and daler silvermynt for silver coins; later, copper coins were denominated both in daler kopparmynt and in daler silvermynt.

The relation 1 mark = 8 öre was upheld as an accounting identity, but the value relations between the actual silver coins were not always in accordance with this. The fine silver content per unit of value was normally lower for öre coins than for mark coins. A distinctive feature of the multi-currency standard in Sweden-Finland during the 17th and 18th centuries was that market exchange rates fluctuated not only between the copper and silver currencies, but also between various silver currencies.

From the 1660s the term carolin came to refer to silver coins in mark denomination and courant to silver coins in öre denomination. Carolins and öre courant were the main domestic silver currencies, while up to the 1760s the riksdaler was mainly used in international trade. One carolin was equal to two marks in silver coins, and one daler carolin to two carolins. One öre courant was the same as one öre in silver coins, and one daler courant was equal to 32 öre courant. In 1681 and 1686 the carolins were officially revalued relative to öre courant so that the identity between one daler carolin and one daler courant definitely disappeared. The widening difference between the two main silver currencies from the 1680s was a consequence of the bimetallic copper and silver standard, and the attempt to make one silver currency (courant) follow the copper currency by lowering its fine silver content, while not debasing the other silver currency (carolins). Officially, one öre courant was equal to one öre silvermynt, but during the fiat standards of the 18th century this identity could not be maintained in the market.

The ducat, minted in gold, was also used as a currency unit, although mainly in international trade.

Stockholm Banco issued bank notes in the 1660s, though they mainly functioned as convertible fiduciary notes. Only briefly did they circulate as unconvertible fiat notes before being exchanged at their full value. These notes never dominated the money supply.

The fiat standard in 1716–9 was based on coin tokens, which circulated alongside

the silver and copper currencies. A premium arose on these metallic currencies. The unit daler silvermynt could refer to either coin tokens or metallic currencies, and it is not always clear in which currency prices and foreign exchange rates were quoted. Prices expressed in coin tokens increased dramatically during the course of 1718 and early 1719. Later in 1719, coin tokens were devalued by 50 per cent.

During the fiat standard of 1745–76 the units daler kopparmynt and daler silvermynt followed the bank notes, but the metallic currencies continued to exist at a premium. The exchange rate of the riksdaler increased from 3 daler silvermynt in the early 1730s to 6 daler silvermynt in late 1776. In effect, the bank notes were devalued by 50 per cent.

Although the value relations between copper coins were officially fixed in 1624–1776, in some periods there were two different copper currencies, one based on copper plates and the other on round copper coins ('slantar'). Most notably, this occurred during the fiat standard of 1745–76. The round copper coins (with a lower copper content per unit of value than copper plates) then followed the value of the notes.

Tables A4.7 to A4.10 present the exchange rates between various domestic currency units used in Sweden-Finland. Table A4.7 contains the exchange rate of the riksdaler in mark silver coins for the period 1534–1624 and in mark kopparmynt for 1624–1776. Table A4.8 presents the exchange rate of the ducat in mark kopparmynt and riksdaler specie for the period 1652–1776. Table A4.9 contains the exchange rate of daler carolin in daler kopparmynt and of the riksdaler in mark silver coins (half carolins) for the period 1624–1776. Table A4.10 presents the exchange rate of öre courant in öre kopparmynt and of riksdaler in öre courant.

The copper standard contained the seeds of its own destruction, though it was remarkably long-lived. The high transaction costs involved when payments were made in intrinsic copper coins, especially copper plates, encouraged the introduction of a fiat currency. Once paper notes came to dominate circulation, even in smaller denominations, the need for a copper currency decreased. In 1777 a mono-currency, silver standard was reintroduced, but with the riksdaler as the main unit. However, the existence of paper money in the form of convertible fiduciary notes also became a threat to the silver standard itself, especially during times of war.

The monetary uniformity only lasted until 1789. Riksgäldskontoret (National Debt Office) started to issue riksgälds notes in 1789 and they fell in value relative to the riksdaler banco, which continued to be convertible into silver coins (riksdaler specie) by the Riksbank. Hence, an unconvertible fiat standard was briefly combined with a convertible metallic standard. The monthly premium on banco notes relative to riksgälds notes is presented in Table A4.6. In 1803 the relation 1 riksdaler riksgälds = ⅔ riksdaler banco was fixed, which basically ended the period of multiple currencies. Even though the riksdaler specie and the ducat were on floating exchange rates after 1803, these two currencies played only a minor role in domestic trade.

# Appendix A4: Summary tables

**Table A4.1.** *Monthly data on riksdaler in marks (kopparmynt) 1626–86.*

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1626 | | 6.5 | | | 6.5 | | | | | 8 | | | 6.966 |
| 1627 | | | | | | 6.5 | | | | | | | 6.5 |
| 1628 | | 9 | | | | | | | | 10 | | | 9.487 |
| | | | | | | | | | | | | | |
| 1640 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| 1641 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| 1642 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| 1643 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 |
| 1644 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15.25 | 15 | 15 | 15 | 15.02 |
| 1645 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| 1646 | 16 | 16 | 16 | 16 | 16 | 16 | 15.5 | 15 | 15.75 | 15.75 | 15.75 | 15.75 | 15.79 |
| 1647 | 15.5 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15 | 15.04 |
| 1648 | 15 | 15 | 15 | 15 | 15 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 15.58 |
| 1649 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| 1650 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| 1651 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| 1652 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| 1653 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| 1654 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 | 16 |
| 1655 | 16 | 16 | 16.25 | 16.25 | 16.38 | 16.25 | 16.25 | 16.25 | 16.75 | 16.75 | 16.25 | 16.25 | 16.3 |
| 1656 | 16.5 | 16.5 | 16.5 | 16.5 | 16.63 | 16.5 | 16.63 | 16.5 | 16.63 | 16.63 | 16.63 | 16.63 | 16.56 |
| 1657 | 16.25 | 16.75 | 16.63 | 16.75 | 16.75 | 16.75 | 16.75 | 16.75 | 17 | 17 | 17 | 16 | 16.7 |
| 1658 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17.25 | 17.13 | 17.03 |
| 1659 | 17.13 | 17.38 | 17.75 | 17.25 | 17.25 | 17.25 | 17.25 | 17.5 | 17.5 | 17.75 | 17.75 | 17.75 | 17.46 |
| 1660 | 17.25 | 17.25 | 17.25 | 18 | 18 | 17.75 | 17.25 | 18 | 18 | 18 | 18 | 18 | 17.73 |
| 1661 | 18 | 18 | 18 | 18.25 | 18.25 | 18.25 | 18.25 | 18.25 | 18.25 | 18.25 | 18.25 | 18.25 | 18.19 |
| 1662 | 18.25 | 18.25 | 18.25 | 18.25 | 18.25 | 18.25 | 18.25 | 18.25 | 18.25 | 18.25 | 18.25 | 18.25 | 18.25 |
| 1663 | 18.25 | 18.25 | 18.25 | 18.25 | 18.25 | 18.75 | 18.75 | 18.5 | 18.5 | 19 | 19 | 19 | 18.56 |
| 1664 | 20 | 20 | 20 | 20 | 20 | 19 | 19 | 19 | 20 | 20.5 | 20.5 | 21 | 19.91 |
| 1665 | 21.5 | 21.75 | 21.5 | 21.5 | 21.25 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21.21 |
| 1666 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| 1667 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| 1668 | 21 | 21 | 21.25 | 21.25 | 21 | 21 | 21 | 21.06 | 21 | 21 | 21 | 21 | 21.05 |
| 1669 | 21 | 21 | 21 | 21 | 21.25 | 21.13 | 21 | 21 | 21 | 21 | 21 | 21 | 21.03 |
| 1670 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| 1671 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| 1672 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 |
| 1673 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21.13 | 21.13 | 21.13 | 21.13 | 21.31 | 21.07 |

**Table A4.1 (cont.).** *Monthly data on riksdaler in marks (kopparmynt) 1626–86.*

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1674 | 21.31 | 21 | 21 | 21.13 | 21.25 | 21.5 | 21.5 | 21.75 | 22 | 22 | 22 | 22 | 21.53 |
| 1675 | 22 | 22.25 | 22.5 | 22.56 | 22.88 | 22.94 | 23.13 | 23.38 | 26.38 | 24.13 | 24.5 | 24.5 | 23.4 |
| 1676 | 24 | 24 | 24.25 | 24.25 | 24.38 | 24.88 | 25.13 | 25.75 | 26 | 25.75 | 25.75 | 25.75 | 24.98 |
| 1677 | 25.75 | 25.75 | 25.75 | 26 | 26 | 26.5 | 26 | 26 | 26.5 | 26.5 | 26.5 | 26.75 | 26.16 |
| 1678 | 26.75 | 26.75 | 26.75 | 27 | 27 | 27 | 27 | 26.75 | 26.75 | 26.75 | 26.75 | 26.75 | 26.83 |
| 1679 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| 1680 | 27.27 | 27 | 27.27 | 27 | 27 | 27 | 27 | 27 | 27.27 | 27.27 | 27.27 | 27.27 | 27.13 |
| 1681 | 27.27 | 27.27 | 27 | 24 | 22.56 | 24 | 24 | 24 | 24.5 | 24.5 | 25 | 25 | 24.88 |
| 1682 | 24.75 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 24.98 |
| 1683 | 25.13 | 25.13 | 25.13 | 25.44 | 25.44 | 25.44 | 25 | 25 | 25 | 25 | 25 | 25 | 25.14 |
| 1684 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 | 25 |
| 1685 | 25 | | | | | | | | | | | | 25.06 |
| 1686 | 25.13 | 25.13 | 24.69 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | 24.24 |

Sources: Wolontis (1936) and Swenne (1933). Annual average calculated as geometric.

**Table A4.2.** *Monthly data on one riksdaler carolin in mark kopparmynt 1670–86.*

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1670 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| 1671 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| 1672 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| 1673 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 |
| 1674 | 19 | 19 | 19 | 19 | 19 | 19.5 | 19.5 | 19.63 | 20 | 20 | 20 | 20 | 19.464 |
| 1675 | 20 | 20 | 20 | 20.19 | 20.31 | 20.5 | 20.5 | 21 | 21 | 21.13 | 21.13 | 21.38 | 20.588 |
| 1676 | 21 | 21 | 21 | 21 | 21 | 21 | 21.5 | 21.75 | 22 | 22 | 22 | 22 | 21.433 |
| 1677 | 22 | 22 | 22 | 22 | 22 | 22.13 | 22.13 | 22.13 | 22.13 | 22.5 | 22.63 | 22.88 | 22.207 |
| 1678 | 23 | 23.13 | 23.13 | 23.38 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23.052 |
| 1679 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 23 |
| 1680 | 23 | 23.23 | 23.06 | 23 | 23.13 | 23.13 | 23.13 | 23.06 | 23.06 | 23.06 | 23.06 | 23.06 | 23.082 |
| 1681 | 23.19 | 23 | 23 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 21.498 |
| | | | | | | | | | | | | | |
| 1686 | 22 | 22 | 21.5 | 21 | 21 | 21 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 22.5 | 21.949 |

Source: Wolontis (1936). Annual average calculated as geometric. 1 riksdaler carolin = 3 carolins.

**Table A4.3.** *Monthly premium (per cent) on courant silver coins 1670–86.*

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sept | Oct | Nov | Dec | Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1670 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1671 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1672 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1673 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1674 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1.25 | 1.75 | 1.75 | 2 | 2 | 0.896 |
| 1675 | 2 | 2.25 | 2.25 | 3 | 3 | 3 | 3 | 3 | 3.75 | 3.75 | 3.75 | 5.5 | 3.188 |
| 1676 | 6.25 | 7.75 | 6.75 | 6.75 | 7.75 | 8.25 | 9.5 | 10.25 | 11.5 | 12.33 | 12.33 | 12.5 | 9.326 |
| 1677 | 12.5 | 12.5 | 12.5 | 12.5 | 15 | 16.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 17.5 | 15.54 |
| 1678 | 17.75 | 17.75 | 17.75 | 18.5 | 18.5 | 17 | 17 | 16.75 | 17 | 16 | 16.5 | 16.5 | 17.25 |
| 1679 | 16.75 | 16.75 | 16.75 | 16.75 | 16.75 | 16.75 | 16.75 | 16.75 | 16.75 | 16.75 | 15.17 | 15.17 | 16.49 |
| 1680 | 15.17 | 15.17 | 15.5 | 14.44 | 13.5 | 14.33 | 11.44 | 12.17 | 9.778 | 11.17 | 11.17 | 11.17 | 12.92 |
| 1681 | 9.778 | 6.5 | 6.5 | (2) | (2) | (2) | (2) | (2) | (2) | (2) | (2) | (2) | 3.398 |
| | | | | | | | | | | | | | |
| 1686 | 3* (2.5 **) | 3* (2.5 **) | 3* (2.5 **) | 1.5* (1**) | 1.5* (1**) | 1.5* (1**) | 1.5* (2**) | 1.5* (1**) | 1.5* (1**) | 1.5* (1**) | 1.5* (1**) | 1.5* (1**) | 1.77* (1.4**) |

Source: Wolontis (1936). Annual average calculated as arithmetic.

Par value: 1 öre courant = 1 öre silvermynt.

* 4-öre coins

** 2-öre coins

**Table A4.4.** *Monthly exchange rates between Swedish currency units 1705–76.*

| Year | Month | 1 ducat in daler kopparmynt (par value 12 daler k.m. before 1718, 18 daler k.m. after 1718) | | | 1 riksdaler specie in daler kopparmynt (par value 6 daler k.m. before 1718, 9 daler k.m. after 1718) | | |
|---|---|---|---|---|---|---|---|
| | | Average | Lowest | Highest | Average | Lowest | Highest |
| 1705 | May | 12.5 | 12.5 | 12.5 | 6.5 | 6.5 | 6.5 |
| 1705 | June | 13.75 | 13.5 | 14 | 6.5 | 6.5 | 6.5 |
| 1705 | July | 13.56 | 13.5 | 13.63 | 6.563 | 6.563 | 6.563 |
| 1705 | Aug | 13.56 | 13.5 | 13.63 | 6.563 | 6.563 | 6.563 |
| 1705 | Sept | 13.56 | 13.5 | 13.63 | 6.563 | 6.563 | 6.563 |
| 1705 | Oct | 13.56 | 13.5 | 13.63 | 6.559 | 6.55 | 6.563 |
| 1705 | Nov | 13.56 | 13.5 | 13.63 | 6.563 | 6.563 | 6.563 |
| 1705 | Dec | 13.56 | 13.5 | 13.63 | 6.563 | 6.563 | 6.563 |
| 1706 | Jan | 13.56 | 13.5 | 13.63 | 6.563 | 6.563 | 6.563 |
| 1706 | Feb | 13.56 | 13.5 | 13.63 | 6.563 | 6.563 | 6.563 |
| 1706 | March | 13.56 | 13.5 | 13.63 | 6.594 | 6.563 | 6.625 |

**Table A4.4 (cont.).** *Monthly exchange rates between Swedish currency units 1705–76.*

| Year | Month | 1 ducat in daler kopparmynt (par value 12 daler k.m. before 1718, 18 daler k.m. after 1718) | | | 1 riksdaler specie in daler kopparmynt (par value 6 daler k.m. before 1718, 9 daler k.m. after 1718) | | |
|---|---|---|---|---|---|---|---|
| | | Average | Lowest | Highest | Average | Lowest | Highest |
| 1706 | April | | | | | | |
| 1706 | May | 13.63 | 13.63 | 13.63 | 6.563 | 6.563 | 6.563 |
| 1706 | June | 13.63 | 13.63 | 13.63 | 6.563 | 6.563 | 6.563 |
| 1706 | July | 13.63 | 13.63 | 13.63 | 6.563 | 6.563 | 6.563 |
| 1706 | Aug | 13.63 | 13.63 | 13.63 | 6.563 | 6.563 | 6.563 |
| 1706 | Sept | 13.63 | 13.63 | 13.63 | 6.563 | 6.563 | 6.563 |
| 1706 | Oct | 13.63 | 13.63 | 13.63 | 6.563 | 6.563 | 6.563 |
| 1706 | Nov | 13.75 | 13.5 | 14 | 6.594 | 6.563 | 6.625 |
| 1706 | Dec | 13.7 | 13.5 | 14 | 6.525 | 6.5 | 6.563 |
| 1707 | Jan | 13.54 | 13.5 | 14 | 6.542 | 6.5 | 6.563 |
| 1707 | Feb | 13.5 | 13.5 | 13.5 | 6.531 | 6.5 | 6.563 |
| | | | | | | | |
| 1708 | Dec | 13.94 | 13.88 | 14 | 6.563 | 6.563 | 6.563 |
| | | | | | | | |
| 1711 | Sept | 14.06 | 14.06 | 14.06 | 6.5 | 6.5 | 6.5 |
| | | | | | | | |
| 1728 | Nov | 18.5 | 18.5 | 18.5 | 9 | 9 | 9 |
| | | | | | | | |
| 1729 | Sept | 18.25 | 18.25 | 18.25 | 9 | 9 | 9 |
| 1729 | Oct | 18.31 | 18.25 | 18.38 | 9 | 9 | 9 |
| | | | | | | | |
| 1733 | Jan | 18 | 18 | 18 | 9 | 9 | 9 |
| 1733 | Feb | 18 | 18 | 18 | 9 | 9 | 9 |
| 1733 | March | 18 | 18 | 18 | 9 | 9 | 9 |
| 1733 | April | 18 | 18 | 18 | 9 | 9 | 9 |
| 1733 | May | 18 | 18 | 18 | 9 | 9 | 9 |
| 1733 | June | 18 | 18 | 18 | 9 | 9 | 9 |
| 1733 | July | 18 | 18 | 18 | 9 | 9 | 9 |
| 1733 | Aug | 18 | 18 | 18 | 9 | 9 | 9 |
| 1733 | Sept | 18 | 18 | 18 | 9 | 9 | 9 |
| 1733 | Oct | 18.18 | 18.16 | 18.19 | 9 | 9 | 9 |
| 1733 | Nov | 18.03 | 18 | 18.16 | 9 | 9 | 9 |
| 1733 | Dec | 18 | 18 | 18 | 9 | 9 | 9 |

**Table A4.4 (cont.).** *Monthly exchange rates between Swedish currency units 1705–76.*

| Year | Month | 1 ducat in daler kopparmynt (par value 18 daler k.m.) | | | 1 riksdaler specie in daler kopparmynt (par value 9 daler k.m.) | | | 1 öre courant in öre silvermynt (par value 1 öre s.m.) | | | 1 carolin in öre silvermynt (par value 25 öre s.m.) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Aver-age | Low-est | High-est | Aver-age | Low-est | High-est | Aver-age | Low-est | High-est | Aver-age | Low-est | High-est |
| 1734 | Jan | 18.19 | 18.16 | 18.25 | 9.125 | 9.125 | 9.125 | 1.016 | 1.015 | 1.018 | 25.97 | 25.94 | 26 |
| 1734 | Feb | 18.13 | 18.13 | 18.19 | 9.133 | 9.125 | 9.188 | 1.016 | 1.015 | 1.018 | 25.97 | 25.94 | 26 |
| 1734 | Mar | 18.18 | 18.13 | 18.25 | 9.156 | 9.125 | 9.188 | 1.016 | 1.015 | 1.018 | 25.91 | 25.81 | 26 |
| 1734 | April | 18.22 | 18.19 | 18.25 | 9.156 | 9.125 | 9.188 | 1.015 | 1.015 | 1.015 | 25.84 | 25.81 | 25.88 |
| 1734 | May | 18.19 | 18.19 | 18.19 | 9.156 | 9.125 | 9.188 | 1.015 | 1.015 | 1.015 | 25.84 | 25.81 | 25.88 |
| 1734 | June | 18.19 | 18.19 | 18.19 | 9.156 | 9.125 | 9.188 | 1.015 | 1.015 | 1.015 | 25.84 | 25.81 | 25.88 |
| 1734 | July | 18.25 | 18.25 | 18.25 | | | | | | | | | |
| 1734 | Aug | 18 | 18 | 18 | | | | | | | | | |
| 1734 | Sept | 18.13 | 18 | 18.31 | | | | | | | | | |
| 1734 | Oct | 18.23 | 18 | 18.31 | 9.188 | 9.188 | 9.188 | 1.02 | 1.02 | 1.02 | 25.88 | 25.88 | 25.88 |
| 1734 | Nov | 18.23 | 18 | 18.38 | 9.198 | 9.188 | 9.25 | 1.023 | 1.02 | 1.025 | 25.88 | 25.88 | 25.88 |
| 1734 | Dec | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| 1736 | Jan | | | | | | | | | | | | |
| 1736 | Feb | | | | | | | | | | | | |
| 1736 | Mar | 18.75 | 18.75 | 18.75 | | | | | | | | | |
| 1736 | April | | | | | | | | | | | | |
| 1736 | May | 18.75 | 18.75 | 18.75 | 9.375 | 9.375 | 9.375 | 1.038 | 1.038 | 1.04 | 27.81 | 27.75 | 27.88 |
| 1736 | June | 18.78 | 18.75 | 19 | 9.375 | 9.375 | 9.375 | 1.035 | 1.035 | 1.035 | 27.89 | 27.88 | 27.91 |
| 1736 | July | 18.75 | 18.75 | 18.75 | 9.375 | 9.375 | 9.375 | 1.035 | 1.035 | 1.035 | 27.88 | 27.88 | 27.88 |
| 1736 | Aug | 19.12 | 18.75 | 19.75 | 9.437 | 9.375 | 9.5 | 1.035 | 1.035 | 1.035 | 27.88 | 27.88 | 27.88 |
| 1736 | Sep | 18.78 | 18.75 | 18.86 | 9.375 | 9.375 | 9.375 | 1.035 | 1.035 | 1.035 | 28 | 28 | 28 |
| 1736 | Oct | 18.75 | 18.75 | 18.75 | 9.375 | 9.375 | 9.375 | 1.027 | 1.025 | 1.03 | 28.08 | 28 | 28.13 |
| 1736 | Nov | 18.75 | 18.75 | 18.75 | 9.5 | 9.5 | 9.5 | 1.027 | 1.025 | 1.03 | 28.56 | 28.25 | 29 |
| 1736 | Dec | 18.73 | 18.5 | 18.81 | 9.416 | 9.375 | 9.5 | 1.025 | 1.025 | 1.025 | 28.41 | 28 | 28.75 |
| | | | | | | | | | | | | | |
| 1740 | Jan | | | | | | | | | | | | |
| 1740 | Feb | | | | | | | | | | | | |
| 1740 | Mar | 18.61 | 18.56 | 18.63 | 9.45 | 9.375 | 9.5 | 1.033 | 1.03 | 1.035 | 27.26 | 27.13 | 27.38 |
| 1740 | April | 18.6 | 18.56 | 18.63 | 9.5 | 9.5 | 9.5 | 1.032 | 1.03 | 1.035 | 27.32 | 27.25 | 27.44 |
| 1740 | May | 18.65 | 18.56 | 18.75 | 9.437 | 9.375 | 9.5 | 1.031 | 1.03 | 1.035 | 27.39 | 27.38 | 27.44 |
| 1740 | June | 18.68 | 18.56 | 18.75 | 9.437 | 9.375 | 9.5 | 1.03 | 1.03 | 1.035 | 27.35 | 27.25 | 27.38 |
| 1740 | July | 18.72 | 18.69 | 18.75 | 9.437 | 9.375 | 9.5 | 1.032 | 1.03 | 1.035 | 27.25 | 27.25 | 27.25 |
| 1740 | Aug | 18.67 | 18.63 | 18.75 | 9.437 | 9.375 | 9.5 | 1.032 | 1.03 | 1.035 | 27.31 | 27.25 | 27.38 |
| 1740 | Sept | 18.66 | 18.63 | 18.75 | 9.437 | 9.375 | 9.5 | 1.032 | 1.03 | 1.035 | 27.27 | 27.25 | 27.38 |
| 1740 | Oct | 18.66 | 18.63 | 18.69 | 9.437 | 9.375 | 9.5 | 1.037 | 1.035 | 1.04 | 27.31 | 27.25 | 27.38 |
| 1740 | Nov | 18.66 | 18.63 | 18.69 | 9.437 | 9.375 | 9.5 | 1.045 | 1.04 | 1.05 | 27.36 | 27.31 | 27.38 |

**Table A4.4 (cont.).** *Monthly exchange rates between Swedish currency units 1705–76.*

| Year | Month | 1 ducat in daler kopparmynt (par value 18 daler k.m.) | | | 1 riksdaler in daler kopparmynt (par value 9 daler k.m.) | | | 1 öre courant in öre silvermynt (par value 1 öre s.m.) | | | 1 carolin in öre silvermynt (par value 25 öre s.m.) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest |
| 1740 | Dec | 18.64 | 18.63 | 18.69 | 9.437 | 9.375 | 9.5 | 1.047 | 1.045 | 1.05 | 27.34 | 27.25 | 27.38 |
| 1741 | Jan | 18.68 | 18.63 | 18.75 | 9.437 | 9.375 | 9.5 | 1.046 | 1.04 | 1.05 | 27.35 | 27.25 | 27.38 |
| 1741 | Feb | 18.63 | 18.63 | 18.66 | 9.437 | 9.375 | 9.5 | 1.05 | 1.05 | 1.05 | 27.3 | 27.25 | 27.38 |
| 1741 | Mar | 18.65 | 18.63 | 18.69 | 9.487 | 9.438 | 9.5 | 1.047 | 1.045 | 1.05 | 27.38 | 27.38 | 27.38 |
| 1741 | April | 18.63 | 18.63 | 18.63 | 9.5 | 9.5 | 9.5 | 1.041 | 1.03 | 1.045 | 27.46 | 27.31 | 27.75 |
| 1741 | May | 18.72 | 18.69 | 18.75 | 9.5 | 9.5 | 9.5 | 1.03 | 1.03 | 1.03 | 27.85 | 27.75 | 28 |
| 1741 | June | 18.72 | 18.69 | 18.75 | 9.5 | 9.5 | 9.5 | 1.036 | 1.03 | 1.04 | 27.8 | 27.75 | 27.88 |
| 1741 | July | 18.75 | 18.75 | 18.75 | 9.5 | 9.5 | 9.5 | 1.044 | 1.04 | 1.05 | 27.7 | 27.63 | 27.75 |
| 1741 | Aug | 19.29 | 18.88 | 20 | 9.5 | 9.5 | 9.5 | 1.049 | 1.045 | 1.05 | 27.67 | 27.63 | 27.75 |
| 1741 | Sept | 19.06 | 19 | 19.25 | 9.5 | 9.5 | 9.5 | 1.046 | 1.045 | 1.05 | 27.53 | 27.5 | 27.63 |
| 1741 | Oct | 19.25 | 19.19 | 19.38 | 9.523 | 9.5 | 9.563 | 1.047 | 1.045 | 1.05 | 27.33 | 27.25 | 27.5 |
| 1741 | Nov | 19.31 | 19.19 | 19.5 | 9.581 | 9.5 | 9.625 | 1.049 | 1.045 | 1.05 | 27.24 | 27.13 | 27.38 |
| 1741 | Dec | 19.28 | 19.25 | 19.38 | 9.594 | 9.563 | 9.625 | 1.052 | 1.05 | 1.06 | 27.28 | 27.25 | 27.38 |
| 1742 | Jan | 19.46 | 19.38 | 19.56 | 9.594 | 9.563 | 9.625 | 1.056 | 1.05 | 1.06 | 27.34 | 27.25 | 27.38 |
| 1742 | Feb | 19.64 | 19.5 | 20 | 9.594 | 9.563 | 9.625 | 1.057 | 1.055 | 1.06 | 27.51 | 27.5 | 27.56 |
| 1742 | Mar | 19.66 | 19.5 | 19.75 | 9.594 | 9.563 | 9.625 | 1.058 | 1.055 | 1.06 | 27.56 | 27.5 | 27.63 |
| 1742 | April | 19.83 | 19.75 | 20 | 9.594 | 9.563 | 9.625 | 1.06 | 1.06 | 1.06 | 27.77 | 27.63 | 27.88 |
| 1742 | May | 20 | 20 | 20 | 9.624 | 9.5 | 9.75 | 1.06 | 1.06 | 1.06 | 28.05 | 28 | 28.13 |
| 1742 | June | 20 | 20 | 20 | 9.624 | 9.5 | 9.75 | 1.067 | 1.06 | 1.07 | 28.44 | 28.25 | 28.5 |
| 1742 | July | 20.65 | 20 | 21 | 9.624 | 9.5 | 9.75 | 1.071 | 1.06 | 1.08 | 28.55 | 28.5 | 28.63 |
| 1742 | Aug | 20.43 | 19.5 | 21 | 9.624 | 9.5 | 9.75 | 1.08 | 1.08 | 1.08 | 28.56 | 28.5 | 28.63 |
| 1742 | Sept | 19.56 | 19 | 20 | 9.624 | 9.5 | 9.75 | 1.067 | 1.055 | 1.08 | 28.29 | 28.13 | 28.5 |
| 1742 | Oct | 19.55 | 19.38 | 20 | 9.624 | 9.5 | 9.75 | 1.06 | 1.05 | 1.07 | 28.06 | 28 | 28.13 |
| 1742 | Nov | 19.62 | 19.5 | 19.75 | 9.624 | 9.5 | 9.75 | 1.065 | 1.06 | 1.07 | 28.12 | 28 | 28.25 |
| 1742 | Dec | 19.62 | 19.5 | 19.75 | 9.624 | 9.5 | 9.75 | 1.062 | 1.06 | 1.065 | 28.25 | 28.25 | 28.25 |
| 1743 | Jan | 19.62 | 19.5 | 19.75 | 9.624 | 9.5 | 9.75 | 1.066 | 1.06 | 1.07 | 28.41 | 28.25 | 28.63 |
| 1743 | Feb | 19.62 | 19.5 | 19.75 | 9.716 | 9.5 | 10 | 1.066 | 1.06 | 1.07 | 28.77 | 28.63 | 28.88 |
| 1743 | Mar | 20.08 | 19.75 | 20.5 | 9.832 | 9.5 | 10 | 1.067 | 1.065 | 1.07 | 29.25 | 29 | 29.5 |
| 1743 | April | 20.12 | 20 | 20.25 | 9.874 | 9.75 | 10 | 1.08 | 1.08 | 1.08 | 29.54 | 29.5 | 29.75 |
| 1743 | May | 20.12 | 20 | 20.25 | 10 | 10 | 10 | 1.078 | 1.075 | 1.08 | 29.7 | 29.63 | 29.75 |
| 1743 | June | 20.67 | 20 | 22.5 | 10.04 | 10 | 10.25 | 1.085 | 1.08 | 1.11 | 29.87 | 29.75 | 30 |
| 1743 | July | 20.16 | 20 | 20.5 | 10.12 | 10 | 10.25 | 1.076 | 1.07 | 1.08 | 30.12 | 30 | 30.25 |
| 1743 | Aug | 20.25 | 20 | 21 | 10.12 | 10 | 10.25 | 1.068 | 1.065 | 1.07 | 30.25 | 30.25 | 30.25 |
| 1743 | Sept | 20.25 | 20 | 20.5 | 10.12 | 10 | 10.25 | 1.072 | 1.065 | 1.08 | 30.22 | 29.5 | 30.5 |
| 1743 | Oct | 20.31 | 20 | 20.5 | 10.12 | 10 | 10.25 | 1.072 | 1.07 | 1.075 | 29.56 | 29.5 | 30 |
| 1743 | Nov | 20.59 | 20.5 | 20.75 | 10.17 | 10 | 10.38 | 1.077 | 1.07 | 1.08 | 29.5 | 29.5 | 29.5 |
| 1743 | Dec | 20.78 | 20.5 | 21 | 10.34 | 10.25 | 10.5 | 1.08 | 1.08 | 1.08 | 29.5 | 29.5 | 29.5 |
| 1744 | Jan | 20.81 | 20.5 | 21 | 10.34 | 10.25 | 10.5 | 1.085 | 1.08 | 1.09 | 29.62 | 29.5 | 30 |

**Table A4.4 (cont.).** *Monthly exchange rates between Swedish currency units 1705–76.*

| Year | Month | 1 ducat in daler kopparmynt (par value 18 daler k.m.) | | | 1 riksdaler in daler kopparmynt (par value 9 daler k.m.) | | | 1 öre courant in öre silvermynt (par value 1 öre s.m.) | | | 1 carolin in öre silvermynt (par value 25 öre s.m.) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest |
| 1744 | Feb | 20.87 | 20.75 | 21 | 10.31 | 10.25 | 10.38 | 1.09 | 1.09 | 1.09 | 29.91 | 29.75 | 30 |
| 1744 | Mar | 20.87 | 20.75 | 21 | 10.31 | 10.25 | 10.38 | 1.086 | 1.08 | 1.09 | 29.96 | 29.88 | 30 |
| 1744 | April | 20.81 | 20.75 | 21 | 10.44 | 10.38 | 10.5 | 1.091 | 1.09 | 1.095 | 30.06 | 30 | 30.13 |
| 1744 | May | 21 | 21 | 21 | 10.5 | 10.5 | 10.5 | 1.101 | 1.09 | 1.11 | 30.2 | 30 | 30.25 |
| 1744 | June | 21 | 21 | 21 | 10.31 | 10.25 | 10.5 | 1.108 | 1.105 | 1.11 | 30.11 | 30 | 30.25 |
| 1744 | July | 21.06 | 21 | 21.5 | 10.37 | 10.25 | 10.5 | 1.11 | 1.11 | 1.11 | 30.25 | 30.25 | 30.25 |
| 1744 | Aug | 21 | 21 | 21 | 10.37 | 10.25 | 10.5 | 1.112 | 1.11 | 1.115 | 30.25 | 30.25 | 30.25 |
| 1744 | Sept | 21.12 | 21 | 21.5 | 10.33 | 10.25 | 10.5 | 1.106 | 1.1 | 1.11 | 30.27 | 30.25 | 30.38 |
| 1744 | Oct | 21.33 | 21.25 | 21.5 | 10.34 | 10.25 | 10.5 | 1.107 | 1.1 | 1.11 | 30.27 | 30.25 | 30.38 |
| 1744 | Nov | 21.44 | 21.38 | 21.5 | 10.45 | 10.38 | 10.5 | 1.112 | 1.11 | 1.115 | 30.31 | 30.25 | 30.38 |
| 1744 | Dec | 21.5 | 21.5 | 21.5 | 10.5 | 10.5 | 10.5 | 1.113 | 1.11 | 1.115 | 30.34 | 30.25 | 30.38 |
| 1745 | Jan | 21.62 | 21.5 | 21.75 | 10.62 | 10.5 | 10.75 | 1.114 | 1.11 | 1.12 | 30.34 | 30.25 | 30.44 |
| 1745 | Feb | 21.62 | 21.5 | 21.75 | 10.62 | 10.5 | 10.75 | 1.115 | 1.115 | 1.115 | 30.4 | 30.38 | 30.44 |
| 1745 | Mar | 21.94 | 21.75 | 22 | 10.75 | 10.75 | 10.75 | 1.117 | 1.115 | 1.12 | 30.69 | 30.5 | 30.75 |
| 1745 | April | 21.22 | 20.75 | 21.75 | 10.62 | 10.25 | 10.75 | 1.112 | 1.105 | 1.12 | 30.64 | 30.38 | 30.88 |
| 1745 | May | 20.43 | 20 | 21 | 10.19 | 10 | 10.5 | 1.107 | 1.105 | 1.11 | 30.44 | 30.38 | 30.5 |
| 1745 | June | | | | | | | 1.109 | 1.105 | 1.115 | 30.45 | 30.38 | 30.5 |
| 1745 | July | 20 | 20 | 20 | 10 | 10 | 10 | 1.111 | 1.11 | 1.115 | 30.45 | 30.38 | 30.5 |
| 1745 | Aug | 20 | 20 | 20 | 10 | 10 | 10 | 1.112 | 1.11 | 1.115 | 30.44 | 30.38 | 30.5 |
| 1745 | Sept | 20 | 20 | 20 | 10 | 10 | 10 | 1.112 | 1.11 | 1.115 | 30.29 | 30.13 | 30.5 |
| 1745 | Oct | 20 | 20 | 20 | 10 | 10 | 10 | 1.119 | 1.115 | 1.125 | 30.2 | 30 | 30.38 |
| 1745 | Nov | 20 | 20 | 20 | 10 | 10 | 10 | 1.127 | 1.12 | 1.13 | 30.55 | 30.25 | 30.75 |
| 1745 | Dec | 20 | 20 | 20 | 10 | 10 | 10 | 1.131 | 1.13 | 1.135 | 30.77 | 30.75 | 30.88 |
| 1746 | Jan | 20 | 20 | 20 | 10 | 10 | 10 | 1.142 | 1.14 | 1.145 | 30.77 | 30.75 | 31 |
| 1746 | Feb | 20 | 20 | 20 | 10 | 10 | 10 | 1.14 | 1.14 | 1.14 | 30.87 | 30.75 | 31 |
| 1746 | Mar | 20 | 20 | 20 | 10 | 10 | 10 | 1.136 | 1.13 | 1.14 | 30.87 | 30.75 | 31 |
| 1746 | April | 20 | 20 | 20 | 10 | 10 | 10 | 1.132 | 1.13 | 1.135 | 30.87 | 30.75 | 31 |
| 1746 | May | 20 | 20 | 20 | 10 | 10 | 10 | 1.128 | 1.12 | 1.13 | 30.65 | 30.5 | 30.75 |
| 1746 | June | 20 | 20 | 20 | 10 | 10 | 10 | 1.125 | 1.12 | 1.13 | 30.66 | 30.5 | 30.75 |
| 1746 | July | 20 | 20 | 20 | 10 | 10 | 10 | 1.135 | 1.13 | 1.14 | 30.82 | 30.75 | 31 |
| 1746 | Aug | 20 | 20 | 20 | 10 | 10 | 10 | 1.145 | 1.14 | 1.15 | 30.94 | 30.88 | 31 |
| 1746 | Sept | 20 | 20 | 20 | 10 | 10 | 10 | 1.15 | 1.15 | 1.15 | 31 | 31 | 31 |
| 1746 | Oct | 20 | 20 | 20 | 10 | 10 | 10 | 1.15 | 1.15 | 1.15 | 31.19 | 31 | 31.25 |
| 1746 | Nov | 20 | 20 | 20 | 10 | 10 | 10 | 1.147 | 1.14 | 1.15 | 31.31 | 31.25 | 31.5 |
| 1746 | Dec | 20 | 20 | 20 | 10 | 10 | 10 | 1.14 | 1.14 | 1.14 | 31.62 | 31.25 | 31.75 |
| 1747 | Jan | 20 | 20 | 20 | 10 | 10 | 10 | 1.137 | 1.13 | 1.14 | 31.9 | 31.75 | 32 |
| 1747 | Feb | 20 | 20 | 20 | 10 | 10 | 10 | 1.132 | 1.13 | 1.135 | 32 | 32 | 32 |
| 1747 | Mar | 20 | 20 | 20 | 10 | 10 | 10 | 1.141 | 1.14 | 1.145 | 32 | 32 | 32 |
| 1747 | April | | | | | | | 1.143 | 1.14 | 1.15 | 32 | 32 | 32 |

**Table A4.4 (cont.).** *Monthly exchange rates between Swedish currency units 1705–76.*

| Year | Month | 1 ducat in daler kopparmynt (par value 18 daler k.m.) | | | 1 riksdaler in daler kopparmynt (par value 9 daler k.m.) | | | 1 öre courant in öre silvermynt (par value 1 öre s.m.) | | | 1 carolin in öre silvermynt (par value 25 öre s.m.) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest |
| 1747 | May | 22.75 | 22.75 | 22.75 | 11.5 | 11.5 | 11.5 | 1.152 | 1.145 | 1.16 | 32.06 | 32 | 32.25 |
| 1747 | June | 22.75 | 22.75 | 22.75 | 11.5 | 11.5 | 11.5 | 1.156 | 1.15 | 1.16 | 32 | 32 | 32 |
| 1747 | July | 22.77 | 22.75 | 23 | 11.55 | 11.5 | 11.75 | 1.165 | 1.16 | 1.17 | 32.15 | 32 | 32.25 |
| 1747 | Aug | 22.87 | 22.75 | 23 | 11.62 | 11.5 | 11.75 | 1.17 | 1.17 | 1.17 | 32.25 | 32.25 | 32.25 |
| 1747 | Sept | 22.94 | 22.75 | 23 | 11.55 | 11.5 | 11.63 | 1.17 | 1.17 | 1.17 | 32.25 | 32.25 | 32.25 |
| 1747 | Oct | 23 | 23 | 23 | 11.72 | 11.5 | 11.75 | 1.175 | 1.17 | 1.18 | 32.25 | 32.25 | 32.25 |
| 1747 | Nov | 22.87 | 22.75 | 23 | 11.62 | 11.5 | 11.75 | 1.173 | 1.17 | 1.18 | 32.19 | 32 | 32.25 |
| 1747 | Dec | 22.87 | 22.75 | 23 | 11.62 | 11.5 | 11.75 | 1.164 | 1.16 | 1.17 | 32.12 | 32 | 32.25 |
| 1748 | Jan | 22.87 | 22.75 | 23 | 11.62 | 11.5 | 11.75 | 1.165 | 1.16 | 1.17 | 32.25 | 32 | 32.38 |
| 1748 | Feb | 22.87 | 22.75 | 23 | 11.62 | 11.5 | 11.75 | 1.165 | 1.16 | 1.17 | 32.12 | 32 | 32.25 |
| 1748 | Mar | 22.87 | 22.75 | 23 | 11.62 | 11.5 | 11.75 | 1.164 | 1.16 | 1.17 | 32.3 | 32 | 32.5 |
| 1748 | April | 22.87 | 22.75 | 23 | 11.62 | 11.5 | 11.75 | 1.165 | 1.16 | 1.17 | 32.37 | 32.25 | 32.5 |
| 1748 | May | 22.87 | 22.75 | 23 | 11.62 | 11.5 | 11.75 | 1.169 | 1.16 | 1.18 | 32.37 | 32.25 | 32.5 |
| 1748 | June | 22.67 | 22.5 | 23 | 11.5 | 11.5 | 11.5 | 1.177 | 1.175 | 1.18 | 32.37 | 32.25 | 32.5 |
| 1748 | July | 22.62 | 22.5 | 22.75 | 11.5 | 11.5 | 11.5 | 1.177 | 1.175 | 1.18 | 32.37 | 32.25 | 32.5 |
| 1748 | Aug | 22.62 | 22.5 | 22.75 | 11.5 | 11.5 | 11.5 | 1.177 | 1.175 | 1.18 | 32.37 | 32.25 | 32.5 |
| 1748 | Sept | 22.62 | 22.5 | 22.75 | 11.5 | 11.5 | 11.5 | 1.178 | 1.175 | 1.18 | 32.37 | 32.25 | 32.5 |
| 1748 | Oct | 22.62 | 22.5 | 22.75 | 11.5 | 11.5 | 11.5 | 1.18 | 1.18 | 1.18 | 32.37 | 32.25 | 32.5 |
| 1748 | Nov | 22.62 | 22.5 | 22.75 | 11.53 | 11.5 | 11.75 | 1.18 | 1.18 | 1.18 | 32.37 | 32.25 | 32.5 |
| 1748 | Dec | 22.62 | 22.5 | 22.75 | 11.62 | 11.5 | 11.75 | 1.172 | 1.16 | 1.18 | 32.5 | 32.5 | 32.5 |
| 1749 | Jan | | | | | | | | | | | | |
| 1749 | Feb | | | | | | | | | | | | |
| 1749 | Mar | | | | | | | | | | | | |
| 1749 | April | | | | | | | | | | | | |
| 1749 | May | 22.62 | 22.5 | 22.75 | 11.62 | 11.5 | 11.75 | 1.177 | 1.175 | 1.18 | 32.75 | 32.75 | 32.75 |
| 1749 | June | 22.62 | 22.5 | 22.75 | 11.62 | 11.5 | 11.75 | 1.177 | 1.175 | 1.18 | 33 | 33 | 33 |
| 1749 | July | 22.62 | 22.5 | 22.75 | 11.62 | 11.5 | 11.75 | 1.178 | 1.175 | 1.18 | 33 | 33 | 33 |
| 1749 | Aug | 22.62 | 22.5 | 22.75 | 11.62 | 11.5 | 11.75 | 1.18 | 1.18 | 1.18 | 33 | 33 | 33 |
| 1749 | Sept | 22.56 | 22.5 | 22.75 | 11.62 | 11.5 | 11.75 | 1.18 | 1.18 | 1.18 | 33.09 | 33 | 33.25 |
| 1749 | Oct | 22.47 | 22.25 | 22.5 | 11.62 | 11.5 | 11.75 | 1.18 | 1.18 | 1.18 | 33.12 | 33 | 33.25 |
| 1749 | Nov | 22.5 | 22.5 | 22.5 | 11.62 | 11.5 | 11.75 | 1.18 | 1.18 | 1.18 | 33.12 | 33 | 33.25 |
| 1749 | Dec | 22.33 | 22 | 22.5 | 11.62 | 11.5 | 11.75 | 1.18 | 1.18 | 1.18 | 33.12 | 33 | 33.25 |
| 1750 | Jan | 22 | 22 | 22 | 11.62 | 11.5 | 11.75 | 1.177 | 1.175 | 1.18 | 33.12 | 33 | 33.25 |
| 1750 | Feb | 22 | 22 | 22 | 11.62 | 11.5 | 11.75 | 1.175 | 1.175 | 1.175 | 33.12 | 33 | 33.25 |
| 1750 | Mar | 22 | 22 | 22 | 11.62 | 11.5 | 11.75 | 1.175 | 1.175 | 1.175 | 33.12 | 33 | 33.25 |
| 1750 | April | 21.91 | 21.5 | 22 | 11.62 | 11.5 | 11.75 | 1.175 | 1.175 | 1.175 | 33.12 | 33 | 33.25 |
| 1750 | May | 21.52 | 21 | 21.75 | 11.62 | 11.5 | 11.75 | 1.175 | 1.175 | 1.175 | 33.12 | 33 | 33.25 |
| 1750 | June | 21.12 | 21 | 21.25 | 11.62 | 11.5 | 11.75 | 1.167 | 1.165 | 1.17 | 33.12 | 33 | 33.25 |
| 1750 | July | 20.87 | 20.75 | 21 | 11.37 | 11.25 | 11.5 | 1.162 | 1.16 | 1.165 | 33.12 | 33 | 33.25 |

**Table A4.4 (cont.).** *Monthly exchange rates between Swedish currency units 1705–76.*

| Year | Month | 1 ducat in daler kopparmynt (par value 18 daler k.m.) | | | 1 riksdaler in daler kopparmynt (par value 9 daler k.m.) | | | 1 öre courant in öre silvermynt (par value 1 öre s.m.) | | | 1 carolin in öre silvermynt (par value 25 öre s.m.) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest |
| 1750 | Aug | 20.67 | 20.5 | 21 | 11.37 | 11.25 | 11.5 | 1.161 | 1.15 | 1.165 | 33.12 | 33 | 33.25 |
| 1750 | Sept | 20.28 | 20 | 20.5 | 11.19 | 11 | 11.25 | 1.14 | 1.12 | 1.15 | 33.09 | 33 | 33.25 |
| 1750 | Oct | 20.12 | 20 | 20.25 | 11 | 11 | 11 | 1.117 | 1.115 | 1.12 | 33 | 33 | 33 |
| 1750 | Nov | 19.97 | 19.75 | 20.25 | 10.9 | 10.5 | 11 | 1.099 | 1.08 | 1.11 | 32.72 | 32.5 | 33 |
| 1750 | Dec | 19.87 | 19.75 | 20 | 10.65 | 10 | 11 | 1.075 | 1.07 | 1.08 | 32.52 | 32.25 | 32.75 |
| 1751 | Jan | 19.77 | 19.5 | 20 | 10.25 | 10 | 10.5 | 1.075 | 1.06 | 1.09 | 32.4 | 32 | 33 |
| 1751 | Feb | 19.62 | 19.5 | 19.75 | 10.25 | 10 | 10.5 | 1.075 | 1.07 | 1.08 | 32.87 | 32.75 | 33 |
| 1751 | Mar | 19.62 | 19.5 | 19.75 | 10.25 | 10 | 10.5 | 1.075 | 1.07 | 1.08 | 32.87 | 32.75 | 33 |
| 1751 | April | 19.62 | 19.5 | 19.75 | 10.25 | 10 | 10.5 | 1.081 | 1.07 | 1.09 | 32.87 | 32.75 | 33 |
| 1751 | May | 19.72 | 19.5 | 20 | 10.25 | 10 | 10.5 | 1.074 | 1.07 | 1.08 | 32.87 | 32.75 | 33 |
| 1751 | June | 19.87 | 19.75 | 20 | 10.25 | 10 | 10.5 | 1.082 | 1.07 | 1.09 | 32.87 | 32.75 | 33 |
| 1751 | July | 19.87 | 19.75 | 20 | 10.25 | 10 | 10.5 | 1.085 | 1.08 | 1.09 | 32.87 | 32.75 | 33 |
| 1751 | Aug | 19.87 | 19.75 | 20 | 10.25 | 10 | 10.5 | 1.085 | 1.08 | 1.09 | 32.87 | 32.75 | 33 |
| 1751 | Sept | 19.87 | 19.75 | 20 | 10.25 | 10 | 10.5 | 1.085 | 1.08 | 1.09 | 32.62 | 32.5 | 32.75 |
| 1751 | Oct | 19.87 | 19.75 | 20 | 10.71 | 10 | 11 | 1.076 | 1.07 | 1.09 | 32.25 | 32 | 32.75 |
| 1751 | Nov | 19.87 | 19.75 | 20 | 10.87 | 10.75 | 11 | 1.072 | 1.07 | 1.075 | 32.12 | 32 | 32.25 |
| 1751 | Dec | 19.87 | 19.75 | 20 | 10.87 | 10.75 | 11 | 1.072 | 1.07 | 1.075 | 32.37 | 32.25 | 32.5 |
| 1752 | Jan | 19.56 | 19 | 20 | 10.75 | 10.5 | 11 | 1.072 | 1.07 | 1.075 | 32.25 | 32 | 32.5 |
| 1752 | Feb | 19.75 | 19.5 | 20 | 10.87 | 10.5 | 11.25 | 1.075 | 1.07 | 1.08 | 32.33 | 32 | 32.5 |
| 1752 | Mar | 20 | 20 | 20 | 11.12 | 11 | 11.25 | 1.077 | 1.075 | 1.08 | 32.5 | 32.5 | 32.5 |
| 1752 | April | 19.9 | 19.5 | 20 | 10.97 | 10.5 | 11.25 | 1.081 | 1.08 | 1.085 | 32.37 | 32 | 32.5 |
| 1752 | May | 19.44 | 19.25 | 19.5 | 10.5 | 10.5 | 10.5 | 1.077 | 1.07 | 1.08 | 32.05 | 32 | 32.25 |
| 1752 | June | 19.55 | 19.25 | 19.75 | 10.4 | 10 | 10.5 | 1.074 | 1.07 | 1.08 | 32.11 | 32 | 32.25 |
| 1752 | July | 19.12 | 19 | 19.5 | 10 | 10 | 10 | 1.071 | 1.07 | 1.075 | 32.06 | 32 | 32.25 |
| 1752 | Aug | 19 | 19 | 19 | 10 | 10 | 10 | 1.067 | 1.06 | 1.07 | 31.87 | 31.5 | 32 |
| 1752 | Sept | 19 | 19 | 19 | 10 | 10 | 10 | 1.054 | 1.05 | 1.06 | 31.45 | 31 | 32 |
| 1752 | Oct | 19.16 | 19 | 19.25 | 10.16 | 10 | 10.25 | 1.048 | 1.045 | 1.05 | 30.31 | 30 | 30.5 |
| 1752 | Nov | 19.12 | 19 | 19.25 | 10.12 | 10 | 10.25 | 1.05 | 1.05 | 1.05 | 30.34 | 30 | 30.5 |
| 1752 | Dec | 19.12 | 19 | 19.25 | 10.12 | 10 | 10.25 | 1.05 | 1.05 | 1.05 | 30.05 | 30 | 30.5 |
| 1753 | Jan | 19.12 | 19 | 19.25 | 10.15 | 10 | 10.5 | 1.049 | 1.045 | 1.05 | 29.78 | 29.5 | 30 |
| 1753 | Feb | 19.12 | 19 | 19.25 | 10.16 | 10 | 10.5 | 1.051 | 1.05 | 1.055 | 29.75 | 29.63 | 30 |
| 1753 | Mar | 19.12 | 19 | 19.25 | 10.12 | 10 | 10.25 | 1.05 | 1.05 | 1.05 | 29.69 | 29.63 | 29.75 |
| 1753 | April | 19.12 | 19 | 19.25 | 10.12 | 10 | 10.25 | 1.05 | 1.05 | 1.05 | 29.69 | 29.63 | 29.75 |
| 1753 | May | 19.12 | 19 | 19.25 | 10.12 | 10 | 10.25 | 1.05 | 1.05 | 1.05 | 29.67 | 29.5 | 29.75 |
| 1753 | June | 19.12 | 19 | 19.25 | 10.12 | 10 | 10.25 | 1.052 | 1.05 | 1.06 | 29.62 | 29.5 | 29.75 |
| 1753 | July | 19.22 | 19 | 19.75 | 10 | 10 | 10 | 1.05 | 1.05 | 1.05 | 29.61 | 29.5 | 29.75 |
| 1753 | Aug | 19.31 | 19 | 19.75 | 10 | 10 | 10 | 1.05 | 1.05 | 1.05 | 29.69 | 29.63 | 29.75 |
| 1753 | Sept | 19.5 | 19.25 | 19.75 | 10 | 10 | 10 | 1.05 | 1.05 | 1.05 | 29.69 | 29.63 | 29.75 |
| 1753 | Oct | 19.4 | 19.25 | 19.75 | 10.05 | 10 | 10.25 | 1.05 | 1.05 | 1.05 | 29.66 | 29.63 | 29.75 |

**Table A4.4 (cont.).** *Monthly exchange rates between Swedish currency units 1705–76.*

| Year | Month | 1 ducat in daler kopparmynt (par value 18 daler k.m.) | | | 1 riksdaler in daler kopparmynt (par value 9 daler k.m.) | | | 1 öre courant in öre silvermynt (par value 1 öre s.m.) | | | 1 carolin in öre silvermynt (par value 25 öre s.m.) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest |
| 1753 | Nov | 19.37 | 19.25 | 19.5 | 10 | 10 | 10 | 1.05 | 1.05 | 1.05 | 29.63 | 29.63 | 29.63 |
| 1753 | Dec | 19.37 | 19.25 | 19.5 | 10.37 | 10.25 | 10.5 | 1.05 | 1.05 | 1.05 | 29.62 | 29.5 | 29.75 |
| 1754 | Jan | 19.37 | 19.25 | 19.5 | 9.949 | 9.75 | 10 | 1.05 | 1.05 | 1.05 | 29.67 | 29.5 | 29.75 |
| 1754 | Feb | 19.37 | 19.25 | 19.5 | 9.906 | 9.75 | 10 | 1.05 | 1.05 | 1.05 | 29.75 | 29.75 | 29.75 |
| 1754 | Mar | 19.37 | 19.25 | 19.5 | 10 | 10 | 10 | 1.057 | 1.055 | 1.06 | 29.81 | 29.75 | 29.88 |
| 1754 | April | 19.5 | 19.5 | 19.5 | 10.05 | 10 | 10.25 | 1.057 | 1.055 | 1.06 | 29.98 | 29.88 | 30.25 |
| 1754 | May | 19.59 | 19.5 | 19.75 | 10 | 10 | 10 | 1.057 | 1.055 | 1.06 | 29.95 | 29.88 | 30 |
| 1754 | June | 19.62 | 19.5 | 19.75 | 10.09 | 10 | 10.5 | 1.055 | 1.055 | 1.055 | 29.94 | 29.88 | 30 |
| 1754 | July | 19.62 | 19.5 | 19.75 | 10.37 | 10.25 | 10.5 | 1.055 | 1.055 | 1.055 | 29.94 | 29.88 | 30 |
| 1754 | Aug | 19.62 | 19.5 | 19.75 | 10.37 | 10.25 | 10.5 | 1.051 | 1.05 | 1.055 | 29.91 | 29.75 | 30 |
| 1754 | Sept | 19.52 | 19.5 | 19.63 | 10.37 | 10.25 | 10.5 | 1.051 | 1.05 | 1.055 | 29.86 | 29.75 | 30 |
| 1754 | Oct | 19.37 | 19 | 19.75 | 10.49 | 10 | 11 | 1.05 | 1.05 | 1.05 | 29.87 | 29.75 | 30 |
| 1754 | Nov | 19.59 | 19.5 | 19.75 | 10.5 | 10.5 | 10.5 | 1.05 | 1.05 | 1.05 | 29.86 | 29.75 | 30 |
| 1754 | Dec | 19.52 | 19.5 | 19.75 | 10.3 | 10.25 | 10.5 | 1.053 | 1.05 | 1.055 | 29.91 | 29.75 | 30 |
| 1755 | Jan | 19.62 | 19.5 | 19.75 | 10.25 | 10.25 | 10.25 | 1.055 | 1.055 | 1.055 | 29.94 | 29.88 | 30 |
| 1755 | Feb | 19.55 | 19.5 | 19.75 | 10.19 | 10 | 10.25 | 1.055 | 1.055 | 1.055 | 29.98 | 29.88 | 30.13 |
| 1755 | Mar | 19.56 | 19.5 | 19.63 | 10.06 | 10 | 10.25 | 1.055 | 1.055 | 1.055 | 30.14 | 30.13 | 30.25 |
| 1755 | April | 19.57 | 19.5 | 19.75 | 9.996 | 9.5 | 10.25 | 1.055 | 1.055 | 1.055 | 30.05 | 29.88 | 30.25 |
| 1755 | May | 19.62 | 19.5 | 19.75 | 10 | 10 | 10 | 1.055 | 1.055 | 1.055 | 29.91 | 29.75 | 30 |
| 1755 | June | 19.62 | 19.5 | 19.75 | 10 | 10 | 10 | 1.055 | 1.055 | 1.055 | 29.87 | 29.75 | 30 |
| 1755 | July | 19.62 | 19.5 | 19.75 | 10 | 10 | 10 | 1.055 | 1.055 | 1.055 | 29.97 | 29.75 | 30 |
| 1755 | Aug | 19.72 | 19.5 | 20 | 10 | 10 | 10 | 1.055 | 1.055 | 1.055 | 30 | 30 | 30 |
| 1755 | Sept | 19.5 | 19.5 | 19.5 | 10.22 | 10 | 10.75 | 1.055 | 1.055 | 1.055 | 30.05 | 30 | 30.13 |
| 1755 | Oct | 19.78 | 19.5 | 20 | 10.59 | 10.25 | 10.75 | 1.055 | 1.055 | 1.055 | 30 | 30 | 30 |
| 1755 | Nov | 19.87 | 19.75 | 20 | 10.5 | 10.25 | 10.75 | 1.055 | 1.055 | 1.055 | 30 | 30 | 30 |
| 1755 | Dec | 19.96 | 19.75 | 20.13 | 10.5 | 10.25 | 10.75 | 1.055 | 1.055 | 1.055 | 30 | 30 | 30 |
| 1756 | Jan | | | | | | | | | | | | |
| 1756 | Feb | | | | | | | | | | 30.62 | 30.5 | 30.75 |
| 1756 | Mar | | | | | | | 1.062 | 1.06 | 1.065 | 30.62 | 30.5 | 30.75 |
| 1756 | April | | | | | | | 1.062 | 1.06 | 1.065 | 30.62 | 30.5 | 30.75 |
| 1756 | May | | | | 10.5 | 10.5 | 10.5 | 1.06 | 1.06 | 1.06 | 30.62 | 30.5 | 30.75 |
| 1756 | June | | | | 10.5 | 10.5 | 10.5 | 1.06 | 1.06 | 1.06 | 30.62 | 30.5 | 30.75 |
| 1756 | July | 21.25 | 21.25 | 21.25 | | | | 1.06 | 1.06 | 1.06 | 30.87 | 30.5 | 31.25 |
| 1756 | Aug | 20.75 | 20.75 | 20.75 | | | | 1.06 | 1.06 | 1.06 | 31.05 | 31 | 31.25 |
| 1756 | Sept | 20.75 | 20.75 | 20.75 | | | | 1.06 | 1.06 | 1.06 | 31 | 31 | 31 |
| 1756 | Oct | 20.75 | 20.75 | 20.75 | | | | 1.062 | 1.06 | 1.07 | 31 | 31 | 31 |
| 1756 | Nov | 20.9 | 20.75 | 21 | 11 | 11 | 11 | 1.068 | 1.065 | 1.07 | 31.07 | 31 | 31.13 |
| 1756 | Dec | 21 | 21 | 21 | 11 | 11 | 11 | 1.07 | 1.07 | 1.07 | 31.13 | 31.13 | 31.13 |
| 1757 | Jan | 21.47 | 21.25 | 21.5 | 11.12 | 11 | 11.5 | 1.07 | 1.07 | 1.07 | 31.13 | 31.13 | 31.13 |

**Table A4.4 (cont.).** *Monthly exchange rates between Swedish currency units 1705–76.*

| Year | Month | 1 ducat in daler kopparmynt (par value 18 daler k.m.) | | | 1 riksdaler in daler kopparmynt (par value 9 daler k.m.) | | | 1 öre courant in öre silvermynt (par value 1 öre s.m.) | | | 1 carolin in öre silvermynt (par value 25 öre s.m.) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest |
| 1757 | Feb | 21.5 | 21.5 | 21.5 | 11 | 11 | 11 | 1.07 | 1.07 | 1.07 | 31.19 | 31.13 | 31.25 |
| 1757 | Mar | 21.7 | 21.5 | 22 | 10.8 | 10.5 | 11 | 1.06 | 1.06 | 1.06 | 31.6 | 31.5 | 31.75 |
| 1757 | April | 21.75 | 21.5 | 22 | 10.87 | 10.75 | 11 | 1.06 | 1.06 | 1.06 | 31.62 | 31.5 | 31.75 |
| 1757 | May | 21.9 | 21.5 | 22 | 10.87 | 10.75 | 11 | 1.067 | 1.06 | 1.075 | 32 | 31.5 | 32.25 |
| 1757 | June | 22 | 22 | 22 | 10.87 | 10.75 | 11 | 1.075 | 1.075 | 1.075 | 32.25 | 32.25 | 32.25 |
| 1757 | July | 23 | 23 | 23 | 11 | 11 | 11 | 1.092 | 1.085 | 1.1 | 32.25 | 32.25 | 32.25 |
| 1757 | Aug | 23.2 | 23 | 24 | 11 | 11 | 11 | 1.122 | 1.12 | 1.13 | 32.52 | 32.5 | 32.75 |
| 1757 | Sept | 24 | 24 | 24 | 11.37 | 11.25 | 11.5 | 1.15 | 1.13 | 1.17 | 32.62 | 32.5 | 32.75 |
| 1757 | Oct | 24 | 24 | 24 | 11.5 | 11.5 | 11.5 | 1.16 | 1.16 | 1.16 | 32.62 | 32.5 | 32.75 |
| 1757 | Nov | 24 | 24 | 24 | 11.6 | 11.5 | 11.75 | 1.172 | 1.16 | 1.19 | 33.17 | 32.5 | 34 |
| 1757 | Dec | 24 | 24 | 24 | 11.75 | 11.75 | 11.75 | 1.19 | 1.19 | 1.19 | 34 | 34 | 34 |
| 1758 | Jan | 24.85 | 24.75 | 25 | 12.55 | 12.25 | 12.75 | 1.186 | 1.18 | 1.19 | 34.2 | 34 | 34.5 |
| 1758 | Feb | 25.25 | 24.75 | 26 | 12.66 | 12.5 | 12.75 | 1.189 | 1.18 | 1.2 | 34.44 | 34 | 35 |
| 1758 | Mar | 26.4 | 26 | 26.75 | 13 | 12.75 | 13.25 | 1.235 | 1.22 | 1.26 | 35.37 | 35 | 36 |
| 1758 | April | 27 | 26.5 | 27.25 | 13.62 | 13.25 | 14 | 1.257 | 1.24 | 1.27 | 36.12 | 35.5 | 36.5 |
| 1758 | May | 27.22 | 27 | 27.5 | 13.75 | 13.5 | 14 | 1.268 | 1.25 | 1.28 | 36.25 | 36 | 36.5 |
| 1758 | June | 27.06 | 26.75 | 27.5 | 13.62 | 13.5 | 14 | 1.275 | 1.26 | 1.28 | 36.37 | 36 | 36.5 |
| 1758 | July | 26.56 | 26.25 | 27 | 13.12 | 13 | 13.5 | 1.282 | 1.28 | 1.3 | 36.5 | 36.5 | 36.5 |
| 1758 | Aug | 26.12 | 26 | 26.75 | 13 | 13 | 13 | 1.286 | 1.28 | 1.32 | 36.5 | 36.5 | 36.5 |
| 1758 | Sept | 26.09 | 26 | 26.25 | 13 | 13 | 13 | 1.31 | 1.3 | 1.32 | 36.5 | 36.5 | 36.5 |
| 1758 | Oct | 26 | 26 | 26 | 13.1 | 13 | 13.5 | 1.316 | 1.3 | 1.33 | 36.5 | 36.5 | 36.5 |
| 1758 | Nov | 25.81 | 25 | 26 | 13.25 | 13 | 13.5 | 1.327 | 1.32 | 1.34 | 36.69 | 36.5 | 37 |
| 1758 | Dec | 25.93 | 25 | 26.5 | 13.25 | 13 | 13.5 | 1.335 | 1.33 | 1.34 | 37.12 | 37 | 37.25 |
| 1759 | Jan | 26.5 | 26.5 | 26.5 | 13.65 | 13 | 14 | 1.335 | 1.33 | 1.34 | 37.12 | 37 | 37.25 |
| 1759 | Feb | 26.5 | 26.5 | 26.5 | 13.75 | 13.5 | 14 | 1.335 | 1.33 | 1.34 | 37.12 | 37 | 37.25 |
| 1759 | Mar | 26.5 | 26.5 | 26.5 | 13.75 | 13.5 | 14 | 1.335 | 1.33 | 1.34 | 37.12 | 37 | 37.25 |
| 1759 | April | 26.37 | 26.25 | 26.5 | 13.87 | 13.5 | 14 | 1.335 | 1.33 | 1.34 | 38.62 | 38.5 | 38.75 |
| 1759 | May | 26.45 | 26.25 | 26.5 | 13.75 | 13.5 | 14 | 1.335 | 1.33 | 1.34 | 39 | 38.5 | 39.5 |
| 1759 | June | 26.5 | 26.5 | 26.5 | 13.75 | 13.5 | 14 | 1.335 | 1.33 | 1.34 | 39.25 | 39 | 39.5 |
| 1759 | July | 26.5 | 26.5 | 26.5 | 14.5 | 14.5 | 14.5 | 1.335 | 1.33 | 1.34 | 39.25 | 39 | 39.5 |
| 1759 | Aug | 26.5 | 26.5 | 26.5 | 14.5 | 14.5 | 14.5 | 1.335 | 1.33 | 1.34 | 39.25 | 39 | 39.5 |
| 1759 | Sept | 26.5 | 26.5 | 26.5 | 14.5 | 14.5 | 14.5 | 1.335 | 1.33 | 1.34 | 39.25 | 39 | 39.5 |
| 1759 | Oct | 26.55 | 26.5 | 26.75 | 14.6 | 14.5 | 15 | 1.357 | 1.33 | 1.4 | 39.45 | 39 | 40 |
| 1759 | Nov | 26.62 | 26.5 | 26.75 | 14.75 | 14.5 | 15 | 1.39 | 1.38 | 1.4 | 39.75 | 39.5 | 40 |
| 1759 | Dec | 27.06 | 26.5 | 27.5 | 15 | 14.5 | 15.25 | 1.42 | 1.38 | 1.45 | 39.75 | 39.5 | 40 |
| 1760 | Jan | 27.8 | 27.5 | 28 | 15.45 | 15.25 | 15.5 | 1.45 | 1.45 | 1.45 | 41.94 | 39.5 | 42.5 |
| 1760 | Feb | 28 | 28 | 28 | 15.5 | 15.5 | 15.5 | 1.46 | 1.46 | 1.46 | 43 | 43 | 43 |
| 1760 | Mar | 29 | 28.5 | 29.5 | 15.75 | 15.75 | 15.75 | 1.47 | 1.46 | 1.48 | 43.37 | 43 | 43.5 |
| 1760 | April | 29.95 | 29.5 | 30.25 | 15.75 | 15.75 | 15.75 | 1.48 | 1.48 | 1.48 | 43.6 | 43.5 | 43.75 |

**Table A4.4 (cont.).** *Monthly exchange rates between Swedish currency units 1705–76.*

| Year | Month | 1 ducat in daler kopparmynt (par value 18 daler k.m.) | | | 1 riksdaler in daler kopparmynt (par value 9 daler k.m.) | | | 1 öre courant in öre silvermynt (par value 1 öre s.m.) | | | 1 carolin in öre silvermynt (par value 25 öre s.m.) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest |
| 1760 | May | 29.5 | 29 | 30 | 15.81 | 15.75 | 16 | 1.5 | 1.5 | 1.5 | 44.44 | 43.75 | 45 |
| 1760 | June | 30.25 | 30 | 30.5 | 16 | 16 | 16 | 1.5 | 1.5 | 1.5 | 45.12 | 45 | 45.5 |
| 1760 | July | 30 | 30 | 30 | 16 | 16 | 16 | 1.5 | 1.5 | 1.5 | 45.5 | 45.5 | 45.5 |
| 1760 | Aug | 31 | 31 | 31 | 16.25 | 16.25 | 16.25 | 1.5 | 1.5 | 1.5 | 46.25 | 46.25 | 46.25 |
| 1760 | Sept | 31 | 31 | 31 | 16.25 | 16.25 | 16.25 | 1.5 | 1.5 | 1.5 | 46.25 | 46.25 | 46.25 |
| 1760 | Oct | 31 | 31 | 31 | 16.25 | 16.25 | 16.25 | 1.5 | 1.5 | 1.5 | 46.25 | 46.25 | 46.25 |
| 1760 | Nov | 32 | 31.5 | 32.5 | 16.25 | 16.25 | 16.25 | 1.5 | 1.5 | 1.5 | 46.87 | 46.25 | 47.5 |
| 1760 | Dec | 33 | 33 | 33 | 17 | 17 | 17 | 1.52 | 1.52 | 1.52 | 47.5 | 47.5 | 47.5 |
| 1761 | Jan | 33.75 | 33.5 | 34 | 17.5 | 17.5 | 17.5 | 1.53 | 1.52 | 1.54 | 47.5 | 47.5 | 47.5 |
| 1761 | Feb | 34 | 34 | 34 | 17.5 | 17.5 | 17.5 | 1.53 | 1.52 | 1.54 | 48.12 | 47.5 | 48.75 |
| 1761 | Mar | 34.1 | 34 | 34.5 | 17.55 | 17.5 | 17.75 | 1.524 | 1.52 | 1.54 | 48.75 | 48.75 | 48.75 |
| 1761 | April | 35.12 | 34.5 | 35.5 | 17.94 | 17.75 | 18 | 1.565 | 1.54 | 1.58 | 49.68 | 48.75 | 50 |
| 1761 | May | 35.5 | 35.5 | 35.5 | 18 | 18 | 18 | 1.6 | 1.6 | 1.6 | 50 | 50 | 50 |
| 1761 | June | 35.8 | 35.5 | 36 | 18 | 18 | 18 | 1.61 | 1.6 | 1.65 | 50 | 50 | 50 |
| 1761 | July | 36.5 | 36.5 | 36.5 | 18 | 18 | 18 | 1.65 | 1.65 | 1.65 | 50 | 50 | 50 |
| 1761 | Aug | 36.5 | 36.5 | 36.5 | 18 | 18 | 18 | 1.675 | 1.65 | 1.7 | 50.56 | 50 | 50.75 |
| 1761 | Sept | 36.2 | 36 | 36.5 | 18 | 18 | 18 | 1.73 | 1.7 | 1.75 | 50.75 | 50.75 | 50.75 |
| 1761 | Oct | 36.56 | 36 | 36.75 | 18 | 18 | 18 | 1.75 | 1.75 | 1.75 | 50.75 | 50.75 | 50.75 |
| 1761 | Nov | 36.25 | 36 | 36.5 | 18 | 18 | 18 | 1.725 | 1.7 | 1.75 | 50.75 | 50.75 | 50.75 |
| 1761 | Dec | 36.5 | 36.5 | 36.5 | 18.5 | 18.5 | 18.5 | 1.72 | 1.7 | 1.75 | 50.75 | 50.75 | 50.75 |
| 1762 | Jan | 36.5 | 36.5 | 36.5 | 18.5 | 18.5 | 18.5 | 1.7 | 1.7 | 1.7 | 50.75 | 50.75 | 50.75 |
| 1762 | Feb | 36.87 | 36.5 | 37 | 18.75 | 18.5 | 19 | 1.725 | 1.7 | 1.75 | 50.75 | 50.75 | 50.75 |
| 1762 | Mar | 38.4 | 38 | 39 | 19 | 19 | 19 | 1.75 | 1.75 | 1.75 | 50.75 | 50.75 | 50.75 |
| 1762 | April | 39.75 | 39 | 40 | 19.5 | 19 | 20 | 1.75 | 1.75 | 1.75 | 50.75 | 50.75 | 50.75 |
| 1762 | May | 40 | 40 | 40 | 20 | 20 | 20 | 1.8 | 1.8 | 1.8 | 51 | 50.75 | 51.25 |
| 1762 | June | 41.09 | 40 | 42 | 20.8 | 20 | 21 | 1.804 | 1.8 | 1.82 | 51.25 | 51.25 | 51.25 |
| 1762 | July | 42.75 | 42 | 43 | 21.75 | 21 | 22 | 1.88 | 1.82 | 1.9 | 51.81 | 51.25 | 52 |
| 1762 | Aug | 43 | 43 | 43 | 22 | 22 | 22 | 1.959 | 1.9 | 2 | 52 | 52 | 52 |
| 1762 | Sept | 43 | 43 | 43 | 22 | 22 | 22 | 2 | 2 | 2 | 52 | 52 | 52 |
| 1762 | Oct | 48.49 | 48 | 50 | 24.2 | 23 | 27 | 2.09 | 2.06 | 2.12 | 52.25 | 52 | 52.5 |
| 1762 | Nov | 49.59 | 48 | 50 | 25.67 | 24 | 27 | 2.095 | 2 | 2.12 | 55 | 55 | 55 |
| 1762 | Dec | 45 | 45 | 45 | 24.25 | 24 | 25 | 2 | 2 | 2 | 55.61 | 55 | 57.5 |
| 1763 | Jan | 43.47 | 42 | 45 | 24.49 | 24 | 25 | 2 | 2 | 2 | 57.5 | 57.5 | 57.5 |
| 1763 | Feb | 42.73 | 42 | 45 | 23.24 | 22.5 | 24 | 2 | 2 | 2 | 57.5 | 57.5 | 57.5 |
| 1763 | Mar | 44.18 | 42 | 45 | 22.79 | 22.5 | 24 | 2 | 2 | 2 | 57.5 | 57.5 | 57.5 |
| 1763 | April | 42 | 42 | 42 | 21.25 | 21 | 22 | 2 | 2 | 2 | 57.5 | 57.5 | 57.5 |
| 1763 | May | 41.19 | 40 | 42 | 20.59 | 20 | 21 | 1.992 | 1.98 | 2 | 56.49 | 55 | 57.5 |
| 1763 | June | 39.75 | 39 | 40 | 19.75 | 19 | 20 | 1.995 | 1.98 | 2 | 55 | 55 | 55 |
| 1763 | July | 39.5 | 39 | 40 | 19.49 | 19 | 20 | 2 | 2 | 2 | 55 | 55 | 55 |

**Table A4.4 (cont.).** *Monthly exchange rates between Swedish currency units 1705–76.*

| Year | Month | 1 ducat in daler kopparmynt (par value 18 daler k.m.) | | | 1 riksdaler in daler kopparmynt (par value 9 daler k.m.) | | | 1 öre courant in öre silvermynt (par value 1 öre s.m.) | | | 1 carolin in öre silvermynt (par value 25 öre s.m.) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest |
| 1763 | Aug | 41 | 40.5 | 42 | 20.79 | 20 | 22 | 2 | 2 | 2 | 55 | 55 | 55 |
| 1763 | Sept | 42.75 | 42 | 43 | 22.49 | 22 | 23 | 2.04 | 2 | 2.08 | 55 | 55 | 55 |
| 1763 | Oct | 44.24 | 43 | 45 | 23.49 | 23 | 24 | 2.085 | 2.08 | 2.1 | 56.24 | 55 | 57.5 |
| 1763 | Nov | 45.74 | 45 | 47 | 23.24 | 22.5 | 24 | 2.125 | 2.1 | 2.15 | 56.24 | 55 | 57.5 |
| 1763 | Dec | 44.25 | 44 | 45 | 22.12 | 22 | 22.5 | 2.025 | 2 | 2.1 | 55 | 55 | 55 |
| 1764 | Jan | 44.4 | 44 | 45 | 22 | 22 | 22 | 2 | 2 | 2 | 55 | 55 | 55 |
| 1764 | Feb | 43.25 | 43 | 44 | 22.49 | 22 | 23 | 2 | 2 | 2 | 55 | 55 | 55 |
| 1764 | Mar | 42.25 | 42 | 43 | 22.81 | 22.75 | 23 | 2 | 2 | 2 | 55 | 55 | 55 |
| 1764 | April | 42.75 | 42 | 43 | 22.12 | 22 | 22.5 | 2 | 2 | 2 | 55 | 55 | 55 |
| 1764 | May | 43 | 43 | 43 | 22.99 | 22 | 23.5 | 2 | 2 | 2 | 55 | 55 | 55 |
| 1764 | June | 43 | 43 | 43 | 22.5 | 22.5 | 22.5 | 2.1 | 2.1 | 2.1 | 55 | 55 | 55 |
| 1764 | July | 43.2 | 43 | 44 | 22.6 | 22.5 | 23 | 2.1 | 2.1 | 2.1 | 55 | 55 | 55 |
| 1764 | Aug | 44.25 | 44 | 44.5 | 23.83 | 23.5 | 24 | 2.1 | 2.1 | 2.1 | 55 | 55 | 55 |
| 1764 | Sept | 45.37 | 45 | 45.5 | 23.75 | 23.5 | 24 | 2.125 | 2.1 | 2.15 | 55 | 55 | 55 |
| 1764 | Oct | 45.3 | 45 | 46.5 | 23.1 | 23 | 23.5 | 2.15 | 2.15 | 2.15 | 55 | 55 | 55 |
| 1764 | Nov | 46.62 | 46 | 47 | 23.75 | 23.5 | 24 | 2.15 | 2.15 | 2.15 | 55 | 55 | 55 |
| 1764 | Dec | 46 | 46 | 46 | 23.25 | 23 | 23.5 | 2.15 | 2.15 | 2.15 | 55 | 55 | 55 |
| 1765 | Jan | 45.2 | 45 | 46 | 23 | 23 | 23 | 2.15 | 2.15 | 2.15 | 55 | 55 | 55 |
| 1765 | Feb | 44.12 | 44 | 44.5 | 22.87 | 22.5 | 23 | 2.111 | 2 | 2.15 | 55 | 55 | 55 |
| 1765 | Mar | 44.25 | 44 | 44.5 | 22 | 22 | 22 | 2 | 2 | 2 | 55 | 55 | 55 |
| 1765 | April | 44.5 | 44.5 | 44.5 | 22 | 22 | 22 | 2 | 2 | 2 | 55 | 55 | 55 |
| 1765 | May | 46 | 45 | 46.5 | 22 | 22 | 22 | 2 | 2 | 2 | 55 | 55 | 55 |
| 1765 | June | 45.87 | 45 | 46 | 22 | 22 | 22 | 2 | 2 | 2 | 55 | 55 | 55 |
| 1765 | July | 46 | 46 | 46 | 22 | 22 | 22 | 2 | 2 | 2 | 55 | 55 | 55 |
| 1765 | Aug | 46 | 46 | 46 | 22.25 | 22 | 22.5 | 2 | 2 | 2 | 55 | 55 | 55 |
| 1765 | Sept | 46 | 46 | 46 | 22.5 | 22.5 | 22.5 | 2 | 2 | 2 | 55 | 55 | 55 |
| 1765 | Oct | 45.33 | 45 | 46 | 22.17 | 22 | 22.5 | 2 | 2 | 2 | 55 | 55 | 55 |
| 1765 | Nov | 40.66 | 40 | 42 | 20.06 | 18 | 21 | 2 | 2 | 2 | 55 | 55 | 55 |
| 1765 | Dec | 40 | 40 | 40 | 19.79 | 18 | 20 | 2 | 2 | 2 | | | |
| 1766 | Jan | 38.73 | 37 | 40 | 19.1 | 18 | 20 | 2 | 2 | 2 | | | |
| 1766 | Feb | 37.99 | 37 | 39 | 18.61 | 18 | 19.5 | 2 | 2 | 2 | | | |
| 1766 | Mar | 37.5 | 37 | 38 | 18.49 | 18 | 19 | 2 | 2 | 2 | | | |
| 1766 | April | 39.03 | 37 | 42 | 20.12 | 18 | 21.5 | 2 | 2 | 2 | | | |
| 1766 | May | 41.5 | 41 | 42 | 21.25 | 21 | 21.5 | 2 | 2 | 2 | | | |
| 1766 | June | 41.5 | 41 | 42 | 21.25 | 21 | 21.5 | 2 | 2 | 2 | | | |
| 1766 | July | 40.3 | 39 | 41 | 20.39 | 19 | 21 | 2 | 2 | 2 | | | |
| 1766 | Aug | 39.5 | 39 | 40 | 19.49 | 19 | 20 | 2 | 2 | 2 | | | |
| 1766 | Sept | 37.2 | 36 | 38 | 18.5 | 18 | 19 | 1.996 | 1.98 | 2 | | | |
| 1766 | Oct | 36.5 | 36 | 37 | 18 | 18 | 18 | 1.99 | 1.98 | 2 | | | |

**Table A4.4 (cont.).** *Monthly exchange rates between Swedish currency units 1705–76.*

| Year | Month | 1 ducat in daler kopparmynt (par value 18 daler k.m.) | | | 1 riksdaler in daler kopparmynt (par value 9 daler k.m.) | | | 1 öre courant in öre silvermynt (par value 1 öre s.m.) | | | 1 carolin in öre silvermynt (par value 25 öre s.m.) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest |
| 1766 | Nov | 35.68 | 35 | 37 | 17.43 | 17 | 18 | 1.944 | 1.9 | 2 | | | |
| 1766 | Dec | 34.29 | 33.5 | 35.5 | 17.15 | 17 | 17.5 | 1.849 | 1.8 | 1.9 | | | |
| 1767 | Jan | 33.5 | 33.5 | 33.5 | 17 | 17 | 17 | 1.79 | 1.78 | 1.8 | | | |
| 1767 | Feb | 33.37 | 33 | 33.5 | 16.75 | 16.5 | 17 | 1.78 | 1.78 | 1.78 | | | |
| 1767 | Mar | 33.75 | 33.5 | 34 | 16.87 | 16.5 | 17.25 | 1.76 | 1.76 | 1.76 | | | |
| 1767 | April | 33.75 | 33.5 | 34 | 16.87 | 16.5 | 17.25 | | | | | | |
| 1767 | May | 33.75 | 33.5 | 34 | 16.87 | 16.5 | 17.25 | | | | | | |
| 1767 | June | 33.6 | 33 | 34 | 16.7 | 16.5 | 17.25 | | | | | | |
| 1767 | July | 32.5 | 32 | 33 | 16.21 | 15.75 | 16.75 | | | | | | |
| 1767 | Aug | 30.55 | 27 | 32 | 15.12 | 14 | 15.75 | | | | | | |
| 1767 | Sept | 26.85 | 26.5 | 27 | 13.25 | 13 | 13.5 | | | | | | |
| 1767 | Oct | 24.49 | 24 | 25 | 12 | 11.75 | 12.25 | | | | | | |
| 1767 | Nov | 24.25 | 24 | 25 | 11.87 | 11.75 | 12 | | | | | | |
| 1767 | Dec | 24 | 24 | 24 | 12.03 | 11.75 | 12.5 | | | | | | |

**Table A4.4 (cont.).** *Monthly exchange rates between Swedish currency units 1705–76.*

| Year | Month | 1 ducat in daler kopparmynt (par value 18 daler k.m.) | | | 1 riksdaler in daler kopparmynt (par value 9 daler k.m.) | | | 1 öre courant in öre silvermynt (par value 1 öre s.m.) | | | 1 carolin in öre silvermynt (par value 25 öre s.m.) | | | 1 daler s.m. in plates in daler s.m. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | |
| 1768 | Jan | 24 | 24 | 24 | | | | | | | | | | |
| 1768 | Feb | 22 | 22 | 22 | | | | | | | | | | |
| 1768 | Mar | 22 | 22 | 22 | | | | 1.167 | 1.167 | 1.167 | | | | |
| 1768 | Apr | | | | | | | 1.154 | 1.15 | 1.167 | | | | |
| 1768 | May | 22 | 22 | 22 | | | | 1.163 | 1.15 | 1.167 | 32 | 32 | 32 | |
| 1768 | June | 22 | 22 | 22 | 12 | 12 | 12 | 1.167 | 1.167 | 1.167 | 32 | 32 | 32 | |
| 1768 | July | 24.81 | 24.25 | 25.5 | 12.62 | 12.5 | 12.75 | 1.167 | 1.167 | 1.167 | | | | |
| 1768 | Aug | 25.32 | 25 | 25.5 | 13.1 | 12.75 | 13.25 | 1.25 | 1.25 | 1.25 | 30.5 | 30.5 | 30.5 | 1.383 |
| 1768 | Sept | 25.25 | 25 | 25.5 | 13.12 | 13 | 13.25 | 1.25 | 1.25 | 1.25 | 30.5 | 30.5 | 30.5 | 1.385 |
| 1768 | Oct | 25.75 | 25.5 | 26 | 12.84 | 12.5 | 13 | | | | | | | 1.356 |
| 1768 | Nov | 26.33 | 26 | 26.5 | 13 | 13 | 13 | | | | | | | 1.372 |
| 1768 | Dec | 27.25 | 27 | 27.5 | 14 | 14 | 14 | | | | | | | 1.478 |
| 1769 | Jan | 27.5 | 27.5 | 27.5 | 14 | 14 | 14 | | | | 33 | 33 | 33 | 1.478 |
| 1769 | Feb | 27.5 | 27.5 | 27.5 | 13.87 | 13.5 | 14 | 1.333 | 1.333 | 1.333 | 33 | 33 | 33 | 1.464 |
| 1769 | Mar | | | | | | | 1.333 | 1.333 | 1.333 | | | | |

**Table A4.4 (cont.).** *Monthly exchange rates between Swedish currency units 1705–76.*

| Year | Month | 1 ducat in daler kopparmynt (par value 18 daler k.m.) | | | 1 riksdaler in daler kopparmynt (par value 9 daler k.m.) | | | 1 öre courant in öre silvermynt (par value 1 öre s.m.) | | | 1 carolin in öre silvermynt (par value 25 öre s.m.) | | | 1 daler s.m. in plates in daler s.m. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | |
| 1769 | Apr | 26.8 | 26.5 | 27 | 13.92 | 13.5 | 14 | 1.332 | 1.33 | 1.333 | | | | 1.469 |
| 1769 | May | 26.75 | 26.5 | 27 | 13.62 | 13.5 | 14 | 1.331 | 1.33 | 1.333 | 34 | 34 | 34 | 1.438 |
| 1769 | June | | | | | | | 1.333 | 1.333 | 1.333 | 34 | 34 | 34 | |
| 1769 | July | 28 | 28 | 28 | 15.75 | 15.5 | 16 | 1.333 | 1.333 | 1.333 | 34 | 34 | 34 | 1.662 |
| 1769 | Aug | 28.89 | 28 | 30 | 16.02 | 15.5 | 16.5 | 1.333 | 1.333 | 1.333 | | | | 1.62 |
| 1769 | Sept | 29.75 | 29.5 | 30 | 16.21 | 16 | 16.5 | 1.5 | 1.5 | 1.5 | | | | 1.621 |
| 1769 | Oct | | | | 17.06 | 17 | 17.13 | 1.5 | 1.5 | 1.5 | | | | 1.706 |
| 1769 | Nov | | | | 16.87 | 16.75 | 17 | 1.5 | 1.5 | 1.5 | | | | 1.687 |
| 1769 | Dec | | | | 16.87 | 16.75 | 17 | 1.5 | 1.5 | 1.5 | | | | 1.687 |
| 1770 | Jan | 30.7 | 30 | 31 | 17.59 | 16.75 | 18 | 1.505 | 1.5 | 1.53 | | | | 1.759 |
| 1770 | Feb | 30 | 30 | 30 | 17.37 | 17.13 | 17.75 | | | | | | | 1.737 |
| 1770 | Mar | 30 | 30 | 30 | 16.88 | 16 | 17 | | | | | | | 1.688 |
| 1770 | Apr | | | | 16.96 | 16.75 | 17 | | | | | | | 1.696 |
| 1770 | May | 31.75 | 31.5 | 32 | 16.9 | 16.75 | 17 | | | | | | | 1.69 |
| 1770 | June | 31.12 | 31 | 31.5 | | | | | | | | | | |
| 1770 | July | 31 | 31 | 31 | 17.18 | 16.75 | 18 | | | | | | | 1.718 |
| 1770 | Aug | | | | 17.5 | 17.5 | 17.5 | | | | | | | 1.75 |
| 1770 | Sept | 34.5 | 34.5 | 34.5 | 17.37 | 17.25 | 17.5 | | | | | | | 1.737 |
| 1770 | Oct | 33.25 | 33.25 | 33.25 | 17.35 | 17.25 | 17.5 | | | | | | | 1.735 |
| 1770 | Nov | 33 | 33 | 33 | 17.37 | 17.25 | 17.5 | 1.655 | 1.65 | 1.66 | | | | 1.737 |
| 1770 | Dec | | | | 17.25 | 17.25 | 17.25 | 1.655 | 1.65 | 1.66 | | | | 1.725 |
| 1771 | Jan | 33.25 | 33.25 | 33.25 | 17.55 | 17.25 | 17.75 | 1.655 | 1.65 | 1.66 | | | | 1.852 |
| 1771 | Feb | 33.62 | 33.25 | 34 | 17.75 | 17.75 | 17.75 | | | | | | | 1.874 |
| 1771 | Mar | 33.56 | 33.5 | 34 | 17.42 | 17.25 | 17.5 | | | | | | | 1.838 |
| 1771 | Apr | 33.5 | 33.5 | 33.5 | 17.19 | 17 | 17.25 | | | | | | | 1.814 |
| 1771 | May | 32.5 | 32.5 | 32.5 | 16.5 | 16.5 | 16.5 | | | | | | | 1.742 |
| 1771 | June | 32.37 | 32 | 32.5 | 16.25 | 16 | 16.5 | | | | | | | 1.715 |
| 1771 | July | 33 | 33 | 33 | 16.44 | 16.25 | 16.63 | | | | | | | 1.735 |
| 1771 | Aug | 33 | 33 | 33 | 16.58 | 16.5 | 17.16 | | | | | | | 1.75 |
| 1771 | Sept | 32.87 | 32.5 | 33 | 16.47 | 16.25 | 16.5 | | | | | | | 1.738 |
| 1771 | Oct | 32.5 | 32.5 | 32.5 | 16.37 | 16.25 | 16.5 | | | | | | | 1.728 |
| 1771 | Nov | 33 | 33 | 33 | 16.75 | 16.75 | 16.75 | | | | | | | 1.768 |
| 1771 | Dec | 33.17 | 33 | 33.5 | 16.94 | 16.75 | 17.13 | | | | | | | 1.788 |
| 1772 | Jan | 33.25 | 33 | 33.5 | 17.06 | 17 | 17.13 | | | | | | | 1.801 |
| 1772 | Feb | 33.25 | 33 | 33.5 | | | | | | | | | | |
| 1772 | Mar | | | | | | | | | | | | | |
| 1772 | Apr | | | | 17.62 | 17.5 | 17.75 | | | | | | | 1.86 |
| 1772 | May | | | | 17.81 | 17.5 | 18 | | | | | | | 1.88 |
| 1772 | June | | | | 18 | 18 | 18 | | | | | | | 1.9 |

**Table A4.4 (cont.).** *Monthly exchange rates between Swedish currency units 1705–76.*

| Year | Month | 1 ducat in daler kopparmynt (par value 18 daler k.m.) | | | 1 riksdaler in daler kopparmynt (par value 9 daler k.m.) | | | 1 öre courant in öre silvermynt (par value 1 öre s.m.) | | | 1 carolin in öre silvermynt (par value 25 öre s.m.) | | | 1 daler s.m. in plates in daler s.m. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | |
| 1772 | July | 35 | 34.5 | 35.5 | 18.37 | 18 | 19 | | | | | | | 1.939 |
| 1772 | Aug | 35 | 34.5 | 35.5 | 19 | 19 | 19 | | | | | | | 2.006 |
| 1772 | Sept | 33.37 | 33 | 34.5 | 18.77 | 18.75 | 18.88 | | | | | | | 1.981 |
| 1772 | Oct | 34.37 | 33.5 | 34.5 | 18.72 | 18.63 | 18.75 | | | | | | | 1.976 |
| 1772 | Nov | 34.5 | 34.5 | 34.5 | 18.88 | 18.88 | 18.88 | 1.6 | 1.6 | 1.6 | | | | 1.992 |
| 1772 | Dec | 36.12 | 36 | 36.25 | 19.4 | 19.25 | 19.5 | | | | | | | 2.048 |
| 1773 | Jan | 36.12 | 36 | 36.25 | 19.44 | 19.38 | 19.5 | | | | | | | 2.052 |
| 1773 | Feb | 36.12 | 36 | 36.25 | 19.44 | 19.38 | 19.5 | | | | | | | 2.052 |
| 1773 | Mar | 39.5 | 39 | 40 | 20.71 | 20 | 21.5 | | | | | | | 2.186 |
| 1773 | Apr | 39.25 | 39 | 40 | 20.57 | 19.75 | 21.5 | | | | | | | 2.171 |
| 1773 | May | | | | 20.87 | 20.75 | 21 | | | | | | | 2.203 |
| 1773 | June | 39.42 | 39 | 39.75 | 21 | 21 | 21 | | | | | | | 2.217 |
| 1773 | July | 39.94 | 39.5 | 40 | 20.73 | 20.5 | 20.88 | | | | | | | 2.188 |
| 1773 | Aug | 39.85 | 39 | 40 | 20.51 | 20.25 | 20.63 | | | | | | | 2.165 |
| 1773 | Sept | 39.31 | 39 | 40 | 20.31 | 20.25 | 20.38 | | | | | | | 2.144 |
| 1773 | Oct | 39.87 | 39 | 40 | 20.75 | 20.31 | 21 | | | | | | | 2.191 |
| 1773 | Nov | 40 | 40 | 40 | 21.06 | 21 | 21.13 | 1.986 | 1.973 | 2 | | | | 2.223 |
| 1773 | Dec | 40 | 40 | 40 | 21.13 | 21.13 | 21.13 | 1.986 | 1.973 | 2 | | | | 2.23 |
| 1774 | Jan | 39.87 | 39.5 | 40 | 21.44 | 21.25 | 21.5 | 1.986 | 1.973 | 2 | | | | 2.263 |
| 1774 | Feb | 39.75 | 39.5 | 40 | 21.31 | 21.25 | 21.5 | 1.986 | 1.973 | 2 | | | | 2.25 |
| 1774 | Mar | 39.75 | 39.5 | 40 | 21.25 | 21.25 | 21.25 | 1.986 | 1.973 | 2 | | | | 2.123 |
| 1774 | Apr | 39.75 | 39.5 | 40 | 20.41 | 20.38 | 20.5 | 1.986 | 1.973 | 2 | | | | 1.965 |
| 1774 | May | 39.15 | 39 | 39.5 | 19.75 | 19.5 | 20.25 | 1.986 | 1.973 | 2 | | | | 1.902 |
| 1774 | June | 39 | 39 | 39 | 19.5 | 19.5 | 19.5 | 1.986 | 1.973 | 2 | | | | 1.878 |
| 1774 | July | 38.75 | 38.5 | 39 | 19.31 | 19.25 | 19.5 | 1.986 | 1.973 | 2 | | | | 1.86 |
| 1774 | Aug | 36.75 | 36.5 | 37 | | | | 1.986 | 1.973 | 2 | | | | |
| 1774 | Sept | 36.56 | 36.5 | 37 | 18.5 | 18.5 | 18.5 | 1.986 | 1.973 | 2 | | | | 1.781 |
| 1774 | Oct | 36.22 | 36 | 36.5 | 18.5 | 18.5 | 18.5 | 1.986 | 1.973 | 2 | | | | 1.781 |
| 1774 | Nov | 36.12 | 36 | 36.25 | 18.5 | 18.5 | 18.5 | 1.986 | 1.973 | 2 | | | | 1.781 |
| 1774 | Dec | 36.12 | 36 | 36.25 | 18.75 | 18.75 | 18.75 | 1.986 | 1.973 | 2 | | | | 1.806 |
| 1775 | Jan | 36.12 | 36 | 36.25 | 18.75 | 18.75 | 18.75 | 1.986 | 1.973 | 2 | | | | 1.806 |
| 1775 | Feb | 36.5 | 36.5 | 36.5 | | | | 1.986 | 1.973 | 2 | | | | |
| 1775 | Mar | 36.5 | 36.5 | 36.5 | | | | 1.986 | 1.973 | 2 | | | | |
| 1775 | Apr | 36.5 | 36.5 | 36.5 | | | | 1.993 | 1.973 | 2 | | | | |
| 1775 | May | 35.25 | 35.25 | 35.25 | 17.88 | 17.88 | 17.88 | 2 | 2 | 2 | | | | |
| 1775 | June | 35.75 | 35.75 | 35.75 | 17.88 | 17.88 | 17.88 | 2 | 2 | 2 | | | | |
| 1775 | July | | | | 17.88 | 17.88 | 17.88 | 2 | 2 | 2 | | | | |

**Table A4.4 (cont.).** *Monthly exchange rates between Swedish currency units 1705–76.*

| Year | Month | 1 ducat in daler kopparmynt (par value 18 daler k.m.) | | | 1 riksdaler in daler kopparmynt (par value 9 daler k.m.) | | | 1 öre courant in öre silvermynt (par value 1 öre s.m.) | | | 1 carolin in öre silvermynt (par value 25 öre s.m.) | | | 1 daler s.m. in plates in daler s.m. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | Average | Lowest | Highest | |
| 1775 | Aug | 36 | 36 | 36 | 18 | 18 | 18 | 2 | 2 | 2 | | | | 1.667 |
| 1775 | Sept | 35.83 | 35.5 | 36 | 17.83 | 17.5 | 18 | 2 | 2 | 2 | | | | 1.651 |
| 1775 | Oct | 35.5 | 35.5 | 35.5 | 17.5 | 17.5 | 17.5 | 2 | 2 | 2 | | | | 1.62 |
| 1775 | Nov | 35.5 | 35.5 | 35.5 | 17.5 | 17.5 | 17.5 | 2 | 2 | 2 | | | | 1.62 |
| 1775 | Dec | 35.5 | 35.5 | 35.5 | 17.5 | 17.5 | 17.5 | 2 | 2 | 2 | | | | 1.62 |
| 1776 | Jan | 35.5 | 35.5 | 35.5 | 17.5 | 17.5 | 17.5 | 2 | 2 | 2 | | | | 1.62 |
| 1776 | Feb | 35.5 | 35.5 | 35.5 | 17.59 | 17.5 | 18 | 2 | 2 | 2 | | | | 1.629 |
| 1776 | Mar | 35.5 | 35.5 | 35.5 | 17.87 | 17.75 | 18 | | | | | | | 1.655 |
| 1776 | Apr | 35.45 | 35.25 | 35.5 | 17.89 | 17.75 | 18 | | | | | | | 1.656 |
| 1776 | May | 35.25 | 35.25 | 35.25 | 17.94 | 17.88 | 18 | | | | | | | 1.661 |
| 1776 | June | 35.25 | 35.25 | 35.25 | 18 | 18 | 18 | | | | | | | 1.617 |
| 1776 | July | 35.25 | 35.25 | 35.25 | 18 | 18 | 18 | 1.833 | 1.833 | 1.833 | | | | 1.617 |
| 1776 | Aug | 35.25 | 35.25 | 35.25 | 18 | 18 | 18 | 1.833 | 1.833 | 1.833 | | | | 1.617 |
| 1776 | Sept | 35.25 | 35.25 | 35.25 | 18 | 18 | 18 | 1.833 | 1.833 | 1.833 | | | | 1.617 |
| 1776 | Oct | 35.25 | 35.25 | 35.25 | 18 | 18 | 18 | 1.833 | 1.833 | 1.833 | | | | 1.617 |
| 1776 | Nov | 35.25 | 35.25 | 35.25 | 18 | 18 | 18 | 1.833 | 1.833 | 1.833 | | | | 1.617 |
| 1776 | Dec | 35.25 | 35.25 | 35.25 | 18 | 18 | 18 | 1.833 | 1.833 | 1.833 | | | | |

Sources: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv) and Stockholms stads priscourant (Kungliga biblioteket, Stockholms stadsarkiv and Wahrendorff-ska arkivet). The monthly average is calculated as geometric.

**Table A4.5.** *The premium (agio) on banco notes (in per cent) relative to riksgälds notes in 1789–1803 according to various sources.*

| Year | Noted premium (agio): | | | | Premium based on foreign exchange rate quotations | | | | Price differences | This study** |
|---|---|---|---|---|---|---|---|---|---|---|
| | Wallroth (1918, p. 149) | Mårtensson (1958, pp. 20-25) | Ahlström (1972, p. 133) | Ss, O:1, f. 364–5 | Ahlström (1972, p. 134), on Hamburg | Ahlström (1972, p. 134), on 3 currencies* | Ss, O:1, f. 364–5, on Hamburg | Mårtensson (1958, p. 26), on Hamburg) | von Schwerin (1903, p. 43) | |
| 1789 | | | 1.5 | | | | 7.1 | | | 1.5 |
| 1790 | 6 | 5.5 | 8.8 | | | | 0.9 | | 8.3 | 7.9 |
| 1791 | 6 | 12.1 | 10.2 | | | | 4.9 | | 8.4 | 11.4 |
| 1792 | 10 | 10.1 | | | | | 3.4 | | 7.9 | 10.6 |
| 1793 | 14 | 11.4 | 12.1 | 12.5 | | | 5.5 | | 18.8 | 11.4 |
| 1794 | 22 | 21.1 | 21.1 | 16.5 | | | 8.6 | | 18.8 | 20.9 |
| 1795 | 10 | 11.6 | 11.8 | 14 | | | 11.6 | | 16.3 | 12.1 |
| 1796 | 10 | 10.3 | 10.3 | 10.5 | | | 10.9 | | 16.3 | 10.2 |
| 1797 | 14 | 11.4 | 10 | 10 | 4.4 | 4.8 | 2.9 | | 18.7 | 10.5 |
| 1798 | 23.5 | 20.9 | 20.3 | 18.5 | 10.2 | 10.8 | 30.1 | | 56.3 | 21.8 |
| 1799 | 50 | 44.0 | | | 41.8 | 41.1 | 45.8 | 46.1 | 56.1 | 41.8 |
| 1800 | 47 | 43.4 | | | 38.9 | 40.5 | 47.4 | 44.4 | 56.2 | 44.5 |
| 1801 | 48 | 55.2 | | | 44.9 | 46.8 | 42.9 | 56.0 | 58.3 | 49.1 |
| 1802 | 50 | 53.5 | | | 48.3 | 49.6 | 48.8 | 56.9 | 56.3 | 51.3 |
| 1803 | 50 | | | | 49.7 | 50.8 | 55.4 | | | 50.9 |

* Average of the premiums calculated according to exchange rate quotations on Hamburg, London and Amsterdam.

** See Table A4.6.

Abbreviation: Ss – Sandbergska samlingen (Riksarkivet).

**Table A4.6.** *Monthly premium (agio) on banco notes (in per cent) relative riksgälds notes 1789–1803.*

| Year | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec | Annual geometric average** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1789 | | | | | | | 1.2 | 1.8 | | | | | 1.5 |
| 1790 | 7.3 | 6.3 | 4.0 | 5.9 | 6.0 | 5.8 | 6.6 | 9.9 | 8.5 | 11.5 | 11.7 | 12.0 | 7.9 |
| 1791 | 11.5 | 10.9 | 11.0 | 11.1 | 11.1 | 12.7 | 11.6 | 12.2 | 12.6 | 11.2 | 10.6 | 10.2 | 11.4 |
| 1792 | 10.5 | 10.5 | 10.5 | 10.5 | 10.3 | 10.6 | 10.5 | 10.5 | 10.6 | 10.5 | 10.8 | 10.7 | 10.6 |
| 1793 | 10.7 | 11.2 | 11.3 | 11.4 | 11.6 | 11.0 | 11.2 | 12.2 | 11.2 | 11.7 | 11.4 | 12.8 | 11.4 |
| 1794 | 14.9 | 21.3 | 19.8 | 21.0 | 22.0 | 21.8 | 22.2 | 22.6 | 22.7 | 22.1 | 22.1 | 19.1 | 20.9 |
| 1795 | 17.1 | 17.1 | 16.2 | 13.3 | 11.6 | 10.2 | 10.2 | 10.1 | 10.1 | 10.0 | 10.1 | 10.1 | 12.1 |
| 1796 | 10.0 | 10.3 | 10.0 | 10.6 | 10.7 | 10.4 | 10.2 | 10.2 | 10.3 | 10.2 | 10.1 | 10.2 | 10.2 |
| 1797 | 10.0 | 10.1 | 10.1 | 10.0 | 10.3 | 10.6 | 10.5 | 10.9 | 10.7 | 11.2 | 10.3 | 12.0 | 10.5 |
| 1798 | 12.0 | 17.8 | 17.7 | 19.3 | 20.9 | 19.1 | 19.7 | 23.9 | 23.8 | 26.7 | 26.6 | 36.4 | 21.8 |
| 1799 | 36.6 | 35.7 | 33.5 | 32.6 | 39.2 | 40.9 | 44.5 | 44.0 | 44.8 | 45.8 | 55.0 | 51.3 | 41.8 |
| 1800 | 57.3 | 61.5 | 46.9 | 42.0 | 42.0 | 38.1 | 39.1 | 38.3 | 42.6 | 43.0 | 43.5 | 41.9 | 44.5 |
| 1801 | 40.3 | 53.0 | 46.0 | 50.4 | 43.5 | 42.2 | 46.7 | 50.7 | 52.6 | 54.4 | 56.1 | 54.3 | 49.1 |
| 1802 | 49.5 | 47.5 | 47.4 | 53.2 | 50.8 | 52.8 | 52.5 | 51.7 | 52.3 | 51.6 | 54.3 | 52.7 | 51.3 |
| 1803 | 50.4 | 51.2 | 50.1 | 51.0 | 51.8 | 54.4 | 52.3 | 49.5 | 50* | 50* | 50* | 50* | 50.9 |

Sources: See footnote 167.

* The premium was fixed at 50 per cent as of 29th August 1803.

** See footnote 7.

**Table A4.7.** *Riksdaler in marks 1534–1776.*

| Year | Source | Official rate | Market rate | Lowest | Highest |
|---|---|---|---|---|---|
| 1534 | Based on silver contents of daler and mark | | 3.169 | | |
| 1535 | Ss, O:1, f. 70 and 1784. | | 3.688 | 3.375 | 4 |
| 1536 | Ss, O:1, f. 72, and OO, f. 35 | | 3.5 | 3 | 4 |
| 1537 | Median of previous and next year | | 3.25 | | |
| 1538 | Hallenberg (1798, p. 139) | | 3 | | |
| 1539 | Median of previous and next year | | 3.5 | | |
| 1540 | Ss, O:1, f. 84 | | 4 | | |
| 1541 | Ss, O:1, f. 74 and 1783, and OO, f. 173. | | 3.5 | 3 | 4 |
| 1542 | Ss, O:1, f. 1774, and OO, f. 173. | | 3 | | |
| 1543 | Ss, O:1, f. 78, and OO, f. 173. | | 3 | | |
| 1544 | Median of previous and next year | | 3.5 | | |
| 1545 | Ss, O:1, f. 81, 83 and 1783, and OO, f. 170 | | 4 | 3.5 | 4.125 |
| 1546 | Ss, O:1, f. 83 and 1783, and OO, f. 170 | | 4 | | |
| 1547 | Heckscher (1935, pp. 211–2), *Sst 1544–48* (1936, p. 266) | | 4 | 4 | 4.25 |
| 1548 | Ss, O:1, f. 84 and 1783, *Sst 1544–48* (1936, p. 266) | 3.375 | 4 | | |
| 1549 | Ss, O:1, f. 85; RAs ämnessamlingar, Misc. 26 Myntväsen vol 4 | | 4.125 | 4 | 4.25 |
| 1550 | Heckscher (1935, pp. 211–2), Ss, O:1, f. 87 and 1783, Hallenberg (1798, p. 284), Forssell (1872, p. 87). | 3.5 | 3.875 | 3.5 | 4.5 |
| 1551 | Heckscher (1935, pp. 211–2) | | 3.5 | | |
| 1552 | Median of previous and next year | | 3.5 | | |
| 1553 | Heckscher (1935, pp. 211–2), Ss, O:1, f. 89, 90 and 1783 | | 3.5 | | |
| 1554 | Heckscher (1935, pp. 211–2) | | 4 | | |
| 1555 | Heckscher (1935, pp. 211–2), *Vsat 1577–1610* (1952, p. 70) | | 3.5 | | |
| 1556 | Ss, O:1, f. 93 and 1783 | | 3.5 | | |
| 1557 | Heckscher (1935, pp. 211–2), Ss, O:1, f. 94–96, 98 and 1783, Hallenberg (1798, p. 313) | | 3.5 | 3 | 3.75 |
| 1558 | Heckscher (1935, pp. 211–2), Hallenberg (1798, p. 313) | | 3.625 | 3.5 | 3.75 |
| 1559 | Heckscher (1935, pp. 211–2), Ss, O:1, f. 99 and 1783, and OO 734, Hallenberg (1798, p. 313) | | 3.750 | 3.5 | 3.75 |
| 1560 | Ss, O:1, f. 100, 1774 and 1783, and OO, f. 176, Hallenberg (1798, pp. 313–4) | | 3.750 | 3.5 | 4 |
| 1561 | Hallenberg (1798, p. 314), Ss, OO, f. 743 | | 4 | | |
| 1562 | Hallenberg (1798, p. 314) | | 4 | | |
| 1563 | Riksarkivets ämnessamlingar. Misc. 26 Myntväsen vol 4 | | 4.5 | | |
| 1564 | Ss, O:1, f. 100 and 102, and OO, f. 40 | | 5 | 4 | 6.5 |
| 1565 | Based on silver contents | | 6.187 | | |
| 1566 | Based on silver contents. See also Wallroth (1918, pp. 28–9) | | 6.187 | | |
| 1567 | Wallroth (1918, pp. 28–9), Ss, O:1 , f. 102, 107 and 1783 | | 6.5 | 5 | 8 |
| 1568 | Wallroth (1918, pp. 28–9), 7 marks in Ss, O:1, f. 102 | | 7.5 | 7 | 8 |

**Table A4.7 (cont.).** *Riksdaler in marks 1534–1776.*

| Year | Source | Official rate | Market rate | Lowest | Highest |
|---|---|---|---|---|---|
| 1569 | Ss, O:1 , f. 107, and OO, f. 42 | | 9 | 8 | 10 |
| 1570 | Ss, O:1 , f. 107 | | 10 | | |
| 1571 | Odén (1955, pp. 237 and 256), Ss, O:1, f. 104 and 107, and OO, f. 42 | | 13.250 | 10 | 20 |
| 1572 | Odén (1955, p. 237), and Ss, OO, f. 50 | | 20 | 8 | 25 |
| 1573 | Odén (1955, pp. 237–8), Ss, O:1 , f. 108 and 109 | | 26 | 24 | 28.375 |
| 1574 | Odén (1955, p. 238) | | 32 | | |
| 1575 | Odén (1955, p. 240), Ss, O:1 , f. 110 and 111, *Sst 1568–75* (1941, pp. 378, 544 and 615) | | 28 | 26 | 32 |
| 1576 | Odén (1955, p. 241), *Sst 1568–75* (1941, pp. 378, 544 and 615) | 4 | 26* (4**) | | |
| 1577 | Odén (1955, p. 241) | 4 | 4.250 | | |
| 1578 | Ss, O:1 , f. 119 | 4 | 4.460 | | |
| 1579 | Odén (1955, p. 241) | 4 | 4.250 | | |
| 1580 | Odén (1955, p. 241), Ss, O:1 , f. 126 and 1833 | 4 | 4.250 | | |
| 1581 | Odén (1955, p. 241) and Ss, O:1 , f. 1833 | 4 | 4.250 | | |
| 1582 | Odén (1955, p. 245) | 4 | 4.250 | | |
| 1583 | Odén (1955, p. 241) | 4 | 4.250 | | |
| 1584 | Odén (1955, p. 241) | 4 | 4.250 | | |
| 1585 | Odén (1955, p. 241) | 4 | 4.250 | | |
| 1586 | Ss, O:1 , f. 128 and 129 | 4 | 4.5 | | |
| 1587 | Odén (1960, p. 207), *Vsat 1577–1610* (1952, p. 127) | 4 | 4.5 | | |
| 1588 | Odén (1960, p. 207), *Vsat 1577–1610* (1952, p. 133) | 4 | 4.5 | | |
| 1589 | Ss, O:1 , f. 130 | 4 | 4.5 | | |
| 1590 | Median of previous and next year | 4 | 4.65 | | |
| 1591 | Odén (1960, p. 210) | 4 | 4.8 | | |
| 1592 | *Sst från år 1592* (1939, part I, 1592–95, pp. 8, 25 and 51) | 4 | 15.75 | 10.125 | 18 |
| 1593 | Wallroth (1918, pp. 24 and 50) | 4.5 | 18* (4.5**) | | |
| 1594 | Ss, O:1 , f. 137 | 4.5 | 4.5 | | |
| 1595 | Odén (1960, p. 210) | 4.5 | 4.444 | | |
| 1596 | *Sst från år 1592* (1954, part II, 1596–99, p. 90). | 4.5 | 4.5 | | |
| 1597 | *Sst från år 1592* (1963, vol. VI, 1605–08, p. 14) | 4.5 | 4.5 | | |
| 1598 | *Sst från år 1592* (1954, vol. II, 1596–99, p. 216) | 4.5 | 4.5 | | |
| 1599 | Ss, O:1 , f. 1860 | 4.5 | 4.480 | | |
| 1600 | Wallroth (1918, p. 50) | 4.5 | 4.5 | | |
| 1601 | Ss, OO , f. 185, *Sst från år 1592* (1957, part II, 1601–02, p. 149) | 4.5 | 4.6875 | 4.5 | 4.875 |
| 1602 | Ss, O:1 , f. 142 | 4.5 | 4.5 | | |
| 1603 | Wallroth (1918, p. 50 | 4.5 | 4.5 | | |
| 1604 | Ss, O:1 , f. 145 and 147, and OO, f. 593 | 4.5 | 4.550 | 4.5 | 4.75 |

**Table A4.7 (cont.).** *Riksdaler in marks 1534–1776.*

| Year | Source | Official rate (mark koppar-mynt after 1624) | Market rate (mark koppar-mynt after 1624) | Lowest | Highest |
|---|---|---|---|---|---|
| 1605 | Ss, O:1 , f. 145 and 148 | 4.5 | 4.5 | | |
| 1606 | Ss, O:1 , f. 161 assumes 1 slagen daler = 4.5 as late as 1610 | 4.5 | 4.5 | | |
| 1607 | Ss, O:1 , f. 161 assumes 1 slagen daler = 4.5 as late as 1610. 1607 års myntplacat 13th of April 1 rdr = 4 1/2 mark according to Ss, O:1 , f. 1434. | 4.5 | 4.5 | | |
| 1608 | *Sst från år 1592* (1963, vol. VI, 1605–08, p. 302) | 4.5 | 5.250 | | |
| 1609 | Interpolation. | 4.5 | 5.250 | | |
| 1610 | Interpolation. | 4.5 | 5.250 | | |
| 1611 | Ss, O:1 , f. 162, and OO, f. 186 | 4.5 | 6 | | |
| 1612 | Ss, O:1 , f. 164, and OO, f. 595 | 4.5 | 6 | | |
| 1613 | Stierndstedt (1863, p. 12) | 4.5 | 7 | | |
| 1614 | Ss, O:1 , f. 169, and OO, f. 595 | 4.5 | 6.250 | 6 | 6.5 |
| 1615 | Ss, O:1 , f. 171 and 1434 | 4.5 | 6.5 | | |
| 1616 | Ss, O:1 , f. 172 | 4.5 | 6.5 | | |
| 1617 | Ss, O:1 , f. 173 | 4.5 | 6.375 | 6.25 | 6.5 |
| 1618 | Ss, O:1 , f. 174 and 175 | 4.5 | 6.625 | 6.5 | 6.75 |
| 1619 | Wallroth (1918, p. 61) and Ss, O:1 , f. 1434 | 4.5 (6.5) | 6.5 | | |
| 1620 | Ss, O:1 , f. 182 | 6.5 | 6.5 | | |
| 1621 | Ss, O:1 , f. 1466, and OO, f. 595 | 6.5 | 6.5 | | |
| 1622 | Ss, O:1 , f. 189 | 6.5 | 6.583 | | |
| 1623 | Ss, O:1 , f. 599 | 6.5 | 6.5 | | |
| 1624 | Wolontis (1936, p. 68) | 6.5 | 6.5 | | |
| 1625 | Ss, O:1 , f. 197 | 6.5 | 6.667 | | |
| 1626 | Wolontis (1936, p. 66) | 6.5 | 7 | | |
| 1627 | Swenne (1933, p. 195) | 6.5 | 7 | | |
| 1628 | Swenne (1933, p. 196), Stiernstedt (1863, p. 97) | 6.5 | 9.5 | | |
| 1629 | Swenne (1933, p. 196) | 6.5 | 14.5 | | |
| 1630 | Swenne (1933, p. 196) | 6.5 | 15.750 | | |
| 1631 | Swenne (1933, p. 196) | 6.5 | 16.240 | 15.5 | 17 |
| 1632 | Swenne (1933, p. 196) | 6.5 | 15.132 | 14 | 16.5 |

**Table A4.7 (cont.).** *Riksdaler in marks 1534-1776.*

| Year | Source | Official rate, mark koppar-mynt | Market rate, mark koppar-mynt | Lowest | Highest |
|---|---|---|---|---|---|
| 1633 | Swenne (1933, p. 196) | 6.5 (12) | 14.491 | 12 | 17.5 |
| 1634 | Swenne (1933, p. 196) | 12 | 12.961 | 12 | 14 |
| 1635 | Swenne (1933, p. 196) | 12 | 13.565 | 12 | 16 |
| 1636 | Swenne (1933, p. 196) | 12 | 13 | | |
| 1637 | Swenne (1933, p. 196) | 12 | 13.491 | 13 | 14 |
| 1638 | Swenne (1933, p. 196), *Vendels sockens dombok 1615–1645* (1925, p. 138) | 12 | 13 | | |
| 1639 | Swenne (1933, p. 196), Ss, OO, f. 612 | 12 | 14.5 | 14 | 15 |
| 1640 | Wolontis (1936) | 12 | 15 | 15 | 15 |
| 1641 | Wolontis (1936) | 12 | 15 | 15 | 15 |
| 1642 | Wolontis (1936) | 12 | 15 | 15 | 15 |
| 1643 | Wolontis (1936) | 12 (15) | 15 | 15 | 15 |
| 1644 | Wolontis (1936) | 15 | 15.021 | 15 | 15.25 |
| 1645 | Wolontis (1936) | 15 | 16 | 16 | 16 |
| 1646 | Wolontis (1936) | 15 | 15.789 | 15 | 16 |
| 1647 | Wolontis (1936) | 15 | 15.041 | 15 | 15.5 |
| 1648 | Wolontis (1936) | 15 | 15.575 | 15 | 16 |
| 1649 | Wolontis (1936) | 15 | 16 | 16 | 16 |
| 1650 | Wolontis (1936) | 15 | 16 | 16 | 16 |
| 1651 | Wolontis (1936) | 15 | 16 | 16 | 16 |
| 1652 | Wolontis (1936) | 15 | 16 | 16 | 16 |
| 1653 | Wolontis (1936) | 15 | 16 | 16 | 16 |
| 1654 | Wolontis (1936) | 15 | 16 | 16 | 16 |
| 1655 | Wolontis (1936) | 15 | 16.301 | 16 | 16.75 |
| 1656 | Wolontis (1936) | 15 | 16.562 | 16.5 | 16.625 |
| 1657 | Wolontis (1936) | 15 | 16.695 | 16 | 17 |
| 1658 | Wolontis (1936) | 15 | 17.031 | 17 | 17.25 |
| 1659 | Wolontis (1936) | 15 | 17.457 | 17.125 | 17.75 |
| 1660 | Wolontis (1936) | 15 | 17.726 | 17.25 | 18 |
| 1661 | Wolontis (1936) | 15 | 18.187 | 18 | 18.25 |
| 1662 | Wolontis (1936) | 15 | 18.25 | 18.25 | 18.25 |
| 1663 | Wolontis (1936) | 15 | 18.56 | 18.25 | 19 |
| 1664 | Wolontis (1936) | 15 | 19.907 | 19 | 21 |
| 1665 | Wolontis (1936) | 15 (19.5) | 21.207 | 21 | 21.75 |
| 1666 | Wolontis (1936) | 19.5 | 21 | 21 | 21 |
| 1667 | Wolontis (1936) | 19.5 | 21 | 21 | 21 |
| 1668 | Wolontis (1936) | 19.5 | 21.047 | 21 | 21.25 |
| 1669 | Wolontis (1936) | 19.5 | 21.031 | 21 | 21.25 |
| 1670 | Wolontis (1936) | 19.5 | 21 | 21 | 21 |

**Table A4.7 (cont.).** *Riksdaler in marks 1534-1776.*

| Year | Source | Official rate, mark koppar-mynt | Market rate, mark koppar-mynt | Lowest | Highest |
|---|---|---|---|---|---|
| 1671 | Wolontis (1936) | 19.5 | 21 | 21 | 21 |
| 1672 | Wolontis (1936) | 19.5 | 21 | 21 | 21 |
| 1673 | Wolontis (1936) | 19.5 | 21.068 | 21 | 21.3125 |
| 1674 | Wolontis (1936) | 19.5 | 21.533 | 21 | 22 |
| 1675 | Wolontis (1936) | 19.5 | 23.398 | 22 | 26.375 |
| 1676 | Wolontis (1936) | 19.5 | 24.978 | 24 | 26 |
| 1677 | Wolontis (1936) | 19.5 | 26.164 | 25.75 | 26.75 |
| 1678 | Wolontis (1936) | 19.5 | 26.833 | 26.75 | 27 |
| 1679 | Wolontis (1936) | 19.5 | 27 | 27 | 27 |
| 1680 | Wolontis (1936) | 19.5 | 27.135 | 27 | 27.27 |
| 1681 | Wolontis (1936) | 19.5 (24) | 24.884 | 22.56 | 27.27 |
| 1682 | Wolontis (1936) | 24 | 24.979 | 24.75 | 25 |
| 1683 | Wolontis (1936) | 24 | 25.14 | 25 | 25.4375 |
| 1684 | Wolontis (1936) | 24 | 25 | 25 | 25 |
| 1685 | Wolontis (1936) | 24 | 25.062 | 25 | 25.06242 |
| 1686 | Wolontis (1936) | 24 | 24.241 | 24 | 25.125 |
| 1687 | Wolontis (1936, p. 174) | 24 | 25.25 | | |
| 1688 | Wolontis (1936, p. 174) | 24 | 25.25 | | |
| 1689 | Wolontis (1936, p. 174) | 24 | 25.25 | | |
| 1690 | Wolontis (1936, p. 174) | 24 | 25.25 | | |
| 1691 | Ss, O:1 , f. 328 | 24 | 24.749 | 24.5 | 25 |
| 1692 | Ss, O:1 , f. 329 | 24 | 25 | | |
| 1693 | Ss, O:1 , f. 1780 | 24 | 24.75 | | |
| 1694 | Ss, O:1 , f. 1780 | 24 | 25 | | |
| 1695 | Ss, OO , f. 653 | 24 | 25 | | |
| 1696 | Based on Hamburger banco | 24 | 27.016 | | |
| 1697 | Ss, O:1 , f. 335 | 24 | 27.187 | 27 | 27.375 |
| 1698 | Based on Hamburger banco | 24 | 26.535 | | |
| 1699 | Based on Hamburger banco | 24 | 24.864 | | |
| 1700 | Based on Hamburger banco | 24 | 25.747 | | |
| 1701 | Based on Hamburger banco | 24 | 24.989 | | |
| 1702 | Based on Hamburger banco | 24 | 24.611 | | |
| 1703 | Based on Hamburger banco | 24 | 26.463 | | |
| 1704 | Based on silver contents | 24 | 26.244 | | |
| 1705 | Riksbankens arkiv | 24 | 26.186 | 26 | 26.25 |
| 1706 | Riksbankens arkiv | 24 | 26.259 | 26 | 26.5 |
| 1707 | Riksbankens arkiv | 24 | 26.146 | 26 | 26.25 |
| 1708 | Ss, O:1 , f. 335 | 24 | 26.25 | | |
| 1709 | Based on silver contents | 24 | 26.244 | | |

**Table A4.7 (cont.).** *Riksdaler in marks 1534-1776.*

| Year | Source | Official rate, mark koppar-mynt | Market rate, mark koppar-mynt | Lowest | Highest |
|---|---|---|---|---|---|
| 1710 | Based on silver contents | 24 | 26.244 | | |
| 1711 | Ss, O:1 , f. 344 | 24 | 26 | | |
| 1712 | Based on silver contents | 24 | 26.244 | | |
| 1713 | Based on silver contents | 24 | 26.244 | | |
| 1714 | Based on Hamburger banco | 24 | 25.723 | | |
| 1715 | Ss, O:1 , f. 345 | 24 | 25 | | |
| 1716 | Ss, O:1 , f. 347 | 24 | 27.56* (26**) | | |
| 1717 | Interpolation, based on Hamburger banco | 24 | 38.386* (34.273**) | | |
| 1718 | Interpolation, based on Hamburger banco | 24 (36) | 60.371* (52.625**) | | |
| 1719 | Interpolation, based on Hamburger banco | 36 | 41.405 | | |
| 1720 | Ss, O:1 , f. 580 and 1251 | 36 | 40.314 | 39 | 42 |
| 1721 | Interpolation | 36 | 37.775 | | |
| 1722 | Interpolation | 36 | 38.103 | | |
| 1723 | Interpolation | 36 | 36.576 | | |
| 1724 | Interpolation | 36 | 36.44 | | |
| 1725 | Sjöstrand (1908, p. 17) | 36 | 34 | | |
| 1726 | Interpolation | 36 | 34.712 | | |
| 1727 | Interpolation | 36 | 35.696 | | |
| 1728 | Riksbankens arkiv | 36 | 36 | | |
| 1729 | Riksbankens arkiv | 36 | 36 | | |
| 1730 | Interpolation | 36 | 36 | | |
| 1731 | Interpolation | 36 | 36 | | |
| 1732 | Interpolation | 36 | 36 | | |
| 1733 | Riksbankens arkiv | 36 | 36 | 36 | 36 |
| 1734 | Riksbankens arkiv | 36 | 36.634 | 36.5 | 37 |
| 1735 | Sjöstrand (1908, p. 17) | 36 | 36.75 | | |
| 1736 | Riksbankens arkiv | 36 | 37.614 | 37.5 | 38 |
| 1737 | Interpolation | 36 | 37.234 | | |
| 1738 | Sjöstrand (1908, p. 48) | 36 | 37.25 | | |
| 1739 | Interpolation | 36 | 37.161 | | |
| 1740 | Sveriges Riksbank (1931) | 36 | 37.779 | 37.5 | 38 |
| 1741 | Sveriges Riksbank (1931) | 36 | 38.02 | 37.5 | 38.5 |
| 1742 | Sveriges Riksbank (1931) | 36 | 38.456 | 38 | 39 |
| 1743 | Sveriges Riksbank (1931) | 36 | 40.025 | 38 | 42 |
| 1744 | Sveriges Riksbank (1931) | 36 | 41.531 | 41 | 42 |

**Table A4.7 (cont.).** *Riksdaler in marks 1534-1776.*

| Year | Source | Official rate, mark koppar-mynt | Market rate, mark koppar-mynt | Lowest | Highest |
|---|---|---|---|---|---|
| 1745 | Sveriges Riksbank (1931) | 36 | 40.949 | 40 | 43 |
| 1746 | Sveriges Riksbank (1931) | 36 | 40 | 40 | 40 |
| 1747 | Sveriges Riksbank (1931) | 36 | 44.384 | 40 | 47 |
| 1748 | Sveriges Riksbank (1931) | 36 | 46.258 | 46 | 47 |
| 1749 | Sveriges Riksbank (1931) | 36 | 46.497 | 46 | 47 |
| 1750 | Sveriges Riksbank (1931) | 36 | 45.389 | 42 | 47 |
| 1751 | Sveriges Riksbank (1931) | 36 | 41.55 | 40 | 44 |
| 1752 | Sveriges Riksbank (1931) | 36 | 41.643 | 40 | 45 |
| 1753 | Sveriges Riksbank (1931) | 36 | 40.411 | 40 | 42 |
| 1754 | Sveriges Riksbank (1931) | 36 | 40.795 | 39 | 44 |
| 1755 | Sveriges Riksbank (1931) | 36 | 40.759 | 38 | 43 |
| 1756 | Sveriges Riksbank (1931) | 36 | 42.97 | 42 | 44 |
| 1757 | Sveriges Riksbank (1931) | 36 | 44.572 | 42 | 47 |
| 1758 | Sveriges Riksbank (1931) | 36 | 52.618 | 49 | 56 |
| 1759 | Sveriges Riksbank (1931) | 36 | 56.754 | 52 | 61 |
| 1760 | Sveriges Riksbank (1931) | 36 | 64.067 | 61 | 68 |
| 1761 | Sveriges Riksbank (1931) | 36 | 71.654 | 70 | 74 |
| 1762 | Sveriges Riksbank (1931) | 36 | 84.994 | 74 | 108 |
| 1763 | Sveriges Riksbank (1931) | 36 | 87.701 | 76 | 100 |
| 1764 | Sveriges Riksbank (1931) | 36 | 91.702 | 88 | 96 |
| 1765 | Sveriges Riksbank (1931) | 36 | 87.461 | 72 | 92 |
| 1766 | Sveriges Riksbank (1931) | 36 | 76.417 | 68 | 86 |
| 1767 | Sveriges Riksbank (1931) | 36 | 59.894 | 47 | 69 |
| 1768 | *Stockholms stads priscouranter* | 36 | 50.172 | 48 | 56 |
| 1769 | *Stockholms stads priscouranter* | 36 | 60.692 | 54 | 68.5 |
| 1770 | *Stockholms stads priscouranter* | 36 | 68.916 | 64 | 72 |
| 1771 | *Stockholms stads priscouranter* | 36 | 67.371 | 64 | 71 |
| 1772 | *Stockholms stads priscouranter* | 36 | 72.614 | 68 | 78 |
| 1773 | *Stockholms stads priscouranter* | 36 | 82.143 | 77.5 | 86 |
| 1774 | *Stockholms stads priscouranter* | 36 | 78.584 | 74 | 86 |
| 1775 | *Stockholms stads priscouranter* | 36 | 72.478 | 70 | 75 |
| 1776 | *Stockholms stads priscouranter* | 36 | 71.594 | 70 | 75 |
| 1777 | According to the mint reform of 1776 | 72 | 72 | | |

*In debased coins (coin tokens 1716–18)

** In proper coins

For abbreviations, see section 'Abbreviations'.

**Table A4.8.** *The exchange rate of the ducat 1652–1776.*

| Year | Source | 1 ducat in mark kop-parmynt, market rate | 1 ducat in riksdaler specie, market rate | 1 ducat in riksdaler specie, official rate | Gold-silver (value) ratio, Sweden | Gold-silver (value) ratio, 'world'* |
|---|---|---|---|---|---|---|
| 1652 | Ss, O:1 , f. 562 | 32 | 2 | | 14.867 | 14.41 |
| 1653 | Ss, OO , f. 628 | 32 | 2 | | 14.867 | 14.44 |
| 1654 | Ss, O:1 , f. 563 | 32 | 2 | | 15.12 | 14.39 |
| 1655 | Interpolation | 32.601 | 2 | | 15.12 | 14.44 |
| 1656 | Interpolation | 33.125 | 2 | | 15.12 | 14.42 |
| 1657 | Interpolation | 33.391 | 2 | | 15.12 | 14.42 |
| 1658 | Interpolation | 34.062 | 2 | | 15.12 | 14.37 |
| 1659 | Interpolation | 34.914 | 2 | | 15.12 | 14.33 |
| 1660 | Interpolation | 35.452 | 2 | | 15.12 | 14.33 |
| 1661 | Ss, O:1 , f. 255 and 566 | 39.846 | 2.191 | | 16.563 | 14.52 |
| 1662 | Ss, O:1 , f. 258 and 259 | 36.125 | 1.979 | | 14.965 | 14.53 |
| 1663 | Ss, O:1 , f. 1724 | 37.12 | 2 | | 15.12 | 14.40 |
| 1664 | Ss, O:1 , f. 262 | 39.815 | 2 | | 15.12 | 14.44 |
| 1665 | Interpolation | 40.782 | 1.923 | 1.923 | 14.31 | 14.49 |
| 1666 | Interpolation | 40.385 | 1.923 | 1.923 | 14.31 | 14.80 |
| 1667 | Hegardt (1975, p. 226) | 40.8 | 1.943 | 1.923 | 14.457 | 14.85 |
| 1668 | Interpolation | 40.474 | 1.923 | 1.923 | 14.31 | 14.90 |
| 1669 | Ss, O:1 , f. 286 | 42 | 1.997 | 1.923 | 14.86 | 14.98 |
| 1670 | Ss, O:1 , f. 570 | 42 | 2 | 1.923 | 14.882 | 15.09 |
| 1671 | Interpolation | 42 | 2 | 1.923 | 14.882 | 15.24 |
| 1672 | Ss, OO , f. 659 | 42 | 2 | 1.923 | 14.882 | 15.30 |
| 1673 | Ss, O:1 , f. 280 | 42.135 | 2 | 1.923 | 14.882 | 15.27 |
| 1674 | Ss, O:1 , f. 295 and 298 | 44.43 | 2.063 | 1.923 | 15.353 | 15.16 |
| 1675 | Interpolation | 46.795 | 2 | 1.923 | 14.882 | 15.15 |
| 1676 | Interpolation | 49.956 | 2 | 1.923 | 14.882 | 15.20 |
| 1677 | Ss, O:1 , f. 295 | 52 | 1.987 | 1.923 | 14.788 | 15.20 |
| 1678 | Ss, O:1 , f. 295 | 52 | 1.938 | 1.923 | 14.42 | 15.08 |
| 1679 | Ss, O:1 , f. 663 and 310 | 54 | 2 | 1.923 | 14.882 | 15.09 |
| 1680 | Ss, O:1 , f. 1910 | 54.269 | 2 | 1.923 | 14.882 | 15.08 |
| 1681 | Ss, O:1 , f. 315 | 49.5 | 1.989 | 1.923 (2) | 14.801 | 15.02 |
| 1682 | Interpolation | 49.968 | 2 | 2 | 14.885 | 15.16 |
| 1683 | Ss, O:1 , f. 577 | 52 | 2.068 | 2 | 15.391 | 15.12 |
| 1684 | Ss, O:1 , f. 322 | 52 | 2.08 | 2 | 15.477 | 15.06 |
| 1685 | Ss, O:1 , f. 322 | 48 | 1.915 | 2 | 14.251 | 15.02 |
| 1686 | Wolontis (1936, p. 167 | 48.81 | 2.014 | 2 | 14.983 | 15.14 |
| 1687 | Ss, O:1 , f. 322 and 578 | 46.989 | 1.861 | 2 | 13.847 | 14.94 |
| 1688 | Interpolation | 50.5 | 2 | 2 | 14.882 | 14.94 |
| 1689 | Interpolation | 50.5 | 2 | 2 | 14.882 | 15.02 |

**Table A4.8 (cont.).** *The exchange rate of the ducat 1652–1776.*

| Year | Source | 1 ducat in mark kop-parmynt, market rate | 1 ducat in riksdaler specie, market rate | 1 ducat in riksdaler specie, official rate | Gold-silver (value) ratio, Sweden | Gold-silver (value) ratio, 'world'* |
|---|---|---|---|---|---|---|
| 1690 | Interpolation | 50.5 | 2 | 2 | 14.882 | 15.02 |
| 1691 | Interpolation | 49.497 | 2 | 2 | 14.882 | 14.98 |
| 1692 | Interpolation | 50 | 2 | 2 | 14.882 | 14.92 |
| 1693 | Ss, O:1 , f. 330 | 52 | 2.101 | 2 | 15.633 | 14.83 |
| 1694 | Interpolation | 50 | 2 | 2 | 14.882 | 14.87 |
| 1695 | Interpolation | 50 | 2 | 2 | 14.882 | 15.02 |
| 1696 | Interpolation | 54.033 | 2 | 2 | 14.882 | 15.00 |
| 1697 | Ss, O:1 , f. 335 | 55.759 | 2.061 | 2 | 15.333 | 15.20 |
| 1698 | Interpolation | 53.07 | 2 | 2 | 14.882 | 15.07 |
| 1699 | Interpolation | 49.728 | 2 | 2 | 14.882 | 14.94 |
| 1700 | Ss, O:1 , f. 1922 | 54 | 2.097 | 2 | 15.606 | 14.81 |
| 1701 | Interpolation | 49.978 | 2 | 2 | 14.882 | 15.07 |
| 1702 | Interpolation | 49.223 | 2 | 2 | 14.882 | 15.52 |
| 1703 | Interpolation | 52.927 | 2 | 2 | 14.882 | 15.17 |
| 1704 | Interpolation | 52.488 | 2 | 2 | 14.882 | 15.22 |
| 1705 | Riksbankens arkiv. | 53.791 | 2.054 | 2 | 15.285 | 15.11 |
| 1706 | Riksbankens arkiv. | 54.502 | 2.076 | 2 | 15.444 | 15.27 |
| 1707 | Riksbankens arkiv. | 54.082 | 2.068 | 2 | 15.392 | 15.44 |
| 1708 | Ss, O:1 , f. 335 | 55.749 | 2.124 | 2 | 15.803 | 15.41 |
| 1709 | Interpolation based world gold-silver ratio | 53.998 | 2.058 | 2 | 15.31 | 15.31 |
| 1710 | Ss, OO , f. 677 | 60 | 2.286 | 2 | 17.012 | 15.22 |
| 1711 | Ss, O:1 , f. 344 | 56.25 | 2.163 | 2 | 16.098 | 15.29 |
| 1712 | Interpolation based world gold-silver ratio | 53.998 | 2.058 | 2 | 15.31 | 15.31 |
| 1713 | Interpolation based world gold-silver ratio | 53.751 | 2.048 | 2 | 15.24 | 15.24 |
| 1714 | Interpolation based world gold-silver ratio | 52.304 | 2.033 | 2 | 15.13 | 15.13 |
| 1715 | Interpolation based world gold-silver ratio | 50.766 | 2.031 | 2 | 15.11 | 15.11 |
| 1716 | Interpolation based world gold-silver ratio | 55.891** (52.727***) | 2.028 | 2 | 15.09 | 15.09 |
| 1717 | Ss, O:1 , f. 350 | 76.772** (68.547***) | 2 | 2 | 14.882 | 15.13 |
| 1718 | Stiernstedt (1863, p. 270) | 122.82** (107.06***) | 2.034 | 2 | 15.138 | 15.11 |
| 1719 | Interpolation based world gold-silver ratio | 82.585 | 1.995 | 2 | 15.09 | 15.09 |
| 1720 | Stiernstedt (1863, p. 580) and Ss, O:1 , f. 580 | 80.628 | 2 | 2 | 15.131 | 15.04 |

**Table A4.8 (cont.).** *The exchange rate of the ducat 1652–1776.*

| Year | Source | 1 ducat in mark kop-parmynt, market rate | 1 ducat in riksdaler specie, market rate | 1 ducat in riksdaler specie, official rate | Gold-silver (value) ratio, Sweden | Gold-silver (value) ratio, 'world'* |
|---|---|---|---|---|---|---|
| 1721 | Interpolation based world gold-silver ratio | 75.145 | 1.989 | 2 | 15.05 | 15.05 |
| 1722 | Interpolation based world gold-silver ratio | 76.401 | 2.005 | 2 | 15.17 | 15.17 |
| 1723 | Interpolation based world gold-silver ratio | 73.484 | 2.009 | 2 | 15.2 | 15.20 |
| 1724 | Interpolation based world gold-silver ratio | 72.881 | 2 | 2 | 15.11 | 15.11 |
| 1725 | Interpolation based world gold-silver ratio | 68 | 2 | 2 | 15.11 | 15.11 |
| 1726 | Interpolation based world gold-silver ratio | 69.424 | 2 | 2 | 15.15 | 15.15 |
| 1727 | Interpolation based world gold-silver ratio | 71.392 | 2 | 2 | 15.24 | 15.24 |
| 1728 | Riksbankens arkiv | 74 | 2.056 | 2 | 15.552 | 15.11 |
| 1729 | Riksbankens arkiv | 73.125 | 2.031 | 2 | 15.368 | 14.92 |
| 1730 | Interpolation based world gold-silver ratio | 72 | 2 | 2 | 14.81 | 14.81 |
| 1731 | Interpolation based world gold-silver ratio | 72 | 2 | 2 | 14.94 | 14.94 |
| 1732 | Interpolation based world gold-silver ratio | 72 | 2 | 2 | 15.09 | 15.09 |
| 1733 | Riksbankens arkiv | 72.069 | 2.002 | 2 | 15.146 | 15.18 |
| 1734 | Riksbankens arkiv | 72.706 | 1.985 | 2 | 15.015 | 15.39 |
| 1735 | Interpolation based world gold-silver ratio | 74.854 | 2.037 | 2 | 15.41 | 15.41 |
| 1736 | Riksbankens arkiv | 75.181 | 1.999 | 2 | 15.122 | 15.18 |
| 1737 | Interpolation based world gold-silver ratio | 73.92 | 1.985 | 2 | 15.02 | 15.02 |
| 1738 | Interpolation based world gold-silver ratio | 73.411 | 1.971 | 2 | 14.91 | 14.91 |
| 1739 | Interpolation based world gold-silver ratio | 73.723 | 1.971 | 2 | 14.91 | 14.91 |
| 1740 | Sveriges Riksbank (1931) | 74.613 | 1.975 | 2 | 14.942 | 14.94 |
| 1741 | Sveriges Riksbank (1931) | 75.645 | 1.99 | 2 | 15.053 | 14.92 |
| 1742 | Sveriges Riksbank (1931) | 79.331 | 2.063 | 2 | 15.607 | 14.85 |
| 1743 | Sveriges Riksbank (1931) | 80.852 | 2.02 | 2 | 15.283 | 14.85 |
| 1744 | Sveriges Riksbank (1931) | 84.27 | 2.029 | 2 | 15.351 | 14.87 |
| 1745 | Sveriges Riksbank (1931) | 82.297 | 2.01 | 2 | 15.205 | 14.98 |
| 1746 | Sveriges Riksbank (1931) | 80 | 2 | 2 | 15.131 | 15.13 |
| 1747 | Sveriges Riksbank (1931) | 87.912 | 1.975 | 2 | 14.939 | 15.26 |
| 1748 | Sveriges Riksbank (1931) | 90.931 | 1.966 | 2 | 14.872 | 15.11 |
| 1749 | Sveriges Riksbank (1931) | 90.286 | 1.942 | 2 | 14.69 | 14.80 |

**Table A4.8 (cont.).** *The exchange rate of the ducat 1652–1776.*

| Year | Source | 1 ducat in mark kop-parmynt, market rate | 1 ducat in riksdaler specie, market rate | 1 ducat in riksdaler specie, official rate | Gold-silver (value) ratio, Sweden | Gold-silver (value) ratio, 'world'* |
|---|---|---|---|---|---|---|
| 1750 | Sveriges Riksbank (1931) | 84.057 | 1.852 | 2 | 14.011 | 14.55 |
| 1751 | Sveriges Riksbank (1931) | 79.164 | 1.905 | 2 | 14.415 | 14.39 |
| 1752 | Sveriges Riksbank (1931) | 77.562 | 1.863 | 2 | 14.091 | 14.54 |
| 1753 | Sveriges Riksbank (1931) | 76.975 | 1.905 | 2 | 14.411 | 14.54 |
| 1754 | Sveriges Riksbank (1931) | 78.032 | 1.913 | 2 | 14.471 | 14.48 |
| 1755 | Sveriges Riksbank (1931) | 78.669 | 1.93 | 2 | 14.602 | 14.68 |
| 1756 | Sveriges Riksbank (1931) | 81.675 | 1.901 | 2 | 14.38 | 14.94 |
| 1757 | Sveriges Riksbank (1931) | 90.742 | 2.036 | 2 | 15.402 | 14.87 |
| 1758 | Sveriges Riksbank (1931) | 104.73 | 1.99 | 2 | 15.059 | 14.85 |
| 1759 | Sveriges Riksbank (1931) | 106.18 | 1.871 | 2 | 14.155 | 14.15 |
| 1760 | Sveriges Riksbank (1931) | 120.69 | 1.884 | 2 | 14.252 | 14.14 |
| 1761 | Sveriges Riksbank (1931) | 142.2 | 1.985 | 2 | 15.014 | 14.54 |
| 1762 | Sveriges Riksbank (1931) | 167.41 | 1.97 | 2 | 14.902 | 15.27 |
| 1763 | Sveriges Riksbank (1931) | 170.1 | 1.94 | 2 | 14.674 | 14.99 |
| 1764 | Sveriges Riksbank (1931) | 176.38 | 1.923 | 2 | 14.551 | 14.70 |
| 1765 | Sveriges Riksbank (1931) | 177.79 | 2.033 | 2 | 15.379 | 14.83 |
| 1766 | Sveriges Riksbank (1931) | 152.99 | 2.002 | 2 | 15.147 | 14.80 |
| 1767 | Sveriges Riksbank (1931) | 120.32 | 2.009 | 2 | 15.198 | 14.85 |
| 1768 | Stockholms stads pris-courant | 95.94 | 1.912 | 2 | 14.467 | 14.80 |
| 1769 | Stockholms stads pris-courant | 114.13 | 1.881 | 2 | 14.227 | 14.72 |
| 1770 | Stockholms stads pris-courant | 127.22 | 1.846 | 2 | 13.966 | 14.62 |
| 1771 | Stockholms stads pris-courant | 132.11 | 1.961 | 2 | 14.836 | 14.66 |
| 1772 | Stockholms stads pris-courant | 137.55 | 1.894 | 2 | 14.332 | 14.52 |
| 1773 | Stockholms stads pris-courant | 156.14 | 1.901 | 2 | 14.381 | 14.62 |
| 1774 | Stockholms stads pris-courant | 152.47 | 1.94 | 2 | 14.679 | 14.62 |
| 1775 | Stockholms stads pris-courant | 143.6 | 1.981 | 2 | 14.99 | 14.72 |
| 1776 | Stockholms stads pris-courant | 141.32 | 1.974 | 2 | 14.933 | 14.55 |

* Average of England, France, Kraków, Luzern and Austria in 1652–86. Hamburg in 1687–1776.

Source: 'MEMDB - Medieval and Early Modern Data Bank'.

** In coin tokens

*** In proper coins

Ss – Sandbergska samlingen.

**Table A4.9.** *The exchange rate of carolins 1624–1777.*

| Year | Source | Daler carolin in daler koppar-mynt, market rate | Daler carolin in daler koppar-mynt, official rate | Riks-daler in half carolins (marks), market rate | Riks-daler in half carolins (marks), official rate |
|---|---|---|---|---|---|
| 1624 | Wallroth (1918) | 1 | 1 | 6.5 | 6.5 |
| 1625 | Ss, O:1 , f. 197 | 1 | 1 | 6.667 | 6.5 |
| 1626 | Wallroth (1918) | 1.077 | 1 | 6.5 | 6.5 |
| 1627 | Wallroth (1918) | 1.077 | 1 | 6.5 | 6.5 |
| 1628 | Wolontis (1936, p. 94), Stiernstedt (1863, p. 97) | 1.462 | 1 | 6.5 | 6.5 |
| 1629 | Wolontis (1936, p. 94), Swenne (1933, p. 189) | 2.071 | 1 | 7 | 6.5 |
| 1630 | Wolontis (1936, p. 94) | 2.1 | 1 | 7.5 | 6.5 |
| 1631 | Wolontis (1936, p. 94) | 2.165 | 1 | 7.5 | 6.5 |
| 1632 | Wolontis (1936, p. 94) | 2.018 | 1 | 7.5 | 6.5 |
| 1633 | Swenne (1933, pp. 189-190) | 2.07* (1.811**) | 1 (2) | 7* (8**) | 6.5 (6) |
| 1634 | Swenne (1933, pp. 189–90) | 2* (1.949**) | 2 | 6.481* (6.65**) | 6 |
| 1635 | Swenne (1933, pp. 189–90) | 2* (1.809**) | 2 | 6.782* (7.5**) | 6 |
| 1636 | Swenne (1933, p. 190) | 2 | 2 | 6.5 | 6 |
| 1637 | Swenne (1933, p. 190) | 2 | 2 | 6.745 | 6 |
| 1638 | Swenne (1933, p. 190) | 2 | 2 | 6.5 | 6 |
| 1639 | Swenne (1933, p. 190), Ss, OO, f. 612 | 2 | 2 | 7.25 | 6 |
| 1640 | Interpolation | 2.105 | 2 | 7.125 | 6 |
| 1641 | Wolontis (1936, p. 102) | 2.143 | 2 | 7 | 6 |
| 1642 | Interpolation | 2.308 | 2 | 6.5 | 6 |
| 1643 | Wolontis (1936, p. 102) | 2.5 | 2 (2.5) | 6 | 6 |
| 1644 | Interpolation | 2.5 | 2.5 | 6.008 | 6 |
| 1645 | Interpolation | 2.5 | 2.5 | 6.4 | 6 |
| 1646 | Interpolation | 2.5 | 2.5 | 6.316 | 6 |
| 1647 | Interpolation | 2.5 | 2.5 | 6.016 | 6 |
| 1648 | Interpolation | 2.5 | 2.5 | 6.23 | 6 |
| 1649 | Swenne (1933, p. 190) | 2.5 | 2.5 | 6.4 | 6 |
| 1650 | Interpolation | 2.5 | 2.5 | 6.4 | 6 |
| 1651 | Swenne (1933, p. 190) | 2.5 | 2.5 | 6.4 | 6 |
| 1652 | Interpolation | 2.5 | 2.5 | 6.4 | 6 |
| 1653 | Interpolation | 2.5 | 2.5 | 6.4 | 6 |
| 1654 | Interpolation | 2.5 | 2.5 | 6.4 | 6 |
| 1655 | Interpolation | 2.547 | 2.5 | 6.4 | 6 |
| 1656 | Interpolation | 2.588 | 2.5 | 6.4 | 6 |
| 1657 | Interpolation | 2.609 | 2.5 | 6.4 | 6 |
| 1658 | Interpolation | 2.661 | 2.5 | 6.4 | 6 |

**Table A4.9 (cont.).** *The exchange rate of carolins 1624–1777.*

| Year | Source | Daler carolin in daler koppar-mynt, market rate | Daler carolin in daler koppar-mynt, official rate | Riks-daler in half carolins (marks), market rate | Riks-daler in half carolins (marks), official rate |
|---|---|---|---|---|---|
| 1659 | Interpolation | 2.728 | 2.5 | 6.4 | 6 |
| 1660 | Interpolation | 2.77 | 2.5 | 6.4 | 6 |
| 1661 | Interpolation | 2.842 | 2.5 | 6.4 | 6 |
| 1662 | Ss, O:1 , f. 262 | 2.875 | 2.5 | 6.348 | 6 |
| 1663 | Interpolation | 2.855 | 2.5 | 6.5 | 6 |
| 1664 | Wolontis (1936, p. 144) | 3.063 | 2.5 | 6.5 | 6 |
| 1665 | Wolontis (1936, p. 144) | 3.138 | 2.5 (3) | 6.757 | 6 (6.5) |
| 1666 | Wolontis (1936, p. 144) | 3.108 | 3 | 6.757 | 6.5 |
| 1667 | Wolontis (1936, p. 144) | 3.108 | 3 | 6.757 | 6.5 |
| 1668 | Wolontis (1936, p. 144) | 3.115 | 3 | 6.757 | 6.5 |
| 1669 | Ss, O:1 , f. 286 | 3.112 | 3 | 6.757 | 6.5 |
| 1670 | Wolontis (1936) | 3.167 | 3 | 6.632 | 6.5 |
| 1671 | Wolontis (1936) | 3.167 | 3 | 6.632 | 6.5 |
| 1672 | Wolontis (1936) | 3.167 | 3 | 6.632 | 6.5 |
| 1673 | Wolontis (1936) | 3.167 | 3 | 6.653 | 6.5 |
| 1674 | Wolontis (1936) | 3.244 | 3 | 6.638 | 6.5 |
| 1675 | Wolontis (1936) | 3.431 | 3 | 6.819 | 6.5 |
| 1676 | Wolontis (1936) | 3.572 | 3 | 6.993 | 6.5 |
| 1677 | Wolontis (1936) | 3.701 | 3 | 7.069 | 6.5 |
| 1678 | Wolontis (1936) | 3.842 | 3 | 6.984 | 6.5 |
| 1679 | Wolontis (1936) | 3.833 | 3 | 7.043 | 6.5 |
| 1680 | Wolontis (1936) | 3.847 | 3 | 7.054 | 6.5 |
| 1681 | Wolontis (1936) | 3.583 | 3 (3.5) | 6.945 | 6.5 (6.857) |
| 1682 | Interpolation | 3.5 | 3.5 | 7.137 | 6.857 |
| 1683 | Interpolation | 3.6 | 3.5 | 6.983 | 6.857 |
| 1684 | Interpolation | 3.6 | 3.5 | 6.944 | 6.857 |
| 1685 | Interpolation | 3.667 | 3.5 | 6.835 | 6.857 |
| 1686 | Wolontis (1936) | 3.658 | 3.5 (3.75) | 6.626 | 6.857 (6.4) |
| 1687 | Interpolation | 3.75 | 3.75 | 6.733 | 6.4 |
| 1688 | Interpolation | 3.75 | 3.75 | 6.733 | 6.4 |
| 1689 | Ss, O:1 , f. 676 | 3.75 | 3.75 | 6.733 | 6.4 |
| 1690 | Ss, O:1 , f. 677 | 3.75 | 3.75 | 6.733 | 6.4 |
| 1691 | Ss, O:1 , f. 679 | 3.75 | 3.75 | 6.6 | 6.4 |
| 1692 | Interpolation | 3.75 | 3.75 | 6.667 | 6.4 |
| 1693 | Interpolation | 3.75 | 3.75 | 6.6 | 6.4 |

**Table A4.9 (cont.).** *The exchange rate of carolins 1624–1777.*

| Year | Source | Daler carolin in daler koppar-mynt, market rate | Daler carolin in daler koppar-mynt, official rate | Riks-daler in half carolins (marks), market rate | Riks-daler in half carolins (marks), official rate |
|---|---|---|---|---|---|
| 1694 | Interpolation | 3.75 | 3.75 | 6.667 | 6.4 |
| 1695 | Wolontis (1936, p. 176) | 3.75 | 3.75 | 6.667 | 6.4 |
| 1696 | Wolontis (1936, p. 176) | 3.75 | 3.75 | 7.204 | 6.4 |
| 1697 | Wolontis (1936, p. 176) | 3.75 | 3.75 | 7.216 | 6.4 |
| 1698 | Wolontis (1936, p. 176) | 3.75 | 3.75 | 7.076 | 6.4 |
| 1699 | Wolontis (1936, p. 176) | 3.75 | 3.75 | 6.63 | 6.4 |
| 1700 | Wolontis (1936, p. 176) | 3.75 | 3.75 | 6.866 | 6.4 |
| 1701 | Wolontis (1936, p. 176) | 3.75 | 3.75 | 6.664 | 6.4 |
| 1702 | Wolontis (1936, p. 176) | 3.75 | 3.75 | 6.563 | 6.4 |
| 1703 | Wolontis (1936, p. 176) | 3.75 | 3.75 | 7.057 | 6.4 |
| 1704 | Wolontis (1936, p. 176) | 3.75 | 3.75 | 6.998 | 6.4 |
| 1705 | Wolontis (1936, p. 176) | 3.75 | 3.75 | 6.983 | 6.4 |
| 1706 | Wolontis (1936, p. 176) | 3.75 | 3.75 | 7.002 | 6.4 |
| 1707 | Wolontis (1936, p. 176) | 3.75 | 3.75 | 6.972 | 6.4 |
| 1708 | Wolontis (1936, p. 176) | 3.75 | 3.75 | 7 | 6.4 |
| 1709 | Wolontis (1936, p. 176) | 3.75 | 3.75 | 6.998 | 6.4 |
| 1710 | Interpolation | 3.75 | 3.75 | 6.998 | 6.4 |
| 1711 | Interpolation | 3.75 | 3.75 | 6.933 | 6.4 |
| 1712 | Interpolation | 3.75 | 3.75 | 6.998 | 6.4 |
| 1713 | Ss, O:1 , f. 687 | 3.75 | 3.75 | 6.998 | 6.4 |
| 1714 | Interpolation | 3.75 | 3.75 | 6.859 | 6.4 |
| 1715 | Interpolation | 3.75 | 3.75 | 6.667 | 6.4 |
| 1716 | Interpolation | 4.969*** (4.6875 ****) | 4.6875 | 5.547 | 5.12 |
| 1717 | Interpolation | 5.25*** (4.6875 ****) | 4.6875 | 7.312 | 5.12 |
| 1718 | Not legal tender | | | | |
| 1719 | Interpolation | 5.457 | 4.6875 | 7.538 | 7.68 |
| 1720 | Interpolation | 5.348 | 4.6875 | 7.538 | 7.68 |
| 1721 | Interpolation | 4.978 | 4.6875 | 7.538 | 7.68 |
| 1722 | Interpolation | 5.021 | 4.6875 | 7.538 | 7.68 |
| 1723 | Interpolation | 4.82 | 4.6875 | 7.538 | 7.68 |
| 1724 | Interpolation | 4.802 | 4.6875 | 7.538 | 7.68 |
| 1725 | Interpolation | 4.511 | 4.6875 | 7.538 | 7.68 |
| 1726 | Interpolation | 4.575 | 4.6875 | 7.538 | 7.68 |

**Table A4.9 (cont.).** *The exchange rate of carolins 1624–1777.*

| Year | Source | Daler carolin in daler koppar-mynt, market rate | Daler carolin in daler koppar-mynt, official rate | Riks-daler in half carolins (marks), market rate | Riks-daler in half carolins (marks), official rate |
|---|---|---|---|---|---|
| 1727 | Interpolation | 4.704 | 4.6875 | 7.538 | 7.68 |
| 1728 | Ss, O:1 , f. 357 | 4.781 | 4.6875 | 7.529 | 7.68 |
| 1729 | Interpolation | 4.776 | 4.6875 | 7.538 | 7.68 |
| 1730 | Interpolation | 4.776 | 4.6875 | 7.538 | 7.68 |
| 1731 | Interpolation | 4.776 | 4.6875 | 7.538 | 7.68 |
| 1732 | Interpolation | 4.776 | 4.6875 | 7.538 | 7.68 |
| 1733 | Interpolation | 4.776 | 4.6875 | 7.538 | 7.68 |
| 1734 | Riksbankens arkiv | 4.854 | 4.6875 | 7.546 | 7.68 |
| 1735 | Interpolation | 4.996 | 4.6875 | 7.355 | 7.68 |
| 1736 | Riksbankens arkiv | 5.262 | 4.6875 | 7.149 | 7.68 |
| 1737 | Interpolation | 5.029 | 4.6875 | 7.355 | 7.68 |
| 1738 | Sjöstrand (1908, p. 48) | 4.781 | 4.6875 | 7.791 | 7.68 |
| 1739 | Interpolation | 5.052 | 4.6875 | 7.355 | 7.68 |
| 1740 | Stockholms stads priscourant | 5.122 | 4.6875 | 7.376 | 7.68 |
| 1741 | Stockholms stads priscourant | 5.154 | 4.6875 | 7.376 | 7.68 |
| 1742 | Stockholms stads priscourant | 5.257 | 4.6875 | 7.315 | 7.68 |
| 1743 | Stockholms stads priscourant | 5.541 | 4.6875 | 7.223 | 7.68 |
| 1744 | Stockholms stads priscourant | 5.649 | 4.6875 | 7.352 | 7.68 |
| 1745 | Stockholms stads priscourant | 5.713 | 4.6875 | 7.167 | 7.68 |
| 1746 | Stockholms stads priscourant | 5.806 | 4.6875 | 6.89 | 7.68 |
| 1747 | Stockholms stads priscourant | 6.018 | 4.6875 | 7.398 | 7.68 |
| 1748 | Stockholms stads priscourant | 6.065 | 4.6875 | 7.627 | 7.68 |
| 1749 | Stockholms stads priscourant | 6.167 | 4.6875 | 7.539 | 7.68 |
| 1750 | Stockholms stads priscourant | 6.193 | 4.6875 | 7.329 | 7.68 |
| 1751 | Stockholms stads priscourant | 6.123 | 4.6875 | 6.786 | 7.68 |
| 1752 | Stockholms stads priscourant | 5.931 | 4.6875 | 7.022 | 7.68 |
| 1753 | Stockholms stads priscourant | 5.564 | 4.6875 | 7.263 | 7.68 |
| 1754 | Stockholms stads priscourant | 5.601 | 4.6875 | 7.284 | 7.68 |
| 1755 | Stockholms stads priscourant | 5.624 | 4.6875 | 7.248 | 7.68 |
| 1756 | Stockholms stads priscourant | 5.774 | 4.6875 | 7.442 | 7.68 |
| 1757 | Stockholms stads priscourant | 6.045 | 4.6875 | 7.374 | 7.68 |
| 1758 | Stockholms stads priscourant | 6.757 | 4.6875 | 7.787 | 7.68 |
| 1759 | Stockholms stads priscourant | 7.262 | 4.6875 | 7.815 | 7.68 |
| 1760 | Stockholms stads priscourant | 8.433 | 4.6875 | 7.597 | 7.68 |
| 1761 | Stockholms stads priscourant | 9.336 | 4.6875 | 7.675 | 7.68 |
| 1762 | Stockholms stads priscourant | 9.744 | 4.6875 | 8.722 | 7.68 |

**Table A4.9 (cont.).** *The exchange rate of carolins 1624–1777.*

| Year | Source | Daler carolin in daler koppar-mynt, market rate | Daler carolin in daler koppar-mynt, official rate | Riks-daler in half carolins (marks), market rate | Riks-daler in half carolins (marks), official rate |
|---|---|---|---|---|---|
| 1763 | Stockholms stads priscourant | 10.529 | 4.6875 | 8.33 | 7.68 |
| 1764 | Stockholms stads priscourant | 10.313 | 4.6875 | 8.892 | 7.68 |
| 1765 | Stockholms stads priscourant | 10.313 | 4.6875 | 8.481 | 7.68 |
| 1766 | Interpolation | 9.516 | 4.6875 | 8.031 | 7.68 |
| 1767 | Interpolation | 7.380 | 4.6875 | 8.116 | 7.68 |
| 1768 | Stockholms stads priscourant | 5.858 | 4.6875 | 8.565 | 7.68 |
| 1769 | Stockholms stads priscourant | 6.581 | 4.6875 | 9.222 | 7.68 |
| 1770 | Interpolation | 8.066 | 4.6875 | 8.544 | 7.68 |
| 1771 | Interpolation | 8.000 | 4.6875 | 8.421 | 7.68 |
| 1772 | Interpolation | 8.336 | 4.6875 | 8.711 | 7.68 |
| 1773 | Interpolation | 9.753 | 4.6875 | 8.423 | 7.68 |
| 1774 | Interpolation | 9.662 | 4.6875 | 8.133 | 7.68 |
| 1775 | Interpolation | 9.302 | 4.6875 | 7.792 | 7.68 |
| 1776 | Interpolation | 8.957 | 4.6875 | 7.993 | 7.68 |
| 1777 | According to the mint reform of 1776 | 9.375 | 9.375 | 7.68 | 7.68 |

* In marks minted from 1633 onwards

** In marks minted before 1633

*** In coin tokens

**** In proper coins

Ss – Sandbergska samlingen.

**Table A4.10.** *The exchange rate of öre courant ('vitt mynt') 1624–1777.*

| Year | Source | Öre cou-rant ('vitt mynt') in öre kop-parmynt, market rate | Daler silver-mynt in daler koppar-mynt | Riksdaler in öre courant, market rate | Riksdaler in öre courant, official rate |
|---|---|---|---|---|---|
| 1624 | Wolontis (1936, p. 68) | 1 | 1 | 52 | 52 |
| 1625 | Ss, O:1 , f. 197 | 1 | 1 | 53.6 | 52 |
| 1626 | Interpolation | 1 | 1 | 56 | 52 |
| 1627 | Interpolation | 1 | 1 | 56 | 52 |
| 1628 | Swenne (1933, p. 193) | 1 | 1 | 76 | 52 |

**Table A4.10 (cont.).** *The exchange rate of öre courant ('vitt mynt') 1624–1777.*

| Year | Source | Öre courant ('vitt mynt') in öre kopparmynt, market rate | Daler silvermynt in daler kopparmynt | Riksdaler in öre courant, market rate | Riksdaler in öre courant, official rate |
|---|---|---|---|---|---|
| 1629 | Swenne (1933, p. 193) | 1.318 | 1 | 88 | 52 |
| 1630 | Swenne (1933, p. 193) | 1.428 | 1 | 88 | 52 |
| 1631 | Swenne (1933, p. 193) | 1.353 | 1 | 96 | 52 |
| 1632 | Swenne (1933, p. 193) | 1.681 | 1 | 72 | 52 |
| 1633 | Swenne (1933, p. 193) | 2.07* (1.61**) | 1 (2) | 56* (72**) | 52 (48) |
| 1634 | Swenne (1933, p. 193) | 2* (1.525**) | 2 | 51.8* (68**) | 48 |
| 1635 | Swenne (1933, p. 193) | 2* (1.428**) | 2 | 54.3* (76**) | 48 |
| 1636 | Interpolation | 2 | 2 | 52 | 48 |
| 1637 | Interpolation | 2 | 2 | 53.6 | 48 |
| 1638 | Interpolation | 2 | 2 | 52 | 48 |
| 1639 | Interpolation | 2 | 2 | 58 | 48 |
| 1640 | Interpolation | 2.105 | 2 | 57 | 48 |
| 1641 | Wolontis (1936, p. 102) | 2.143 | 2 | 56 | 48 |
| 1642 | Interpolation | 2.308 | 2 | 52 | 48 |
| 1643 | Wolontis (1936, p. 102) | 2.5 | 2 (2.5) | 48 | 48 |
| 1644 | Interpolation | 2.5 | 2.5 | 48 | 48 |
| 1645 | Interpolation | 2.5 | 2.5 | 51.2 | 48 |
| 1646 | Interpolation | 2.5 | 2.5 | 50.4 | 48 |
| 1647 | Interpolation | 2.5 | 2.5 | 48 | 48 |
| 1648 | Interpolation | 2.5 | 2.5 | 49.6 | 48 |
| 1649 | Interpolation | 2.5 | 2.5 | 51.2 | 48 |
| 1650 | Interpolation | 2.5 | 2.5 | 51.2 | 48 |
| 1651 | Interpolation | 2.5 | 2.5 | 51.2 | 48 |
| 1652 | Interpolation | 2.5 | 2.5 | 51.2 | 48 |
| 1653 | Interpolation | 2.5 | 2.5 | 51.2 | 48 |
| 1654 | Interpolation | 2.5 | 2.5 | 51.2 | 48 |
| 1655 | Interpolation | 2.51 | 2.5 | 52 | 48 |
| 1656 | Interpolation | 2.55 | 2.5 | 52 | 48 |
| 1657 | Interpolation | 2.571 | 2.5 | 52 | 48 |
| 1658 | Interpolation | 2.623 | 2.5 | 52 | 48 |
| 1659 | Interpolation | 2.688 | 2.5 | 52 | 48 |
| 1660 | Interpolation | 2.73 | 2.5 | 52 | 48 |
| 1661 | Interpolation | 2.801 | 2.5 | 52 | 48 |
| 1662 | Ss, O:1 , f. 262 | 2.833 | 2.5 | 51.2 | 48 |

**Table A4.10 (cont.).** *The exchange rate of öre courant ('vitt mynt') 1624–1777.*

| Year | Source | Öre courant ('vitt mynt') in öre kopparmynt, market rate | Daler silvermynt in daler kopparmynt | Riksdaler in öre courant, market rate | Riksdaler in öre courant, official rate |
|---|---|---|---|---|---|
| 1663 | Interpolation | 2.814 | 2.5 | 52.8 | 48 |
| 1664 | Wolontis (1936, p. 144) | 3 | 2.5 | 52.8 | 48 |
| 1665 | Wolontis (1936, p. 144) | 3 | 2.5 (3) | 56.8 | 48 (52) |
| 1666 | Wolontis (1936, p. 144) | 3 | 3 | 56 | 52 |
| 1667 | Wolontis (1936, p. 144) | 3 | 3 | 56 | 52 |
| 1668 | Wolontis (1936, p. 144) | 3 | 3 | 56.12 | 52 |
| 1669 | Wolontis (1936, p. 144) | 3 | 3 | 56.08 | 52 |
| 1670 | Wolontis (1936) | 3 | 3 | 56 | 52 |
| 1671 | Wolontis (1936) | 3 | 3 | 56 | 52 |
| 1672 | Wolontis (1936) | 3 | 3 | 56 | 52 |
| 1673 | Wolontis (1936) | 3 | 3 | 56.18 | 52 |
| 1674 | Wolontis (1936) | 3.027 | 3 | 56.91 | 52 |
| 1675 | Wolontis (1936) | 3.096 | 3 | 60.47 | 52 |
| 1676 | Wolontis (1936) | 3.28 | 3 | 60.93 | 52 |
| 1677 | Wolontis (1936) | 3.466 | 3 | 60.39 | 52 |
| 1678 | Wolontis (1936) | 3.518 | 3 | 61.03 | 52 |
| 1679 | Wolontis (1936) | 3.495 | 3 | 61.81 | 52 |
| 1680 | Wolontis (1936) | 3.388 | 3 | 64.08 | 52 |
| 1681 | Wolontis (1936) | 3.102 | 3 | 64.18 | 52 (64) |
| 1682 | Interpolation | 3.06 | 3 | 65.3 | 64 |
| 1683 | Interpolation | 3.06 | 3 | 65.73 | 64 |
| 1684 | Interpolation | 3.06 | 3 | 65.36 | 64 |
| 1685 | Interpolation | 3.06 | 3 | 65.52 | 64 |
| 1686 | Wolontis (1936) | 3.048 | 3 | 63.63 | 64 |
| 1687 | Interpolation | 3 | 3 | 67.33 | 64 |
| 1688 | Interpolation | 3 | 3 | 67.33 | 64 |
| 1689 | Interpolation | 3 | 3 | 67.33 | 64 |
| 1690 | Interpolation | 3 | 3 | 67.33 | 64 |
| 1691 | Interpolation | 3 | 3 | 66 | 64 |
| 1692 | Interpolation | 3 | 3 | 66.67 | 64 |
| 1693 | Interpolation | 3 | 3 | 66 | 64 |
| 1694 | Interpolation | 3 | 3 | 66.67 | 64 |
| 1695 | Interpolation | 3 | 3 | 66.67 | 64 |
| 1696 | Interpolation | 3 | 3 | 72.04 | 64 |
| 1697 | Interpolation | 3 | 3 | 72.16 | 64 |
| 1698 | Interpolation | 3 | 3 | 70.76 | 64 |

**Table A4.10 (cont.).** *The exchange rate of öre courant ('vitt mynt') 1624–1777.*

| Year | Source | Öre courant ('vitt mynt') in öre kopparmynt, market rate | Daler silvermynt in daler kopparmynt | Riksdaler in öre courant, market rate | Riksdaler in öre courant, official rate |
|---|---|---|---|---|---|
| 1699 | Interpolation | 3 | 3 | 66.3 | 64 |
| 1700 | Interpolation | 3 | 3 | 68.66 | 64 |
| 1701 | Interpolation | 3 | 3 | 66.64 | 64 |
| 1702 | Interpolation | 3 | 3 | 65.63 | 64 |
| 1703 | Interpolation | 3 | 3 | 70.57 | 64 |
| 1704 | Interpolation | 3 | 3 | 69.98 | 64 |
| 1705 | Interpolation | 3 | 3 | 69.83 | 64 |
| 1706 | Interpolation | 3 | 3 | 70.02 | 64 |
| 1707 | Interpolation | 3 | 3 | 69.72 | 64 |
| 1708 | Interpolation | 3 | 3 | 70 | 64 |
| 1709 | Interpolation | 3 | 3 | 69.98 | 64 |
| 1710 | Interpolation | 3 | 3 | 69.98 | 64 |
| 1711 | Interpolation | 3 | 3 | 69.33 | 64 |
| 1712 | Interpolation | 3 | 3 | 69.98 | 64 |
| 1713 | Interpolation | 3 | 3 | 69.98 | 64 |
| 1714 | Interpolation | 3 | 3 | 68.59 | 64 |
| 1715 | Interpolation | 3 | 3 | 66.67 | 64 |
| 1716 | Interpolation | 3.18*** (3****) | 3 | 73.49 | 64 |
| 1717 | Interpolation | 3.36*** (3****) | 3 | 102.4 | 64 |
| 1718 | Interpolation | 3.442*** (3****) | 3 | 161 | 64 |
| 1719 | Interpolation | 3 | 3 | 110.4 | 96 |
| 1720 | Interpolation | 3 | 3 | 107.5 | 96 |
| 1721 | Interpolation | 3 | 3 | 100.7 | 96 |
| 1722 | Interpolation | 3 | 3 | 101.6 | 96 |
| 1723 | Interpolation | 3 | 3 | 97.53 | 96 |
| 1724 | Interpolation | 3 | 3 | 97.17 | 96 |
| 1725 | Interpolation | 3 | 3 | 90.67 | 96 |
| 1726 | Interpolation | 3 | 3 | 92.57 | 96 |
| 1727 | Interpolation | 3 | 3 | 95.19 | 96 |
| 1728 | Interpolation | 3 | 3 | 96 | 96 |
| 1729 | Interpolation | 3 | 3 | 96 | 96 |
| 1730 | Interpolation | 3 | 3 | 96 | 96 |
| 1731 | Interpolation | 3 | 3 | 96 | 96 |
| 1732 | Interpolation | 3 | 3 | 96 | 96 |

**Table A4.10 (cont.).** *The exchange rate of öre courant ('vitt mynt') 1624–1777.*

| Year | Source | Öre courant ('vitt mynt') in öre kopparmynt, market rate | Daler silvermynt in daler kopparmynt | Riksdaler in öre courant, market rate | Riksdaler in öre courant, official rate |
|---|---|---|---|---|---|
| 1733 | Interpolation | 3 | 3 | 96 | 96 |
| 1734 | Riksbankens arkiv | 3.051 | 3 | 96.05 | 96 |
| 1735 | Interpolation | 3.043 | 3 | 96.62 | 96 |
| 1736 | Riksbankens arkiv | 3.096 | 3 | 97.19 | 96 |
| 1737 | Interpolation | 3.043 | 3 | 97.25 | 96 |
| 1738 | Interpolation | 3.064 | 3 | 97.25 | 96 |
| 1739 | Interpolation | 3.057 | 3 | 97.25 | 96 |
| 1740 | Stockholms stads priscourant | 3.106 | 3 | 97.32 | 96 |
| 1741 | Stockholms stads priscourant | 3.135 | 3 | 97.03 | 96 |
| 1742 | Stockholms stads priscourant | 3.191 | 3 | 96.41 | 96 |
| 1743 | Stockholms stads priscourant | 3.222 | 3 | 99.38 | 96 |
| 1744 | Stockholms stads priscourant | 3.305 | 3 | 100.5 | 96 |
| 1745 | Stockholms stads priscourant | 3.347 | 3 | 97.87 | 96 |
| 1746 | Stockholms stads priscourant | 3.418 | 3 | 93.63 | 96 |
| 1747 | Stockholms stads priscourant | 3.469 | 3 | 102.7 | 96 |
| 1748 | Stockholms stads priscourant | 3.518 | 3 | 105.2 | 96 |
| 1749 | Stockholms stads priscourant | 3.533 | 3 | 105.3 | 96 |
| 1750 | Stockholms stads priscourant | 3.449 | 3 | 105.3 | 96 |
| 1751 | Stockholms stads priscourant | 3.234 | 3 | 102.8 | 96 |
| 1752 | Stockholms stads priscourant | 3.199 | 3 | 104.1 | 96 |
| 1753 | Stockholms stads priscourant | 3.151 | 3 | 102.6 | 96 |
| 1754 | Stockholms stads priscourant | 3.159 | 3 | 103.3 | 96 |
| 1755 | Stockholms stads priscourant | 3.165 | 3 | 103 | 96 |
| 1756 | Stockholms stads priscourant | 3.187 | 3 | 107.9 | 96 |
| 1757 | Stockholms stads priscourant | 3.319 | 3 | 107.4 | 96 |
| 1758 | Stockholms stads priscourant | 3.814 | 3 | 110.4 | 96 |
| 1759 | Stockholms stads priscourant | 4.045 | 3 | 112.3 | 96 |
| 1760 | Stockholms stads priscourant | 4.47 | 3 | 114.7 | 96 |
| 1761 | Stockholms stads priscourant | 4.896 | 3 | 117.1 | 96 |
| 1762 | Stockholms stads priscourant | 5.623 | 3 | 120.9 | 96 |
| 1763 | Stockholms stads priscourant | 6.064 | 3 | 115.7 | 96 |
| 1764 | Stockholms stads priscourant | 6.216 | 3 | 118 | 96 |
| 1765 | Stockholms stads priscourant | 6.064 | 3 | 115.4 | 96 |
| 1766 | Stockholms stads priscourant | 5.944 | 3 | 102.9 | 96 |
| 1767 | Stockholms stads priscourant | 4.561 | 3 | 105.1 | 96 |
| 1768 | Stockholms stads priscourant | 3.608 | 3 | 111.2 | 96 |

**Table A4.10 (cont.).** *The exchange rate of öre courant ('vitt mynt') 1624–1777.*

| Year | Source | Öre courant ('vitt mynt') in öre kopparmynt, market rate | Daler silvermynt in daler kopparmynt | Riksdaler in öre courant, market rate | Riksdaler in öre courant, official rate |
|---|---|---|---|---|---|
| 1769 | Stockholms stads priscourant | 4.159 | 3 | 116.7 | 96 |
| 1770 | Ss, O:1 , f. 1263 and 1969 | 4.735 | 3 | 116.4 | 96 |
| 1771 | Stockholms stads priscourant | 4.765 | 3 | 118.7 | 96 |
| 1772 | Stockholms stads priscourant | 4.8 | 3 | 121 | 96 |
| 1773 | Stockholms stads priscourant | 5.808 | 3 | 113.1 | 96 |
| 1774 | Stockholms stads priscourant | 5.959 | 3 | 105.5 | 96 |
| 1775 | Stockholms stads priscourant | 5.988 | 3 | 96.83 | 96 |
| 1776 | Stockholms stads priscourant | 5.621 | 3 | 101.9 | 96 |
| 1777 | According to the mint reform of 1776 | 6 | 6 | 96 | 96 |

* In öre minted from 1633 onwards

** In öre minted before 1633

*** In coin tokens

**** In proper coins

Ss – Sandbergska samlingen.

## Abbreviations

d.k.m. – daler kopparmynt
d.s.m. – daler silvermynt
k.m. – kopparmynt
RA – Riksarkivet
RBA – Riksbankens arkiv
RD – riksdaler
rdr – riksdaler
s.m. – silvermynt
SEK – Swedish krona
Ss – Sanderbergska samlingen
Sst – Stockholms stads tänkeböcker
USD – US dollar
Vsät – Vadstena stads äldsta tänkeböcker

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# 5.
# Foreign exchange rates in Sweden 1658–1803[1]

**Rodney Edvinsson**

## 5.1. Introduction

This chapter deals with foreign exchange rates in Sweden in the period 1658–1803. Since Finland was part of Sweden up to 1808/9, Swedish currency was also current there. However, the primary data used in this study are from Stockholm and other towns in present-day Sweden.

In the 18th century, the most frequently quoted exchange rates in Sweden were on Amsterdam, Hamburg, London, Paris, Copenhagen, Gdańsk and Swedish Pomerania. Of these seven, the exchange rates on Hamburg and Amsterdam were the most frequent. At that time, all seven currencies were based in one way or another on precious metals, primarily silver, and the par relations between them were, therefore, largely determined by their intrinsic metal values.

A classic distinction is made between exchange of coins and exchange by bills.[2] The bill of exchange is a written order by the drawer to the drawee to pay money to the payee. Before the spread of paper currency, payments in international trade were often made in bills. While foreign exchange was, at least from the 17th century, mainly conducted in bills, exchange between domestic currencies was mostly conducted in actual coins.

Bills of exchange had different terms to maturity, from a few days (sight bills) up to more than 6 months. Nowadays, the spot exchange rate is usually calculated as the average of the buying and selling rates. For earlier times, the price of sight bills is often the only available source for the calculation of spot exchange rates. The price of

1 Some of the data presented in this chapter have been constructed in cooperation with Johan Söderberg, Martin Sutinen and Göran Hansson. For many insightful comments and suggestions, I want also to thank Göran Ahlström, Marc Flandreau, Klas Fregert, Jan T Klovland, Lars O Lagerqvist and Håkan Lobell.

2 McCusker (1978, p. 18).

bills with longer terms to maturity should be lower than the price of sight bills, and in theory the difference would be determined by the prevailing interest rate. In reality it is not as simple. The price of a sight bill does not necessarily equal the spot exchange rate, since it took time to transport the bill from one city to another and there was a grace period between the day when the bill was presented and the day when it was paid.[3] In Hamburg, the grace period could be up to 12 days.[4]

A bigger problem with historical exchange rates is that the sources do not always provide information on the durations of the bills of exchange.[5]

Several authors emphasise that bills of exchange were useful instruments for evading usury ceilings and hiding interest rates. By the 18th century, credit instruments had been developed that were based on exchange rate derivatives. A low bill price is tantamount to a high interest rate. Knowing the prices of bills of various terms to maturity enables one to calculate the short-term market interest rate, and knowing the interest rate enables one to calculate a theoretical spot exchange rate. According to Flandreau, Galimard, Jobst, and Marco, the interest rate calculated from bills of exchange on, for example, Amsterdam traded in London provides information on the interest rate in Amsterdam, not London, since it is Amsterdam money that is bought, not London money. Furthermore, they argue that such a shadow interest rate is somewhat higher than the actual rate, since it includes additional transaction costs because the foreign market is located further away than the domestic market.[6]

Several of the quoted foreign currencies have their origins in the German reichstaler. According to the Leipzig convention in 1566, the German reichstaler as a coin was to contain 1/9 of a Cologne mark of silver, or 25.98 grams of fine silver. The unit was adopted in other countries and was widely used across Europe, as riksdaler in Sweden, rigsdaler in Denmark and rijksdaalder in Holland. Sometimes the term rix-dollar is used as a common label for the various national coins.[7] In 1754 the Reichstaler was replaced by the Conventionsthaler, containing 1/10 of a Cologne mark of silver.

## 5.2. Current and bank money

Exchange rates on Amsterdam and Hamburg could be quoted in two different currencies, one being actual coins or current money (courant) and the other notional or bank money (banco). Bank money existed in the form of credit on the books of the bank. Bank money supplied by the Bank of Amsterdam, founded in 1609, and Hamburger Bank, founded in 1619, included a premium or agio relative to current

3 See Flandreau, Galimard, Jobst, and Marco (2006, p. 23).
4 Hayes (2001 [1740], p. 307).
5 Lobell (2000, pp. 231–2).
6 Flandreau, Galimard, Jobst, and Marco (2006).
7 Hayes (2001 [1740]) and Attman (1983, p. 8).

money.[8] For example, a premium of 4 percent on banco money implied that 100 guilders in banco money was the equivalent of 104 guilders in courant money. The premium was much higher in Hamburg (around 20 per cent in the 18th century)[9] than in Amsterdam (around 4–5 per cent),[10] although the two banks had much the same regulations.[11]

The premiums were a consequence of the two banks' refusal to accept inferior coins at par with their bank monies,[12] which were linked to the better coins, according to the standard of the mint.[13] Inferior coins circulated widely (because of wear and tear, clipping and small increases in the mint equivalent) and tended to drive out better coins (unless the latter circulated at a premium). Most rix-dollar coins that circulated in the 17th and 18th centuries had a significantly lower fine silver content than the 25.98 grams established by the Leipzig convention. The Swedish riksdaler coins, weighing 25.3–25.7 grams, had, in fact, a higher fine silver content than in other countries.[14] In addition, bank money had other advantages even compared to newly minted coins; since it was secure from fire, robbery and other accidents, it could easily be transferred between cities, etc. As pointed out by Adam Smith in *The Wealth of Nations*:[15]

> The agio of the bank of Hamburg, for example, which is said to be commonly about fourteen per cent, is the supposed difference between the good standard money of the state, and the clipt, worn, and diminished currency poured into it from all the neighbouring states.
>
> Before 1609 the great quantity of clipt and worn foreign coin, which the extensive trade of Amsterdam brought from all parts of Europe, reduced the value of its currency about nine per cent below that of good money fresh from the mint. Such money no sooner appeared than it was melted down or carried away, as it always is in such circumstances.

At some time in the 18th century (not known when) the Bank of Amsterdam stopped paying specie for banco notes. The currency supplied by the bank became de facto inconvertible. The premium on bank money was kept at a stable level since the bank usually bought bank money when the premium fell below 4.5 per cent and sold

8 McCusker (1978, pp. 42–79).
9 Monthly premiums on Hamburg bank money can be found in McCusker (1978, pp. 65–8) for the period 1672–1775.
10 Monthly premiums on Amsterdam bank money can be found in McCusker (1978, pp. 46–51) for the period 1638–1775, and in Posthumus (1946, pp. 651–6) for the period 1648–1819.
11 Hayes (2001 [1740], p. 301).
12 However, in, for example, Amsterdam the premium was not officially sanctioned until the 1650s. See Quinn and Roberds (2006).
13 van Dillen (1936, pp. 89–90).
14 Sjöstrand (1908, p.10).
15 Smith (1999 [1776], p. 57).

whenever it rose above 4⅞ per cent[16] (in this respect, it was a kind of specie exchange standard). This could not be sustained in some periods. Most notably in 1794–1802 there was a significant discount (negative premium) on banco money (at most 27 per cent in January 1795).[17]

In Sweden, the exchange rate on Hamburg was mostly quoted on banco money. In contrast, the exchange rate on Amsterdam was mostly quoted on current money.

## 5.3. Sources and calculations for this study

For the period after 1740, Sveriges Riksbank (1931) presents a continuous annual series of exchange rates on Amsterdam, Hamburg, Paris and London (the annual average of these series is arithmetic). The rates are based on quotations in various newspapers, such as *Stockholms stads priscourant*. All the data that were collected for Sveriges Riksbank (1931) is stored in the archive of Sweden's central bank.[18] The data have been used in this study, since the material includes weekly data, data for the period 1705–36 and notations on other foreign currencies.

For the period before 1740, several other sources are used in this study.

The best data are for 1660–85. Monthly prices exist for bills of exchange of various durations (8 days, 14 days, one month, two months, and longer) on Amsterdam and Hamburg, and for 1668–85 on Paris. There are also a few notations on Gdańsk, but none on London.[19] After that period, such detailed price differentiation between bills with various terms to maturity is available only from the mid-19th century onwards.

The exchange rates in 1660–85 are calculated from monthly data on bills with various durations and an estimated average interest rate for the period.

When estimating interest rates, comparisons should not be made between bills of short duration, for example one-month bills relative to 14-day bills, since the price of bills was often rounded off, which could systematically distort the computed interest rate. Data on bills of longer duration, 4 to 8 months, exist mainly for the period 1662–9. To estimate an interest rate for this period, the prices of these bills have been compared to the prices of one-month bills. The interest rate $r$, in per cent, is calculated as:

16 van Dillen (1936, pp. 101–2).

17 Posthumus (1946, p. 655).

18 Riksbankens arkiv, 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803'.

19 Kammarkollegii, oordnade handlingar, no. 444 (Riksarkivet). Posthumus (1946, pp. 592–3) presents the exchange rate in Amsterdam on Stockholm for 1664, 1665, 1669, 1671 and 1672.

$$r = \left( \left( \frac{P_{bill\,1}}{P_{bill\,2}} \right)^{12/(T_{bill\,2} - T_{bill\,1})} \right) \times 100 - 100$$

where $P$ is the price and $T$ the time duration in months of two bills, bill 1 and bill 2.

The 34 different interest rates that have been calculated range from -6.3 to 35.5 per cent (based on both Hamburg and Amsterdam exchange rates). The median value is 12.5 per cent, which seems to be quite a robust result.[20] This is consistent with a monthly interest rate of one per cent (12.7 per cent on an annual basis), which according to Eli Heckscher was very common in the 17th century.[21] The extreme values can be explained by market fluctuations during the month and price differences between brokers. While the individual values are unreliable, especially the extreme values (and negative interest rates did, of course, not exist), the median should be quite reliable.

The high interest rate in 17th-century Sweden – despite a more homogeneous capital market in the latter part of the century and a statutory maximum rate of 8 per cent from 1666 and 6 per cent from 1687 – is known from many sources.[22] Lower interest rates, 6–8 per cent, were common in this period, but mostly for loans with security and of a somewhat longer duration, involving lower risks.

Following the argument of Flandreau, Galimard, Jobst, and Marco (see above), the shadow interest rate calculated from bills on Amsterdam and Hamburg must be seen as reflecting the interest rate in those cities, not in Stockholm. Although the interest rate was probably lower in Amsterdam and Hamburg than in Stockholm, the shadow interest rate was probably higher than the actual one because of the additional cost of acquiring information about the foreign markets. Christina Dalhede gives two examples of short-term interest rates in Lübeck, one of 10 per cent in 1664

20 The interest rate of the first quartile is 9.3 per cent and of the third quartile 13.1 per cent, which was probably roughly the range for the actual short-term interest rate at the time. The median for the first 17 values (in 1662–6) is 12.4 per cent and 12.9 percent for the last 17 values (in 1667–9), which is an indication that the market interest rate seems to have been quite stable over time, at least in the 1660s (which was a decade of some financial turmoil in Sweden). The median interest rate estimated from Amsterdam bills is 12.7 percent and 12.3 percent estimated from Hamburg bills, which likewise is a negligible difference.

21 Heckscher (1936, vol I:2, p. 578).

22 Heckscher (1936, vol I:2, pp. 577–81), and Montgomery (1920, p. 140). Heckscher mentions an interest rate as high as 42 per cent in 1631; according to him, the interest rate fell towards the end of the 17th century. A table of interest rates published in 1690 shows that they varied between 5 and 12 per cent, despite the legislated maximum of 6 per cent. The variation can be explained by the variation in the risk premium.

View of Stockholm*, 1801, by Elias Martin (1739–1818).*
Source: Nationalmuseum.

on a 3-month loan and the other of 12 per cent in 1667 on a 4–12-month loan,[23] which conforms to the high interest rates calculated for Hamburg and Amsterdam in the present study.

The computed median interest rate of 12.5 per cent differs significantly from the interest rates in Amsterdam, London and Paris as estimated by Flandreau, Galimard, Jobst, and Marco for the 18th century (after 1720).[24] Based on bills of exchange with various terms to maturity, they conclude that the average interest rate was around 3–5 per cent in that century. That would mean that the interest rate was more than halved between the 17th and 18th centuries. Further investigation is necessary before such a conclusion can be drawn. In Chapter 6, Håkan Lobell assumes that the shadow interest rate was 5 per cent in the first half of the 19th century; that is also the assumption in this chapter for the 18th century. For 1704–1804, it is also assumed that the term to maturity was 67 days for bills on Amsterdam and Hamburg and 90 days for bills on London and Paris, which corresponds to Lobell's assumptions for the early 19th century. The few notations on terms to maturity in the late 18th century are consistent with these conjectures.

Tables A5.1, A5.5 and A5.12 present monthly exchange rates on Hamburg, Amsterdam and Paris, respectively, for the period 1660–85 (for Paris 1668–85), based on bills with between 8 days and two months to maturity and an assumed interest rate of 12.5 per cent (which disregards the possibility that this rate may have

23 Dalhede (2006, p. 117).
24 Flandreau, Galimard, Jobst, and Marco (2006, p. 24).

fluctuated over time).[25] Neither has allowance been made for the grace period between the day when the bill was presented and the day when it was paid (this could be viewed as a pure transaction cost). The data have been collected and the calculations have been made in collaboration with Göran Hansson for Amsterdam and with Martin Sutinen for Hamburg and Paris.

There are various sources for annual exchange rates in the period 1696–1739.[26] For this period, annual averages have been estimated mainly by taking the geometric average of the highest and lowest quotations.

For the years when direct data are missing, cross rates have been calculated for the exchange rates on Amsterdam, Paris and London, based on the exchange rate in Stockholm on Hamburg, in Amsterdam on Hamburg,[27] and in London on Hamburg, Paris and Amsterdam.[28] The cross rates are adjusted to take into account the difference between cross rates and actual rates in the adjacent periods where data on actual rates do exist.

When the sources do not provide information about the bills' terms to maturity, the spot rates are calculated from the direct data on exchange rates by increasing the latter by 1.5 per cent in 1658–85, which is consistent with, for example, 1.5 month bills and a 12 per cent interest rate. For 1686–1703, the bills on Amsterdam and Hamburg are increased by one per cent and bills on London by $1.05^{90/365}$. For the period 1704–1804, the bills on Amsterdam and Hamburg are increased by $1.05^{67/365}$ and the bills on London and Paris by $1.05^{90/365}$, consistent with the assumption of a 5 per cent interest rate. See furthermore Tables A5.21 to A5.24 for annual series. The monthly data presented for the period 1705–1803 are raw data (mostly based on two- and three-month bills), not spot rates.

## 5.4. Notations on foreign currencies in Swedish currency

The presented foreign exchange rates are in Swedish currency, which changed during the studied period (see Chapter 4). As a consequence of inflation, the value of Swedish currency fell relative to the quoted foreign currencies during the course of the 18th century.

Up to 1776, foreign currencies were usually quoted in mark kopparmynt (one daler kopparmynt = 4 marks kopparmynt).

In 1716–9 so-called coin tokens circulated that fell in value relative to proper

25 Flandreau, Galimard, Jobst, and Marco (2006, p. 23).

26 Sandbergska samlingen (Riksarkivet), O:1, folio 364, presents exchange rates on Hamburg from 1703 onwards, Riksarkivets ämnessamlingar (Riksarkivet), Handel och sjöfart, Ser. I, vol. 1 Järnhandel, exchange rates on Hamburg and Amsterdam from 1703 onwards (also on London in 1704), and Börstorpssamlingen (Riksarkivet), vol. 85, exchange rates on Hamburg in 1696–1704.

27 Found in Posthumus (1946).

28 Found in McCusker (1978).

money (mainly copper plates). The only exchange rates reported for this period were on Amsterdam and Hamburg, and these were most probably noted in proper money, not in coin tokens. As explained in Chapter 4, the use of coin tokens was not easy to enforce on the foreign exchange, although there are some uncertainties on this matter. Tables A5.21 to A5.22 present the estimated exchange rates in coin tokens as well, by using the premium on proper money to compute those rates (see Chapter 4).

In 1777–88 foreign currencies were usually quoted in skilling (one riksdaler was equal to 48 skilling). Since one Swedish riksdaler was exchanged for 72 marks kopparmynt in 1777, this implies that one skilling was exchanged for 1.5 marks kopparmynt in that year. In 1789–1803, Sweden had two currencies: riksdaler banco (= 48 skilling banco), still convertible into riksdaler specie coins, and riksdaler riksgälds (= 48 skilling riksgälds), which fell in value relative to the specie coins. For the period 1789–96 the foreign exchange rates were most likely expressed in banco notes, although there are some uncertainties about this. As discussed in Chapter 4, the premium (agio) on banco notes cannot be used to transform exchange rates from banco to riksgälds, since the premium on banco notes was affected by market situations. From May 1797 to 1803 the foreign exchange rates are expressed both in riksdaler riksgälds and in riksdaler banco. The premium that can be estimated from these data differs somewhat from the noted agio (premium) in the domestic market.

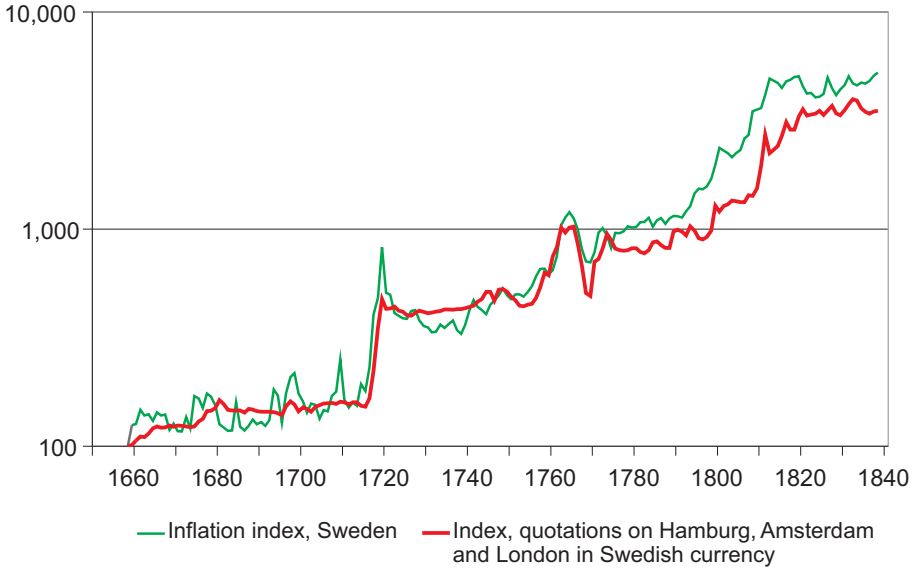
Figure 5.1 compares an index of the quotations on Hamburg, Amsterdam and London with the Swedish inflation index (see Chapter 8) in 1658–1838. All three foreign currencies had a relatively stable precious metal content during the studied period (at least in the long run). The currency index clearly shows how Swedish currency deteriorated relative to these three stable currencies, which was due to debasements and the circulation of fiat money. Up to the 1770s the currency and the inflation indices follow each other in the long run, but after the 1770s the price level rose more than the quotation on the three foreign currencies. Hence, part of the increase in prices in the late 18th century must be explained by other factors than a deteriorating currency. Between 1658 and 1838 the currency index increased 35-fold, while the price level rose 53-fold. The sharpest devaluations of Swedish currency occurred in 1716–19, 1756–62, 1769–73, 1788–99 and 1808–20, which coincided with the circulation of fiat monies (see Chapter 2).

## 5.5. Quotations on Hamburg

During the studied period the Hamburg reichstaler banco was the most important foreign currency quoted in Sweden. Before 1777, quotations on the Hamburg reichstaler banco were even more important than quotations on the domestic riksdaler.

Hamburg was the centre of exchange for the Baltic area. The bank money of Hamburg was viewed as one of the securest in Europe, and all foreign exchange was negotiated through the bank. Hamburg shared its current money with the city of Lübeck. As the circulated coins deteriorated, the premium on bank money increased from 3 per cent in 1672 to over 20 per cent in the 1770s (see Table A5.21).

**Figure 5.1.** *Index of quotations on Hamburg, Amsterdam and London in Swedish currency and the Swedish inflation index 1658–1838 (1658 = 100).*



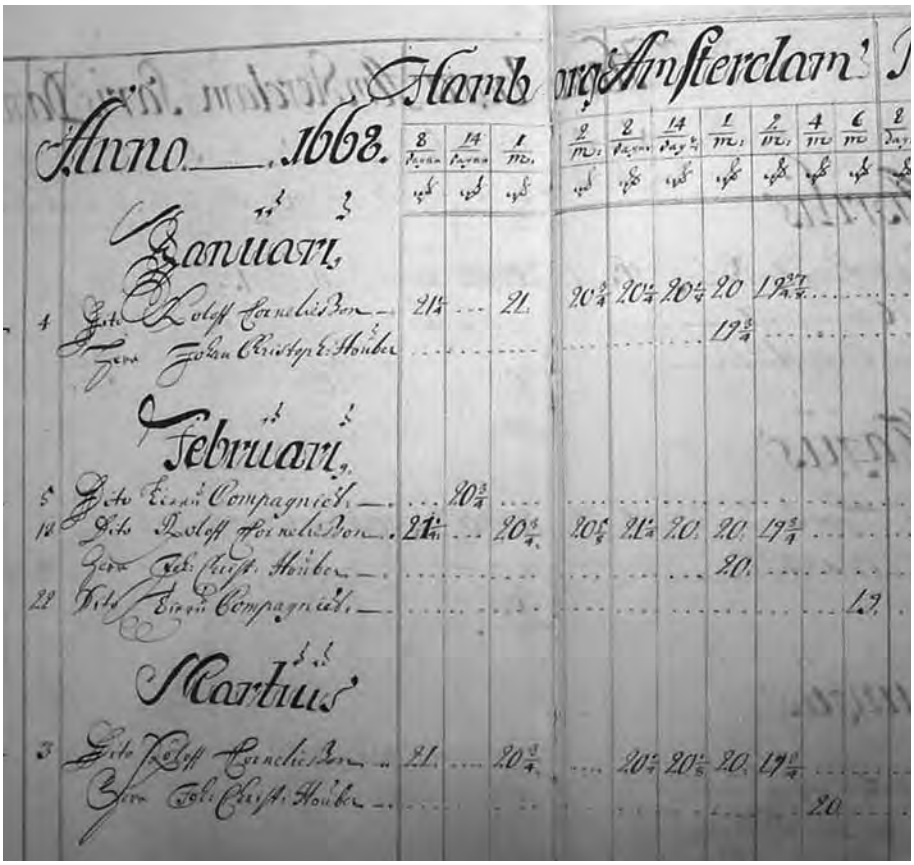

Sources: Tables A5.21 to A5.24, Sveriges Riksbank (1931) and Chapter 8.
Note: The two indices follow mark kopparmynt in 1658–1776, riksdaler specie in 1777–88 and riksdaler riksgälds in 1789–1838. In the period 1716–19 they follow the coin tokens and assume that these tokens were devalued by 50 per cent in 1719.

The Hamburger reichstaler banco was equal to 3 marks banco.[29] Eli Heckscher writes that the 'Hamburg Rixdollar Banco was an ideal money, equivalent to one-ninth of the mark of Cologne, in fine silver, which ought to give it a weight in fine silver of 25.984 gr., though in Sweden it was generally considered as corresponding only to 25.276 gr.'[30] In comparison, in the 18th century the minted Swedish riksdaler (specie) had a fine silver content of 25.6973 grams.

From 1790 the issue rate of one reichstaler banco was 9.25 per mark of fine silver and of the mark banco 27.75 per mark of fine silver. Since the mark of fine silver in Hamburg was equal to 233.855 grams (the Cologne mark), from then on one reichstaler banco was the equivalent of 25.2816 grams.[31]

In Sweden, almost all exchange rates are quoted in bank money, but a few notations on the current money of Lübeck are extant. Tables A5.1 to A5.4 present

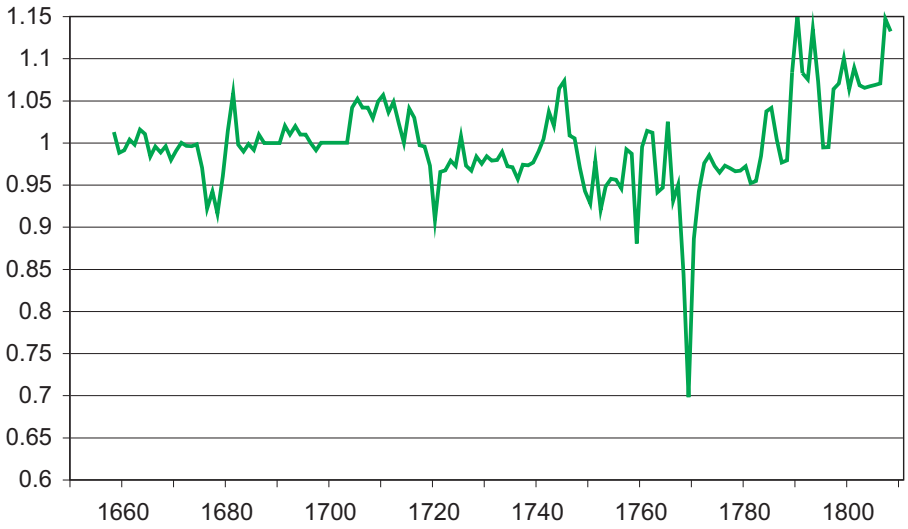
29 Attman (1983, p. 8).
30 Heckscher (1934, p. 194).
31 Shaw (1895, p. 387).




*An example of exchange rate notations in Stockholm in early 1668 (the year in which the Riksbank was founded). Prices for bills differed with their terms to maturity (8 days, 14 days, 1 month, 2 months, 4 months and 6 months). Bills of longer duration were cheaper, reflecting a shadow interest rate. For example, in January a 2-month bill on Hamburg (reichstaler banco) was sold for 20¾ marks kopparmynt, while an 8-day bill was sold for 21¼ marks kopparmynt. There were also differences between brokers. In March, a 2-month bill on Amsterdam was sold for somewhat less than a 4-month bill by another broker.*
Source: Kammarkollegii, oordnade handlingar, nr 444 (Riksarkivet).

monthly exchange rates on Hamburg; Tables A5.21 and A5.23 give the annual rates. Although the exchange rate on current money of Hamburg can be estimated by deducting the premium on Hamburger reichstaler banco, which is presented for the period 1672–1775 in Table A5.21, the few notations in Stockholm on the current money show that the premium on bank money estimated from the Stockholm data deviated somewhat from the noted premium in Hamburg.

**Figure 5.2.** *Swedish riksdaler per Hamburger Reichstaler banco 1658–1808.*




Sources: Tables A5.21 and A5.23, Sveriges Riksbank (1931) and Chapter 4.

Figure 5.2 presents the Hamburger Reichstaler banco in Swedish riksdaler (specie/banco) in 1658–1808. The silver content of both currencies was stable throughout the period. The par level was slightly below 1 (0.984 in the late 18th century, but closer to 1 in the late 17th century). This level applied during most of the period but at times there were significant deviations, most notably in 1769 and after 1789, caused by monetary instability. In 1769, the high valuation of the Swedish riksdaler was an effect of deflationary policies (see Chapter 4), while after 1789 the riksdaler banco was valued less than Hamburger reichstaler banco because of the circulation of riksgälds notes and expectations that banco notes could become inconvertible as well, which in fact happened in 1808–9. The deviation in 1769 most likely went beyond the specie points (see Chapter 6).

## 5.6. Quotations on Amsterdam

Up to 1681, the guilder/florin[32] was a unit of account rather than a minted coin. It was equal to 20 stuivers. The rijksdaalder coin that was minted in the late 16th century and the first half of the 17th century had a fine silver content of 25.7 grams; it was set equal to 42 stuivers in 1583, 46 stuivers in 1596, 47 stuivers in 1603, 48

32 The guilder as a money of account equal to 20 stuivers should not be confused with the silver carolus guilder, which was an actual coin minted in the 16th and early 17th centuries.

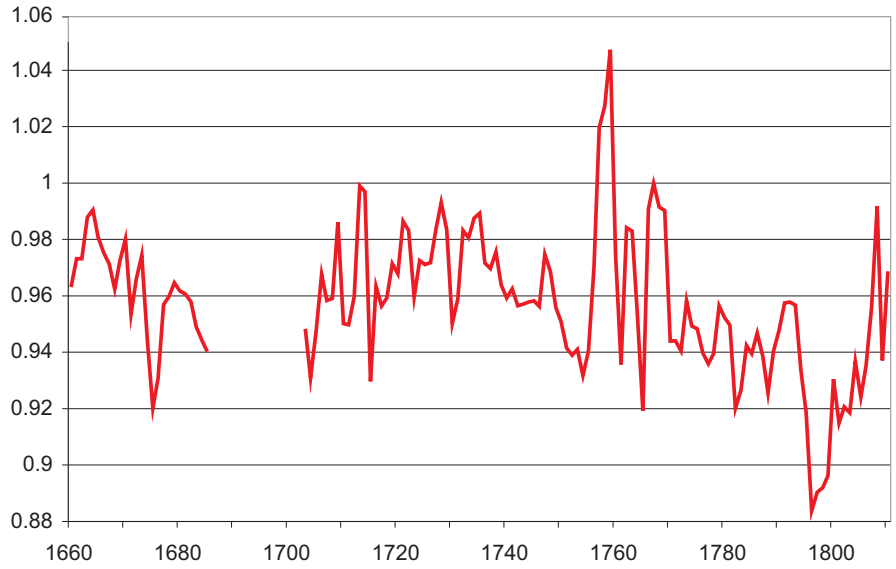
Dam Square, Amsterdam*, by Gerrit Berckheyde (1638–98), a Dutch specialist in townscapes. Notations on Amsterdam were very frequent at the Stockholm exchange in the second half of the 17th century.*
Source: http://en.wikipedia.org/wiki/File:AmsterdamDamsquar.jpg

stuivers in 1610–9 and 50 stuivers (i.e. 2.5 guilders) from 1619 onwards. According to the Dutch price historian Posthumus, the fine silver content of one guilder was 11.17 grams in 1597–1603, 10.94 grams in 1604–6, 10.89 grams in 1607–10, 10.71 grams in 1611–9 (since the rijksdaalder was equal to 48 stuivers), 10.28 grams in 1620–59 (since the rijksdaalder was equal to 50 stuivers) and 9.74 grams in 1660–81 (since the silver ducat contained 24.37 grams fine silver and was set equal to the rijksdaalder).[33]

On 25th December 1681 the states of Holland and West Friesland prescribed the minting of the first gulden (guilder) piece, which hitherto had existed only as money of account. The guilder was fixed at 9.613 grams of fine silver, which did not change until 1845. Thus the fine silver content of one rijksdaalder courant became 24.03 grams, i.e. 6.5 per cent below the fine silver content of the rijksdaalder coins minted in the first half of the 17th century. From 1845 the guilder contained 9.45 grams of fine silver.[34]

33 Posthumus (1946, pp. cviii–cix).
34 Shaw (1895, pp. 350–5), and Posthumus (1936, p. lv).

**Figure 5.3.** *Amsterdam rijksdaalder courant in Hamburger reichstaler banco 1660–1810 based on Swedish foreign exchange.*




Sources: Tables A5.21 and A5.23, Sveriges Riksbank (1931) and Chapter 4.

Tables A5.5 to A5.8 present monthly exchange rates on Amsterdam; Tables A5.21 and A5.23 give the annual rates. To express the exchange rate on Amsterdam in banco money, the exchange rate on rijksdaalder courant can be augmented with the premium on bank money, for which annual data are presented for 1660–1776.[35]

Figure 5.3 presents the cross rate of Amsterdam rijksdaalder in Hamburg reichstaler banco in 1660–1810 based on the data from the foreign exchange in Sweden. The par level based on the fine silver contents of the two currencies in the late 19th century was 0.96, which was also the average and the median value in Sweden in 1660–1810. The coefficient of variation was only 2.7 percent, an indication of quite efficient markets and that the two currencies moved within the specie points.

## 5.7. Quotations on London

One pound sterling was equal to 20 shillings or 240 pence.[36] Since the fine silver content of one penny was 0.479 grams in 1560–1600 and 0.464 grams in 1601–1815, the fine silver content of one pound sterling (if counted in pennies) was 115.1

35 See footnote 10.
36 McCusker (1978, p. 35).

London: The Thames and the City of London from Richmond House*, 1747, by Giovanni Antonio Canal (1697–1768), a Venetian artist. During the 18th century the pound sterling became an important currency on the Stockholm exchange.*
Source: http://commons.wikimedia.org/wiki/File:Canaletto_london.jpg

grams in 1560–1600 and 111.4 grams in 1601–1815.[37] However, in the period 1717–1815 the silver content of the pound was de facto somewhat lower. England had a bimetallic standard in 1717–1815, based on a value ratio of gold to silver of 15.072 to 1. This tended to overvalue gold and cause an outflow of silver and an inflow of gold. Britain introduced a mono-metallic gold standard de jure in 1816. The fine gold content of the sovereign with the nominal value of one pound was then fixed at 7.3224 grams.

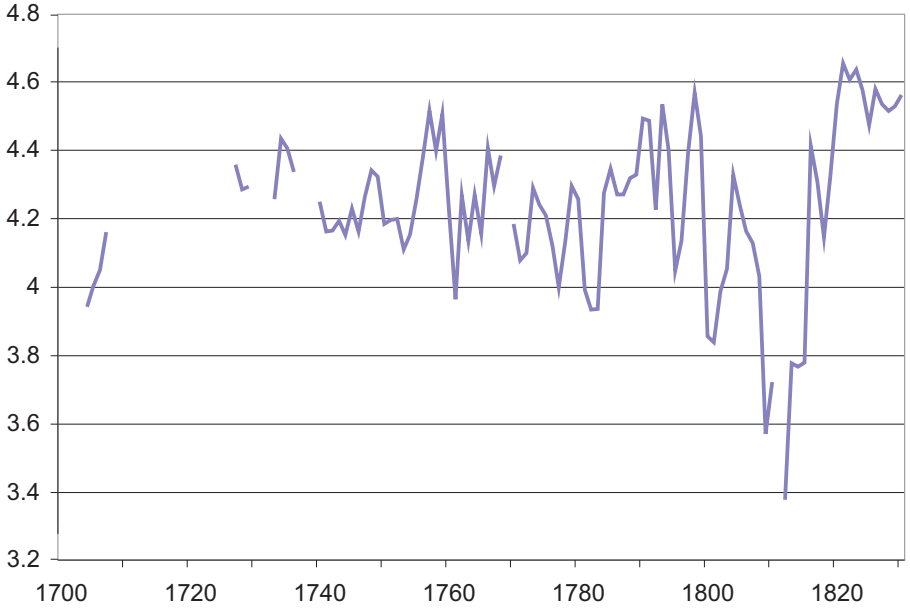
Although England played a dominant role in the world economy, in the 18th century the exchange on Hamburg and Amsterdam was much more important for Sweden. This is confirmed by what *The Negociator's Magazine* wrote about Sweden in 1740: 'To London they mostly exchange by the Way of Amsterdam or Hamburgh; but sometimes Exchange may be directly to London …'[38]

Tables A5.9 to A5.11 present monthly exchange rates on London; Tables A5.22 and A5.24 give the annual rates.

Figure 5.4 presents the cross rate of the British pound in Hamburger reichstaler banco based on the exchange rates in Sweden 1700–1830. The par level based on the

37 'Allen - Unger Database: European Commodity Prices 1260–1914'.
38 Hayes (2001 [1740], p. 338).

**Figure 5.4.** *The pound sterling in Hamburger reichstaler banco based on exchange rates in Sweden 1704–1830.*

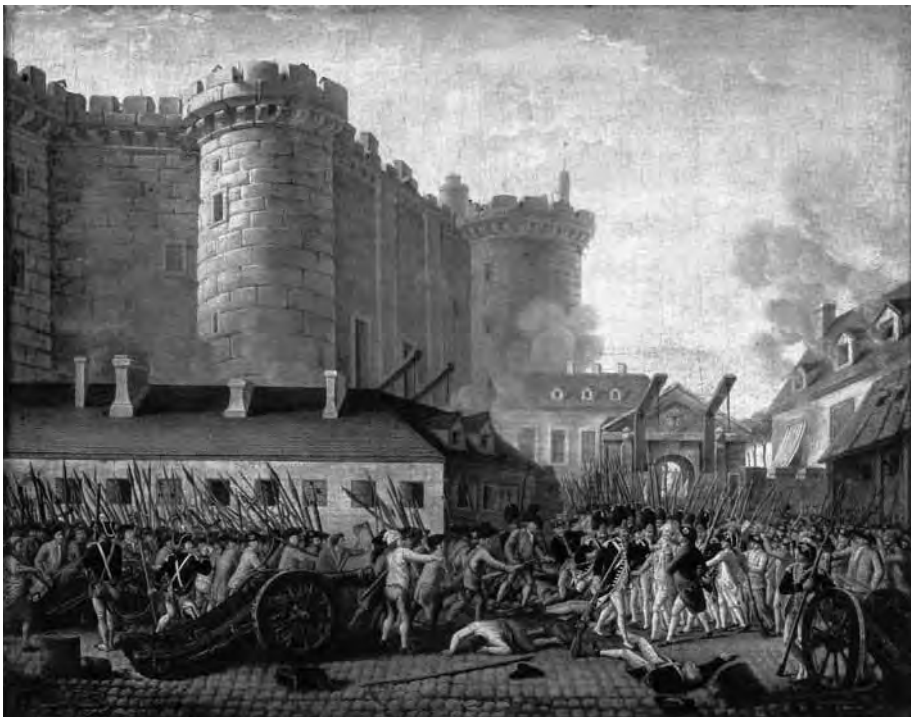



Sources: Tables A5.21 to A5.24, Sveriges Riksbank (1931) and Chapter 4.

silver contents of the two currencies was around 4.4 reichstaler per pound. During the 18th century the market rate was normally below this level because of the overvaluation of gold under the bimetallic standard, making British silver coins undervalued. Very few silver coins were in fact minted after 1717, and Britain was, therefore, de facto on a gold standard in the 18th century.

During the French Revolutionary and Napoleonic wars, sterling reached its lowest level, due to excessive note issues and the suspension of conversion on demand in 1797.[39] In the early 1810s sterling was one fourth below its par level against the reichstaler banco (see also Chapter 6). The situation led to the Bullionist Controversy, where the Bullionists, among them David Ricardo, argued that convertibility must be restored, while the Anti-Bullionists claimed that banks would not issue more notes than commerce demanded. Convertibility into gold was not restored until 1821.

39 Mayhew (1999, p. 132–52).



The Storming of the Bastille in Paris, *July 1789. Despite the dramatic events, the value of the livres tournois was quite stable relative to other currencies. The French currency did not start to deteriorate until 1791.*

Source: http://upload.wikimedia.org/wikipedia/commons/5/57/Anonymous_-_Prise_de_la_Bastille.jpg

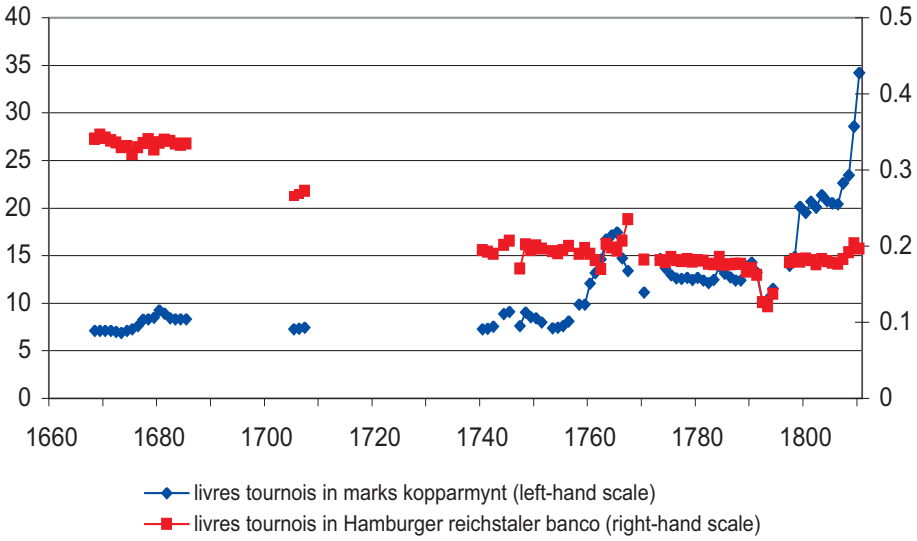
## 5.8. Quotations on Paris

In the sources used in this study, the exchange rate on Paris is quoted in livres tournois in 1740–1794, but in écu de change in 1668–1707. The écu de change was the French equivalent of the reichstaler. One écu de change was equal to three livres tournois, and one livres tournois to 20 sou tournois. This accounting relation was stable in the 17th and 18th centuries up to the French revolution, despite the monetary chaos in the 17th and early 18th centuries.[40] Livres tournois ceased to be minted in 1641 but continued to exist as a unit of account.[41] In the 18th century some quotations were also made on Bordeaux and Marseille. Tables A5.12 to A5.15 present monthly exchange rates on Paris; Tables A5.22 and A5.24 give annual rates.

40 McCusker (1978, pp. 87–8).

41 Lagerqvist and Nathorst-Böös (1968, p. 78).

**Figure 5.5.** *The livres tournois (franc) in marks kopparmynt (= 1/72 riksdaler specie 1777–88 and 1/72 riksdaler riksgälds 1789–1810) and Hamburger reichstaler banco based on foreign exchange in Sweden 1668–1810 (estimated spot rates).*




Sources: Tables A5.21 to A5.24, and Sveriges Riksbank (1931).

The French currency was unstable in 1681–1725 but for this period only a few notations exist from Sweden. The fine silver content of one livres tournois was 11.61 grams in 1603–35, 9.06–10.31 grams in 1636–41, 7.71–8.75 grams in 1642–99, 5.85–8.3 grams in 1700–17, 3.06–5.64 grams in 1718–26, and 4.7 grams in 1727–89.[42] As can be seen from Table A5.22, French currency reached its lowest level in 1720, following the collapse of the shares in the Mississippi Company and John Law's failed experimentation with bank notes.

In the aftermath of the French revolution the monetary system initially fell into disarray. As shown in Table A5.14, the exchange rate on Paris (in skilling banco) decreased by a third between 1789/90 and 1792/3. The franc was introduced in 1795, based on a decimal system (equal to 100 centimes), and was set equal to the old livres tournois. Its fine silver content was 4.5 grams,[43] implying a par level of 8.4 skilling banco for one livre tournois.

In 1803 a bimetallic standard was introduced, based on a gold-silver (value) ratio of 15.5 to 1.[44] The fine gold content of one franc was 0.29 grams.

42 'Allen - Unger Database: European Commodity Prices 1260–1914'
43 Lagerqvist and Nathorst-Böös (1968, p. 78).
44 Redish (1994, p. 70).

Figure 5.5 presents the market value of the livres tournois (franc from 1795) in Swedish and Hamburg currencies in 1668–1808. It shows that while the value relation between French and Swedish currency in the 1750s was about the same as in the 1660s, in this period French currency fell relative to the stable Hamburger reichstaler banco. After the 1750s Swedish currency fell relative to French currency, while, with the exception of a dip after the French Revolution, French currency was stable against the Hamburger reichstaler banco. In the period 1740–88, the median value of one livres tournois was 0.19 Hamburger reichstaler banco, which was also the theoretical exchange rate between the two currencies based on their fine silver contents.

## 5.9. Quotations on Copenhagen

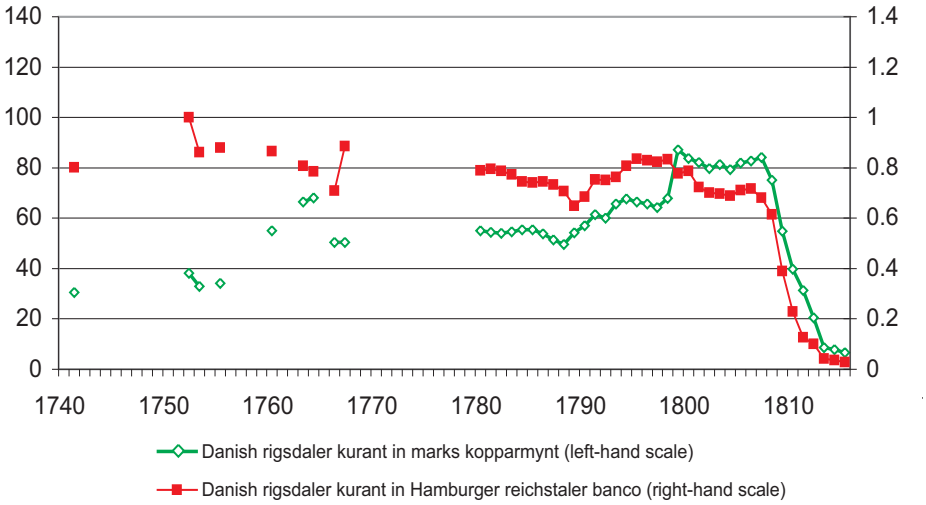
Before the union with Sweden in 1814, Norway was part of the Danish kingdom, with a common currency unit. Since the late medieval period (see Chapter 3), the Danish mark was set equal to roughly half the value of the Lübeck mark, although this could not be maintained in some periods. Like the Lübeck mark, the Danish mark was divided into 16 skillings. The Danish rigsdaler or speciedaler was linked to the German reichstaler, later at par with the Hamburg reichstaler banco. In the 18th century it contained 25.28 grams of fine silver, only slightly less than the Swedish riksdaler. Since the Hamburg reichstaler was divided into 3 German marks, this implies that the par level of the Danish rigsdaler was 6 marks. In 1625 the following relation was fixed: 1 rigsdaler or speciedaler = 6 marks = 96 skillings. In the late 17th century the crown was also minted, set equal to 64 skillings or 4 marks.[45]

The Danish rigsdaler as a unit of account, equal to 96 skillings in coins or notes, must be distinguished from the actual rigsdaler in specie coins. Given that low-standard coins were minted, a premium arose on speciedaler in courant money ('kurantmønt'). The fine silver content of the crown was also debased. Therefore there was also a premium on the speciedaler in crown coins, although not as high as the premium on speciedaler in courant money.

In his study of prices in Jämtland, which Sweden conquered from Denmark-Norway in 1645, Göran Hansson finds that prices were quoted in Swedish daler kopparmynt as well as in Norwegian rigsdaler in the period 1666–88, making it possible to estimate the exchange rates between these two currencies.[46] Throughout this period one Norwegian rigsdaler stood at around 4.5 Swedish daler kopparmynt, which was significantly below the market rate of the Swedish riksdaler specie and the Hamburg reichstaler banco. The quoted Norwegian rigsdaler is, therefore, mostly likely not the specie riksdaler. While in 1666–76 one Norwegian rigsdaler was valued at 0.8–0.9 Hamburg reichstaler banco, in 1677–88 it was valued at only around 0.7 Hamburg reichstaler banco. In comparison, the data of Friis and Glamann show

45 Friis and Glamann (1958, pp. 3–4 and 15).
46 Hansson (2009).

**Figure 5.6.** *The Danish rigsdaler kurant in marks kopparmynt (= 1/72 riksdaler specie 1777–88 and 1/72 riksdaler riksgälds 1789–1808) and Hamburger reichstaler banco based on foreign exchange in Sweden 1741–1815 (estimated spot rates).*




Sources: Tables A5.16 to A5.18, Table A5.21 and A5.23, untitled volume with exchange rates 1804–89 (Riksbankens arkiv), Sveriges Riksbank (1931), and Chapter 6.

that the Danish rigsdaler in courant coins stood at around 0.9 Hamburg reichstaler banco in the 1690s.[47] One possible explanation for the low exchange rate of the Norwegian rigsdaler in Jämtland is that inferior coins circulated in Jämtland during the 1680s. Friis and Glamann also show that the fine silver content of the minted coins varied significantly in the late 17th century. For example, in 1660–70, the most common coins that were minted contained only 65 per cent per unit of the nominal value of the fine silver of the speciedaler.[48]

In 1713–28, paper money circulated in Denmark but was not equivalent to coins in value. In 1737 the Kurantbanken was established as a privately-owned bank; it was nationalised in 1773. Although its notes were supposed to be convertible, convertibility was suspended in 1745–7 and from 1759. There were periods of varying length when the value of the Kurantbanken notes fell below the value of current money in coins. In 1791, the Dansk-Norske Speciesbank was established and issued notes that initially were convertible into speciedaler.[49]

Figure 5.6 presents the exchange rate on the Danish rigsdaler kurant 1741–1815 in Swedish and Hamburg currencies (based on Tables A5.16 to A5.18 up to 1803).

47 Friis and Glamann (1958, pp. 33–4).
48 Friis and Glamann (1958, p. 6).
49 Friis and Glamann (1958, pp. 5–16).

The quotations on Copenhagen follow the Kurantbanken notes, not the courant coins, as is shown, for example, by the deterioration of the Danish currency in 1788–9.

Figure 5.6 shows that during most of the second half of the 19th century the Danish rigsdaler stood at around 0.8 Hamburger reichstaler banco, while appreciating against the Swedish currency. Hence, the Danish currency was much more stable than the Swedish in the 18th century, despite the periods of inconvertibility. The worst Danish inflation occurred instead in the early 19th century, at the time of the Napoleonic wars, as is further discussed by Håkan Lobell in Chapter 6. After 1807, the Danish currency fell like a stone against the Swedish currency, even though the latter fell substantially against the Hamburger reichstaler banco. In 1813 one Danish rigsbankdaler was exchanged for 6 rigsdaler kurant.

## 5.10. Quotations on Gdańsk

Quotations on Gdańsk were quite common in the 18th century. Gdańsk was one of the largest cities on the Baltic seaboard and handled most of Poland's maritime trade via the river Vistula.

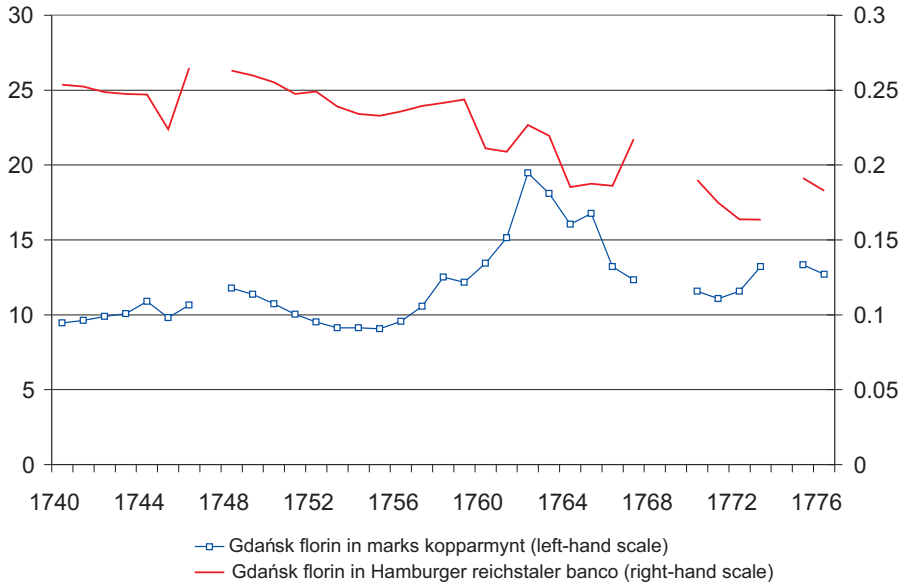
In Poland in the late 17th century both good and bad coins circulated, forming parallel currencies. While the ducat was worth around 7.5 Polish florins (Gulden or złoty) in better coins, it was worth up to 18 Polish florins in inferior coins.[50] The city of Gdańsk used the better coins, which was especially important in foreign trade, and that is the currency that was quoted in Stockholm. The florin was divided into 30 grosz[y] in better coins.

The best material exists for the period 1740–76 and is presented in Table A5.19. Figure 5.7 presents the Gdańsk florin in Swedish marks kopparmynt and Hamburger reichstaler banco for the same period. It shows that the value of both Gdańsk and Swedish currencies fell relative to the stable silver currency of Hamburg during the investigated period. Between 1750 and 1765 the fine silver content of the Gdańsk florin decreased, from around six to four grams, due to the debasement of coins.[51] Since the Swedish currency deteriorated even more, the value of the Polish florin in marks kopparmynt increased somewhat between 1740 and 1776. Although the value of the Gdańsk florin doubled in Swedish currency between 1755 and 1762 in connection with the high inflation in Sweden, later the Gdańsk florin fell back to lower levels.

There are also some quotations from the periods 1675–81 and 1777–81, although not on the florin, but on a taler unit. After 1781 quotations on Gdańsk no longer appear in the Swedish sources, reflecting the decline of Gdańsk as an important seaport.

50 Furtak (1935, p. 45).
51 Furtak (1935, pp. 47 and 77).

**Figure 5.7.** *Gdańsk florin in Swedish marks kopparmynt and Hamburger reichstaler banco 1740–76 (estimated spot rates).*




Sources: Table 5.19 and Table 5.21.

## 5.11. Quotations on Swedish Pomerania

Western Pomerania and a strip of Eastern Pomerania, including the cities of Stralsund och Greifswald and the island of Rügen, belonged to Sweden in the period 1637–1814 (formally from 1648). After the Napoleonic wars, Swedish Pomerania was ceded to Denmark in exchange for Norway in 1814 and was transferred to Prussia in 1815. Swedish Pomerania minted its own coins and had its own currency system, from 1690 adopting the Leipzig Money Convention (although some deviations occurred from this Convention). The taler was the main unit of account, and was of a lower fine silver content than the original reichstaler. Swedish notes were not accepted in Swedish Pomerania.[52]

Since Swedish Pomerania had its own currency system, the Pomeranian taler was often quoted at the foreign exchange in Sweden. Table A5.20 presents monthly exchange rates for the period 1740–1800, and Figure 5.8 the Pomeranian taler in Swedish marks kopparmynt and Hamburger reichstaler banco for the same period.

Most notable in Figure 5.8 is the falling exchange rate on the Swedish-Pomeranian taler in the early 1760s, and the subsequent appreciation. This was caused by

52 Lagerqvist and Nathorst-Böös (1968, pp. 194–200).

Wiesen bei Greifswald*, 1820–2, by Caspar David Friedrich (1774–1840), a German Romantic landscape painter. Greifswald, where Friedrich was born, belonged to Sweden from 1631 to 1814 (formally from 1648). However, Swedish Pomerania retained its own currency, which was quoted in Stockholm.*
Source: http://upload.wikimedia.org/wikipedia/commons/b/be/Caspar_David_Friedrich_043.jpg

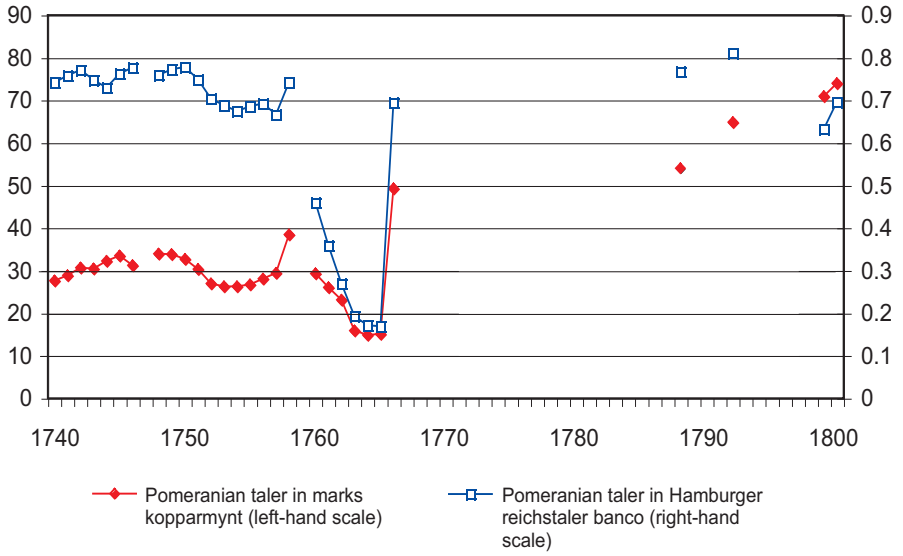
rapid debasement of the Pomeranian taler to finance Sweden's war efforts[53] during the Seven Years' War (1756–63) that pitted Prussia, Britain and some smaller German states against Sweden, Austria, France, Russia and Saxony. The value of the Pomeranian taler decreased from, on average, 0.74 Hamburger reichstaler banco in 1758 to, on average, 0.17 reichstaler banco in 1764/5. The Pomeranian taler even fell in value relative to the weak Swedish currency. However, with the minting of better coins, by April-May 1766 the exchange rate had increased again to 0.69 reichstaler banco. In 1788 it stood at 0.77 reichstaler banco, the same as before the inflationary episode.

## 5.12. Summary

Foreign currencies played a crucial role in Sweden. Most of the domestic currency units were, in fact, originally imported. In this study, primary data on monthly exchange rates are presented on Hamburg (reichstaler banco), Amsterdam (rijks-

53 Lagerqvist and Nathorst-Böös (1968, p. 197).

**Figure 5.8.** *Swedish Pomeranian taler in Swedish marks kopparmynt (= 1/72 riksdaler specie 1777–88 and 1/72 riksdaler riksgälds 1789–1800) and Hamburger reichstaler banco 1740–1800 (estimated spot rates).*




Sources: Tables A5.20, A5.21 and A5.23.

daalder courant), London (pound), Paris (livres tournois/franc), Gdańsk (florin/gulden/złoty = 30 groszy), Copenhagen (rigsdaler kurant = 96 skillings) and Swedish Pomerania (taler) in 1660–1803. All of these foreign currencies were courant money, i.e. linked to actual coins, except for the Hamburg reichstaler banco, which was bank money. Bank money existed also in Amsterdam, but the quotations in Sweden were on its courant money. Since direct data are missing for some years, cross rates are used to fill in some gaps for the annual series.

The primary data are bills of various durations, in the 18th century mostly 67- and 90-day bills. To estimate spot rates, an assumption must be made of a shadow interest rate on these bills, which is problematic since no such rate is known for the 18th century. Only the monthly data 1660–85 are of sufficiently good quality for estimating reliable spot rates for this period. In the period 1662–9 the estimated median shadow interest rate on bills of exchange was as high as 12.5 per cent. This result deviates significantly from the shadow interest rates of 3–5 per cent in the 18th century recently estimated by Flandreau, Galimard, Jobst, and Marco. It is, therefore, likely that interest rates decreased substantially between the 17th and 18th centuries.

The quoted currencies were all based on precious metals, as was the Swedish riksdaler (specie), which implies that the par values between those currencies were determined by their fine metal contents. The actual market rate deviated from these par relations, and on some occasions, at times of monetary instability, the deviation could be quite large.

Compared with its neighbours, Sweden had a weak currency in the 18th century. The quoted currencies on Hamburg, Amsterdam and London were relatively stable in the long term, and the Swedish currency fell substantially relative to these three currencies. Sweden experienced substantial inflation during the 18th century. The Hamburg and Amsterdam rix-dollars contained (more or less) fixed amounts of fine silver, and functioned as important reference points for the monetary system of Sweden. The Hamburg reichstaler banco was even used as a proxy for the value of the riksdaler specie coin. The French livres tournois (franc from 1795), the Danish rigsdaler kurant and the Polish florin were also more stable than the Swedish currency in the 18th century, although the Danish rigsdaler kurant was significantly devalued after 1807. The Swedish-Pomeranian taler fell substantially against the Swedish currency in 1758–65 but was also quite stable in other periods.

# Appendix A5: Summary tables

**Table A5.1.** *Monthly exchange rates on Hamburger reichstaler banco in marks kopparmynt 1660–85 (estimated spot rates).*

| Year | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1660 | 17.63 | 17.63 | 17.72 | 17.5 | 17.63 | 17.18 | 17.12 | 17.7 | 17.5 | 17.67 | 17.89 | 17.71 |
| 1661 | 18.33 | 18.38 | 18.38 | 18.39 | 18.39 | 18.39 | 18.39 | 18.39 | 18.19 | 17.89 | 17.84 | 18.14 |
| 1662 | 18.34 | 18.38 | 18.49 | 18.49 | 18.03 | 17.92 | 18.05 | 18 | 18.14 | 18.3 | 18.18 | 18.25 |
| 1663 | 18.44 | 18.57 | 18.39 | 18.34 | 18.43 | 18.34 | 18.72 | 18.95 | 18.95 | 19.55 | 19.56 | 20.14 |
| 1664 | 21.45 | 21.4 | 20.04 | 20.05 | 19.67 | 19.24 | 19.55 | 19.86 | 19.91 | 19.06 | 20.45 | 20.93 |
| 1665 | 20.91 | 21.15 | 21.28 | 20.59 | 20.2 | 20.42 | 20.57 | 21 | 21 | 21.13 | 21.07 | 21.09 |
| 1666 | 21.18 | 20.95 | 21 | 20.91 | 20.93 | 20.98 | 20.88 | 21.05 | 21 | 20.93 | 20.7 | 20.4 |
| 1667 | 20.71 | 20.77 | 20.96 | 21.01 | 20.87 | 20.93 | 20.96 | 21.01 | 20.96 | 20.94 | 20.96 | 19.19 |
| 1668 | 21.21 | 20.9 | 21 | 21.13 | 21.13 | 21.25 | 21 | 20.82 | 20.77 | 20.75 | 20.8 | 20.82 |
| 1669 | 20.45 | 20.55 | 20.65 | 20.77 | 20.43 | 20.43 | 20.41 | 20.62 | 20.83 | 20.52 | 20.68 | 21 |
| 1670 | 20.82 | 20.84 | 21.04 | 21.07 | 20.87 | 20.22 | 20.24 | 20.5 | 20.8 | 21.07 | 21.09 | 21.13 |
| 1671 | 21 | 21 | 21.05 | 21.02 | 20.84 | 20.82 | 21.05 | 21.05 | 21 | 21.05 | 21.13 | 21 |
| 1672 | 20.91 | 20.88 | 21 | 20.89 | 21 | 20.75 | 20.94 | 20.97 | 20.89 | 20.97 | 20.97 | 20.97 |
| 1673 | 20.99 | 21.12 | 21.15 | 21.15 | 21 | 20.75 | 20.6 | 20.78 | 20.97 | 21.1 | 21.07 | 21.13 |
| 1674 | 21.38 | 21.51 | 21.26 | 21.26 | 21.26 | 21 | 21 | 21.07 | 21.57 | 22.14 | 22.26 | 22.39 |
| 1675 | 22.39 | 22.14 | 22.29 | 22.1 | 22.04 | 22.04 | 22.47 | 23.48 | 24.02 | 23.73 | 23.14 | 22.77 |
| 1676 | 22.66 | 22.51 | 22.56 | 22.66 | 22.73 | 22.39 | 22.76 | 23.14 | 23.35 | 23.52 | 24.02 | 24.18 |
| 1677 | 23.79 | 23.92 | 24.17 | 24.3 | 24.3 | 24.36 | 24.4 | 25.09 | 25.22 | 25.41 | 25.53 | 25.53 |
| 1678 | 24.9 | 25.41 | 24.97 | 24.78 | 24.78 | 24.53 | 24.36 | 24.31 | 24.27 | 24.24 | 24.27 | 24.24 |
| 1679 | 24.4 | 24.36 | 25.03 | 25.28 | 25.16 | 25.66 | 25.94 | 26.62 | 27.17 | 27.07 | 27.1 | 27.7 |
| 1680 | 27.88 | 27.9 | 27.97 | 28.14 | 27.29 | 26.92 | 26.79 | 27.14 | 27.62 | 27.39 | 27.52 | 27.82 |
| 1681 | 27.88 | 27.88 | 28.05 | 27.42 | 26.57 | 26.32 | 26.19 | 25.49 | 25.28 | 25.28 | 25.16 | 25.03 |
| 1682 | 24.99 | 24.74 | 25.11 | 25.52 | 25.02 | 24.99 | 25.03 | 24.74 | 24.92 | 24.61 | 24.44 | 25.12 |
| 1683 | 25.06 | 25.24 | 25.11 | 25.19 | 24.65 | 24.71 | 24.71 | 24.37 | 24.11 | 25.12 | 25.11 | 25.25 |
| 1684 | 25.31 | 25.52 | 25.25 | 25.06 | 24.86 | 24.99 | 24.87 | 24.87 | 24.74 | 24.8 | 24.68 | 24.75 |
| 1685 | 24.93 | 25.06 | 25.02 | 24.87 | 24.87 | 24.84 | 24.67 | 24.61 | 24.61 | 24.86 | 24.94 | 24.96 |

Sources: Kammarkollegiet, oordnade handlingar, no. 444 (Riksarkivet). The data have been collected and calculated in cooperation with Martin Sutinen. The monthly data are based on bills of 8 days to 2 months, assuming an interest rate of 12.5 per cent.

**Table A5.2.** *Monthly exchange rates on Hamburger reichstaler banco in marks kopparmynt 1705–76 (not spot rates).*

| Year | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1705 | | | | | 27 | 27.44 | 27.19 | 27.31 | 27.31 | 25.75 | 27.38 | 27.44 |
| 1706 | 27.44 | 27.31 | 27.31 | | 26.94 | 27 | 27.06 | 27 | 26.94 | 26.81 | 26.81 | 26.5 |
| 1707 | 26.94 | 26.81 | | | | | | | | | | |
| | | | | | | | | | | | | |
| 1722 | | | | 37 | 37.13 | | 37 | 37 | 36.88 | 36.88 | 37 | 37 |
| 1723 | 36.88 | 36.75 | 36.63 | | | | | | | | | |
| | | | | | | | | | | | | |
| 1727 | | | | | | 33.75 | 34.88 | 34.5 | 34.94 | 35.13 | 35.38 | 35.75 |
| 1728 | 35.88 | 35.25 | 35.5 | 35.75 | 35 | 35 | 35.75 | 37.75 | | 35.63 | 35.88 | 35.5 |
| 1729 | 36.5 | 36 | 35.5 | | 34.75 | | | | | | | |
| | | | | | | | | | | | | |
| 1733 | 35.25 | 35.25 | 35.38 | 35.75 | 35.63 | 35 | 34.94 | 35.25 | 35.38 | 35 | 35.44 | 35.13 |
| 1734 | 35.38 | 35.25 | 35.56 | 35.69 | 35.44 | 35.31 | 35.06 | 35.19 | 35.38 | 35.38 | 35.5 | 35.31 |
| 1735 | 35.69 | 35.88 | 36 | 36.06 | 36.06 | 36.19 | 35.75 | 35.81 | 35.38 | 35.19 | 35.25 | 35.63 |
| | | | | | | | | | | | | |
| 1740 | | | 37.13 | 37.19 | 37.13 | 37.31 | 37.25 | 36.5 | 37.06 | 37 | 37.13 | 37.19 |
| 1741 | 37.31 | 37.31 | 37.38 | 37.19 | 37.25 | 37.06 | 36.81 | 37.44 | 37.94 | 39 | 39.75 | 40.38 |
| 1742 | 41.06 | 40.44 | 40.63 | 41.25 | 41.13 | 40.94 | 40.75 | 39.5 | 37.38 | 37.38 | 38.19 | 38.25 |
| 1743 | 38.38 | 38.13 | 38.38 | 39.63 | 40.75 | 40.25 | 39 | 40.75 | 41.38 | 42.38 | 43.13 | 44.06 |
| 1744 | 43.13 | 43 | 42.75 | 43.75 | 44.63 | 43 | 43.25 | 43.25 | 44.38 | 44.94 | 45.25 | 45.5 |
| 1745 | 45.75 | 45.5 | 46.38 | 43.63 | 41.25 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| 1746 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | | | |
| 1747 | 40 | 40 | 40 | | 44.88 | 44.5 | 45.13 | 45.25 | 44.5 | 44.63 | 44.63 | 46.5 |
| 1748 | 46.38 | 45 | 45 | 45.13 | 44.38 | 43.56 | 43.44 | 43.63 | 44 | 44.13 | 44.13 | 44.38 |
| 1749 | | | | | 44.5 | 44.13 | 43.38 | 43 | 42.75 | 42.75 | 43.38 | 43.5 |
| 1750 | 43.63 | 43.38 | 43.13 | 42.5 | 41.88 | 41.88 | 41.69 | 41 | 40.25 | 40.31 | 40.5 | 40.5 |
| 1751 | 40.38 | 40.25 | 40.5 | 40.88 | 40.81 | 40.63 | 40.38 | 40.13 | 39.63 | | | |
| 1752 | 39.88 | 39.38 | 39.38 | 38.75 | 38.38 | 37.5 | 36.38 | 36.88 | 36.75 | 37.38 | 37.88 | 38.25 |
| 1753 | 38.13 | 38.13 | 38.13 | 37.75 | 37.63 | 37.63 | 37.94 | 38.13 | 38.06 | 38 | 38.25 | 38.63 |
| 1754 | 38.63 | 38.63 | 38.63 | 38.63 | 38.63 | 38.69 | 38.88 | 38.81 | 38.81 | 38.81 | 38.81 | 38.81 |
| 1755 | 38.81 | 38.81 | 38.81 | 38.81 | 38.5 | 38.63 | 38.5 | 38.06 | 37.81 | 38.13 | 39 | 40 |
| 1756 | 41.38 | 41.88 | 40.75 | 39.38 | 39.5 | 39.63 | 39.63 | 39.63 | 39.38 | 39.38 | 41.13 | 41.88 |
| 1757 | 42.25 | 40.88 | 40.25 | 40.63 | 41.88 | 43.38 | 44.75 | 46.5 | 46.88 | 46.88 | 48 | 49.63 |
| 1758 | 49.63 | 53.13 | 55.5 | 54.13 | 53.38 | 52 | 50.38 | 49.5 | 49.25 | 49.25 | 49.25 | 49 |
| 1759 | 48.63 | 48.25 | 47.88 | 47.5 | 47.38 | 48.75 | 49.25 | 49.25 | 51 | 52.38 | 53.13 | 54.13 |
| 1760 | 56.75 | 59.75 | 61 | 58.13 | 59.75 | 60.13 | 63 | 65.88 | 66.88 | 68 | 70.13 | 73.38 |
| 1761 | 73.75 | 72.25 | 73.5 | 74.13 | 71.75 | 71.13 | 71.75 | 71.5 | 69.75 | 69.13 | 72 | 74.25 |
| 1762 | 73.63 | 74 | 75.5 | 77.63 | 77.75 | 80.5 | 88.25 | 89.25 | 92.88 | 102.6 | 101.8 | 91.5 |
| 1763 | 84.5 | 81.88 | 84 | 81 | 80 | 79 | 75 | 76.5 | 83 | 90 | 86.25 | 85.5 |

**Table A5.2 (cont.).** *Monthly exchange rates on Hamburger reichstaler banco in marks kopparmynt 1705–76 (not spot rates).*

| Year | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1764 | 84.5 | 81.5 | 81.5 | 82.25 | 83.5 | 85.25 | 84.75 | 86.5 | 92.25 | 93.5 | 92 | 86 |
| 1765 | 82.75 | 82.75 | 84.75 | 85.13 | 85.13 | 91.5 | 90.5 | 88.5 | 86.5 | 83.5 | 80.5 | 79.5 |
| 1766 | 77.75 | 77 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 68.75 | 68.25 | 67.25 |
| 1767 | 66 | 66 | 65.75 | 65.25 | 64.5 | 62.75 | 57.75 | 48 | 43.5 | 43.5 | 43.25 | 42.75 |
| 1768 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 |
| 1769 | 42 |  | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 | 42 |  |
| 1770 | 56 | 55.5 | 55 | 55 | 55 | 55 | 60.5 | 64.5 | 63.75 | 65 | 64.5 | 65 |
| 1771 | 65 | 65 | 65.25 | 63.5 | 61 | 61 | 62.25 | 61.5 | 62 | 62.5 | 63.5 | 64.25 |
| 1772 | 64.5 | 66 | 67 | 68.75 | 68.75 | 68.5 | 71 | 73.25 | 71 | 70.25 | 70 | 73 |
| 1773 | 73.75 |  | 82 | 81 | 81 | 81.5 | 81.5 | 80.5 | 79.38 | 80.13 | 80.38 | 80.63 |
| 1774 | 80.5 | 80.5 | 80.38 | 80.13 | 77.75 | 75.5 | 73.5 | 72.38 | 72.5 | 72.75 | 73.13 | 73.25 |
| 1775 | 71 | 70.5 | 70.13 | 69.38 | 68.63 | 68.25 | 68.38 | 68.63 | 69 | 69 | 69 | 69.13 |
| 1776 | 69.13 | 68.88 | 69.13 | 69 | 68.88 | 68.88 | 69 | 69 | 69 | 69 | 69.13 | 69.63 |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv). The monthly data are estimated as the median of highest and lowest rates, and mostly based on two-month bills.

**Table A5.3.** *Monthly exchange rates on Hamburger reichstaler banco in skilling banco 1777–1803 (not spot rates).*

|  | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1777 | 46.33 | 46.42 | 46.25 | 46.58 | 46.58 | 46.58 | 46.5 | 45.5 | 45.25 | 45.33 | 46.5 | 46.67 |
| 1778 | 46.67 | 47 | 46.83 | 46.29 | 46.29 | 45 | 44.75 | 44.83 | 45.08 | 45.58 | 46.75 | 46.58 |
| 1779 | 46.63 | 46.42 | 45.25 | 45.58 | 45.58 | 45.71 | 45.29 | 45.63 | 45.58 | 46.29 | 47.13 | 47.13 |
| 1780 | 47 | 47 | 46.67 | 46 | 45.58 | 45 | 45.58 | 45.71 | 45.42 | 46 | 47.08 | 47.08 |
| 1781 | 46.75 | 45.75 | 45.58 | 45.17 | 45.08 | 45.88 | 45.42 | 45.13 | 44.92 | 44.5 | 45.58 | 44.58 |
| 1782 | 45.17 | 45.5 | 45 | 45 | 45.13 | 45.63 | 45.13 | 45.5 | 45.42 | 45.42 | 46 | 46.13 |
| 1783 | 45.58 | 46 | 45.75 | 45.75 | 45.79 | 46.88 | 47.17 | 47.79 | 47.79 | 47.83 | 48 | 48 |
| 1784 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 48 | 50 | 49.25 | 52 | 53 |
| 1785 | 51.25 | 49.13 | 49.42 | 49.33 | 48.88 | 48.71 | 49.5 | 49.5 | 49.88 | 49.58 | 51.25 | 49.75 |
| 1786 | 48.75 | 47.75 | 47.5 | 47.38 | 47 | 47 | 46.63 | 47.13 | 47.63 | 47.42 | 48 | 48 |
| 1787 | 47.42 | 46.63 | 46.29 | 46.38 | 46.29 | 46.21 | 46.25 | 46.25 | 45.88 | 46.5 | 46.75 | 46.88 |
| 1788 | 46.5 | 46.75 | 46.5 | 46.13 | 46 | 46.75 | 46.88 |  | 47.5 | 46.88 | 46.5 | 46.75 |
| 1789 |  | 47 | 48 | 47.75 | 48.63 | 48.5 | 49.75 | 51 | 49.13 | 51.25 | 55.75 | 55.25 |
| 1790 | 53.5 | 55 | 56.5 | 54.5 | 55 | 56 | 56.75 | 54 | 54.5 | 55.5 | 54.5 | 54.5 |
| 1791 | 53.75 | 53.5 | 53.38 | 53.25 | 52.5 | 51.5 | 50 | 50.58 | 50.42 | 49.25 | 49.5 | 49.5 |
| 1792 | 49 | 49 | 50 | 50 | 50.75 | 51.75 | 50.88 | 51 | 52.25 | 52.25 | 52.25 | 52.25 |
| 1793 | 52.25 | 53 | 51.88 | 53.75 | 54.5 | 54.5 | 53.75 | 52.88 | 54.5 | 55.5 | 54.75 | 57.5 |
| 1794 | 57.25 | 52 | 51.25 | 51.38 | 50.75 | 50.88 | 51 | 49.5 | 49.25 | 49 | 49 | 48 |
| 1795 | 48 | 48 | 48 | 48 | 47 | 47 | 47 | 47 | 47 | 47 | 47 | 47 |

**Table A5.3 (cont).** *Monthly exchange rates on Hamburger reichstaler banco in skilling banco, 1777–1803 (not spot rates).*

| | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1796 | 47 | 47 | 47 | 47 | 47 | 47.5 | 47 | 47 | 47 | 47.5 | 48 | 48 |
| 1797 | 49.25 | 49.13 | 49.63 | 50.5 | 50.13 | 50.13 | 50 | 51.5 | 50.75 | 50.25 | 51 | 51.5 |
| 1798 | 53.5 | | | | | | | | | 50 | 50.5 | 50.5 |
| 1799 | 50.5 | 52 | 53 | 52.75 | 52 | 53 | 53 | 52.38 | 51 | 52 | 53.5 | |
| 1800 | | | | 54 | 52 | 51 | 51 | 51 | 50 | 49.5 | 49.5 | 49.75 |
| 1801 | 50 | 52.75 | 52.75 | 52.5 | 52.5 | 52.75 | 52 | 51 | 51.25 | 51.5 | 51.13 | 51.5 |
| 1802 | 53 | 53 | 52 | 51.5 | 50.5 | 51.5 | 50.5 | 50.63 | 49.5 | 49 | 49.25 | 50 |
| 1803 | 50.5 | 50.33 | 50.67 | 51.5 | 51 | 52.21 | 52.25 | 52 | 48.5 | 49.25 | 48.88 | 50.5 |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv). Monthly exchange rates are estimated from the mid-month figures, and mostly based on two-month bills.

**Table A5.4.** *Monthly exchange rates on Hamburger reichstaler banco in skilling riksgälds 1797–1803 (not spot rates).*

| | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1797 | | | | | 51.25 | 52.25 | 51.5 | 53 | 53 | 54 | 53.75 | 55.5 |
| 1798 | 56.88 | 56 | 54 | 53.75 | 53.25 | 51 | 51 | 53 | 52.5 | 54.25 | 56 | 69.5 |
| 1799 | 67.75 | 71 | 72 | 74 | 73.75 | 76 | 75.5 | 76 | 74.5 | 77.5 | 82 | |
| 1800 | | | | 75.25 | 72.25 | 68 | 69.25 | 69.75 | 70 | 69.75 | 69.75 | 70.75 |
| 1801 | 69.75 | 79.5 | 73.75 | 74.25 | 73.75 | 74.5 | 73.25 | 75 | 76.75 | 78 | 77.88 | 77.88 |
| 1802 | 79.5 | 76.75 | 76.75 | 75.25 | 74.5 | 75.25 | 75.75 | 75.25 | 73.75 | 73.13 | 76.25 | 75.75 |
| 1803 | 75.75 | 76.25 | 76 | 77.13 | 77.88 | 79.75 | 78.75 | 78.25 | | | | |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv). Monthly exchange rates are estimated from the mid-month figures, and mostly based on two-month bills.

**Table A5.5.** *Monthly exchange rates on Amsterdam rijksdaalder courant in marks kopparmynt 1660–85 (estimated spot rates).*

| Year | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1660 | 17.2 | 17.33 | 17.02 | 17.12 | 16.56 | 16.31 | 16.43 | 16.93 | 16.98 | 16.98 | 17.02 | 17.25 |
| 1661 | 17.42 | 17.63 | 17.84 | 17.92 | 17.92 | 18.14 | 18.09 | 18.09 | 17.5 | 17.69 | 17.37 | 17.62 |
| 1662 | 17.7 | 17.86 | 17.99 | 18 | 17.65 | 17.31 | 17.33 | 17.5 | 17.55 | 17.81 | 17.94 | 18.07 |
| 1663 | 18.27 | 18.3 | 18.28 | 18.14 | 18.09 | 18.31 | 18.75 | 18.82 | 18.83 | 19.05 | 19.13 | 19.62 |
| 1664 | 21.38 | 21.45 | 20.75 | 19.8 | 19.39 | 19.32 | 19.1 | 19.39 | 19.2 | 19.38 | 20.1 | 20.1 |
| 1665 | 20.42 | 20.34 | 20.26 | 20.45 | 20.22 | 20.17 | 20.32 | 20.40 | 20.66 | 20.68 | 20.68 | 21 |
| 1666 | 20.3 | 20.28 | 20.28 | 20.37 | 20.57 | 20.68 | 20.91 | 20.71 | 20.25 | 20.28 | 19.91 | 20.2 |
| 1667 | 20.2 | 20.17 | 20.17 | 20.17 | 20.2 | 20.21 | 20.17 | 20.15 | 20.14 | 20.12 | 20.2 | 20.17 |
| 1668 | 20.21 | 20.17 | 20.21 | 20.23 | 20.2 | 20.4 | 20.21 | 20.07 | 20.13 | 20.17 | 20.07 | 20.05 |

**Table A5.5 (cont.).** *Monthly exchange rates on Amsterdam rijksdaalder courant in marks kopparmynt 1660–85 (estimated spot rates).*

| Year | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1669 | 20.14 | 20 | 20.32 | 20.4 | 20.12 | 20.19 | 19.89 | 19.68 | 19.82 | 19.42 | 20.17 | 20.42 |
| 1670 | 20.5 | 20.65 | 20.96 | 20.94 | 20.2 | 20.09 | 19.7 | 19.84 | 20.19 | 20.56 | 20.69 | 20.44 |
| 1671 | 20.06 | 20.05 | 20.2 | 19.94 | 19.69 | 19.75 | 20.12 | 20.12 | 20.12 | 20.20 | 20.12 | 19.94 |
| 1672 | 19.87 | 19.93 | 20.18 | 20.34 | 20.25 | 20.20 | 20.11 | 20.05 | 20 | 20.28 | 20.75 | 20.63 |
| 1673 | 20.59 | 21.09 | 20.18 | 20.74 | 20.7 | 20.59 | 20.27 | 20.27 | 20.08 | 20.05 | 20.57 | 20.27 |
| 1674 | 20.44 | 20.56 | 20.52 | 20.2 | 20.2 | 20.03 | 20 | 20.12 | 20.34 | 20.58 | 20.38 | 20.38 |
| 1675 | 20.63 | 20.95 | 20.85 | 20.5 | 20.55 | 20.5 | 20.5 | 21.44 | 21.63 | 21.46 | 21.13 | 20.69 |
| 1676 | 20.55 | 20.7 | 21.15 | 20.65 | 20.45 | 20.5 | 21.7 | 21.56 | 22.04 | 22.33 | 22.83 | 23.05 |
| 1677 | 22.76 | 22.89 | 23.23 | 23.33 | 23.29 | 23.29 | 23.65 | 23.91 | 24.31 | 24.46 | 24.18 | 23.96 |
| 1678 | 24.42 | 24.36 | 23.86 | 23.79 | 23.73 | 23.5 | 23.35 | 23.35 | 23.32 | 23.16 | 23.26 | 23.12 |
| 1679 | 23.29 | 23.79 | 24.05 | 24.36 | 24.34 | 25.16 | 25.22 | 25.66 | 25.87 | 26.16 | 26 | 26.56 |
| 1680 | 26.79 | 26.94 | 27.07 | 27.19 | 26.12 | 25.81 | 25.53 | 26.51 | 26.37 | 26.49 | 26.12 | 26.82 |
| 1681 | 26.98 | 26.85 | 27 | 26.12 | 25.44 | 25.37 | 25.11 | 24.61 | 24.24 | 24.15 | 23.98 | 24.23 |
| 1682 | 24.31 | 24.01 | 24.31 | 24.61 | 24.11 | 23.98 | 23.89 | 23.73 | 23.48 | 23.1 | 23.1 | 24.05 |
| 1683 | 23.67 | 24.24 | 24.05 | 24.11 | 24.05 | 23.08 | 23.1 | 24.24 | 22.91 | 23.02 | 23.31 | 23.69 |
| 1684 | 23.83 | 24.02 | 23.79 | 23.67 | 23.52 | 23.44 | 23.44 | 23.61 | 23.5 | 23.35 | 23.35 | 23.51 |
| 1685 | 23.61 | 23.54 | 23.73 | 23.35 | 23.35 | 23.31 | 23.06 | 23.1 | 23.23 | 23.1 | 23.23 | 23.85 |

Sources: Kammarkollegiet, oordnade handlingar, no. 444 (Riksarkivet). The data have been collected and calculated in cooperation with Göran Hansson. The monthly data are based on bills of 8 days to 2 months, assuming an interest rate of 12.5 per cent.

**Table A5.6.** *Monthly exchange rates on Amsterdam rijksdaalder courant in marks kopparmynt 1705–76 (not spot rates).*

| Year | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1705 | | | | | 25.75 | 26.44 | 26 | 26.13 | 26.06 | 26 | 26.19 | 26.31 |
| 1706 | 26.13 | 26.19 | 26.06 | | 25.94 | 25.88 | 25.94 | 25.94 | 25.94 | 25.81 | 25.81 | 25.5 |
| 1707 | 25.94 | 25.81 | | | | | | | | | | |
| | | | | | | | | | | | | |
| 1724 | | | 33.75 | 34.5 | 34 | 33.75 | 33.63 | 33.75 | 33.75 | 33.63 | 33.75 | 33.5 |
| 1725 | 33.88 | 34 | | | | | | | | | | |
| 1726 | | | | | | | | | | | | |
| 1727 | | | | | | | 33.63 | | | 35 | 35 | 35 |
| 1728 | 35.5 | 35 | 35 | 35.5 | 35.25 | 34.5 | 35 | 35 | 34.88 | 34.75 | 35 | 34.38 |
| 1729 | | 34.63 | 34.5 | 35.13 | 34.75 | | | | 32.88 | 32.88 | | |
| | | | | | | | | | | | | |
| 1733 | 34.25 | 34.38 | 34.56 | 34.88 | 34.88 | 34.25 | 34.44 | 34.94 | 34.81 | 34.38 | 34.75 | 34.38 |
| 1734 | 34.88 | 34.81 | 35 | 35.25 | 35.06 | 35 | 34.56 | 34.94 | 35.13 | 35.06 | 35.13 | |
| 1735 | | | | | | | | | | 34.19 | 34.5 | 34.69 |
| 1736 | 34.88 | 35.38 | 35.69 | 35.88 | 35.81 | 35.75 | 35.38 | 35.25 | 34.44 | 34.5 | 34.25 | 34.69 |
| | | | | | | | | | | | | |

**Table A5.6 (cont.).** *Monthly exchange rates on Amsterdam rijksdaalder courant in marks kopparmynt 1705–76 (not spot rates).*

| Year | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1740 | | | 35.44 | 35.56 | 35.63 | 35.69 | 35.75 | 35.13 | 35.5 | 35.56 | 35.81 | 35.75 |
| 1741 | 35.88 | 36 | 35.88 | 35.75 | 35.88 | 35.75 | 35.5 | 36.25 | 36.69 | 37.5 | 37.75 | 39 |
| 1742 | 39.38 | 39.19 | 39.19 | 39.63 | 39.38 | 39.13 | 39.19 | 37.75 | 35.88 | 35.88 | 36.25 | 36.31 |
| 1743 | 36.56 | 36.88 | 36.88 | 37.88 | 38.88 | 40 | 38.25 | 38.5 | 39.5 | 40.38 | 41.13 | 42.25 |
| 1744 | 41.31 | 41.13 | 40.81 | 41.75 | 42.63 | 41.13 | 41.5 | 41.5 | 42.69 | 43.13 | 43.5 | 43.75 |
| 1745 | 43.81 | 43.75 | 44.38 | 42 | 39.5 | 38.25 | 38.25 | 38.25 | 38.25 | 38.25 | 38.25 | 38.25 |
| 1746 | 38.25 | 38.25 | 38.25 | 38.25 | 38.25 | 38.25 | 38.25 | 38.25 | 38.25 | | | |
| 1747 | 38.25 | 38.25 | 38.25 | | 43.88 | 43.63 | 44.13 | 44.38 | 43.75 | 43.75 | 43.88 | 45.63 |
| 1748 | 45.13 | 44.13 | 44.38 | 44 | 43 | 42.38 | 42 | 41.88 | 41.88 | 41.88 | 42 | 42 |
| 1749 | | | | | 42.5 | 42 | 41.5 | 41.25 | 41 | 40.88 | 41.13 | 41 |
| 1750 | 41 | 41 | 40.88 | 40.5 | 39.88 | 39.94 | 39.69 | 38.88 | 38.38 | 38.25 | 38.25 | 38.25 |
| 1751 | 38.13 | 38.13 | 38.25 | 38.25 | 38.25 | 38.13 | 37.88 | 37.88 | 37.38 | | | |
| 1752 | 37.63 | 37.25 | 36.88 | 36.63 | 36.13 | 35.25 | 34.25 | 34.63 | 34.75 | 35.25 | 35.75 | 36 |
| 1753 | 35.88 | 35.94 | 35.88 | 35.69 | 35.63 | 35.38 | 35.69 | 35.81 | 35.63 | 35.75 | 35.88 | 36 |
| 1754 | 36.13 | 36.13 | 36.13 | 36.13 | 36.06 | 36.19 | 36.13 | 36 | 36 | 36.06 | 36.13 | 36.06 |
| 1755 | 36 | 36.06 | 36.06 | 36.06 | 36.06 | 36.13 | 36.13 | 36.13 | 36.06 | 36.13 | 36.88 | 38.25 |
| 1756 | 39.38 | 39.88 | 39.25 | 38.13 | 38.25 | 38.5 | 38.63 | 38.63 | 38.5 | 38.63 | 40.5 | 41.38 |
| 1757 | 42 | 41.13 | 40.5 | 40.69 | 42.25 | 44.63 | 46.13 | 47.63 | 47.88 | 47.88 | 48.5 | 49.75 |
| 1758 | 50.44 | 54.13 | 56.38 | 55.13 | 55 | 53 | 51.88 | 51.13 | 51 | 51 | 50.88 | 50.63 |
| 1759 | 50.38 | 50.25 | 50.5 | 50.63 | 50.88 | 52.25 | 52.63 | 52 | 52.5 | 53.63 | 54.25 | 55.25 |
| 1760 | 57.38 | 60.75 | 62.5 | 59.5 | 59.75 | 58.5 | 60 | 62.38 | 62.5 | 63 | 64.63 | 67.75 |
| 1761 | 68.13 | 67.25 | 68.75 | 69 | 67 | 66.88 | 67.88 | 67.13 | 66 | 65.13 | 67.75 | 69.25 |
| 1762 | 68.88 | 70 | 71.5 | 74 | 75 | 79 | 86.75 | 85 | 93.63 | 102.5 | 101 | 89.5 |
| 1763 | 83 | 80.75 | 82.75 | 80 | 78.75 | 78 | 74 | 75.75 | 82.25 | 84.5 | 83.5 | 83 |
| 1764 | 80.63 | 77 | 77.75 | 78.25 | 79.5 | 81.25 | 81 | 82.75 | 88.25 | 90 | 88.5 | 82 |
| 1765 | 79.25 | 79.25 | 80.5 | 81 | 81 | 87.5 | 86 | 85 | 83.5 | 80.5 | 77.5 | 76.5 |
| 1766 | 75 | 74 | 69 | 69 | 69 | 69 | 69.5 | 70 | 70 | 69 | 69 | 67.25 |
| 1767 | 66 | 66 | 66 | 66 | 66 | 64 | 58.5 | 49 | 44.5 | 44.25 | 43.75 | 42.25 |
| 1768 | 41.38 | 41.63 | 41.63 | 41.75 | 41.75 | 41.75 | 41.75 | 41.13 | 41.25 | 41.75 | 40.5 | 41.75 |
| 1769 | 41.75 | 41.75 | 40.63 | 41.75 | 40.38 | 41.75 | 41.75 | | 41.75 | 41.75 | 41.75 | |
| 1770 | 54 | 53.5 | 53 | 53 | 53 | 53 | 58 | 61.75 | 60.5 | 61.5 | 60.75 | 61 |
| 1771 | 61 | 61 | 61 | 59 | 58.5 | 58 | 59.5 | 58.75 | 59 | 59.5 | 60 | 60 |
| 1772 | 60.5 | 62.25 | 63 | 65 | 64.75 | 64.75 | 67 | 69 | 67 | 66.25 | 68.25 | 69 |
| 1773 | 69.25 | | 78 | 77.5 | 78.25 | 78.5 | 78.25 | 77.5 | 76.38 | 76.38 | 76.25 | 76 |
| 1774 | 75.88 | 76 | 76 | 76 | 73.75 | 71.5 | 70.38 | 69 | 69 | 69.13 | 69.13 | 69.13 |
| 1775 | 67 | 66.75 | 66.38 | 66 | 65.5 | 65.25 | 65.25 | 65.25 | 65.25 | 65.38 | 65.25 | 65.25 |
| 1776 | 65.13 | 64.88 | 65.25 | 65.25 | 65.25 | 65.13 | 65.13 | 64.88 | 64.75 | 64.75 | 64.38 | 64.75 |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv). The monthly data are estimated as the median of highest and lowest rates, and mostly based on two-month bills.

**Table A5.7.** *Monthly exchange rates on Amsterdam rijksdaalder courant in skilling banco 1777–1803 (not spot rates).*

| | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1777 | 43.25 | 43.33 | 43.33 | 43.75 | 44 | 43.83 | 43.17 | 42.25 | 42.25 | 42.33 | 43.17 | 43.5 |
| 1778 | 43.33 | 44 | 44 | 43.33 | 43.25 | 42.17 | 42.08 | 42.75 | 43 | 43 | 43.88 | 44 |
| 1779 | 43.5 | 44.13 | 43.75 | 43.63 | 44.08 | 44 | 43.58 | 43.5 | 43.75 | 44.13 | 44.67 | 43.79 |
| 1780 | 45 | 45.08 | 45.08 | 44.13 | 44 | 43 | 43.42 | 43.42 | 43.42 | 43.75 | 44.5 | 44.17 |
| 1781 | 43.88 | 44 | 43.75 | 43.13 | 43.17 | 43.88 | 43.5 | 43.17 | 42.63 | 42.08 | 42.33 | 41.38 |
| 1782 | 41.88 | 42.25 | 42 | 42 | 42.25 | 42.38 | 42.21 | 42.08 | 41.5 | 40.88 | 41.5 | 40.75 |
| 1783 | 41.17 | 42.58 | 42.5 | 42 | 41.75 | 42.75 | 43.33 | 44.71 | 44.79 | 45.25 | 45.5 | 45.33 |
| 1784 | 45.33 | 45.33 | 45.33 | 45.5 | 45.5 | 45.5 | 46 | 46.5 | 46.5 | 46.33 | 48 | 48.5 |
| 1785 | 47.25 | 46 | 46 | 46 | 46 | 45.75 | 46.58 | 46.63 | 46.88 | 46.67 | 48.38 | 47 |
| 1786 | 46.63 | 45.5 | 45 | 45.5 | 45.25 | 45 | 44.63 | 44.5 | 44.75 | 44.5 | 45 | 45 |
| 1787 | 44.42 | 44 | 43.58 | 43.58 | 43.25 | 43.33 | 43.21 | 43.13 | 43 | 43.75 | 44 | 44 |
| 1788 | 43.42 | 43.75 | 43.75 | 43.38 | 43 | 43.5 | 42.88 | | 43.67 | 42.75 | 42.5 | 42.42 |
| 1789 | | 43.38 | 44.88 | 44.5 | 45.63 | 45.5 | 46.81 | 47 | 46.5 | 48.75 | 52.5 | 51.38 |
| 1790 | 50 | 52.13 | 53.5 | 52.25 | 52 | 53 | 53.75 | 51 | 51.5 | 52.5 | 51.5 | 51 |
| 1791 | 50.5 | 50.5 | 50 | 50.25 | 50 | 49.5 | 49.25 | 48.58 | 48.42 | 47 | 47.13 | 47.5 |
| 1792 | 47 | 47.25 | 48 | 48 | 48.5 | 49.5 | 48.75 | 49 | 50 | 49.75 | 49.75 | 49.75 |
| 1793 | 50 | 51 | 50.5 | 52.25 | 53 | 51.75 | 52.5 | 51.25 | 53.13 | 52.08 | 51.13 | 53.5 |
| 1794 | 53.25 | 48.25 | 47.75 | 48 | 47.75 | 47.38 | 47 | 45 | 45.5 | 45 | 45 | 46 |
| 1795 | | | | 47 | 46 | 45.75 | 42 | 42 | 43 | 42.5 | 42.5 | 41.75 |
| 1796 | 41 | 43 | 42 | 42.5 | 42 | 42.33 | 41.88 | 41.25 | 40.33 | 41.25 | 41.75 | 42 |
| 1797 | 43.63 | 43 | 45 | 45.5 | 45 | 45 | 45.5 | 46.25 | 47 | 46.75 | | 47.5 |
| 1798 | 51 | | | | | | | | | | 45 | 44 |
| 1799 | | 46.5 | | 46 | 46 | 46 | 46.63 | 47.5 | 47.5 | 47 | 48 | |
| 1800 | | | | 50.5 | 48 | 47.75 | 47 | 47 | 46 | 46 | 46 | |
| 1801 | | | | 50 | | | 47.5 | 47 | 46.75 | 47 | 47 | |
| 1802 | | 47 | 47.63 | 47.38 | 47 | 47.13 | 47 | 46.5 | 45.75 | 45.88 | 46.5 | |
| 1803 | | | 48 | | 48.5 | 49 | 48.5 | 47.75 | 45.5 | 46 | 45.25 | 46.13 |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv). Monthly exchange rates are estimated from the mid-month figures, and mostly based on two-month bills. For monthly exchange rates after 1803, see Chapter 6.

**Table A5.8.** *Monthly exchange rates on Amsterdam rijksdaalder courant in skilling riksgälds 1797–1803 (not spot rates).*

| | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1797 | | | | | 46.5 | 48 | 47 | 48 | 49 | 50.5 | 50 | 51.38 |
| 1798 | 53.38 | 52 | 50 | 51.25 | 50.75 | 48 | 48 | 49 | 50.5 | 49.75 | 51 | 61.5 |
| 1799 | 60.5 | 63 | 63.75 | 65 | 64.75 | 67 | 69 | 69 | 68 | 71 | 71 | |
| 1800 | | | | 72 | 68.5 | 64 | 66 | 65.5 | 66 | 65.5 | 65.5 | 65.75 |
| 1801 | 64.25 | 74 | 67 | 69 | 69.5 | 70 | 68.25 | 69.5 | 70.5 | 72.25 | 72.38 | 71.75 |
| 1802 | 72.25 | 70.5 | 70.5 | 71.5 | 70.5 | 71.25 | 70.75 | 70.25 | 69.25 | 69.25 | 71.5 | 71.25 |
| 1803 | 70.25 | 72 | 71.25 | 73.25 | 73.25 | 75.25 | 74.88 | 72.38 | | | | |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv). Monthly exchange rates are estimated from the mid-month figures, and mostly based on two-month bills.

**Table A5.9.** *Monthly exchange rates on pound sterling in daler kopparmynt 1705–76 (not spot rates)*.

| Year | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1705 | | | | | 27 | 27 | 27.13 | 27.31 | 27.31 | 27.31 | 27.38 | 27.56 |
| 1706 | 27.56 | 27.63 | 27.44 | | 27.5 | 27.5 | 27.38 | 27.31 | 27.19 | 27.25 | 27.81 | 28 |
| 1707 | 28.13 | 27.88 | | | | | | | | | | |
| | | | | | | | | | | | | |
| 1727 | | | | | 37.5 | 36.5 | 37.5 | 37.25 | 37 | 37.38 | 37.88 | 38 |
| 1728 | 38.5 | 38.38 | 38.38 | 38.5 | 37.38 | 37 | 37.38 | 37 | 37.13 | 37.13 | 37.13 | 36.63 |
| 1729 | 37.25 | 37 | 37.13 | 37.5 | 36.88 | | | | 33.38 | 33.38 | | |
| | | | | | | | | | | | | |
| 1733 | 37.25 | 37.25 | 37.5 | 37.75 | 37.75 | 37.25 | 37.25 | 37.38 | 37.38 | 37.31 | 37.88 | 37.88 |
| 1734 | 38.38 | 38.75 | 39 | 39.38 | 39.25 | 39.25 | 38.81 | 38.88 | 39.19 | 39.25 | 39.38 | |
| 1735 | | | | | | | | | | 38.5 | 38.94 | 38.75 |
| 1736 | 39.5 | 39.25 | 39.63 | 39.56 | 39.31 | 39.13 | 38.63 | 38.38 | 37.63 | 37.5 | 37.63 | 37.69 |
| | | | | | | | | | | | | |
| 1740 | | | 39.63 | 39.63 | 39.44 | 39.44 | 39.31 | 38.56 | 38.63 | 38.88 | 39.13 | 39 |
| 1741 | 39.25 | 39.13 | 39.19 | 39.13 | 39.13 | 38.75 | 38.31 | 39 | 39.13 | 39.94 | 40.63 | 42.5 |
| 1742 | 42.13 | 42 | 41.88 | 42.63 | 42.38 | 42.13 | 42.25 | 41.44 | 39.38 | 39.13 | 39.63 | 39.63 |
| 1743 | 40.38 | 40.63 | 41.13 | 41.25 | 42.13 | 41.75 | 41.19 | 41.75 | 42.63 | 43.5 | 44.5 | 46.13 |
| 1744 | 45 | 44.88 | 44.31 | 45.13 | 46.13 | 44.38 | 44.75 | 45.13 | 45.63 | 46.13 | 46.5 | 46.88 |
| 1745 | 47.13 | 47.38 | 48.63 | 45.88 | 44.25 | | 41.5 | 41.5 | | 41.5 | | |
| 1746 | | | 41.5 | 41.5 | 41.5 | 41.5 | 41.5 | 41.5 | 41.5 | | | |
| 1747 | 41.5 | 41.5 | 41.5 | | 48.63 | 48.25 | 48.63 | 48.75 | 48.5 | 48.5 | 48.63 | 50.5 |
| 1748 | 50 | 48.25 | 49 | 48.88 | 48.25 | 47.75 | 47.13 | 47.5 | 47.38 | 47.5 | 47.75 | 47.75 |
| 1749 | | | | | 48.5 | 48.13 | 47.25 | 46.63 | 46.38 | 45.63 | 45.63 | 45.63 |

**Table A5.9 (cont.).** *Monthly exchange rates on pound sterling in daler kopparmynt 1705–76 (not spot rates).*

| Year | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1750 | 45.5 | 45.25 | 44.88 | 44.38 | 43.5 | 43.13 | 43.13 | 42.38 | 41.63 | 41.5 | 42.38 | 42.5 |
| 1751 | 42.38 | 42.25 | 42.13 | 42.5 | 42.38 | 42.38 | 42.13 | 41.88 | 41.5 | | | |
| 1752 | 42.13 | 41.63 | 40.88 | 40.38 | 39.88 | 39.25 | 37.75 | 38 | 38.25 | 38.25 | 39.13 | 39.63 |
| 1753 | 39.5 | 39.13 | 38.88 | 38.81 | 38.5 | 38.56 | 38.69 | 38.88 | 38.88 | 39.13 | 39.38 | 40 |
| 1754 | 39.88 | 39.88 | 39.94 | 39.88 | 39.88 | 40.13 | 40.06 | 40 | 40.13 | 40.25 | 40.44 | 40.44 |
| 1755 | 40.44 | 40.44 | 40.63 | 40.88 | 40.88 | 41 | 41.06 | 41.06 | 41 | 41.06 | 41.81 | 42.88 |
| 1756 | 44.25 | 45 | 44.13 | 43.5 | 42.75 | 43.63 | 44.25 | 43.75 | 43.75 | 44 | 45.5 | 47.25 |
| 1757 | 47.5 | 46.75 | 46 | 46.25 | 47.88 | 48.38 | 49.38 | 51.38 | 51.5 | 51.5 | 52.5 | 53.75 |
| 1758 | 54.25 | 57 | 60.5 | 58.75 | 58.38 | 56.5 | 55.5 | 54.88 | 54.88 | 54.63 | 54.63 | 54.75 |
| 1759 | 54.25 | 54.25 | 54.5 | 54.75 | 54.75 | 55.88 | | 56.63 | 58.25 | 58.38 | 59.5 | 62.13 |
| 1760 | 62.75 | 64.25 | 67.63 | 65.5 | 65 | 63.75 | 64.75 | 67 | 67.25 | 67.25 | 69 | 72.5 |
| 1761 | 72.5 | 71.88 | 72.5 | 73.13 | 72 | 69.75 | 70.5 | 70.5 | 68.75 | 68.5 | 71.5 | 75.5 |
| 1762 | 74.5 | 76 | 78.25 | 81 | 81.63 | 84.38 | 92.25 | 95.75 | 100 | 110.5 | 108 | 96.5 |
| 1763 | 89.88 | 86.75 | 87.75 | 85 | 83.25 | 82.25 | 78 | 79.5 | 79.5 | 93 | 90 | 89.25 |
| 1764 | 86.75 | 85.5 | 86.75 | 86.75 | 89 | 90.5 | 91.5 | 93 | 98.75 | 100 | 99.5 | 92.5 |
| 1765 | 90.5 | 90.25 | 93 | | 93.5 | 98.63 | 96 | 94.75 | 93 | 89 | 89.5 | 84 |
| 1766 | 83 | 83 | 76 | | 76 | 76 | 76.5 | 76.5 | 76.5 | 74 | 75.13 | 73 |
| 1767 | 72 | 71.88 | 71.88 | 72 | 71.75 | 69.13 | 64 | 52.25 | 48.75 | 47.5 | 46.75 | 45.25 |
| 1768 | 46 | 46 | 45.38 | 46.25 | | | | 44.5 | | | | |
| 1769 | | | | | | | | | | | | |
| 1770 | 56.13 | 57 | 56.38 | 56.5 | | | 66.5 | 65.25 | 64.5 | 65.5 | 64.75 | 65.75 |
| 1771 | 65.5 | 66 | 66 | 64.25 | 63.25 | 62 | 63.5 | 62.75 | 62.75 | 63.75 | 63.5 | 64 |
| 1772 | | 67 | 67.25 | 71 | 69.5 | 69.5 | 72 | 74.5 | 72.75 | 72.5 | 74.5 | 76.5 |
| 1773 | 67.38 | | | | 86.63 | 87.25 | 87.5 | 86.5 | 85.5 | 86.13 | 86 | 86 |
| 1774 | 86.5 | | 86.5 | 86.5 | 84 | 81.25 | 79 | 77.25 | 77.38 | 77.38 | 77.25 | 77.38 |
| 1775 | 75.5 | 75 | 74.75 | 73.38 | 72.5 | 72 | 72 | 72 | 72.25 | 72.38 | 72.38 | 72 |
| 1776 | 72.06 | 71.75 | 72.13 | 71.88 | 71.63 | 71.25 | 70.25 | 70.38 | 70.25 | 70.13 | 70.06 | 70.19 |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv). The monthly data are estimated as the median of highest and lowest rates, and mostly based on three-month bills.

**Table A5.10.** *Monthly exchange rates on pound sterling in riksdaler banco 1777–1803 (not spot rates).*

| | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1777 | 3.91 | 3.91 | 3.917 | 3.931 | 3.925 | 3.901 | 3.854 | 3.771 | 3.708 | 3.742 | 3.818 | 3.859 |
| 1778 | 3.859 | 3.888 | 3.927 | 3.953 | 3.953 | 3.938 | 3.948 | 3.979 | 3.979 | 3.99 | 4.063 | 4.099 |
| 1779 | 4.208 | 4.224 | 4.146 | 4.188 | 4.182 | 4.135 | 4.073 | 4.031 | 3.927 | 4.021 | 4.104 | 4.146 |
| 1780 | 4.156 | 4.198 | 4.194 | 4.099 | 4.078 | 4.042 | 4.026 | 4.021 | 4.021 | 4.047 | 4.073 | 4.052 |
| 1781 | 4.01 | 3.958 | 3.917 | 3.875 | 3.854 | 3.823 | 3.729 | 3.698 | 3.625 | 3.609 | 3.63 | 3.589 |
| 1782 | 3.677 | 3.708 | 3.698 | 3.724 | 3.734 | 3.75 | 3.76 | 3.755 | 3.708 | 3.688 | 3.688 | 3.688 |

**Table A5.10 (cont.).** *Monthly exchange rates on pound sterling in riksdaler banco 1777–1803 (not spot rates).*

| | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1783 | 3.724 | 3.833 | 3.792 | 3.776 | 3.714 | 3.724 | 3.75 | 3.849 | 3.854 | 4 | 4.073 | 4.125 |
| 1784 | 4.229 | 4.25 | 4.281 | 4.297 | 4.281 | 4.344 | 4.333 | 4.37 | 4.406 | 4.385 | 4.521 | 4.688 |
| 1785 | 4.563 | 4.49 | 4.484 | 4.438 | 4.344 | 4.375 | 4.427 | 4.516 | 4.521 | 4.484 | 4.536 | 4.5 |
| 1786 | 4.38 | 4.323 | 4.333 | 4.281 | 4.181 | 4.104 | 4.125 | 4.161 | 4.167 | 4.182 | 4.271 | 4.26 |
| 1787 | 4.146 | 4.104 | 4.104 | 4.104 | 4.104 | 4.073 | 4.083 | 4.099 | 4.109 | 4.177 | 4.193 | 4.229 |
| 1788 | 4.208 | 4.214 | 4.245 | 4.208 | 4.156 | 4.177 | 4.161 | | 4.208 | 4.151 | 4.141 | 4.151 |
| 1789 | | 4.255 | 4.313 | 4.359 | 4.391 | 4.469 | 4.531 | 4.604 | 4.526 | 4.656 | 4.917 | 4.938 |
| 1790 | 5.042 | 5.083 | 5.208 | 5.167 | 5.25 | 5.219 | 5.208 | 5.167 | 5.042 | 5.01 | 4.917 | 4.896 |
| 1791 | 4.958 | 4.917 | 4.875 | 4.896 | 4.854 | 4.781 | 4.703 | 4.703 | 4.698 | 4.604 | 4.484 | 4.719 |
| 1792 | 4.375 | 4.458 | 4.479 | 4.448 | 4.438 | 4.469 | 4.448 | 4.448 | 4.51 | 4.552 | 4.583 | 4.625 |
| 1793 | 4.703 | 4.786 | 4.875 | 5.021 | 5.125 | 5.125 | 5.125 | 5.083 | 5.167 | 5.063 | 5.219 | 5.073 |
| 1794 | 5.036 | 4.818 | 4.823 | 4.823 | 4.75 | 4.625 | 4.625 | 4.5 | 4.458 | 4.375 | 4.313 | 4.188 |
| 1795 | 4.167 | 4.125 | 4.135 | 4.188 | 4.021 | 3.917 | 3.917 | 3.875 | 3.875 | 3.885 | 3.938 | 3.938 |
| 1796 | 3.938 | 4.01 | 3.979 | 4.167 | 4.104 | 4.094 | 4.01 | 4 | 4 | 4.104 | 4.188 | 4.25 |
| 1797 | 4.375 | 4.396 | 4.417 | 4.542 | 4.583 | 4.604 | 4.667 | 4.802 | 4.948 | 4.813 | 4.865 | 5 |
| 1798 | | | | | | | | | | | 4.833 | 4.833 |
| 1799 | 4.729 | 4.979 | | | 4.917 | 4.854 | 4.719 | | | 3.854 | 3.792 | |
| 1800 | | | | | 4.083 | 4.125 | 4.104 | 4 | 4.021 | 4.01 | | 3.938 |
| 1801 | 3.896 | 4.167 | | | | 4.271 | 4.083 | 4.094 | 4.083 | 4.229 | 4.208 | 4.156 |
| 1802 | | | 4.323 | 4.24 | 4.208 | 4.26 | 4.198 | 4.219 | | 4.156 | 4.156 | 4.24 |
| 1803 | | 4.5 | 4.5 | 4.438 | 4.438 | 4.417 | 4.417 | 4.344 | 4.125 | 4.167 | 4.208 | 4.375 |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv). The monthly data are estimated as the median of highest and lowest rates, and mostly based on three-month bills.

**Table A5.11.** *Monthly exchange rates on pound sterling in riksdaler riksgälds 1797–1803 (not spot rates).*

| | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1797 | | | | | 4.635 | 4.771 | 4.724 | 4.958 | 5.083 | 5.083 | 5.177 | 5.271 |
| 1798 | 5.271 | 5.375 | 5.167 | 5.203 | 5.172 | 4.979 | 4.958 | 5.125 | 5.208 | 5.208 | 5.375 | 6.708 |
| 1799 | 6.49 | 6.719 | 6.76 | 6.938 | 6.792 | 6.813 | 6.75 | 6.75 | 6.25 | 5.917 | 6.188 | |
| 1800 | | | | 5.917 | 5.833 | 5.708 | 5.813 | 5.729 | 5.688 | 5.688 | 5.688 | 5.479 |
| 1801 | 5.438 | 6.146 | | 6.083 | 5.917 | 5.958 | 5.875 | 6.042 | 6.146 | 6.313 | 6.375 | 6.354 |
| 1802 | 6.521 | 6.354 | 6.323 | 6.313 | 6.167 | 6.271 | 6.302 | 6.313 | 6.25 | 6.292 | 6.417 | 6.448 |
| 1803 | 6.583 | 6.75 | 6.708 | 6.75 | 6.688 | 6.792 | 6.677 | 6.625 | | | | |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv). The monthly data are estimated as the median of highest and lowest rates, and mostly based on three-month bills.

**Table A5.12.** *Monthly exchange rates on écu de change (= 3 livres tournois) in marks kopparmynt 1668–85 (estimated spot rates).*

| Year | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1668 | | | | | | | | | 21.41 | | | |
| 1669 | 21.41 | 21.41 | 21.41 | | 21.41 | | | 21.41 | | | 21.41 | |
| 1670 | 21.21 | 21.31 | 21.41 | 21.41 | 21.41 | 21.18 | 21.29 | 21.29 | | 21.4 | | |
| 1671 | 21.63 | | | | 21.21 | 21.41 | 21.21 | 21.31 | 21.31 | 21.21 | 21.31 | |
| 1672 | 21.21 | | 21.21 | 21.21 | 21.21 | 21.31 | 21.18 | 20.95 | 20.95 | 20.95 | | 20.83 |
| 1673 | 20.7 | 20.7 | 21.21 | | 21.21 | 21.15 | 21.06 | 21.21 | 21.06 | 21.06 | | 21.21 |
| 1674 | 21.21 | 21.21 | 21.21 | 21.21 | 21.21 | 21.21 | 21.56 | 21.56 | 21.56 | 21.4 | 21.6 | 21.4 |
| 1675 | 21.56 | 21.71 | | 21.56 | 21.56 | 21.56 | 22.07 | | 22.07 | 22.07 | 22.22 | 22.22 |
| 1676 | 22.58 | | | 22.72 | 22.72 | 21.81 | 20.95 | 22.2 | 22.58 | 23.73 | 23.73 | 24.99 |
| 1677 | 24.24 | | | 24.24 | 24.24 | | 24.24 | 24.74 | 25.25 | 25.25 | 25.49 | 25.37 |
| 1678 | 25.25 | 25.25 | 25.25 | 25.25 | 25.25 | | 25.5 | 25.37 | 24.73 | 24.61 | 24.61 | 24.61 |
| 1679 | 24.61 | 24.61 | 24.74 | 24.61 | 24.74 | 25.11 | 25.62 | 25.97 | 26.13 | 26.13 | 26.13 | 26.89 |
| 1680 | 27.14 | 27.27 | 28.02 | 28.28 | 28.28 | | 27.14 | 27.27 | 27.77 | 27.53 | 28.04 | 28.55 |
| 1681 | 28.28 | 28.28 | | 27.27 | 27.07 | 27.27 | 27.1 | 27.14 | 26.13 | 25.93 | 25.25 | 25.47 |
| 1682 | 25.5 | 25.25 | 25.75 | 26.13 | 26.13 | | 25.24 | 24.84 | 24.73 | 24.65 | 24.73 | 25.25 |
| 1683 | 25.25 | 25.11 | 25.4 | 25.41 | 24.74 | 24.74 | 24.92 | 24.06 | 24.73 | 25.06 | 25.25 | 25.12 |
| 1684 | 25.5 | 25.06 | 25.16 | 24.99 | 24.96 | | 24.74 | 24.87 | 24.93 | 24.8 | 24.62 | 24.84 |
| 1685 | 25.15 | 25.25 | 24.98 | 24.73 | 25.09 | 24.9 | 24.73 | 24.78 | 24.73 | 24.74 | 24.98 | 25.11 |

Source: Kammarkollegiet, oordnade handlingar, no. 444 (Riksarkivet). The monthly data are based on bills of 8 days to 2 months, assuming an interest rate of 12.5 per cent.

**Table A5.13.** *Monthly exchange rates on livres tournois in marks kopparmynt 1705–76 (not spot rates).*

| Year | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1705 | | | | | 7.25 | 7.25 | 7.139 | 7.25 | 7.25 | 7.25 | 7.25 | 7.25 |
| 1706 | 7.25 | 7.25 | 7.25 | | | | | 7.167 | 7.167 | 7.167 | 7.167 | 7.167 |
| 1707 | 7.25 | 7.25 | | | | | | | | | | |
| | | | | | | | | | | | | |
| 1740 | | | | 7.375 | | | 7.5 | 7.438 | 7.125 | 7.125 | 7.125 | 7.125 |
| 1741 | 7.125 | 7.125 | 7.25 | 7.25 | 7.25 | 7.25 | 7.25 | 7.25 | 7.25 | 7.25 | 7.5 | 7.75 |
| 1742 | | | | | 7.625 | 7.563 | 7.438 | | | 7.5 | 7.5 | 7.375 |
| 1743 | | | | | | 7.75 | | | | | | |
| 1744 | | | | | | | 8.75 | 8.75 | | | | |
| 1745 | | 9.25 | 9.25 | | 8.5 | | | | | | | |
| 1746 | | | | | | | | | | | | |
| 1747 | 7.5 | 7.5 | 7.5 | | | | | | | | 8 | |
| 1748 | | | 9.125 | 9.125 | 9.125 | 9.125 | 8.75 | 8.75 | 8.75 | 8.75 | 9 | 9 |

**Table A5.13 (cont.).** *Monthly exchange rates on livres tournois in marks kopparmynt 1705–76 (not spot rates).*

| Year | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1749 | | | | | 8.75 | 8.75 | 8.5 | 8.375 | 8.375 | 8.375 | 8.375 | 8.375 |
| 1750 | 8.375 | 8.5 | 8.5 | 8.5 | 8.5 | 8.5 | 8.5 | 8.375 | 8.25 | 8 | 8 | 8 |
| 1751 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 7.875 | | | |
| 1752 | | 7.5 | 7.5 | 7.25 | | | | | | | | |
| 1753 | 7 | | | 7.5 | | | 7.375 | | | 7.5 | 7.5 | |
| 1754 | | 7.375 | 7.375 | | 7.438 | | | 7.25 | | | | |
| 1755 | 7.5 | | | | | | | | 7.5 | | | 7.5 |
| 1756 | 8.5 | 8.188 | 7.938 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | |
| 1757 | | | | | | | | | | | | |
| 1758 | | | | | | | | | | | 9.75 | 9.75 |
| 1759 | | 9.75 | | | | | | | | | | |
| 1760 | 10.75 | 11.75 | 11.75 | 12 | | | | | 12 | 12.25 | 12.5 | 12.5 |
| 1761 | 14 | 12.75 | 12.75 | 13 | 13 | 13 | | 13 | 13 | | | 13.25 |
| 1762 | 13.25 | | 13.5 | 13.5 | | 14 | 14 | 16 | 16 | | | 17 |
| 1763 | 17 | | 17 | 17 | | | 16 | 16 | | | | 16.25 |
| 1764 | 18 | 16.25 | 15 | | | | | | | | 19 | |
| 1765 | 16 | | | | | | 18 | 18 | | | | |
| 1766 | 15 | 15 | | | | | | | | | | 13.5 |
| 1767 | 13.5 | 13.5 | 13.5 | 13.5 | 13.5 | 12.75 | 12 | | | | | |
| 1768 | | | | | | | | | | | | |
| 1769 | | | | | | | | | | | | |
| 1770 | | | | | | | | | | | | |
| 1771 | | | | | | | | | | | | |
| 1772 | | | | | | | | | | | | |
| 1773 | | | | 14.5 | | 14.5 | | | | | | |
| 1774 | | | | 14.25 | | | | | | | | |
| 1775 | | 13.06 | | | | | | 12.5 | | | | 12.5 |
| 1776 | | | | 12.5 | | | 12.38 | 12.38 | | 12.94 | 12.25 | 12.38 |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv). The monthly data are estimated as the median of highest and lowest rates, and mostly based on three-month bills.

**Table A5.14.** *Monthly exchange rates on livres tournois (franc from 1795) in skilling banco 1777–1803 (not spot rates).*

| | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1777 | 8.25 | 8.25 | 8.25 | 8.333 | 8.292 | 8.333 | | 8.167 | 8.292 | 8.292 | 8.375 | |
| 1778 | 8.417 | 8.333 | 8.417 | 8.308 | 8.333 | | 8.333 | 8.333 | 8.375 | 8.333 | 8.417 | |
| 1779 | | | 8.417 | | | 8 | 8.25 | | 8.333 | 8.333 | 8.417 | 8.333 |
| 1780 | 8.375 | 8.25 | | | 8.333 | 8.125 | 8.333 | | 8.333 | 8.417 | 8.333 | 8.333 |
| 1781 | 8.25 | 8.333 | 8.333 | 8.167 | 8.167 | 8.333 | 8.167 | 8.167 | 8.208 | 8.25 | 8 | 7.875 |
| 1782 | 7.75 | 8 | 7.875 | 8 | 7.917 | 8.083 | 8.125 | 8.083 | 8.083 | 8.042 | 7.875 | |
| 1783 | 7.917 | 8 | 7.875 | 8 | 8 | 8.167 | 8.167 | 8.25 | 8.25 | 8.25 | 8.75 | 8.833 |
| 1784 | 9.042 | 8.917 | 9.292 | 9.219 | 8.875 | 9.167 | 9.042 | 9.292 | 9.208 | 9.208 | 9.333 | 9.417 |
| 1785 | 9.167 | 8.75 | 8.625 | 8.417 | 8.625 | 8.375 | 8.542 | 8.75 | 8.625 | 8.75 | 8.792 | 8.75 |
| 1786 | 8.5 | 8.667 | 8.5 | 8.5 | 8.417 | 8.458 | 8.417 | 8.167 | 8.25 | 8.333 | 8.333 | 8.5 |
| 1787 | 8.5 | 8.25 | 8.083 | 8.5 | 8.5 | 8.125 | 8.167 | 8.083 | 8.125 | 8.208 | 8.25 | 8.229 |
| 1788 | 8.25 | | 8.25 | 8.125 | 8.167 | 8.083 | 8.125 | | | 8.25 | 8.375 | |
| 1789 | | | 8.25 | 8.25 | 8.167 | 8.375 | 8.5 | 8.667 | 8.375 | 8.417 | 9.083 | 8.917 |
| 1790 | 8.833 | 9 | 9.5 | | 9.417 | 9.375 | 9.375 | 9.75 | 9.333 | 9.333 | | 9.333 |
| 1791 | 9 | 9 | 9 | 8.833 | 8.75 | | | | 8 | 7.917 | 8 | 8 |
| 1792 | 7.5 | 6.875 | | | 6 | 6 | 6 | 6.167 | 6.333 | 7 | 7 | |
| 1793 | 7 | | | | | 6 | | | | | | |
| 1794 | | 7 | | | | | | | | | | |
| 1795 | | | | | | | | | | | | |
| 1796 | | | | | | | | | | | | |
| 1797 | 9 | 9 | | | | | | | | | | |
| 1798 | | | | | | | | | | | | |
| 1799 | 8.5 | | | | | | | | | | | |
| 1800 | | | | | | | | | | | | |
| 1801 | | | | | 9.875 | | | | | | | |
| 1802 | | 10 | 8 | | | | 9 | 9.5 | | | | |
| 1803 | 9.25 | 9.75 | 8.5 | | | | 9.833 | 8.667 | 8.667 | 8.667 | 8.5 | 8.667 |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv). The monthly data are estimated as the median of highest and lowest rates, and mostly based on three-month bills.

Underlined data = exchange rates on Bourdeaux.

**Table A5.15.** *Monthly exchange rates on franc in skilling riksgälds 1798–1803 (not spot rates).*

| | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1798 | | | | 10 | | 9.5 | | | | | | |
| 1799 | | | | 13 | 12.67 | 14 | 14 | | | | | |
| 1800 | | | | | | | 13.75 | | 12 | 12.71 | 12.75 | 12.75 |
| 1801 | 12.5 | 13.33 | 13.5 | 14 | 13.38 | 13.67 | 14 | 14 | | 15 | 14.5 | |
| 1802 | 14.5 | | | 13.25 | | 13.25 | 13.25 | 13.5 | 12.79 | 12.75 | 13.38 | 13.13 |
| 1803 | 13.04 | 14 | 13.5 | 14.13 | 13.75 | 14.75 | 14 | 14 | | | | |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv). The monthly data are estimated as the median of highest and lowest rates, and mostly based on three-month bills.

**Table A5.16.** *Monthly exchange rates on Danish courant rigsdaler (= 6 marks in Kurantbanken notes) in marks kopparmynt 1741–67 (not spot rates).*

| Year | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1741 | | | | | | 31.5 | 31.5 | 31.5 | 31.5 | 31.5 | 31.5 | |
| | | | | | | | | | | | | |
| 1752 | | 38 | 38 | | | | | | | | | |
| 1753 | | | | | | | | 32.75 | | | | |
| 1754 | | | | | | | | | | | | |
| 1755 | | | | 34 | | | | | | | | |
| | | | | | | | | | | | | |
| 1760 | | | | | | | | | 56 | 54 | 54 | 55 |
| 1761 | | | | | | | | | | | | |
| 1762 | | | | | | | | | | | | |
| 1763 | | | | | | | | 66 | | | | 66 |
| 1764 | 66 | | | 65 | | 66 | 65 | | | 68 | 72 | 72 |
| 1765 | 64 | | | | | | | | | | | |
| 1766 | | | | | | | | | | | | 50 |
| 1767 | 50 | 50 | 50 | | | | | | | | | |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv). The monthly data are estimated as the median of highest and lowest rates.

**Table A5.17.** *Monthly exchange rates on Danish courant rigsdaler (= 6 marks in Kurantbanken notes) in skilling banco 1777–1803 (not spot rates).*

| | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1780 | | | | | | | | 36 | | | | 37 |
| 1781 | | | | | | 36 | | | | | | |
| 1782 | | | 35.5 | | 36 | | | | | | | |
| 1783 | | | | | | 34 | | 35 | 37 | 37.33 | 37 | 37 |
| 1784 | 36.5 | | 37.5 | | | | 36 | | 36.5 | 36 | | 38 |
| 1785 | 37 | 36.75 | 37 | | 36.5 | 36.38 | 36.75 | 36.75 | 36.75 | 37 | 36.5 | 37 |
| 1786 | 36.5 | 35.75 | 36 | 35.5 | | | | 34.5 | 35.38 | 35.5 | | |
| 1787 | 35 | 34.25 | 34.25 | 34 | | 34 | 34 | | | | 33.04 | |
| 1788 | 33.25 | | | | 33 | 33.5 | 33 | | 32.25 | 32.5 | | |
| 1789 | | 31.75 | | | | 32.13 | 33 | 33 | | 33.5 | 35.5 | 35.75 |
| 1790 | 37 | 35 | 36 | | | 37 | 37.25 | | 38 | 40 | | 40 |
| 1791 | 40 | 40.25 | 41 | 40.5 | | | 39 | 36.25 | 37.5 | 38.5 | 37 | 38 |
| 1792 | 36.75 | 37 | 38 | 38 | | 38.5 | 38 | 38.13 | 39.25 | 39.75 | 39.5 | 40 |
| 1793 | | 39.75 | 40 | | 42 | 41 | | 42 | 42.5 | | | |
| 1794 | | | | 40.5 | 42 | 41.5 | | | 41 | | | |
| 1795 | 39 | 40.75 | | 39 | 39.75 | 39 | 39 | 40 | 39.5 | 39.75 | 39.25 | 39.5 |
| 1796 | 39.5 | 39 | 39 | 39 | 39.5 | 40 | | 38.88 | 38.5 | 38.5 | 39.5 | 40.25 |
| 1797 | 40.5 | 41 | 40.75 | 40.5 | 41 | 43 | 40.5 | 43 | 42 | 42.13 | 42 | 43.75 |
| 1798 | | | | | | | | | | | | |
| 1799 | | | | | 40 | 42.5 | | | | 41 | | |
| 1800 | | | | | | | | | | | | |
| 1801 | | | 38 | | | 38 | 37 | 36.63 | | | | |
| 1802 | | | | | 36 | | 34.5 | | | 34 | | |
| 1803 | | 37 | | | | 37 | 36 | 33.33 | 34.83 | 34.75 | 34 | 34.5 |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv). The monthly data are estimated as the median of highest and lowest rates.

**Table A5.18.** *Monthly exchange rates on Danish courant rigsdaler (= 6 marks in courant-money) in skilling riksgälds 1798–1803 (not spot rates).*

| | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1798 | 45.75 | 46.25 | 45 | 44.75 | 44.5 | 41.25 | 42.63 | 43 | 43.75 | 43 | 45.25 | 56.5 |
| 1799 | 55.25 | 55.75 | 56.25 | 56.75 | 56.25 | 58.5 | 58.25 | 58 | 56 | 60.5 | 64 | |
| 1800 | | | | 59 | 55 | 55 | 57.25 | 55 | 55 | 54.25 | 54.5 | 54 |
| 1801 | 52 | 57 | 54.75 | 55.25 | 53.5 | 53.38 | 53.25 | 54.63 | 54.38 | 54.5 | 55.5 | 54.5 |
| 1802 | 55.5 | 54.75 | 54.38 | 53.5 | 51.75 | 53.25 | 52.25 | 51.75 | 51 | 51 | 52.5 | 52 |
| 1803 | 53.88 | 56.13 | 55.75 | 56.5 | 55.5 | 56 | 54.25 | 51.88 | | | | |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv). The monthly data are estimated as the median of highest and lowest rates.

**Table A5.19.** *Monthly exchange rates on Gdańsk florin/gulden/złoty (= 30 grosz) in marks kopparmynt 1740–76 (not spot rates).*

| Year | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1740 | | | | | | 9 | | 9. 5 | 9.5 | 9.5 | 9.5 | 9.5 |
| 1741 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.438 | 9.438 | 9.438 | 9.5 | 9.625 | 9.75 | 10 |
| 1742 | 10 | | | | | | | 9.75 | 9.75 | | | |
| 1743 | 9.75 | 9 | 9.625 | 9.875 | | 10.5 | | 10.25 | | | | 11.25 |
| 1744 | | 11 | | | | | | | | | 10.75 | 10.75 |
| 1745 | | | | | | | 9.75 | | | | | |
| 1746 | 9.75 | 9.75 | 9.75 | | 11.5 | | 11.5 | 11.5 | | | | |
| 1747 | | | | | | | | | | | | |
| 1748 | | 12 | 12 | 12 | 12 | 12 | 11.38 | 11.38 | 11.5 | 11.5 | 11.5 | 11.5 |
| 1749 | | | | | 11.5 | 11.38 | 11.38 | 11.25 | 11.13 | 11.13 | 11.13 | 11.38 |
| 1750 | 11 | 11 | 11 | 11 | 11 | 10.75 | 10.5 | 10.5 | 10.5 | 10.25 | 10.25 | 10.13 |
| 1751 | 10 | 9.75 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | | |
| 1752 | 9.875 | | 9.563 | 9.5 | 9.5 | 9.375 | 9.375 | 9.25 | 9.25 | 9.625 | 9.375 | |
| 1753 | | 9.125 | 9.125 | | | 9.125 | 9.125 | 9 | 9.063 | 9.063 | 9 | |
| 1754 | | | | | | | 9.25 | | 9 | 9 | 9 | |
| 1755 | 9 | | | | | | 9 | | | | | |
| 1756 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | 9.5 | |
| 1757 | | | | | | 10.5 | | | | | | |
| 1758 | | | | | | | | 12.63 | 12.63 | | 12.25 | 12.25 |
| 1759 | | | | | | | | 11.5 | 11.5 | 11.5 | | 14 |
| 1760 | 14 | | | | 14 | 14 | | 14 | 12 | 12 | 13 | 14 |
| 1761 | 16 | 15.75 | 15 | | 14.5 | 15 | | 15 | 15 | | 14 | 15.25 |
| 1762 | | | | 16 | | | 19 | 19.25 | | | 21 | 22 |
| 1763 | | 19 | | | 17 | | | | | | | |
| 1764 | 17 | | 15.5 | 16 | | 16.25 | 15.5 | 15.5 | | | | |
| 1765 | | | | | | | | 16 | 17 | 17 | | |
| 1766 | | | | | | 13 | 14.56 | 12.88 | 12.88 | 12.88 | 12.88 | 12.88 |
| 1767 | 12.88 | 12.44 | 12 | 12 | 12 | 12.5 | 12 | | | | | |
| 1768 | | | | | | | | | | | | |
| 1769 | | | | | | | | | | | | |
| 1770 | | | | | | | | 11.5 | | | | |
| 1771 | | | | | | | | | 11 | | | |
| 1772 | | | | 11.5 | | | | | | | | |
| 1773 | | | | 13.25 | | 13 | | | | | | |
| 1774 | | | | | | | | | | | | |
| 1775 | | | 13.25 | | | | | | | | | |
| 1776 | | | | | | | | 14 | | | 11.38 | |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv). The monthly data are estimated as the median of highest and lowest rates.

**Table A5.20.** *Monthly exchange rates on Swedish-Pomeranian taler courant in Swedish currency 1740–1800 (not spot rates).*

| Year | Jan | Feb | Mar | Apr | May | June | July | Aug | Sept | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **in marks kopparmynt** | | | | | | | | | | | | |
| 1740 | | | | | | | | 28 | 27 | 27.5 | 27.5 | 27.5 |
| 1741 | 28.5 | 28.5 | 28.5 | 28.25 | 28 | 28.13 | 28.13 | 28.75 | 28.88 | 29.25 | 29.75 | 29.5 |
| 1742 | | | | | | 30.5 | | | | | | |
| 1743 | | | 30.5 | | | | | 30 | | | | |
| 1744 | | | | | 32 | | | | | | | |
| 1745 | 34.5 | | 32 | | | | | | | | | |
| 1746 | 29.25 | 29.25 | 29.25 | | 33 | | 33 | 33 | | | | |
| 1747 | | | | | | | | | | | | |
| 1748 | | 34.88 | 35 | 35 | | 35 | 33 | 32.75 | 32.5 | 32.5 | 33.25 | 33.63 |
| 1749 | | | | | | | 34 | 34 | 34 | 33 | 33 | 33.5 |
| 1750 | 33.75 | 33.5 | 32.75 | 32.5 | 32.5 | 32.5 | 32.5 | 32.5 | 32 | | | 30.5 |
| 1751 | 30.5 | 30.5 | 30.5 | 30 | 30 | 30 | 30 | 30 | 30 | | | |
| 1752 | | 27 | | | 28 | 27 | 25.25 | 26 | | | 26 | 28 |
| 1753 | | 26.5 | 26.5 | | | | 26 | 25.5 | | | | |
| 1754 | | 26 | 26.5 | | | | | 26 | 26 | 26.75 | 26 | 25.63 |
| 1755 | | 26 | | 26.5 | | | | | | | | 27 |
| 1756 | | 28 | 28 | 28 | 28 | 28 | 28 | 28 | 27.5 | 27.5 | 27.75 | |
| 1757 | 28.5 | 28.5 | 28.5 | | | | | 31.5 | | | | |
| 1758 | | | 48 | | 42 | 41 | | 34.5 | | 33 | 33 | |
| 1759 | | | | | | | | | | | | |
| 1760 | | | 32 | | | | | 31 | 28 | 27.5 | 27.5 | 29 |
| 1761 | | 26.5 | | | 29.5 | | | | | | 22 | 26 |
| 1762 | | | | | | | | | | | 23 | |
| 1763 | | 17.75 | | | | | | | 15.88 | 14 | | |
| 1764 | 16.5 | 13.38 | | | 14.5 | | | 15 | | | | |
| 1765 | | 15.06 | | | | | | | 15 | 15 | | |
| 1766 | | | | 49 | 49 | | | | | | | |
| **in skilling banco** | | | | | | | | | | | | |
| 1788 | | | 36 | | 35.5 | | | | | | | |
| | | | | | | | | | | | | |
| 1792 | | | | | | | | | 41.5 | | | |
| **in skilling riksgälds** | | | | | | | | | | | | |
| 1799 | | 44 | | | | 48 | | 48 | 48 | | | |
| 1800 | | | | | | 51 | | | 48 | | 48 | |

Source: 'Växelkurser å Stockholms börs. Primärtabeller (1705–)/1740–1803' (Riksbankens arkiv).
The monthly data are estimated as the median of highest and lowest rates.

**Table A5.21.** *The exchange rate on Hamburg and Amsterdam 1658–1776.*

| Year | Hamburg, 1 reichstaler banco in marks kopparmynt | | | | Premium on Hamburg bank money (%) | Amsterdam, 1 rijksdaalder courant in marks kopparmynt | | | | Premium on Amsterdam bank money (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Direct data (spot rates 1660-1685) | | | Estimated spot rates | | Direct data (spot rates 1660–85) | | | Estimated spot rates | |
| | Average | Lowest | Highest | | | Average | Lowest | Highest | | |
| 1658 | 17 | | | 17.255 | | | | | | |
| 1659 | 17 | | | 17.255 | | | | | | |
| 1660 | 17.572 | 17.077 | 18.297 | 17.572 | | 16.924 | 16.284 | 17.545 | 16.924 | 3.25 |
| 1661 | 18.258 | 17.672 | 18.548 | 18.258 | | 17.768 | 17.081 | 18.297 | 17.768 | |
| 1662 | 18.213 | 17.591 | 18.583 | 18.213 | | 17.724 | 17.167 | 18.297 | 17.724 | |
| 1663 | 18.857 | 18.177 | 20.302 | 18.857 | | 18.628 | 18.051 | 19.839 | 18.628 | 3.25 |
| 1664 | 20.121 | 18.356 | 21.67 | 20.121 | | 19.929 | 18.583 | 21.597 | 19.929 | 3.06 |
| 1665 | 20.866 | 19.375 | 21.555 | 20.866 | | 20.465 | 20.09 | 21.095 | 20.465 | 3.06 |
| 1666 | 20.909 | 20.395 | 21.305 | 20.909 | | 20.394 | 19.63 | 21.054 | 20.394 | |
| 1667 | 20.767 | 19.187 | 21.555 | 20.767 | | 20.171 | 19.692 | 20.302 | 20.171 | |
| 1668 | 20.964 | 20.197 | 21.305 | 20.964 | | 20.176 | 19.758 | 21.305 | 20.176 | |
| 1669 | 20.61 | 20.302 | 21.095 | 20.61 | | 20.044 | 19.313 | 20.702 | 20.044 | 3.65 |
| 1670 | 20.804 | 20.133 | 21.206 | 20.804 | | 20.392 | 19.597 | 21.054 | 20.392 | |
| 1671 | 21.003 | 20.592 | 21.206 | 21.003 | | 20.026 | 19.613 | 20.905 | 20.026 | 3.88 |
| 1672 | 20.929 | 20.702 | 21.054 | 20.929 | 7.12 | 20.214 | 19.801 | 20.803 | 20.214 | 3.8 |
| 1673 | 20.984 | 20.512 | 21.206 | 20.984 | | 20.446 | 20.051 | 21.206 | 20.446 | |
| 1674 | 21.502 | 20.954 | 22.469 | 21.502 | | 20.31 | 19.944 | 20.844 | 20.31 | 4.16 |
| 1675 | 22.708 | 21.964 | 24.062 | 22.708 | | 20.895 | 20.302 | 21.711 | 20.895 | 3.66 |
| 1676 | 23.034 | 22.307 | 24.187 | 23.034 | | 21.44 | 20.302 | 23.059 | 21.44 | 3.78 |
| 1677 | 24.661 | 23.731 | 25.566 | 24.661 | | 23.599 | 22.721 | 24.563 | 23.599 | 3.96 |
| 1678 | 24.585 | 24.187 | 25.566 | 24.585 | | 23.6 | 23.104 | 24.488 | 23.6 | 3.78 |
| 1679 | 25.934 | 24.312 | 27.77 | 25.934 | | 25.017 | 23.226 | 26.769 | 25.017 | 4.16 |
| 1680 | 27.529 | 26.761 | 28.275 | 27.529 | | 26.475 | 25.498 | 27.265 | 26.475 | 4.01 |
| 1681 | 26.354 | 24.993 | 28.072 | 26.354 | | 25.316 | 23.606 | 27.07 | 25.316 | 3.58 |
| 1682 | 24.935 | 24.108 | 25.566 | 24.935 | | 23.887 | 23.059 | 24.741 | 23.887 | 4.01 |
| 1683 | 24.884 | 23.983 | 25.372 | 24.884 | | 23.616 | 22.601 | 24.359 | 23.616 | 4 |
| 1684 | 24.974 | 24.642 | 25.53 | 24.974 | | 23.584 | 23.226 | 24.108 | 23.584 | 4.28 |
| 1685 | 24.854 | 24.488 | 25.239 | 24.854 | | 23.371 | 23.037 | 23.964 | 23.371 | 4.25 |
| 1686 | 24.241 | | | 24.483 | | 22.907 | | | 23.136 | 5.06 |
| 1687 | 25 | | | 25.25 | 10.21 | 24.252 | | | 24.495 | |
| 1688 | 25 | | | 25.25 | 9.88 | 23.761 | | | 23.999 | 5.18 |
| 1689 | 25 | | | 25.25 | 10.12 | 23.432 | | | 23.666 | 5.47 |
| 1690 | 25 | | | 25.25 | 10.89 | | | | | |
| 1691 | 25 | | | 25.25 | 10.73 | 23.376 | | | 23.609 | 5.42 |
| 1692 | 25 | | | 25.25 | 9.98 | 23.009 | | | 23.239 | 5.48 |
| 1693 | 25 | | | 25.25 | 9.6 | 23.572 | | | 23.808 | 7.38 |

**Table A5.21 (cont.) .** *The exchange rate on Hamburg and Amsterdam 1658–1776.*

| Year | Hamburg, 1 reichstaler banco in marks kopparmynt | | | | Premium on Hamburg bank money (%) | Amsterdam, 1 rijksdaalder courant in marks kopparmynt | | | | Premium on Amsterdam bank money (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Direct data (spot rates 1660-1685) | | | Estimated spot rates | | Direct data (spot rates 1660–85) | | | Estimated spot rates | |
| | Average | Lowest | Highest | | | Average | Lowest | Highest | | |
| 1694 | 25 | | | 25.25 | 11.09 | 23.553 | | | 23.788 | 4.77 |
| 1695 | 25 | | | 25.25 | 12.67 | 23.925 | | | 24.164 | 4.83 |
| 1696 | 26.749 | 26.5 | 27 | 27.016 | 14.29 | 25.505 | | | 25.76 | 4.76 |
| 1697 | 26.685 | 26.25 | 27.25 | 26.952 | 13.98 | 26.216 | | | 26.478 | 4.96 |
| 1698 | 26.28 | 25 | 27.625 | 26.543 | 13.74 | 25.287 | | | 25.54 | 4.82 |
| 1699 | 24.625 | 24.5 | 24.75 | 24.871 | 13.57 | 23.495 | | | 23.73 | 5.17 |
| 1700 | 25.499 | 25.25 | 25.75 | 25.754 | 14.28 | 24.6 | | | 24.846 | 4.65 |
| 1701 | 24.749 | 24.5 | 25 | 24.996 | 13.39 | 24.247 | | | 24.489 | 4.73 |
| 1702 | 24.375 | 24.25 | 24.5 | 24.618 | 13.34 | 23.749 | | | 23.986 | 3 |
| 1703 | 26.209 | 24.5 | 26.875 | 26.471 | 15.1 | 24.855 | 23.875 | 25.875 | 25.103 | 2.81 |
| 1704 | 27.098 | 26.25 | 27.75 | 27.342 | 17.17 | 25.225 | 24.125 | 26.375 | 25.452 | 2.69 |
| 1705 | 27.311 | 27 | 27.75 | 27.557 | 18.8 | 25.872 | 25.5 | 26.25 | 26.105 | 3.27 |
| 1706 | 27.122 | 26.75 | 27.5 | 27.366 | 18.24 | 26.245 | 25.75 | 26.75 | 26.481 | 5.54 |
| 1707 | 26.998 | 26.75 | 27.5 | 27.241 | 17.56 | 25.875 | 25.75 | 26 | 26.107 | 5.62 |
| 1708 | 26.781 | 26.5 | 27 | 27.022 | 16.95 | 25.687 | 25.5 | 25.875 | 25.918 | 4.84 |
| 1709 | 27.299 | 26.5 | 28.75 | 27.545 | 16.78 | 26.921 | 26 | 27.875 | 27.163 | 4.83 |
| 1710 | 27.486 | 26.375 | 28.75 | 27.734 | 16.73 | 26.118 | 25.5 | 26.75 | 26.352 | 4.76 |
| 1711 | 26.711 | 26 | 27.75 | 26.951 | 16.71 | 25.367 | 24.75 | 26 | 25.596 | |
| 1712 | 27.274 | 26.375 | 28 | 27.519 | 16.54 | 26.175 | 25.375 | 27 | 26.41 | |
| 1713 | 26.608 | 25.5 | 28 | 26.847 | 17.28 | 26.58 | 26 | 27 | 26.819 | |
| 1714 | 25.56 | 25 | 26 | 25.79 | 18.28 | 25.48 | 24.5 | 26.5 | 25.71 | 4.5 |
| 1715 | 25.793 | 25 | 27.5 | 26.025 | 19.7 | 23.979 | 23 | 25 | 24.195 | |
| 1716 | 26.546 | 25 | 28.75 | 26.785*<br>28.39** | 20.9 | 25.573 | 24 | 27.25 | 25.803*<br>27.35** | |
| 1717 | 33.952 | 29 | 39.75 | 34.258*<br>38.37** | 24.72 | 32.473 | 27.75 | 38 | 32.765*<br>36.7** | |
| 1718 | 52.056 | 43.75 | 83.75 | 52.525*<br>60.26** | 27.74 | 49.933 | 42 | 80 | 50.382*<br>57.8** | 4.59 |
| 1719 | 40.03 | 38 | 41 | 40.39 | 29.7 | 38.884 | 36 | 42 | 39.234 | |
| 1720 | 36.289 | 36 | 37 | 36.615 | 28.33 | 35.123 | 34.75 | 35.5 | 35.439 | |
| 1721 | 36.24 | 35 | 37 | 36.566 | 28.84 | 35.749 | 35.5 | 36 | 36.071 | |
| 1722 | 36.616 | 35.25 | 37.25 | 36.945 | 29.53 | 35.999 | 35.75 | 36.25 | 36.323 | 5.25 |
| 1723 | 35.577 | 34.125 | 36.625 | 35.897 | 30.35 | 34.139 | 32.375 | 36 | 34.447 | 4.94 |
| 1724 | 35.209 | 34.125 | 36 | 35.526 | 31.35 | 34.242 | 33.5 | 35 | 34.55 | 4.57 |
| 1725 | 33.968 | 32 | 35.75 | 34.274 | 33.24 | 32.985 | 32 | 34 | 33.282 | 4.42 |
| 1726 | 33.552 | 32.5 | 34.5 | 33.854 | 16 | 32.606 | 31.5 | 33.75 | 32.899 | 4.88 |
| 1727 | 34.293 | 32.5 | 35.5 | 34.602 | 16 | 33.735 | 32.75 | 34.75 | 34.039 | 4.97 |

**Table A5.21 (cont.) .** *The exchange rate on Hamburg and Amsterdam 1658–1776.*

| Year | Hamburg, 1 reichstaler banco in marks kopparmynt | | | | Premium on Hamburg bank money (%) | Amsterdam, 1 rijksdaalder courant in marks kopparmynt | | | | Premium on Amsterdam bank money (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Direct data (spot rates 1660-1685) | | | Estimated spot rates | | Direct data (spot rates 1660–85) | | | Estimated spot rates | |
| | Average | Lowest | Highest | | | Average | Lowest | Highest | | |
| 1728 | 35.11 | 33.5 | 36 | 35.426 | 16 | 34.869 | 34.25 | 35.5 | 35.183 | 4.79 |
| 1729 | 34.806 | 34 | 35.5 | 35.119 | 16 | 34.227 | 33 | 35.5 | 34.535 | 4.77 |
| 1730 | 35.119 | 34.25 | 35.75 | 35.435 | 16 | 33.369 | 32.75 | 34 | 33.669 | 4.58 |
| 1731 | 34.933 | 34.25 | 35.5 | 35.247 | 16 | 33.496 | 33 | 34 | 33.798 | 4.52 |
| 1732 | 34.958 | 33.625 | 35.75 | 35.272 | 16 | 34.369 | 33.75 | 35 | 34.679 | 4.02 |
| 1733 | 35.308 | 34.75 | 35.875 | 35.626 | 16 | 34.623 | 34.25 | 35 | 34.934 | 3.8 |
| 1734 | 35.31 | 34.75 | 35.75 | 35.627 | 16 | 34.869 | 34.25 | 35.5 | 35.183 | 4.44 |
| 1735 | 35.369 | 34.75 | 36 | 35.688 | 16 | 34.992 | 34.25 | 35.75 | 35.307 | 4 |
| 1736 | 35.68 | 34.75 | 36.375 | 36.001 | 16 | 34.667 | 33.5 | 35.875 | 34.979 | 3.9 |
| 1737 | 36.028 | 35.5 | 36.5 | 36.352 | 16 | 34.936 | 34.625 | 35.25 | 35.25 | 4.02 |
| 1738 | 35.933 | 35.25 | 36.5 | 36.256 | 16.31 | 35.056 | 34.375 | 35.75 | 35.371 | 4.45 |
| 1739 | 36.305 | 35.25 | 37 | 36.632 | 17.48 | 34.996 | 34.5 | 35.5 | 35.311 | 5.11 |
| 1740 | 37.06 | 36 | 37.5 | 37.393 | 18.03 | 35.55 | 34.75 | 35.875 | 35.87 | 5.23 |
| 1741 | 37.86 | 36.75 | 41 | 38.201 | 17.49 | 36.44 | 35.375 | 39.5 | 36.768 | 4.64 |
| 1742 | 39.53 | 36.75 | 42 | 39.886 | 17.79 | 37.81 | 35.25 | 40 | 38.15 | 4.43 |
| 1743 | 40.48 | 37 | 44.25 | 40.844 | 18.85 | 38.74 | 35.75 | 42.5 | 39.089 | 4.8 |
| 1744 | 43.83 | 42 | 45.75 | 44.224 | 19.37 | 41.98 | 40 | 44 | 42.358 | 4.86 |
| 1745 | 43.57 | 40 | 47 | 43.962 | 20 | 41.75 | 38.25 | 45.25 | 42.126 | 4.93 |
| 1746 | 40 | 40 | 40 | 40.36 | 18.67 | 38.25 | 38.25 | 38.25 | 38.594 | 4.86 |
| 1747 | 44.23 | 40 | 47.5 | 44.628 | 16.5 | 43.11 | 38.25 | 46.25 | 43.498 | 4.65 |
| 1748 | 44.47 | 43.125 | 47.25 | 44.87 | 16.17 | 43.08 | 41.75 | 46 | 43.468 | 4.74 |
| 1749 | 43.45 | 42.25 | 44.75 | 43.841 | 17.05 | 41.53 | 40.5 | 42.75 | 41.904 | 4.64 |
| 1750 | 41.74 | 40 | 43.75 | 42.116 | 17.51 | 39.69 | 38.125 | 41 | 40.047 | 4.53 |
| 1751 | 40.28 | 39.25 | 41 | 40.642 | 17.68 | 37.92 | 37 | 38.25 | 38.261 | 4.88 |
| 1752 | 38 | 36 | 40 | 38.342 | 16.44 | 35.68 | 33.75 | 37.75 | 36.001 | 4.48 |
| 1753 | 37.99 | 37.5 | 38.75 | 38.332 | 17.34 | 35.75 | 35 | 36 | 36.072 | 4.63 |
| 1754 | 38.71 | 38.5 | 39 | 39.058 | 17.24 | 36.07 | 36 | 36.25 | 36.394 | 4.51 |
| 1755 | 38.63 | 37.5 | 40.75 | 38.978 | 17.56 | 36.33 | 36 | 39 | 36.657 | 4.18 |
| 1756 | 40.28 | 39 | 43 | 40.642 | 17.42 | 39.08 | 37.75 | 42.25 | 39.432 | 4.22 |
| 1757 | 43.84 | 40.25 | 49.75 | 44.234 | 11.7 | 44.7 | 40.25 | 50 | 45.102 | 3.76 |
| 1758 | 51.49 | 48.75 | 56.25 | 51.953 | 7.68 | 52.9 | 50.125 | 57.25 | 53.376 | 3.33 |
| 1759 | 49.55 | 47.25 | 55 | 49.996 | 8.02 | 51.89 | 50.25 | 56.25 | 52.357 | 2.27 |
| 1760 | 63.21 | 55 | 76 | 63.779 | 18.58 | 61.63 | 55.5 | 70 | 62.184 | 3.11 |
| 1761 | 72.04 | 67.75 | 75.75 | 72.688 | 24.83 | 67.41 | 63.75 | 70.75 | 68.016 | 4.53 |
| 1762 | 85.28 | 73 | 108 | 86.047 | 22.39 | 83.93 | 68.5 | 108 | 84.685 | 3.02 |
| 1763 | 81.82 | 73 | 94.5 | 82.556 | 23.85 | 80.43 | 71.5 | 93 | 81.154 | 2.36 |

**Table A5.21 (cont.) .** *The exchange rate on Hamburg and Amsterdam 1658–1776.*

| Year | Hamburg, 1 reichstaler banco in marks kopparmynt | | | | Premium on Hamburg bank money (%) | Amsterdam, 1 rijksdaalder courant in marks kopparmynt | | | | Premium on Amsterdam bank money (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Direct data (spot rates 1660-1685) | | | Estimated spot rates | | Direct data (spot rates 1660–85) | | | Estimated spot rates | |
| | Average | Lowest | Highest | | | Average | Lowest | Highest | | |
| 1764 | 86.08 | 79 | 96 | 86.854 | 26.21 | 82.07 | 74 | 93 | 82.808 | 3.12 |
| 1765 | 88.87 | 79 | 94 | 89.669 | 21.44 | 81.69 | 76 | 90 | 82.425 | 3.76 |
| 1766 | 70.53 | 66.5 | 80 | 71.165 | 19.88 | 69.88 | 66.5 | 77 | 70.509 | 4.74 |
| 1767 | 56.42 | 42 | 66 | 56.928 | 17.72 | 56.41 | 41 | 66 | 56.917 | 4.76 |
| 1768 | 42 | 42 | 42 | 42.378 | 22.35 | 41.64 | 39.25 | 41.75 | 42.015 | 4.58 |
| 1769 | 42 | 42 | 42 | 42.378 | 24.6 | 41.59 | 39 | 41.75 | 41.964 | 4.87 |
| 1770 | 60.54 | 55 | 68 | 61.085 | 24.26 | 57.15 | 53 | 64 | 57.664 | 4.9 |
| 1771 | 62.93 | 60 | 65.5 | 63.496 | 24.64 | 59.41 | 57 | 61 | 59.944 | 4.88 |
| 1772 | 70.26 | 64 | 74.5 | 70.892 | 25.08 | 66.08 | 60 | 70 | 66.674 | 4.75 |
| 1773 | 80.23 | 73.5 | 82.5 | 80.952 | 24.71 | 76.88 | 69 | 79.5 | 77.572 | 4.66 |
| 1774 | 75.75 | 72 | 80.5 | 76.431 | 23.88 | 71.91 | 69 | 76 | 72.557 | 4.73 |
| 1775 | 69.3 | 68.25 | 72 | 69.923 | 21.88 | 65.72 | 65.25 | 68 | 66.311 | 4.7 |
| 1776 | 69.06 | 68.5 | 70 | 69.681 | | 64.9 | 64 | 65.25 | 65.484 | 4.781 |

Underlined data = based on cross rates.

Sources: See the main text. For 1660–85, the exchange rates on Hamburg and Amsterdam are estimated spot rates, based on bills of 8 days to 2 months, assuming an annual interest rate of 12.5 per cent, and the average calculated as the geometric average of the monthly data (see Table A5.5). To calculate spot rates for the period 1658–9 the direct data are increased by 1.5 per cent; for 1686–1703 the increase is 1 per cent. For 1704–77 the direct data is increased by $1.05^{67/365}$.

* Estimated rates in proper coins 1716–18.

** Estimated rate in coin tokens 1716–18.

**Table A5.22.** *The exchange rate on London and Paris 1658–1776.*

| Year | London, 1 pound sterling in daler kopparmynt | | | | Paris, 1 livres tournois in marks kopparmynt | | | |
|---|---|---|---|---|---|---|---|---|
| | Direct data | | | Estimated spot rates | Direct data (spot rates up to 1702) | | | Estimated spot rates |
| | Average | Lowest | Highest | | Average | Lowest | Highest | |
| 1658 | 17.49 | | | 17.752 | | | | |
| 1659 | 18.197 | | | 18.47 | | | | |
| 1660 | 20.226 | | | 20.53 | | | | |
| 1661 | 21.137 | | | 21.454 | | | | |
| 1662 | | | | | | | | |
| 1663 | 21.206 | | | 21.525 | 6.914 | | | 6.914 |
| 1664 | 22.108 | | | 22.44 | 7.013 | | | 7.013 |
| 1665 | 22.026 | | | 22.356 | 7.043 | | | 7.043 |
| 1666 | 21.096 | | | 21.413 | | | | |
| 1667 | 21.81 | | | 22.137 | 7.151 | | | 7.151 |
| 1668 | 22.936 | | | 23.28 | 7.138 | 7.138 | 7.138 | 7.138 |
| 1669 | 22.517 | | | 22.855 | 7.138 | 7.138 | 7.138 | 7.138 |
| 1670 | 22.826 | | | 23.168 | 7.108 | 7.061 | 7.138 | 7.108 |
| 1671 | 22.921 | | | 23.265 | 7.108 | 7.069 | 7.209 | 7.108 |
| 1672 | 22.316 | | | 22.651 | 7.033 | 6.943 | 7.104 | 7.033 |
| 1673 | 21.487 | | | 21.809 | 7.018 | 6.901 | 7.069 | 7.018 |
| 1674 | 21.526 | | | 21.849 | 7.12 | 7.069 | 7.199 | 7.12 |
| 1675 | 23.315 | | | 23.665 | 7.286 | 7.188 | 7.405 | 7.286 |
| 1676 | 24.302 | | | 24.666 | 7.592 | 6.985 | 7.91 | 7.592 |
| 1677 | 26.424 | | | 26.82 | 8.259 | 8.079 | 8.498 | 8.259 |
| 1678 | 26.664 | | | 27.064 | 8.352 | 8.203 | 8.499 | 8.352 |
| 1679 | 26.235 | | | 26.628 | 8.477 | 8.203 | 8.71 | 8.477 |
| 1680 | 29.829 | | | 30.277 | 9.25 | 9.048 | 9.425 | 9.25 |
| 1681 | 28.784 | | | 29.216 | 8.939 | 8.415 | 9.425 | 8.939 |
| 1682 | 26.872 | | | 27.276 | 8.429 | 8.217 | 8.71 | 8.429 |
| 1683 | 26.556 | | | 26.954 | 8.327 | 8.021 | 8.469 | 8.327 |
| 1684 | 26.552 | | | 26.95 | 8.317 | 8.207 | 8.499 | 8.317 |
| 1685 | 26.831 | | | 27.234 | 8.31 | 8.243 | 8.415 | 8.31 |
| 1686 | | | | | | | | |
| 1687 | | | | | | | | |
| 1688 | | | | | | | | |
| 1689 | 25.869 | | | 26.182 | 8.294 | | | 8.294 |
| 1690 | 25.234 | | | 25.54 | | | | |
| 1691 | 25.39 | | | 25.698 | 7.302 | | | 7.302 |
| 1692 | 25.738 | | | 26.049 | 7.364 | | | 7.364 |
| 1693 | 24.711 | | | 25.01 | 7.191 | | | 7.191 |

**Table 5.22 (cont.).** *The exchange rate on London and Paris 1658–1776.*

| Year | London, 1 pound sterling in daler kopparmynt | | | | Paris, 1 livres tournois in marks kopparmynt | | | |
|---|---|---|---|---|---|---|---|---|
| | Direct data | | | Estimated spot rates | Direct data (spot rates up to 1702) | | | Estimated spot rates |
| | Average | Lowest | Highest | | Average | Lowest | Highest | |
| 1694 | 24 | | | 24.291 | 7.434 | | | 7.434 |
| 1695 | 22.224 | | | 22.493 | 7.332 | | | 7.332 |
| 1696 | 25.564 | | | 25.873 | 7.927 | | | 7.927 |
| 1697 | 29.253 | | | 29.607 | 7.732 | | | 7.732 |
| 1698 | 27.932 | | | 28.27 | 7.318 | | | 7.318 |
| 1699 | 25.846 | | | 26.159 | 6.882 | | | 6.882 |
| 1700 | 27.079 | | | 27.407 | 7.153 | | | 7.153 |
| 1701 | 26.985 | | | 27.312 | 6.875 | | | 6.875 |
| 1702 | 25.659 | | | 25.969 | 6.477 | | | 6.477 |
| 1703 | 26.351 | | | 26.67 | | | | |
| 1704 | 26.625 | | | 26.947 | | | | |
| 1705 | 27.25 | 26.875 | 27.625 | 27.58 | 7.222 | 7.111 | 7.333 | 7.31 |
| 1706 | 27.375 | 26.75 | 28 | 27.706 | 7.25 | 7.167 | 7.333 | 7.338 |
| 1707 | 28 | 27.75 | 28.25 | 28.339 | 7.333 | 7.167 | 7.5 | 7.422 |
| 1708 | 27.695 | | | 28.03 | 7.447 | | | 7.537 |
| 1709 | 27.624 | | | 27.959 | 7.583 | | | 7.675 |
| 1710 | 27.763 | | | 28.099 | 7.549 | | | 7.64 |
| 1711 | 27.483 | | | 27.815 | | | | |
| 1712 | 27.994 | | | 28.333 | | | | |
| 1713 | 28.281 | | | 28.623 | 6.263 | | | 6.339 |
| 1714 | 27.498 | | | 27.831 | 6.494 | | | 6.572 |
| 1715 | 27.972 | | | 28.311 | 7.936 | | | 8.032 |
| 1716 | 28.256 | | | 28.598*<br>30.314** | 7.647 | | | 7.74*<br>8.2** |
| 1717 | 35.458 | | | 35.887*<br>40.193** | 10.02 | | | 10.14*<br>11.35** |
| 1718 | 54.381 | | | 55.039*<br>63.14** | 11.9 | | | 12.05*<br>13.82** |
| 1719 | 42.695 | | | 43.212 | 7.229 | | | 7.317 |
| 1720 | 38.29 | | | 38.754 | 3.763 | | | 3.808 |
| 1721 | 38.262 | | | 38.725 | 5.55 | | | 5.617 |
| 1722 | 39.63 | | | 40.11 | 5.453 | | | 5.519 |
| 1723 | 37.957 | | | 38.417 | 5.105 | | | 5.166 |
| 1724 | 36.999 | | | 37.447 | 6.706 | | | 6.788 |
| 1725 | 35.611 | | | 36.042 | 8.078 | | | 8.176 |
| 1726 | 35.973 | | | 36.408 | 7.752 | | | 7.846 |
| 1727 | 37.25 | 36.5 | 38 | 37.701 | 7.256 | | | 7.343 |

**Table 5.22 (cont.).** *The exchange rate on London and Paris 1658–1776.*

| Year | London, 1 pound sterling in daler kopparmynt | | | | Paris, 1 livres tournois in marks kopparmynt | | | |
|---|---|---|---|---|---|---|---|---|
| | Direct data | | | Esti-mated spot rates | Direct data (spot rates up to 1702) | | | Esti-mated spot rates |
| | Average | Lowest | Highest | | Average | Lowest | Highest | |
| 1728 | 37.5 | 36.5 | 38.5 | 37.954 | 7.197 | | | 7.284 |
| 1729 | 37.25 | 36.5 | 38 | 37.701 | 7.008 | | | 7.093 |
| 1730 | 36.405 | | | 36.845 | 6.979 | | | 7.064 |
| 1731 | 37.052 | | | 37.5 | 6.926 | | | 7.01 |
| 1732 | 37.307 | | | 37.759 | 7.091 | | | 7.176 |
| 1733 | 37.46 | 37 | 38 | 37.913 | 7.081 | | | 7.167 |
| 1734 | 39.02 | 38 | 39.5 | 39.492 | 7.26 | | | 7.348 |
| 1735 | 38.84 | 38.5 | 39 | 39.31 | 7.187 | | | 7.274 |
| 1736 | 38.57 | 37 | 40 | 39.037 | 7.145 | | | 7.232 |
| 1737 | 38.499 | | | 38.965 | 7.288 | | | 7.376 |
| 1738 | 38.42 | | | 38.885 | 7.192 | | | 7.279 |
| 1739 | 39.229 | | | 39.704 | 7.169 | | | 7.256 |
| 1740 | 39.25 | 38 | 39.75 | 39.725 | 7.19 | 7 | 7.5 | 7.277 |
| 1741 | 39.28 | 38.125 | 42.5 | 39.755 | 7.26 | 7 | 7.75 | 7.348 |
| 1742 | 41.04 | 38.75 | 43.125 | 41.537 | 7.48 | 7.25 | 7.625 | 7.571 |
| 1743 | 42.31 | 39.75 | 46.5 | 42.822 | 7.963 | | | 8.059 |
| 1744 | 45.36 | 43.25 | 47 | 45.909 | 8.79 | 8.5 | 9 | 8.896 |
| 1745 | 45.93 | 41.5 | 49.25 | 46.486 | 9 | 8.5 | 9.25 | 9.109 |
| 1746 | 41.5 | 41.5 | 41.5 | 42.002 | 7.8 | | | 7.895 |
| 1747 | 47 | 41.5 | 51 | 47.569 | 7.5 | 7.5 | 7.5 | 7.591 |
| 1748 | 48.12 | 46.75 | 50.5 | 48.702 | 8.95 | 8.75 | 9.125 | 9.058 |
| 1749 | 46.82 | 45.5 | 48.75 | 47.387 | 8.43 | 8.25 | 8.75 | 8.532 |
| 1750 | 43.53 | 41 | 45.75 | 44.057 | 8.36 | 8 | 8.5 | 8.461 |
| 1751 | 42.13 | 41.25 | 42.75 | 42.64 | 7.88 | 7.75 | 8 | 7.975 |
| 1752 | 39.77 | 37.5 | 42.25 | 40.251 | 7.244 | | | 7.332 |
| 1753 | 38.92 | 38.375 | 40 | 39.391 | 7.31 | 6.5 | 7.5 | 7.398 |
| 1754 | 40.07 | 39.75 | 40.5 | 40.555 | 7.35 | 7.25 | 7.5 | 7.439 |
| 1755 | 41.01 | 40.375 | 43.5 | 41.506 | 7.5 | 7.5 | 7.5 | 7.591 |
| 1756 | 44.03 | 42.25 | 47.5 | 44.563 | 8.03 | 7.875 | 8.5 | 8.127 |
| 1757 | 49.34 | 46 | 53.75 | 49.937 | 8.489 | | | 8.591 |
| 1758 | 56.44 | 54 | 61 | 57.123 | 9.75 | 9.75 | 9.75 | 9.868 |
| 1759 | 55.64 | 54.25 | 62.5 | 56.313 | 9.75 | 9.75 | 9.75 | 9.868 |
| 1760 | 66.58 | 61.5 | 75 | 67.386 | 11.94 | 10.75 | 12.5 | 12.08 |
| 1761 | 71.18 | 68 | 76 | 72.041 | 13.03 | 12.75 | 14 | 13.19 |
| 1762 | 90.72 | 74 | 117 | 91.818 | 14.42 | 13.25 | 17 | 14.59 |
| 1763 | 84.33 | 76 | 93 | 85.351 | 16.52 | 16 | 17 | 16.72 |
| 1764 | 91.61 | 83 | 102.5 | 92.719 | 16.97 | 15 | 19 | 17.18 |

**Table 5.22 (cont.).** *The exchange rate on London and Paris 1658–1776.*

| Year | London, 1 pound sterling in daler kopparmynt | | | | Paris, 1 livres tournois in marks kopparmynt | | | |
|---|---|---|---|---|---|---|---|---|
| | Direct data | | | Estimated spot rates | Direct data (spot rates up to 1702) | | | Estimated spot rates |
| | Average | Lowest | Highest | | Average | Lowest | Highest | |
| 1765 | 92.06 | 83 | 101 | 93.174 | 17.2 | 16 | 18 | 17.41 |
| 1766 | 77.46 | 73 | 85 | 78.398 | 14.56 | 13.5 | 15 | 14.74 |
| 1767 | 60.41 | 45 | 72 | 61.141 | 13.24 | 12 | 13.5 | 13.4 |
| 1768 | 45.9 | 44.5 | 46.5 | 46.456 | 8.097 | | | 8.195 |
| 1769 | 42.207 | | | 42.718 | 7.996 | | | 8.093 |
| 1770 | 63.14 | 55.5 | 68 | 63.904 | 11 | 11 | 11 | 11.13 |
| 1771 | 63.96 | 61 | 66 | 64.734 | 11.88 | | | 12.03 |
| 1772 | 71.78 | 67 | 77 | 72.649 | 13.24 | | | 13.4 |
| 1773 | 85.78 | 67 | 88 | 86.818 | 14.5 | 14.5 | 14.5 | 14.68 |
| 1774 | 80.08 | 77 | 86.5 | 81.049 | 13.5 | 13 | 14.25 | 13.66 |
| 1775 | 72.71 | 71.75 | 76 | 73.59 | 12.8 | 12.38 | 13.125 | 12.95 |
| 1776 | 70.93 | 69.875 | 72.375 | 71.788 | 12.51 | 12.25 | 13.5 | 12.66 |

Underlined data = based on cross rates.

Sources: See the main text. To calculate spot rates, the direct data are increased by 1.5 per cent for London in 1658–85, by $1.05^{90/365}$ for London in 1686–1703, and by $1.05^{90/365}$ for Paris and London in 1704–76. For Paris 1668–1685, see Table A5.12.

* Estimated rates in proper coins 1716–18.

** Estimated rate in coin tokens 1716–18.

**Table A5.23.** *The exchange rate on Hamburg and Amsterdam 1777–1804.*

| Year | Hamburg, 1 reichstaler banco in | | | | | Amsterdam, 1 rijksdaalder courant in | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | skilling banco, direct data | | | skilling banco, spot rate | skilling riksgälds, spot rate | skilling banco, direct data | | | skilling banco, spot rate | skilling riksgälds, spot rate |
| | Average | Lowest | Highest | | | Average | Lowest | Highest | | |
| 1777 | 46.16 | 45 | 47 | 46.575 | | 43.2 | 42 | 44 | 43.589 | |
| 1778 | 45.97 | 44.5 | 47 | 46.384 | | 43.19 | 42 | 44.33 | 43.579 | |
| 1779 | 46.01 | 45 | 47.5 | 46.424 | | 44.01 | 43.25 | 45 | 44.406 | |
| 1780 | 46.25 | 45 | 47.5 | 46.666 | | 44.04 | 43 | 45.5 | 44.436 | |
| 1781 | 45.31 | 44.13 | 47 | 45.718 | | 43.03 | 41.25 | 45.75 | 43.417 | |
| 1782 | 45.43 | 45 | 46.5 | 45.839 | | 41.8 | 40 | 43 | 42.176 | |
| 1783 | 46.84 | 45 | 48.5 | 47.261 | | 43.4 | 41 | 46 | 43.79 | |
| 1784 | 49.35 | 48 | 54 | 49.794 | | 46.51 | 45.33 | 49.5 | 46.928 | |
| 1785 | 49.56 | 48 | 52.5 | 50.006 | | 46.56 | 45 | 48.5 | 46.979 | |
| 1786 | 47.78 | 46.5 | 49 | 48.21 | | 45.24 | 44.25 | 47 | 45.647 | |
| 1787 | 46.47 | 45.75 | 47.75 | 46.888 | | 43.62 | 42.75 | 44.75 | 44.012 | |
| 1788 | 46.59 | 45.75 | 47.5 | 47.009 | | 43.12 | 42.25 | 43.75 | 43.508 | |
| 1789 | 51.55 | 47 | 58.5 | 52.014 | 55.711 | 48.48 | 43.25 | 54 | 48.916 | |
| 1790 | 54.79 | 52 | 58 | 55.283 | 55.785 | 51.93 | 49 | 56 | 52.397 | |
| 1791 | 51.52 | 49 | 54 | 51.983 | 54.507 | 49.33 | 47 | 51.5 | 49.774 | |
| 1792 | 51.17 | 49 | 52.5 | 51.63 | 53.411 | 49.01 | 47 | 50 | 49.451 | |
| 1793 | 54 | 51.5 | 58 | 54.486 | 57.485 | 51.66 | 48 | 53.5 | 52.125 | |
| 1794 | 51.04 | 48 | 57.25 | 51.499 | 55.913 | 47.65 | 44.5 | 53.25 | 48.079 | |
| 1795 | 47.32 | 47 | 48 | 47.746 | 53.274 | 43.47 | 41 | 47 | 43.861 | |
| 1796 | 47.34 | 47 | 49 | 47.766 | 52.99 | 41.84 | 40.33 | 43 | 42.216 | |
| 1797 | 50.62 | 50 | 52.5 | 51.075 | 52.115 | 45.07 | 43 | 48 | 45.475 | 47.907 |
| 1798 | 50.94 | 50 | 53.5 | 51.398 | 54.496 | 45.44 | 44 | 51 | 45.849 | 51.439 |
| 1799 | 52.35 | 50 | 54 | 52.821 | 74.878 | 46.92 | 46 | 48 | 47.342 | 66.523 |
| 1800 | 50.62 | 49 | 54 | 51.075 | 70.983 | 47.1 | 46 | 50.5 | 47.524 | 66.796 |
| 1801 | 51.82 | 50 | 53 | 52.286 | 75.967 | 47.41 | 46.5 | 50 | 47.837 | 70.741 |
| 1802 | 50.82 | 48.67 | 54 | 51.277 | 76.038 | 46.79 | 45.75 | 47.75 | 47.211 | 71.205 |
| 1803 | 50.69 | 48 | 53 | 51.146 | 78.106 | 46.56 | 45 | 49.5 | 46.979 | 73.667 |
| 1804 | 50.78 | 49.5 | 53 | 51.237 | 76.855 | 47.57 | 46 | 49 | 47.998 | 71.997 |

Sources: See the main text. To calculate spot rates, the direct data are increased by $1.05^{67/365}$.

**Table A5.24.** *The exchange rate on London and Paris 1777–1804.*

| Year | London, 1 pound sterling in | | | | | Paris, 1 livres tournois (franc from 1795) in | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | riksdaler banco, direct data | | | riksdaler banco, spot rate | riksdaler riksgälds, spot rate | skilling banco, direct data | | | skilling banco, spot rate | skilling riksgälds, spot rate |
| | Average | Lowest | Highest | | | Average | Lowest | Highest | | |
| 1777 | 3.835 | 3.688 | 3.938 | 3.881 | | 8.27 | 8 | 8.75 | 8.3701 | |
| 1778 | 3.948 | 3.854 | 4.01 | 3.9957 | | 8.36 | 8.2 | 8.417 | 8.4612 | |
| 1779 | 4.105 | 3.854 | 4.24 | 4.1549 | | 8.23 | 7.917 | 8.417 | 8.3296 | |
| 1780 | 4.089 | 3.99 | 4.229 | 4.1387 | | 8.35 | 7.917 | 8.5 | 8.4511 | |
| 1781 | 3.757 | 3.5 | 4.021 | 3.8028 | | 8.16 | 7.5 | 8.333 | 8.2588 | |
| 1782 | 3.713 | 3.656 | 3.771 | 3.7576 | | 8.01 | 7.5 | 8.25 | 8.1069 | |
| 1783 | 3.83 | 3.677 | 4.167 | 3.8761 | | 8.21 | 7.75 | 9 | 8.3094 | |
| 1784 | 4.382 | 4.229 | 4.792 | 4.4351 | | 9.14 | 8.5 | 9.667 | 9.2506 | |
| 1785 | 4.474 | 4.25 | 4.625 | 4.5281 | | 8.64 | 8 | 9.333 | 8.7446 | |
| 1786 | 4.238 | 4.083 | 4.438 | 4.2896 | | 8.39 | 8.167 | 8.667 | 8.4915 | |
| 1787 | 4.122 | 4.063 | 4.25 | 4.1718 | | 8.19 | 7.833 | 8.5 | 8.2891 | |
| 1788 | 4.179 | 4.125 | 4.281 | 4.2295 | | 8.19 | 8 | 8.5 | 8.2891 | |
| 1789 | 4.635 | 4.219 | 5.167 | 4.6909 | | 8.54 | 8 | 9.167 | 8.6434 | |
| 1790 | 5.113 | 4.792 | 5.333 | 5.1748 | | 9.33 | 8.5 | 10 | 9.4429 | |
| 1791 | 4.8 | 4.396 | 5.042 | 4.8585 | | 8.33 | 7.833 | 9 | 8.4308 | |
| 1792 | 4.492 | 4.333 | 4.667 | 4.5465 | | 6.44 | 6 | 7.5 | 6.5179 | |
| 1793 | 5.085 | 4.656 | 5.292 | 5.147 | | 6.5 | 6 | 7 | 6.5787 | |
| 1794 | 4.665 | 4.167 | 5.292 | 4.7213 | | 7* | 7 | 7 | 7.0847 | |
| 1795 | 3.978 | 3.833 | 4.25 | 4.0263 | | | | | | |
| 1796 | 4.066 | 3.917 | 4.333 | 4.115 | | | | | | |
| 1797 | 4.618 | 4.333 | 5.104 | 4.6736 | 4.8834 | 9 | 9 | 9 | 9.1089 | |
| 1798 | 4.833 | 4.833 | 4.833 | 4.8918 | 5.3253 | | | | | 9.949 |
| 1799 | 4.83 | 4.583 | 5 | 4.888 | 6.6383 | 8.5 | 8 | 9 | 8.6029 | 13.431 |
| 1800 | 4.054 | 3.938 | 4.25 | 4.1032 | 5.7667 | | | | | 13.036 |
| 1801 | 4.132 | 3.896 | 4.271 | 4.1817 | 6.1291 | 9.83 | 9.75 | 10 | 9.949 | 13.785 |
| 1802 | 4.209 | 4.146 | 4.323 | 4.2597 | 6.4131 | 8.9 | 8 | 10 | 9.0077 | 13.38 |
| 1803 | 4.268 | 3.917 | 4.5 | 4.3194 | 6.7727 | 8.87 | 8 | 10 | 8.9774 | 14.25 |
| 1804 | 4.565 | 4.333 | 4.75 | 4.62 | 6.9301 | 9.12 | 8.25 | 10 | 9.2304 | 13.846 |

Sources: See the main text. To calculate spot rates, the direct data are increased by $1.05^{90/365}$.

* Bordeaux

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# 6.
# Foreign exchange rates 1804–1914

**Håkan Lobell**

## 6.1. Introduction

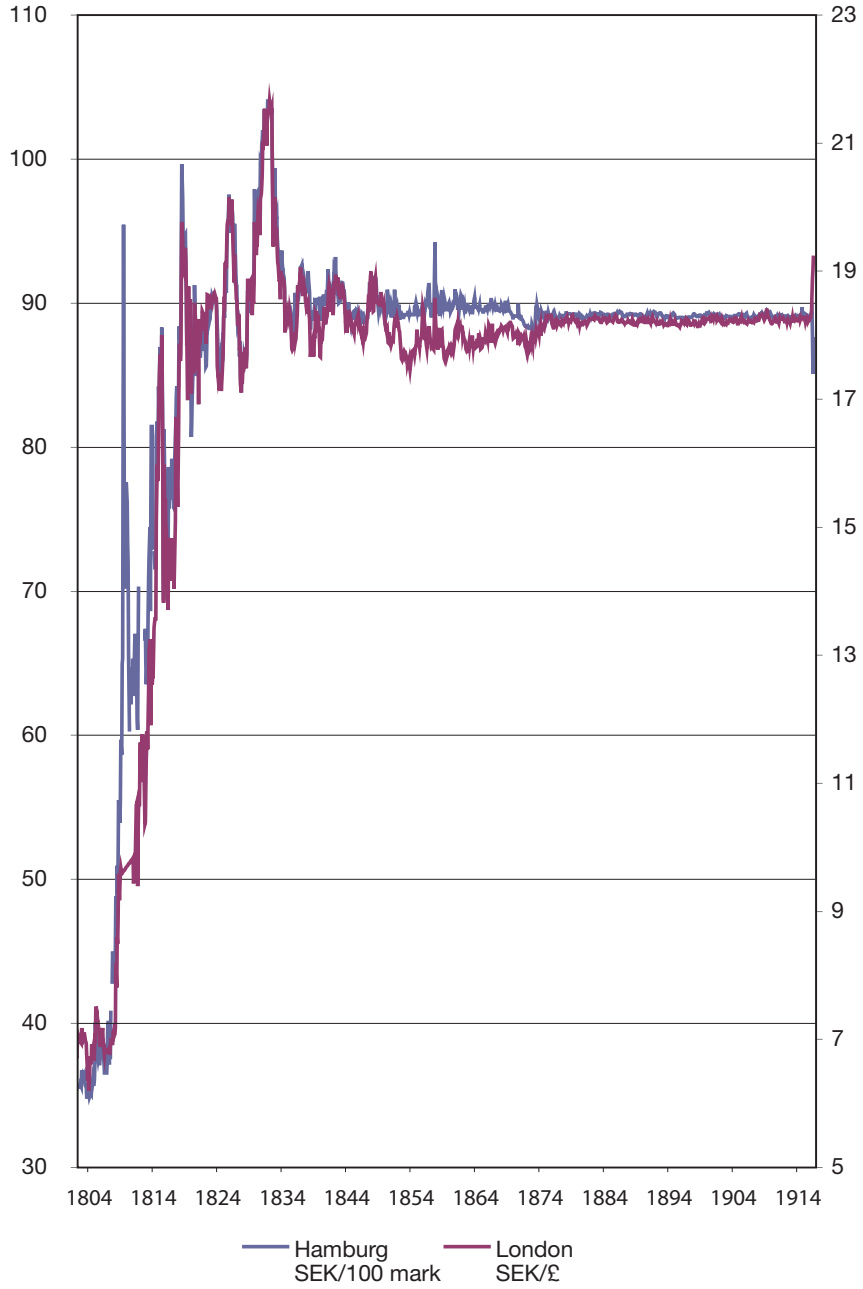
This chapter presents foreign exchange rates in the 'long' 19th century (from 1804 up to the outbreak of the First World War in 1914). The account notes the types of exchange rate series that are included in the data base and the sources for those series. Obtaining long and reasonably homogeneous series entails dealing with matters such as some currencies being issued in different places at different times, the variety of the instruments that were traded at different times and the changing composition of exchange market participants. Another factor that needs to be taken into account is the integration of credit markets and associated foreign exchange markets. The way in which a number of these problems have been tackled is reported in this chapter. The new exchange rate data that this project has produced also pave the way for new analyses of the integration process. First, however, comes a summary of the development of foreign exchange policy and monetary regimes in the 19th century. The new monthly exchange rate series that are the fruit of this work turn out to be extremely suitable as a starting point for an analysis of the history of Sweden's monetary system in the 1800s.

## 6.2. Exchange rates, foreign exchange policy and monetary regimes in the 19th century

Figure 6.1 shows monthly exchange rates on Hamburg and London, which for Sweden were the principal international financial centres in the 19th century.[1] A pronounced depreciation and large fluctuations in these exchange rates give way to

1 Note that the exchange rates are expressed in terms of Swedish currency units per unit of the foreign currency. That was how exchange rates were expressed in Sweden in the 19th century. In this context, a 'rising *foreign* exchange rate' denotes a 'fall' or 'depreciation' of the Swedish currency and vice versa.

**Figure 6.1** *Exchange rates with Hamburg (left scale) and London (right scale) 1804–1914*




Source: Tables A6.1 and A6.2.

increasing stability that leads up to the international gold standard with its historically exceptional exchange stability. Here we have a good illustration of what Eli Heckscher described as a transition from confusion and disorder to an orderly and harmonious monetary system.[2] Moreover, four fairly distinct periods are evident in the series. From 1803 to 1809 Sweden was on a silver standard. This was suspended in 1809 in connection with the war with Russia and the deposition of Gustav IV Adolf; the currency remained inconvertible until 1834 and Sweden was, in practice, on a paper standard. This was also the period with a marked depreciation. A currency reform in September 1834 meant that bank notes could again be redeemed for silver. Sweden then remained on a silver standard until 1873, when this was replaced by a gold standard. These periods are considered in somewhat more detail below.

### 6.2.1. *The silver standard 1803–09*

At the turn of the 18th century Sweden was obliged to move to an inconvertible paper standard. The monetary system was based on a silver coin, riksdaler specie, but in 1789 excessive note issues denominated in riksdaler riksgälds in connection with the war with Russia had forced the Riksbank to suspend the redemption of notes for silver. Riksdaler riksgälds were issued by the National Debt Office (*Riksgäldskontoret*) – side by side with the Riksbank's note issues in riksdaler banco and skilling banco – to enable the Crown to finance the war despite the intransigence of the Riksbank, which was controlled by the Riksdag[3]. Specie payments were resumed in 1803 (the 'realisation' of 1803) and notes could again be redeemed for silver. Meanwhile, however, the period of inconvertibility had led to an agio of 50 per cent between the two paper currencies: riksdaler banco and riksdaler riksgälds. This necessitated a corresponding devaluation of riksdaler riksgälds.

The introduction of a silver or a gold standard had considerable implications for the workings of the foreign exchange market and for exchange rate movements. A paper currency based on silver[4], such as Sweden restored in 1803, meant that notes could be exchanged for silver coin and this tied the value of the paper currency to the silver coin. The exchange rate with another silver-based currency will then have a parity that is determined by the nominal value of the domestic currency expressed in silver in relation to the nominal value of the foreign currency for the same amount of silver. However, this assumes a free exchange of silver between countries and in practice this exchange is associated with transaction costs for commissions, insurance and transport, for example. Prices could therefore vary within certain limits before it became profitable to export/import silver to/from other countries with a silver stan-

2 Heckscher (1941).

3 The Diet of the Estates of the Realm up to 1866, then a bicameral parliament up to 1970, when parliament became unicameral.

4 Or any other precious metal or, for that matter, other commodities that are used as a standard.

dard where the purchasing power of silver differed. These limits are known as silver points (more generally, commodity points). As a rule, however, neither coin nor precious metals were used for international foreign exchange transactions; these were arranged instead with bills of exchange (or drafts), which in the case of Sweden were almost exclusively drawn on foreign banks or bankers. For most of the period, the exchange rates shown in Figure 6.1 are actually the prices of foreign bills from exchange dealing on Swedish bourses. The silver points accordingly determined the limits of the exchange rate's deviations from parity, which in principle would have corresponded to transaction costs for silver. Rates above or below these points would have meant it was profitable to carry out foreign transactions in silver instead of in customary financial instruments, which at this time were primarily bills.[5] So as long as the domestic paper currency could be redeemed for silver and this silver could be used for foreign transactions, the exchange rate could neither fall below nor rise above the silver points.

At macro level, as we say today, the adjustment occurs in markets for goods as well as for money. One of the first to present a theoretical argument of this type was the 18th century philosopher David Hume, whose model for adjustment with a metallic standard is usually known as the 'price-specie flow mechanism'. In general terms, he asserted that the value of a country's coin is determined by the quantity of metallic currency in proportion to the output of goods and services (the quantity theory of money). If the proportion shifts, for instance because the quantity of money increases without a corresponding change in the amount of available goods, prices tend to rise, which is tantamount to a fall in the value of money. If money is worth less, it becomes profitable to import goods from countries where the purchasing power of the currency is unchanged. As the outflow of money to pay for the additional imports reduces the quantity of the domestic currency, the value of the currency will return to its equilibrium level. In other words, the domestic price level tends to fall to a level that is internationally competitive. Hume wanted to demonstrate the futility of the contemporary mercantilist ambition to maintain a trade surplus and build up a stock of bullion. He used an analogy with fluids to explain that trade and the money supply tend to find their own levels. His ideas were current in Sweden in the early 19th century but so were a number of other opinions about how the monetary system functioned with a silver standard.

At the time, the resumption of convertibility in 1803 was commonly regarded as a failure in that the National Debt Office's notes – which circulated alongside the Riksbank's notes and were responsible for the monetary expansion which had necessitated the paper standard – were devalued by 50 per cent relative to banco money. Even so, the currency performed comparatively satisfactorily in the years after the resumption. Figure 6.1 shows that in these years, fluctuations around parity for the

5 A special case is silver point arbitrage, which uses exchange rate differentials and silver transactions with the sole aim of profiting from the spread between the silver point and the exchange rate.

exchange rates with Hamburg and London amounted to a few percentage points. Parity, or mint parity, in this context is the theoretical exchange rate expressed as units of domestic currency per foreign currency units equal in value to the same amount of silver. By 1807 the situation had changed; ongoing war and blockades on the Continent led to exchange market unrest, foreign exchange rates rose to the silver point and notes were converted into silver, mainly for export. This precarious situation was exacerbated by the war with Russia. Convertibility was maintained initially, notwithstanding large note issues, because British subsidies enabled the Riksbank to replenish its silver reserves.[6]

### 6.2.2. The suspension period 1809–34

The war and acute financial requirements after the deposition of Gustav IV Adolf led to greatly increased note issues in 1808–09. The ensuing inflation resulted in a combination of agio between banco and silver currency and growing pressure on Sweden's banco currency relative to the principal foreign currencies. Convertibility became increasingly restricted as the war proceeded and seems to have been suspended in practice in the final phase when the king was deposed and power passed to the Riksdag. An indication that this was the case is that exchange rates began to exceed the levels at which silver had been exported earlier, which suggests that the silver points had ceased to be effective. Convertibility was formally suspended in March 1810.[7]

With a paper standard unequivocally in place and ineffective silver points, exchange rates started to rise and then shot up in the winter of 1810/11. The huge initial depreciation can have been an instance of overshooting – the tendency for financial market participants in particular to generate excessive price movements.[8] The rates did fall back but the depreciation still amounted to as much as about 65 per cent in 1812. This was followed by a period of long-term depreciation, accompanied by considerable exchange rate fluctuations, for instance at the time of the campaign against Norway in 1817 and the British financial crisis in 1825. The depreciation occurred during the international recession in the wake of the Napoleonic wars, when there were also periods of international deflation. Post-war economic setbacks also hit Sweden, particularly Göteborg and the western region. It is possible, however, that deflation was less pronounced than in other countries and instead took the form of a marked depreciation of the currency.

The paper standard was by far the most important economic policy issue in the 1810s and '20s. The currency's depreciation, the agio between paper and silver money and the suspension of convertibility were frequently likened to a national bankruptcy

6 Brisman (1931, p. 10).
7 Brisman (1931, pp. 9-16).
8 Cf. Dornbusch (1976).

in that the State could not meet its commitments (notes) with specie (silver). The large exchange rate fluctuations and the comparatively sizeable price movements during this period were attributed to this lack of confidence and were judged to be a serious impediment to economic development. On behalf of the Crown Prince (subsequently the King), on several occasions in these decades 'finance secretary' Skogman attempted to counter the depreciation and exchange rate fluctuations by means of extensive currency operations, to little or no avail.

While Sweden's exchange rates with the major international currencies, even the franc, increased dramatically after 1809, the exchange rates on Copenhagen declined spectacularly. Denmark was deeply involved in the continental conflict and the military effort was largely financed by issues of courant bank notes, which led to inflation and currency depreciation.[9] The force of the Danish depreciation between 1808 and 1813 is well illustrated by the dramatic decline against the Swedish currency, which was itself depreciating rapidly (see Figure 6.2).

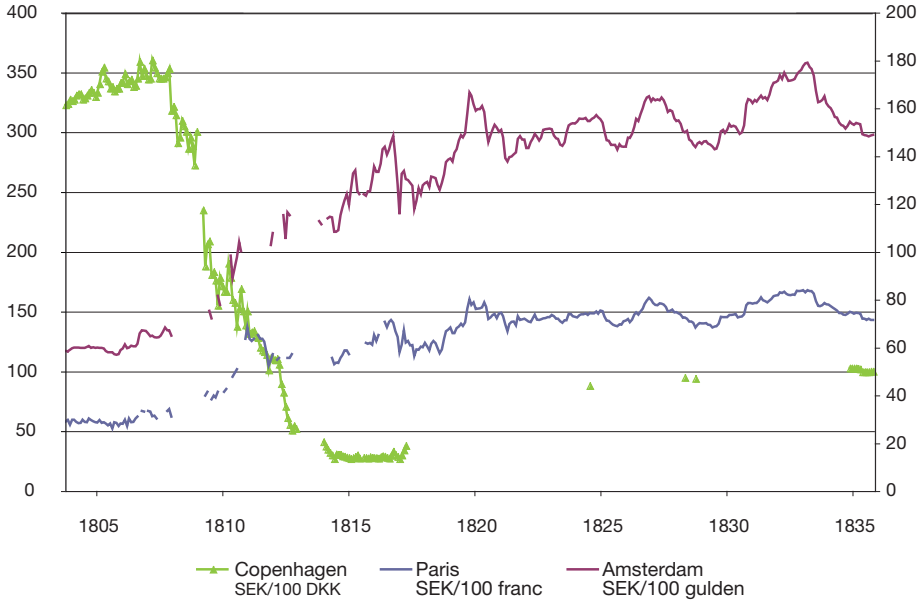
The virtual collapse of the Danish courant currency necessitated far-reaching monetary reforms in Denmark. In 1813 the courant rigsdaler was replaced by a new rigsbankrigsdaler (or rigsbankdaler) at the rate of 6:1. The new currency was not convertible but nevertheless became more stable, at least in terms of Swedish currency. In 1818 the Danish Nationalbank was established and organised as an independent joint stock company in a further attempt to stabilise the monetary system.[10] Furthermore, the Nationalbank conducted contractive monetary policies in the 1820s and '30s in an attempt to accomplish a considerable appreciation of the rigsbankrigsdaler. As a result, between 1817 and 1834 the Danish currency appreciated considerably in terms of Swedish currency, from around 30 to about 100 SEK per 100 DKK.

The Swedish monetary reforms after the currency depreciation were not nearly as far-reaching as those in Denmark. During the 1820s, the Swedish depreciation against the major currencies was less marked, though the fluctuations remained considerable. This led the Riksdag to start a serious discussion about a new currency reform. By the Riksdag of 1822/23 it was increasingly recognised that the depreciation was an irrevocable fact. Unlike their colleagues in Denmark, Swedish politicians considered that the advantages of an appreciation of the banco currency were outweighed by the drawbacks because a monetary tightening could be economically harmful. In Britain, parliamentary debate in 1817 had resulted in a decision to implement a formal devaluation of sterling and resumption of specie payments in 1821. The path of the Swedish exchange rate against sterling in Figure 6.1 suggests that the Swedish depreciation went further than the British since the Swedish currency depreciated almost as much as against reichsthaler Hamburg banco, which was an ideal currency that could not depreciate in terms of silver. However, the Swedish

9 Svendsen and Hansen (1968, pp. 84-99).

10 Svendsen and Hansen (1968, pp. 137-196).

**Figure 6.2** *Exchange rates on Copenhagen (left scale), Paris (right scale) and Amsterdam (right scale) 1804–30*




Source: Tables A6.3, A6.4 and A6.6.

Riksdag decided to put off a return to convertibility on the grounds that the Riksbank had not yet accumulated adequate reserves of silver. Another factor was the King's objection to a solution that involved devaluation; he continued to argue for an appreciation of the riskdaler note to its pre-war level.[11] The struggle between the Riksdag, where a majority favoured an official banco devaluation, and Karl XIV Johan continued throughout the decade. In the end, just as the session of 1828–30 was drawing to a close, the King relented; a law prescribing convertibility into silver and regulating the administration of the Riksbank was passed in March 1830. A resumption of specie payments in silver had to wait, however, until the next Riksdag had approved constitutional amendments in September 1834.

During the Riksdag of 1833–34 there was some concern that a resumption of silver payments would occasion a run on the Riksbank. That these fears were by no means unfounded is indicated by the marked increase in the exchange rate during the first half of the 1830s (Figure 6.1) in connection with the political disturbances on the Continent and Britain's financial crisis. If silver payments had been resumed when the exchange rate was highest, presumably the opportunities for arbitrage would have led to a major influx of notes and exports of silver. In September, how-

11 See e.g. Andreen (1961).

ever, when convertibility was restored, exchange rates were on the way down and silver payments could be resumed without difficulty. The paper riksdaler had then depreciated to only 3/8ths of its earlier value against the silver riksdaler.

### 6.2.3. The silver standard 1834–73

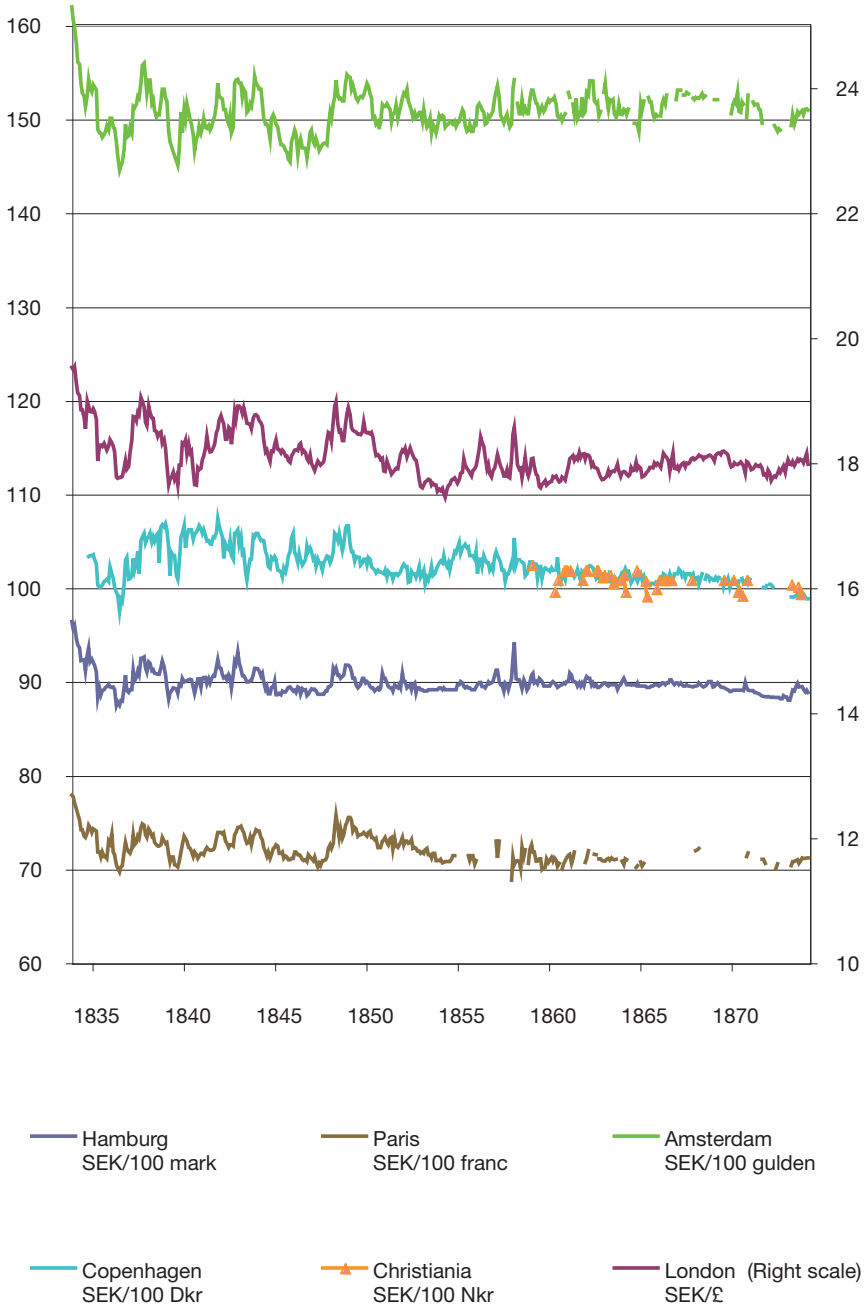
The Riksbank actually started to accept notes for silver in September 1834. The weight of riksdaler specie was reduced by approximately 0.1 grams to approximately 25.1 grams fine silver, while the paper currencies were officially written down from 1 till 2⅔ riksdaler banco, or from 48 to 128 skilling banco, per riksdaler specie. So there was a de facto devaluation of the Swedish paper currencies against foreign currencies, from c. 48 to 127.4 skilling banco per Hamburger reichsthaler banco. There was no fixed parity with sterling because since 1821 Britain had adopted a gold standard; as the price of silver fluctuates relative to the price of gold, no fixed parity could be calculated between these two metals. Exchange rates with the other Scandinavian currencies were calculated in Danish rigsdaler and Norwegian specie, on Amsterdam in Holländsk riksdaler kurant and on Paris in francs.

Following the resumption of silver payments, exchange rates became considerably more stable. The international economic recovery probably contributed to this but so did the credibility of the new monetary regime. The profound change that accompanied the return to a silver standard in 1834 is also evident from Figure 6.1. By vigorously defending the convertibility of the paper currency and naturally also thanks to Sweden not being directly involved in military conflicts, the Riksbank managed to maintain convertibility until the outbreak of the First World War. Exchange rate movements in this period were essentially limited by silver points at first, later by gold points.

The exchange rate fluctuations that continued to occur (see Figure 6.1) were connected as a rule with changing international economic conditions and largely remained within the range of the silver points. Prior to the First World War there was no lasting depreciation or appreciation, at least against other silver currencies such as the one in Hamburg. Britain, as mentioned, was on a gold standard both de facto and de jure from 1821. Some appreciation of the Swedish riksdaler against sterling can be discerned in Figures 6.1 and 6.3; presumably because the discovery of gold in California and Australia greatly increased the supply of gold and this affected the price of gold relative to silver. But there were no sizeable fluctuations or permanent depreciations or appreciations.

Otherwise, exchange rates in the period on a silver standard up to 1873 reflected two main tendencies. One was that with ongoing integration, transaction costs decreased over time and this led to a narrower range between the silver points. This long-term external integration is considered in more detail below. The other tendency was for exchange rate fluctuations to occur largely in the upper part of the range between the silver points. This is evident in the exchange rates from Paris,

**Figure 6.3** *Foreign exchange rates during the silver standard 1834–73*




Source: Tables A6.1 to A6.8.


*This 10-riksdaler riksmynt note from January 1873 was still redeemable for silver coins in the Riksbank, either 2.5 riksdaler specie (since 1 'riksdaler i silfwer' = 4 riksdaler riksmynt) or 20 'ort' (= 85 grams) silver of 12/16 fineness ('tolf-lödigt') in minted coins. 10 riksdaler riksmynt was, therefore, the equivalent of 64 grams of fine silver in minted coins. Sweden switched from a silver to a gold standard later that year, setting 1 krona (linked to gold) = 1 riksdaler riksmynt. See also the next illustration.*
*Photo: The Royal Coin Cabinet, Stockholm.*

Copenhagen and Hamburg (see Figure 6.3) and could be evidence of some continuous pressure for a depreciation of Sweden's currency.

For Sweden, a typical international economic cycle went roughly as follows. International downturns weakened Swedish exports at the same time as the international credit market became less liquid because downturns were usually associated with credit crunches and financial crises of varying severity. This led to a diminishing supply of currency until the exchange rate had risen to the silver export point and it became profitable to use silver for foreign transactions instead of the conventional instruments, or even to practicing silver arbitrage. Silver exported in this way was

largely withdrawn from the Riksbank and most of it was shipped to Hamburg.[12] In that notes were redeemed for much the same amount, there was a domestic monetary squeeze and this limited the potential supply of credit from the Riksbank. Moreover, the revised version of the Riksbank's regulations, from 1844, required the board of directors to cancel credit to banks and the public when silver was exported (the Bank was still engaged in purely commercial transactions at this time). This was seldom done on a sizeable scale because to some extent the Riksbank could sterilise, or counter, a reduction of the money supply, for instance by using unexploited note-issuing rights or by supplementing its specie and bullion with foreign financial assets/drawing rights. On the whole, however, international downturns did result in a rather drastic tightening of the credit market due to direct reductions of the money supply and credit restrictions. Contemporaries referred to this as a *strypsystem* (literally: 'throttle system'). The pattern was repeated during the international economic downturns and crises around 1837, 1842/43, 1847 and 1857, and to a lesser degree during Britain's brief but intense financial crisis in 1866.

The pattern during economic recoveries was somewhat different. The Riksbank was generally short of silver and aimed to replenish the metallic reserves as soon as exchange rates had fallen back and the outflow of silver had ceased. But instead of waiting for increased exports and an improvement in international credit markets that would bring exchange rates close to the silver import point, making it profitable for people to import silver and deposit it in the Riksbank, the Bank itself set about importing silver when exchange rates were approaching their parities. By purchasing large amounts of foreign currency for this purpose, in practice the Riksbank created a floor for exchange rates at their par value, which was one reason why exchange rate fluctuations on Hamburg tended to stay in the upper part of the band.

The external shocks were considerable. During the depression after the crisis in 1837, for instance, Sweden lost a major part of its comparatively large exports of bar iron and an even larger share of more manufactured iron products to the United States. Another example, where the crisis was more financial than economic, was when the downturn that followed the boom during the Crimean war led to a sharp international financial crisis and a run on banks in 1857. The failure of the Ohio Life Insurance and Trust Company triggered a collapse of financial and credit markets, whereupon the panic spread across the world and even Hamburg banks, usually solvent and liquid, had to suspend payments.

The domestic macroeconomic adjustment effects of the cyclical external flows of silver were probably rather limited because economic conditions usually improved simultaneously for Sweden and for trading partners and credit markets abroad. More-

12 Of course there were exceptions. In the 1840s, when a separate monetary system was established in what had become a Russian province, a stock of predominantly Swedish notes in Finland was redeemed for silver that was then exported. Meanwhile there was extensive arbitrage with the Riksbank's stock of Spanish piastres to Asia. Moreover, silver was exported to London towards the end of the period.

over, the Swedish economy was still predominantly agricultural and less affected by international fluctuations. But even in agriculture, a process of commercialisation and international integration was under way during the period with a silver standard.

However, this monetary regime, with the exchange rate as a central variable, meant on the whole that the long-term growth of the money supply in Sweden was determined by the international supply of and demand for silver. As a result, it probably helps to explain why no permanent currency depreciations occurred during the rest of the period up to 1914. The regime also lay behind the fact that during the four decades with a silver standard, the Riksbank made hardly any contribution to the increase in the money supply. Sweden's overall annual economic growth averaged rather more than 3 per cent (at current prices), which could be expected to have generated a corresponding increase in demand for money because it was not until the latter half of the century that the banking system and routine transactions became appreciably more up-to-date. With a largely unchanged money supply and a trend-wise increase in demand, the monetary regime (in Sweden as well as internationally) should have had a deflationary effect.[13] However, the private banks helped to generate a long-term increase in the money supply and growing liquidity. They did so, not so much via the credit multiplier in the way that is usually understood, but by issuing notes based on their capital and reserves of the Riksbank's paper currency.[14]

The metric system was applied to Swedish currency in the second half of the 1850s. The new paper currency, riksdaler riksmynt, was subdivided into 100 öre. The ratio of new riksdaler riksmynt to old riksdaler banco was the same as for riksdaler riksgälds, i.e. 1.5:1. Moreover, the units in which exchange rates on Hamburg were quoted were changed so that the currency was reported in terms of Hamburger mark banco (3 Hamburger mark banco =1 Hamburger reichsthaler banco) and rates were expressed in riksdaler riksmynt per 100 Hamburger mark banco. Bills on Amsterdam were calculated in guilder as of 1858. The new exchange rate parities on Hamburg and Amsterdam were then c. 132.70 riksdaler riksmynt per 100 Hamburger mark banco, and c. 150.4 riksdaler riksmynt per 100 guilders.

### 6.2.4. The gold standard 1873–1914

The creation of a universal international monetary system based on the French gold franc was discussed in earnest in the 1860s but the idea had to be shelved after the Franco-Prussian war of 1870–71. The indemnity which France, as the loser, had to pay Prussia served as a basis for the unification of Germany and a final amalgamation of German currency systems.[15] Germany's adoption of a gold standard was followed

13 See e.g. McKinnon (1993).

14 Ögren (2006).

15 In 1871 there were still three different currencies in the territories that were to become Germany: the Prussian thaler, the Hamburger mark banco and the south-German gulden.

by Sweden and Denmark in 1873, when these two countries agreed on a common currency system, and in 1875 by Norway, which also joined what then became the Scandinavian Currency Union with the Scandinavian krona as the unit of account. The new exchange rate parities were 88.8888… kronor/100 marks with Germany, 72 kronor/100 francs with France and Belgium, which were both participating in the Latin Monetary Union, 18.1595 kronor/pound with Britain, and 149.9903 kronor/100 guilders with the Netherlands.

The krona was equivalent in value to the former riksdaler riksgälds and riksdaler riksmynt. New external parities were established and were fixed in practice both with sterling and quite soon with a growing number of other currencies as these were tied to gold during the emergence of the classic or international gold standard. The three countries in the Scandinavian Currency Union each retained their central bank and cooperated and coordinated their monetary and exchange rate policies. Still, the main reason why the Union worked so well for almost three decades was the gold standard, which imposed stringent restrictions on monetary policy as well as on economic policy in general. The resultant symmetry promoted currency harmonisation and the Union's long existence[16]. The Union's internal exchange rate parity was, of course, 1:1.

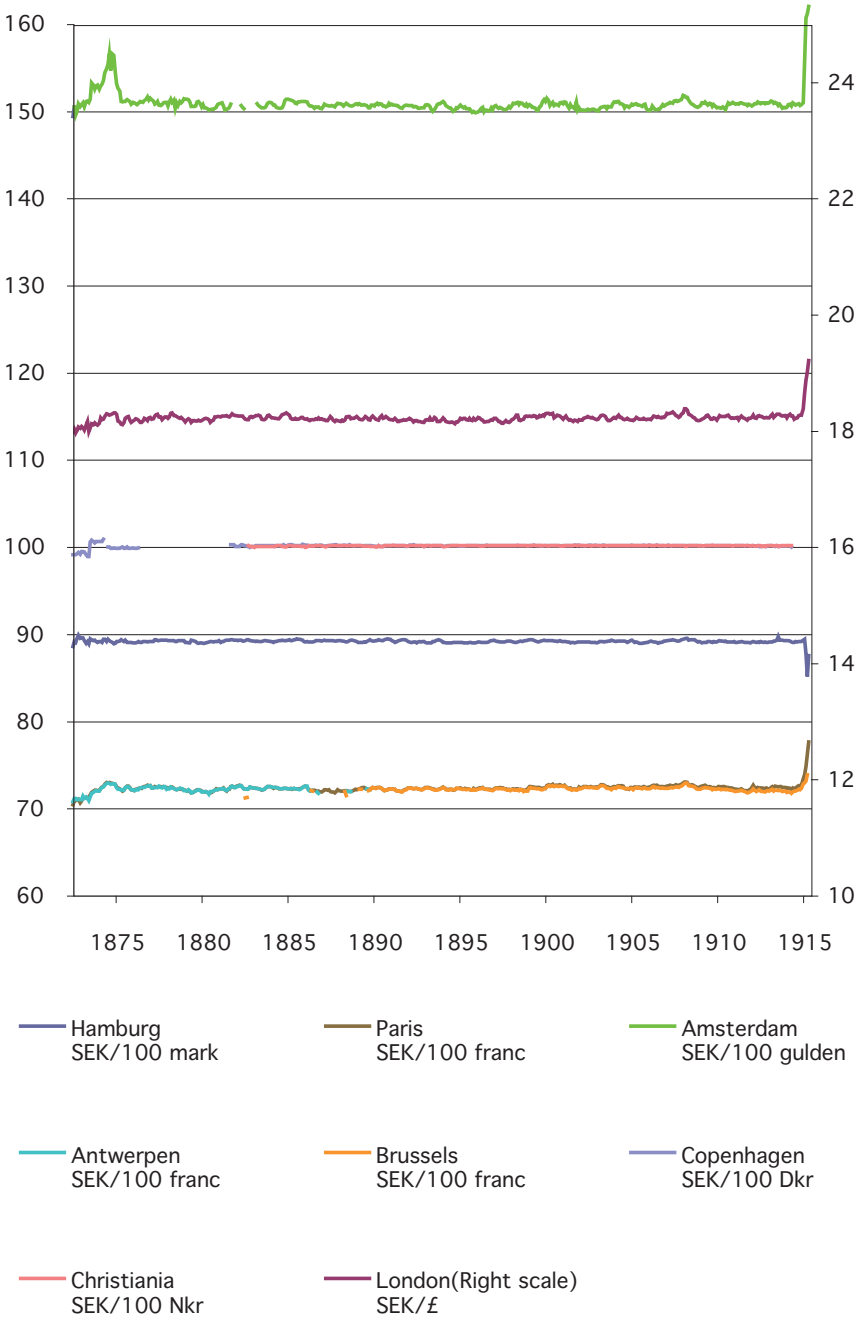
Under the 19th-century gold standard, exchange rates were notably stable (see Figure 6.4). One reason was that a gold standard cut the cost of transactions in gold compared with silver, with the result that gold points had a much smaller range than silver points. The band within which exchange rates could fluctuate without eliciting corrective arbitrage or transactions in gold became correspondingly narrower.

Note that this was by no means a period of financial and economic calm. Serious international financial crises occurred in 1874, 1890, 1903 and 1907, as did a more domestic Swedish financial crisis in 1878 and 1879. In the years up to 1889, moreover, there was a protracted recession with deflationary tendencies and this was followed in the 1890s by a lengthy international economic upswing with rising prices. The break in the international price trend is usually associated with an increased international supply of monetary gold as a consequence of the discovery of gold deposits in South Africa and Alaska, together with more efficient technology for extracting metals. The Swedish economy underwent extensive and profound changes that were accompanied by a massive import of capital, which sustained high long-term growth of both investment and consumption. But it also resulted in a long series of large current-account deficits. In that a stable exchange rate could be maintained for so long, the gold standard was no doubt an important factor behind the particular nature of Sweden's industrialisation.[17]

With Sweden on a gold standard, the operational aspects of monetary and exchange policy changed considerably. Convertibility into precious metal continued

16 Talia 2004, pp. 201 onwards.
17 Schön (2007).

**Figure 6.4** *Exchange rates during the gold standard 1873–1914*




Source: Tables A6.1 to A6.8.


*A 10-krona note from 1877, convertible into gold coins by the Riksbank. In the 1870s, 10 SEK was the equivalent of 4 grams of fine gold and corresponded to a male manufacturing labourer's pay for 40 to 50 hours' work. See also the previous illustration.*
*Photo: The Royal Coin Cabinet, Stockholm.*

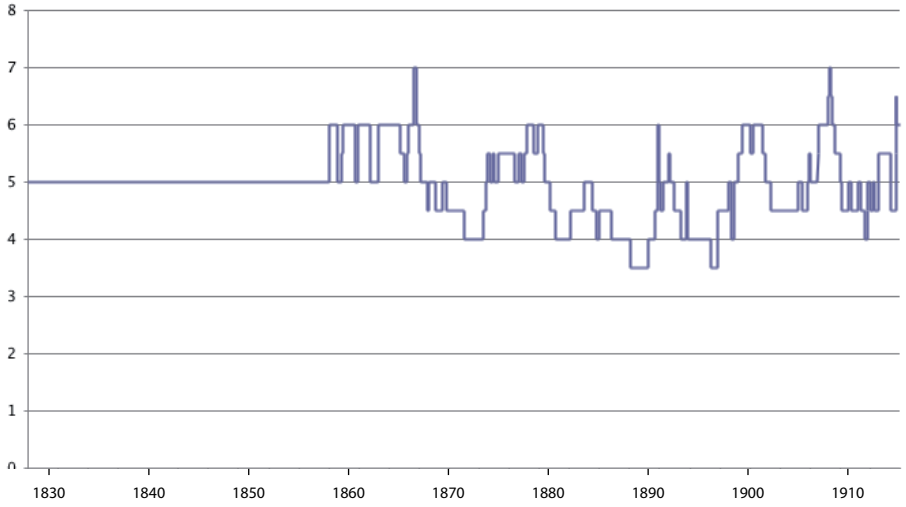
to be the Riksbank's overriding concern but the means for this were augmented, for instance by setting up operational functions. Two of the directors were designated 'delegates for foreign operations' with the task of managing foreign exchange policy. Moreover, the Bank began to trade in foreign currency to a growing extent, both with banks and with the general public.

Another important development was the Riksbank's increasingly well-prepared discount rate adjustments to conditions abroad and to the situation in exchange markets. The Bank had been experimenting with interest rate adjustments since the crisis of 1857. From 1864, moreover, an amendment to the usury law meant that interest rates ceased to be limited to maximum 6 per cent (see Figure 6.5).[18]

Interest rate adjustments and financial transactions accordingly replaced the regular earlier flows of precious metal, the Riksbank's redemption of banknotes and the

18 Note, however, that this change only applied to interest on short-term credit/paper.

**Figure 6.5.** *The Riksbank: official discount rate 1828–1914*




Source*:* Sveriges Riksbank (1931) Del V. *Statistiska tabeller.*

effects of this on the credit market via the money supply as a mechanism for adjustment. Instead of constantly struggling to safeguard or replenish the silver reserves, the Bank was able to achieve an unbroken long-term accumulation of gold reserves and a corresponding growth of the money supply. The private banks' right to issue notes was finally withdrawn in 1902.

It should be born in mind that it was not until around the time of the transition to a gold standard that a number of preconditions for an efficient interest rate policy were in place. There had been a growing understanding of how interest rates and interest rate policy work; in the early 1860s this acquired a more scientific foundation, for instance through G. J. Goschen's *The Theory of the Foreign Exchanges*. Another factor, possibly the most important, was that both the financial system and the banking system in Sweden had not only become considerably larger and more developed but were also increasingly integrated internationally. It is worth considering whether an interest rate policy would have been at all meaningful or effective in earlier times when international liquidity was less abundant and financial flows may not have been sufficiently large to influence with interest rates.

Still, the above is not a sufficient explanation for the outstanding stability of exchange rates during the international gold standard. This is evident not least in a comparison with later decades of the 20th century (see e.g. the next chapter in this volume). So what is the explanation? One interpretation that has become influential is that the gold standard constituted a 'credible commitment mechanism'.[19] A firm

19 Bordo and Kydland (1995).

and perhaps above all a historically long-term undertaking to maintain convertibility to precious metal sent a signal to financial market participants that, at least in peacetime, the State would not go to any extremes of either fiscal or monetary policy. This created confidence among international creditors and investors; moreover, the minimised exchange rate risk meant that credit was almost always available. Borrowers in turn could disregard exchange risks. Matters were probably not made worse by the fact that Sweden had managed to uphold convertibility to precious metal ever since September 1834.

## 6.3. Market integration

During the 19th century the credit and foreign exchange markets in Sweden underwent an extensive and thorough transformation and integration. These processes are analysed in this section with reference to their possible importance for the concurrent development of foreign exchange rates. The new exchange rate series which the project has yielded can be used to both extend and deepen the analyses of long-term integration. The significance of integration for the level of silver and gold points is analysed and thereby the changes in this period in the range formed by these points. This is followed by a study of how the transformation and integration of the Swedish credit and financial markets can be related to the process of integration. The section ends with a look at the development of integration related to the Scandinavian Currency Union.

### *6.3.1. Silver and gold points*

Sweden's foreign exchange market was affected, as mentioned, by an ongoing integration during the periods with a silver or gold standard. This integration can be connected to some extent with innovations in transport and falling transport costs but what helped above all to lower transaction costs was decreased costs for commissions, brokerage, insurance and so on. In that the relative level of transaction costs determined the levels of silver and gold points, over time the range within which exchange rates could fluctuate without eliciting silver or gold arbitrage became narrower. In this way, integration contributed to a long-term stabilisation of exchange rates.[20]

Initially, moreover, the level of silver points varied seasonally because shipping was the cheapest form of transport for silver transactions. Transaction costs were therefore higher during the winter because shipping became ice-bound; this meant that the distance between the silver points widened. In time, this variation diminished as new forms of transport, above all the construction of railways, reduced the cost of moving silver by land, a practice that in those days was not as dependent on seasonal conditions as shipping. The seasonal variation in exchange rates seems to have largely

20 Lobell (2000, 2006).

ceased during the 1860s. Another factor was that during the 19th century Sweden's foreign trade became increasingly diversified and less dependent on seasonal conditions.

Integration led, for example, to falling transaction costs for foreign arbitrage and transactions in silver and gold, which led in turn to a narrowing of the range between silver or gold points and thereby contributed to increasing exchange rate stability. This tendency in the period 1834–80 has been analysed earlier in Lobell (2000, 2006). The Riksbank's new Historical Monetary Statistics now permit new indirect observations of market integration in the period from 1807/08 to 1834.

One approach to estimating costs for transactions and arbitrage involves observing the level of exchange rates in periods when we know that silver or gold was exported. This assumes that normal means of payment, i.e. foreign bills, and silver were substitutes, so that silver could be used when the exchange rate reached a level at which it became profitable to use silver for foreign transactions despite the above-mentioned additional costs. Given also that the market was efficient, the exchange rate ought not to exceed the silver point, in which case the prevailing rate when silver was actually exported should in practice represent the silver point. Transaction costs are then calculated as the difference between exchange parity and the implicit silver or gold point.

Comparisons between direct and indirect measurements of transaction costs have shown fairly good agreement for the period 1834–80. In this case, the average exchange rate for the shipping season was used as an indirect measure. In the work mentioned above, export statistics for silver and gold from the Board of Trade (*Kommerskollegium*) served as an indicator of the years in which precious metal was exported; for the early 19th century one has to rely on indirect information from the Riksbank in Brisman (1930, pp. 8–9). Brisman states, as mentioned above, that silver was withdrawn from the Riksbank and exported at least in 1807. The average exchange rate for the period from April to October would then constitute a measure of the silver export point's level in that year. The new observation is presented in Table 6.1 together with data from Lobell (2006, p. 316). The silver export points refer to exchange rates on Hamburg (which received virtually all the monetary silver that was exported) and are expressed as a percentage of the exchange rate parity.

The figures in Table 6.1 indicate that between the end of the 1830s and the mid 1870s, transaction costs decreased from about two per cent to about half of one per cent of parity. It seems that this fall was preceded by a much steeper reduction since 1807, when transaction costs for exporting silver apparently amounted to more than thirteen per cent of parity. This is not entirely unreasonable in view of the situation in 1807, when the Continent was embroiled in war and blockades. In a study of the integration of Anglo-American foreign exchange markets, Officer (1996, pp. 182–185) demonstrated that transaction costs fell markedly between the periods 1791–1800 and 1821–30. From the present material it is not possible to conclude whether or not the above-mentioned reduction of costs for transactions between Sweden and the Continent occurred between the same periods but it does not seem improbable.

**Table 6.1.** *Average exchange rate for the shipping season in years when specie and bullion were exported (deviation from mint parity, per cent)*

| Year | Average exchange rate | Year | Average exchange rate | Year | Average exchange rate | Year | Average exchange rate |
|---|---|---|---|---|---|---|---|
| 1807 | 13.1 | | | | | | |
| 1837 | 1.8 | 1848 | 2.6 | 1859 | 1.3 | 1870 | .. |
| 1838 | 2.3 | 1849 | .. | 1860 | .. | 1871 | .. |
| 1839 | .. | 1850 | .. | 1861 | 1.2 | 1872 | .. |
| 1840 | .. | 1851 | .. | 1862 | .. | 1873 | .. |
| 1841 | .. | 1852 | .. | 1863 | 1.0 | 1874 | .. |
| 1842 | 1.5 | 1853 | .. | 1864 | .. | 1875 | 0.4** |
| 1843 | 1.5 | 1854 | .. | 1865 | .. | 1876 | .. |
| 1844 | 1.7* | 1855 | .. | 1866 | 1.4 | 1877 | .. |
| 1845 | .. | 1856 | 1.2 | 1867 | 0.9 | 1878 | .. |
| 1846 | .. | 1857 | 1.2 | 1868 | 1.1 | 1879 | .. |
| 1847 | .. | 1858 | .. | 1869 | 0.5 | 1880 | .. |

* This figure is from observations by Skogman (1846).

** This figure denotes the average of exchange rates between September 1874 and April 1875.

Sources: Data for 1807 and 1808 are calculations from exchange rates on Hamburg in database *Historical Monetary Statistics of Sweden 1668–2008*, Sveriges Riksbank. Data between 1837 and 1880 are from Lobell (2006).

### 6.3.2. The Swedish financial system and foreign exchange market

In the first half of the 19th century the major part of Swedish foreign exchange transactions was associated with the sizeable merchant bankers in Stockholm and Göteborg.[21] Their operations included goods, credit, transport and foreign exchange. They were a direct source of foreign currency to clients but foreign exchange trading was largely a matter for the exchanges in the principal towns. Until the end of the 1870s the Swedish foreign exchange market was centred on these exchanges. Swedish exchange trading in the 19th century was dominated by bills drawn on Hamburg and London, which for Sweden were the most important international commercial and financial centres.[22] In the present context, foreign exchange rates are the foreign bill prices that were set in the exchanges' auctions up to the end of 1889. [23]

21 See e.g. Fridlizius (1981, p. 417), Söderlund (1964, p. 45), Andersson (2007).

22 Lobell (2000, p. 144).

23 Auctions were held on two days each week when the items traded were largely goods, foreign currency and maritime insurance. Certain brokers were appointed to perform the auctions, which lasted for one hour (see Algott 1963).

The role of banking companies in the foreign exchange market was very modest in the first half of the century. Three private banks (discount companies) were established in 1803, in Stockholm, Göteborg and Malmö, but they all failed during the international post-war crisis of 1817. The first savings banks appeared in the 1820s, followed by the first private banks and mortgage institutions in 1830 and 1833, respectively. As a rule, however, the note-issuing banking companies did not trade in foreign exchange until around 1860.[24] Moreover, the rudimentary nature of Swedish credit instruments and the difficulties in promoting operations in domestic bills made Swedish commercial paper less attractive internationally.

Exchange market liquidity was rather unstable in the first half of the 19th century. It varied seasonally and was affected by the above-mentioned international credit market conditions. Bills on Hamburg and London were the most important currencies on the Swedish exchanges and bills in other currencies were traded less frequently. This is reflected in the correspondingly large gaps in the exchange rate quotations for these currencies in the present database. During the boom in the 1850s, however, new participants and practices caused the international credit and foreign exchange markets to expand and change. Besides expanding, it has been shown that the foreign exchange market became more sophisticated, though the financial bubble that accompanied this did come to a disastrous end in the crisis of 1857.[25]

In banking, deposits and cash transactions got under way in the 1850s and made a breakthrough in the 1860s. In the 1850s the banks also began to discount domestic bills, albeit on a very modest scale; discounting caught on, however, in the 1860s as the number of banks increased and the banking system became more widespread. Meanwhile the Swedish banks were becoming more integrated internationally. The growth of international interbank trading in the 1860s included the Swedish banking system and helped to improve the liquidity and elasticity of the international foreign exchange market. At the turn of the century, foreign exchange transactions had left the exchanges and become a natural part of banking operations. The exchanges in turn were in the process of becoming stock exchanges.

The Riksbank was active in the foreign exchange market from time to time in the period with a silver standard. The Bank sold foreign currency when the foreign exchange rates were approaching the silver export point; but as the Bank's foreign assets and drawing rights were comparatively small, its sales were relatively insignificant up to the end of the 1880s. The Bank's purchases of foreign currency in connection with imports of bullion were probably more extensive.[26] The Riksbank began to trade in foreign exchange on a regular basis in 1872; in the 1880s the Bank became the central player in the Swedish interbank and foreign exchange markets.[27] As a

24 Brisman (1937, pp. 186–7).
25 Einzig (1962).
26 Lobell (2000).
27 Brisman (1931, p. 285, p. 222).

result, the Riksbank's official exchange rates served as a benchmark for the Swedish market; the Bank's rates are included in the database as of 1890.

The Riksbank's exchange rates were presumably adapted to the market rates. In a statement in 1911 about how exchange rates changed increasingly frequently, the Bank's principal delegate, Bror Karl Johan Langenskiöld, described how foreign currencies were priced. His account shows that the Bank set exchange rates on the basis of information cabled from foreign markets. It seems that banks in Sweden normally followed the Riksbank's exchange rates. Langenskiöld related that commercial banks could obtain information about exchange rates from the Riksbank by telephone or by messenger.[28]

Together with innovations in transportation and communication, this qualitative transformation and development of the Swedish credit and foreign exchange markets contributed, as we saw in the previous section, to both the internal and the international integration of the Swedish foreign exchange market. One way of measuring this integration involves studying the development of price differentials for equivalent financial assets at geographically separate markets. In perfectly integrated markets that conform to the law of one price, prices should be completely uniform. The integration of the Swedish foreign exchange market is illustrated below in terms of a one-year moving average of daily price differentials for three-month bills on London between the exchanges in Stockholm and Göteborg from 1843 (when the Göteborg exchange was established) to 1880. Thus, instead of the silver or gold points that were used to study external integration and the resultant exchange rate band, a somewhat different type of commodity points (or rather 'three-month sterling bill points') is employed in this analysis of the internal integration of the Swedish credit and foreign exchange markets. The price differentials comprise both positive and negative deviations from the price of rather homogeneous three-month sterling bills on London. The more or less continuous falling trend for the mean as well as the standard deviation (see Figure 6.6) indicates a correspondingly continuous rate of integration of the Swedish foreign exchange market and presumably of the Swedish financial system as a whole.

### 6.3.3. The Scandinavian Currency Union

By the time the Swedish financial system had undergone this expansion, transformation and integration, conditions had also been created for making Swedish paper internationally acceptable on an entirely new scale. Short Swedish paper began to be quoted regularly abroad, starting with St. Petersburg in 1878. As of 1882, Swedish bills were also being listed in the major international financial centres. Previously, apart of course from Swedish specie, only Swedish notes had been listed on the Copenhagen and Hamburg exchanges and virtually all the Swedish bonds that were

28 Riksbank archives: F1A:3.

**Figure 6.6.** *One-year moving average of daily market quotations 1843–80. Mean and standard deviation of absolute price differentials between the Stockholm and Göteborg exchanges (SEK/pound sterling). (Moving sample: n=104) (Log scale)*

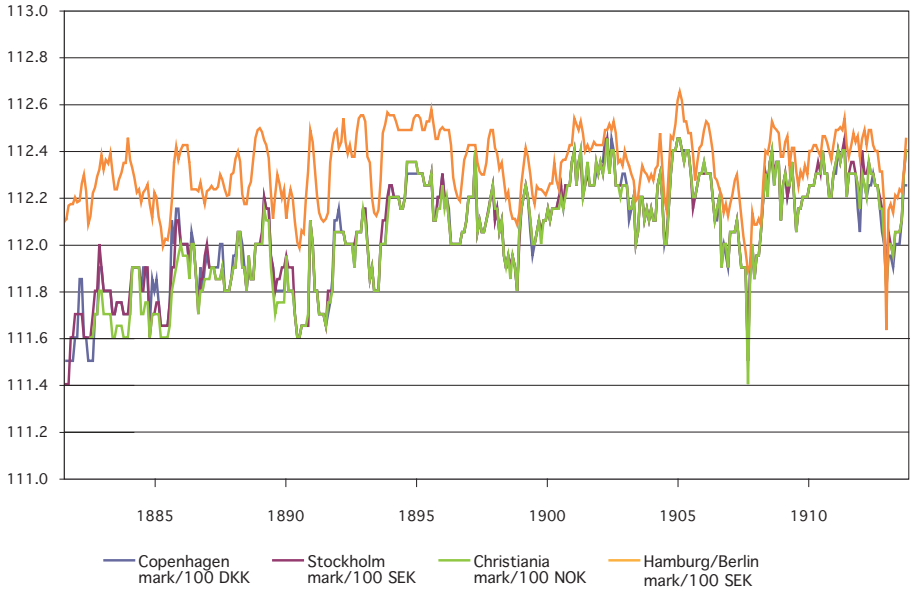

Note. The x-axis indicates the month and year of the last observation in 52-week series (104 trading days). Thus, the first observation concerns 104 price differentials in the period from 3 January 1843 to 2 January 1844.
Source: Modified from Lobell (2000, p. 161).

traded abroad had been made out in foreign currency. From the 1880s onwards, bonds denominated in Swedish currency were marketable internationally. The stable currency based on gold and membership of the Scandinavian Currency Union were naturally no less important in this respect.

Talia (2004, pp. 135–153) has shown that the Scandinavian Currency Union and, perhaps above all, the Union's clearing agreement in the late 1880s promoted the integration of foreign exchange markets in Scandinavia. The present project's new data with Scandinavian bill prices from Hamburg confirm Talia's observations in that they show that certain small price deviations occurred initially but became even smaller over time (see Figure 6.7).

A more unexpected finding is that the Hamburg exchange rate quotations for Scandinavian currencies show a slightly rising trend over as much as fifteen to twenty years, which has not been noted earlier for exchange rates under the gold standard. A

**Figure 6.7.** *Exchange rates for Scandinavian bills of exchange in Hamburg Börse (Copenhagen, Stockholm, Christiania) and German bills in Stockholm 1882–1913 (Hamburg/Berlin) (mark/100 kronor)*




Source: See the main text.

comparison of Hamburg bid prices for Scandinavian bills with prices for bills drawn on Hamburg/Berlin and priced in Stockholm, which show no trend, reveals a price differential that diminishes in the long run. There still seems to have been some price differential at the outbreak of the First World War.

The price differential amounted at most to c. 0.7 per cent of parity; the most probable explanation is that it represented a risk premium which presumably concerned two circumstances. One part of the premium can relate to uncertainty about how the Currency Union and the gold standard would succeed in the Scandinavian countries. The other part can be due to the international markets still being somewhat sceptical about Scandinavian bills of exchange which, as mentioned, had been introduced on the internationally more important exchanges as recently as 1882.

## 6.4. Exchange rate data 1804–1914: description and sources

Foreign exchange rates in the 19th century were actually prices for foreign bills of exchange. Most of the trading from which the price information in this project has been obtained was done on the exchanges. The Swedish centres for the foreign exchange market, at least up to the 1870s, were the Stockholm exchange and, from

its establishment in 1842, the exchange in Göteborg. Trade in Swedish bills in financial centres abroad started as late as in 1882. On the Stockholm exchange, foreign bills were traded on Tuesdays and Fridays.

The market quotations for bills on the Stockholm exchange have been obtained from two daily newspapers: *Aftonbladet* and *Post- och Inrikes Tidningar*. Market quotations were published regularly by local newspapers. The underlying data cover almost all trading days (i.e. two per week) from 1800 to 1889. Another source is the manuscript for the fifth, statistical volume for the history of the Riksbank that was published in 1931.[29] Information from the manuscript has been used mainly for the periods 1800–34 and 1881–89. However, a note on sources in the above-mentioned volume makes it clear that the daily newspaper *Post- och Inrikes Tidningar* was also the basis for those statistics.[30]

As mentioned in the previous section, the trade practices and the way in which foreign exchange rates were quoted changed in the latter part of the century. The volume of interbank trading and the Riksbank's trading gradually outweighed exchange trading as the period drew to a close. For the period 1890–1914 the exchange rates in this database are the Riksbank's and have been compiled from the Bank's internal documents.

### 6.4.1. Sight rates and time bills

Assembling 19th century exchange rate data is not entirely straightforward. The actual rate of exchange is our concern but as bills are financial instruments, their prices sometimes include other components besides the 'true' exchange rate. In the first half of the century, market quotations for foreign bills were based on usance or a time perspective, which means that the calculation of an actual sight exchange rate has to allow for trade practices and time to maturity. Prior to 1847, bills on the Hamburg exchange, for example, usually had 67 days to maturity.

Foreign bills were normally priced with a discount for the time to maturity. However, the sight rate for a sight bill, $E_s$, can be derived by simply cancelling the discount on a time bill, $E_d$. Take, for example, time bill $E_d$ with $d$ days to the due date, where the interest rate at the financial centre where the bill was made out is given by $i$:

$$E_s = \frac{E_d}{1 - \left(\frac{i}{100}\right)\left(\frac{d}{365}\right)} \qquad (1)$$

Eliminating the discount gives bill rates that are closer to the 'true' exchange rates. In this study, interest rate series from the financial centres where the bills were made

29 Sveriges Riksbank (1931).

30 Sveriges Riksbank (1931, p. 142).

out have served as a basis for calculating sight or 'true' exchange rates in accordance with equation 1. The interest rate series from London for the period 1836–80 is 'Minimum Rate of Discount, Bank of England' and comes from NBER online Macro History Database (http://www.nber.org), which is based in turn on information from *The Economist*. The interest rate series from Hamburg for the period 1824–52 is 'Discont an der Hamburger Börse' from Soetbeer (1855, p. 125) and is based on calculations of monthly averages using O. C. Gaedechen's annotations. However, monthly interest rate data for Hamburg and London are missing for the period 1804–23 as well as for 1835, and for Paris for the period 1804–53. A standardised rate of five per cent has then been used instead. The figure is not simply guesswork. In a book on the credit market, J. J. Nordström (1853, p. 161), head of the national archives and subsequently bank inspector, stated that this was a common procedure for discounting maturity periods at the Stockholm exchange in the mid-19th century. It could be argued that this approach should also be adopted for the period to which Nordström refers. The foreign exchange historian Paul Einzig (1962, p. 175) has claimed, as mentioned, that the foreign exchange market became more 'refined' in the mid-19th century, which meant that more consideration was paid to maturity periods, postal days, grace periods, etc.[31] In our opinion, however, as there are no grounds for assuming that, in practice, calculations were invariably done in this way, it is preferable to use the actual discount rate whenever this is available. It should be noted, though, that there is no direct evidence to show that five per cent was used as a standard rate in the early part of the 19th century.

There has been no elimination of the discount for time bills on Amsterdam and Copenhagen during the periods 1804–52 and 1804–34, respectively, since there is insufficient information on maturity periods.

An exchange rate series from which discounting has been eliminated is presented in Figure 6.8. It represents the difference between a series of time bill quotations and a series of estimated quotations of sight rates in the period 1834–52.

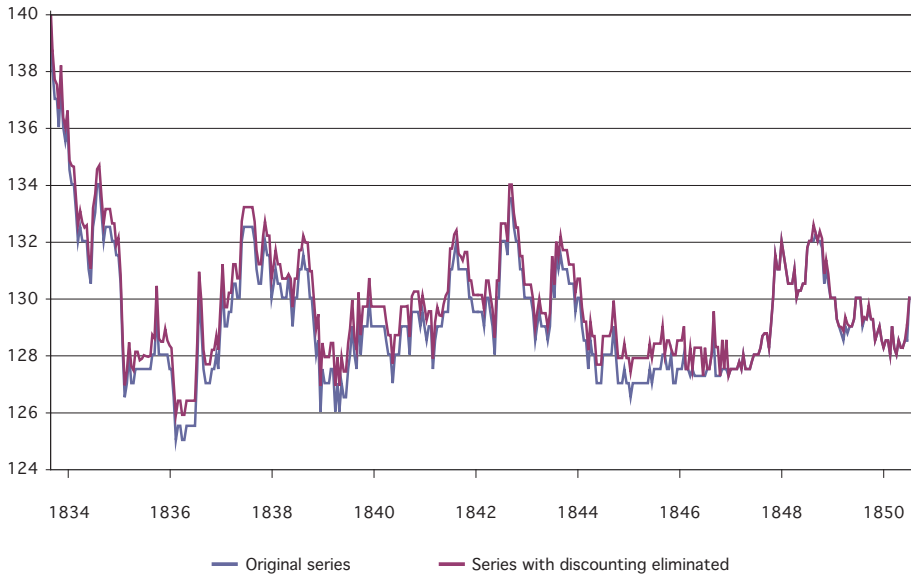
For the latter part of the 19th century, quotations are available for both sight and time bills, which makes it possible to compare the 'accuracy' of the sight rate calculations. Actual sight rates are compared in Figure 6.9 with rates that were reconstructed by applying equation 1 above. The results show fairly good agreement in terms of the level of the series and its medium- and long-term variation.

**Table 6.2** *Correlation between first differences for unprocessed, reconstructed and original series 1870–80*

| | 3-month | Sight or short sight | **Calculated** |
|---|---|---|---|
| 3-month | 1.00 | 0.69 | 0.54 |
| Sight or short sight | 0.69 | 1.00 | 0.54 |
| **Calculated** | 0.54 | 0.54 | 1.00 |

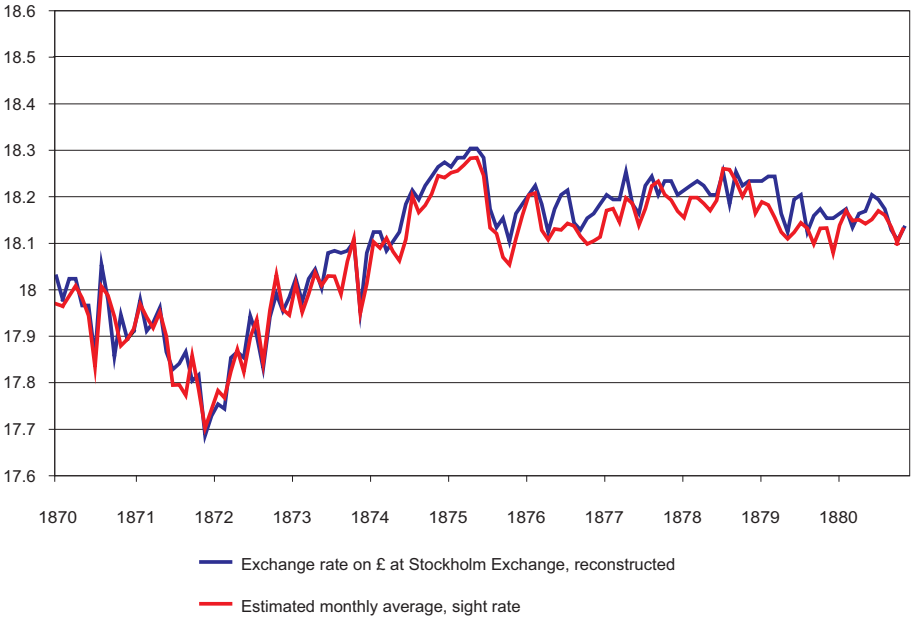
31 Note that postal days and grace periods are not considered in the present calculations.

**Figure 6.8** *An original series compared with a series with discounting eliminated (skilling banco per reichsthaler Hamburg banco)*




Source: See the main text.

**Figure 6.9** *Comparison of a reconstructed and an original series of sight rates 1870–80 (SEK/£)*




Source: See the main text.

There is some difference, on the other hand, in the pattern of short-term variations. This is even clearer in a more thorough comparison of the short-term (monthly) changes in the reconstructed and the 'actual' exchange rates. From Table 6.2 it will be seen that the first differences of the unprocessed series for 3-month and sight rates are more closely correlated than those of the reconstructed series.

## Appendix A6.1 Quotations on Hamburg and Hamburg/Berlin

The currency units that were most important for the Swedish foreign exchange market as regards quotations on Hamburg and Hamburg/Berlin changed a few times during the period and have been converted into consistent series of SEK per 100 marks. Between 1804 and 1857, quotations on Hamburg were made in skilling banco per reichsthaler Hamburg banco; from 1858 to 1872 they were made in riksdaler riksmynt per 100 marks Hamburg banco and between 1873 and 1914 in kronor per 100 marks (in some instances referred to as riksmark or reichsmark). Conversions into SEK/100 marks have been done on the basis of 1 reichsthaler Hamburg banco = 3 marks Hamburg banco = 4.5 marks[32] and 1 SEK = 1 riksdaler riksmynt = 32 skilling banco and 1 riksdaler banco = 48 skilling banco = 1.5 riksdaler riksgälds = 1.5 SEK.[33]

Quotations during the period 1804–89 are from the Stockholm stock exchange, while the Riksbank's official quotations are used for the period 1890–1914.

32 The exact conversion rate in the transition period 1871–76 between mark Hamburg banco and mark is not entirely clear in the literature. K.A.W. (probably the banker Knut Wallenberg) writes, for example, in the encyclopedia *Nordisk familjebok* (1911, p. 995) that mark banco (of Hamburg and Altona) had a value somewhat above 1.50 reichsmark.

33 For example, in order to convert 128 skilling banco into kronor (or riksdaler riksgälds or riksdaler riksmynt) the figure in skillings is divided by 32 (128 ÷ 32 = 4 kronor), and to convert 128 skilling banco into riksdaler banco the figure in skillings is divided by 48 (128 ÷ 48 = 2 2/3 riksdaler banco [or 2 riksdaler banco and 32 skilling banco]). Thus, to convert for example 50 kronor in order to obtain skilling banco the figure in kronor is multiplied by 32 (50 × 32 = 1600 skilling banco), or into riksdaler banco by dividing it with 1.5 (50 ÷ 1.5 = 33 1/3 riksdaler banco [or 33 riksdaler banco and 16 skilling banco]).
Accordingly, if an exchange rate for example in August 1846, 89 SEK per 100 mark, is converted to obtain the original rate expressed in skilling banco per reichsthaler Hamburg banco, one may multiply the numerator, the rate in SEK, with 32 to obtain skilling banco, and divide marks with 4.5 to obtain reichsthaler Hamburg banco in the denominator, and finally divide the rate with 100:

$$\frac{\left[\frac{(89 \times 32)}{\left(\frac{1}{4.5}\right)}\right]}{100} = \frac{12816}{100} = 128.16 \text{ skilling banco per reichsthaler Hamburg banco}$$

The Harbour of Hamburg*, by Anders Zorn (1860–1920). Bills on Hamburg were the most quoted foreign currency in Sweden in the first half of the 19th century.*
Source: Nationalmuseum.

Observations are monthly mid-range in the periods 1804–33 and 1881–89, end-of-month 1834–80 and monthly average 1890–14. The sources for the periods 1804–33 and 1881–89 are unpublished tables that most likely were the basis for calculations for the fifth, statistical volume in Sveriges Riksbank (1931); daily newspapers are reported to be the sources in that volume. Daily newspapers (mostly *Post och inrikes tidningar* and *Aftonbladet*) are sources for Hamburg quotations in the period 1834–80. Official Riksbank quotations on 'Hamburg/Berlin' 1890–1914 are from unpublished material in the Bank.

Quotations are short sight for the period 1848–80 and sight for 1881–1914. The primary instruments traded on the Stockholm stock exchange between 1804 and 1847 were 67-day bills drawn on Hamburg. Consequently the discount embedded in the prices has to be added in order to obtain exchange rates short sight or sight. The exact calculations and data sources are presented in the previous section of this chapter.

**Table A6.1.** *Monthly exchange rates on Hamburg. SEK per 100 marks 1804–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1804 | 35.31 | 35.31 | 35.48 | 35.57 | 35.48 | 35.57 | 35.57 | 35.48 | 35.66 | 35.48 | 36.62 | 36.27 |
| 1805 | 36.18 | 36.36 | 36.18 | 36.27 | 35.83 | 35.57 | 35.48 | 34.78 | 34.78 | 34.87 | 35.22 | 35.04 |
| 1806 | 34.78 | 34.87 | 35.04 | 34.96 | 35.92 | 35.66 | 35.92 | 35.66 | 35.66 | 36.01 | 37.15 | 39.95 |
| 1807 | 39.07 | 39.25 | 37.67 | 37.67 | 37.41 | 37.85 | 36.97 | 37.41 | 38.37 | 38.37 | 39.42 | 38.90 |
| 1808 | 38.37 | 37.76 | 37.15 | 36.45 | 36.45 | 36.45 | 36.45 | 36.45 | 37.15 | 39.25 | 39.95 | 39.95 |
| 1809 | 37.15 | | 37.50 | 40.65 | | 42.75 | 44.86 | 44.33 | 43.63 | 44.27 | 44.16 | 45.03 |
| 1810 | 48.71 | 47.48 | 50.81 | 48.89 | 51.16 | 55.37 | 54.84 | 53.79 | 55.37 | 59.57 | 58.52 | 64.83 |
| 1811 | 65.18 | 81.30 | 95.32 | 71.49 | 70.09 | 76.40 | 77.10 | 77.45 | 76.05 | 73.24 | 71.84 | 65.53 |
| 1812 | 60.28 | | 64.48 | 62.03 | 62.73 | 63.43 | 65.18 | 62.73 | 62.73 | 65.53 | 66.93 | 65.18 |
| 1813 | 65.18 | 65.18 | 60.98 | 60.28 | 65.88 | 70.09 | | | | | | |
| 1814 | | | | | 66.58 | 67.28 | 64.83 | 63.43 | 65.18 | 65.01 | 68.34 | 70.61 |
| 1815 | 72.19 | 74.29 | 68.51 | 75.69 | 81.30 | 81.30 | 73.94 | 72.89 | | 72.54 | 71.49 | 71.49 |
| 1816 | 71.49 | 80.60 | 81.65 | 80.25 | 80.95 | 84.11 | 82.65 | 86.85 | 84.11 | 84.11 | 84.11 | 88.19 |
| 1817 | 81.94 | 74.23 | 69.21 | 81.13 | 76.63 | 78.32 | 77.97 | 77.91 | 77.10 | 72.89 | 72.83 | 78.50 |
| 1818 | 75.64 | 77.10 | 77.21 | 77.10 | 76.22 | 79.08 | 77.10 | 77.51 | 75.69 | 75.64 | 78.44 | 80.60 |
| 1819 | 81.65 | 83.40 | 84.11 | 82.00 | 83.87 | 84.11 | 88.25 | 87.55 | 86.91 | 88.89 | 94.38 | 99.52 |
| 1820 | 97.25 | 94.62 | 94.50 | 93.92 | 94.50 | 94.62 | 92.52 | 90.41 | 86.91 | 89.71 | 89.07 | 89.30 |
| 1821 | 87.96 | 88.14 | 88.31 | 84.40 | 80.60 | 81.65 | 83.35 | 85.51 | 84.81 | 87.61 | 91.11 | 88.66 |
| 1822 | 87.90 | 87.55 | 84.81 | 85.80 | 86.50 | 87.61 | 87.61 | 86.21 | 86.21 | 86.91 | 87.96 | 88.31 |
| 1823 | 88.31 | 88.31 | 87.96 | 86.56 | 86.91 | 86.85 | 85.45 | 85.51 | 86.91 | 88.95 | 89.71 | 89.71 |
| 1824 | 89.34 | 88.66 | 88.83 | 89.57 | 89.75 | 89.71 | 90.33 | 90.16 | 90.06 | 89.98 | 90.00 | 90.04 |
| 1825 | 90.00 | 90.00 | 89.42 | 88.36 | 86.57 | 86.59 | 85.39 | 85.74 | 85.41 | 85.90 | 86.65 | 86.85 |
| 1826 | 87.11 | 86.83 | 88.89 | 89.26 | 88.85 | 90.40 | 91.04 | 90.59 | 93.43 | 94.62 | 94.88 | 96.48 |
| 1827 | 97.40 | 95.27 | 95.74 | 94.75 | 95.52 | 97.05 | 96.32 | 95.95 | 93.57 | 92.47 | 95.39 | 94.18 |
| 1828 | 91.96 | 91.18 | 91.10 | 89.36 | 88.42 | 88.71 | 88.42 | 86.17 | 87.25 | 84.80 | 83.68 | 85.85 |
| 1829 | 85.42 | 85.40 | 85.34 | 86.12 | 85.93 | 86.83 | 85.70 | 85.86 | 86.29 | 88.91 | 90.71 | 89.57 |
| 1830 | 89.19 | 90.00 | 89.77 | 89.81 | 90.95 | 90.95 | 89.63 | 90.89 | 91.18 | 93.20 | 97.79 | 96.15 |
| 1831 | 96.32 | 94.81 | 95.53 | 95.56 | 96.80 | 97.63 | 97.67 | 97.90 | 97.06 | 99.62 | 99.39 | 100.93 |
| 1832 | 101.2 | 101.90 | 101.19 | 102.10 | 103.35 | 100.95 | 102.67 | 101.85 | 101.10 | 102.60 | 103.90 | 103.90 |
| 1833 | 103.83 | 103.78 | 103.85 | 103.78 | 102.97 | 103.40 | 100.23 | 97.63 | 94.94 | 97.78 | 96.30 | 99.25 |
| 1834 | 96.32 | 95.53 | 95.88 | 94.49 | 93.83 | 93.53 | 92.13 | 92.22 | 92.26 | 91.08 | 92.79 | 93.53 |
| 1835 | 92.00 | 92.31 | 91.94 | 91.66 | 90.96 | 88.17 | 89.22 | 88.50 | 88.95 | 89.07 | 89.28 | 89.40 |
| 1836 | 89.61 | 89.34 | 89.30 | 89.36 | 89.11 | 87.37 | 87.74 | 87.39 | 87.88 | 87.86 | 89.30 | 90.58 |
| 1837 | 88.95 | 88.76 | 89.05 | 89.03 | 91.08 | 90.04 | 90.35 | 91.02 | 90.65 | 92.37 | 92.40 | 92.52 |
| 1838 | 91.37 | 90.96 | 92.00 | 91.85 | 91.11 | 91.17 | 90.80 | 90.76 | 90.69 | 90.69 | 91.43 | 92.10 |
| 1839 | 91.45 | 90.65 | 89.34 | 88.03 | 88.70 | 88.89 | 89.24 | 89.20 | 89.16 | 88.66 | 89.55 | 89.42 |
| 1840 | 90.24 | 89.87 | 89.91 | 90.00 | 90.12 | 90.16 | 90.10 | 89.36 | 88.66 | 89.51 | 90.20 | 90.20 |
| 1841 | 89.28 | 90.24 | 90.37 | 90.37 | 89.67 | 90.20 | 89.77 | 90.20 | 90.57 | 90.49 | 91.45 | 92.24 |
| 1842 | 91.41 | 91.33 | 90.63 | 90.32 | 90.47 | 90.14 | 90.67 | 90.35 | 89.24 | 90.63 | 92.09 | 91.83 |
| 1843 | 93.07 | 91.94 | 91.24 | 90.55 | 90.57 | 90.22 | 89.87 | 89.89 | 90.00 | 90.04 | 90.65 | 91.31 |
| 1844 | 91.31 | 91.29 | 91.04 | 90.49 | 90.80 | 89.90 | 89.11 | 89.38 | 88.62 | 88.60 | 89.30 | 89.34 |
| 1845 | 89.93 | 88.54 | 88.52 | 88.68 | 88.50 | 88.89 | 88.81 | 88.83 | 89.05 | 89.30 | 89.32 | 89.16 |
| 1846 | 88.92 | 89.01 | 88.76 | 89.32 | 89.24 | 88.57 | 89.12 | 89.00 | 89.04 | 88.40 | 88.58 | 88.89 |
| 1847 | 89.17 | 89.06 | 89.11 | 88.96 | 88.54 | 88.54 | 88.54 | 88.54 | 88.54 | 88.89 | 88.89 | 89.35 |
| 1848 | 89.41 | 89.58 | 91.32 | 90.97 | 91.32 | 90.63 | 90.63 | 90.28 | 90.45 | 90.63 | 91.67 | 91.67 |

**Table A6.1 (cont.).** *Monthly exchange rates on Hamburg. SEK per 100 marks 1804–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1849 | 91.67 | 91.49 | 90.97 | 90.28 | 90.28 | 89.58 | 89.24 | 89.41 | 89.58 | 90.28 | 90.28 | 89.76 |
| 1850 | 89.93 | 89.76 | 89.41 | 89.24 | 89.24 | 88.89 | 89.06 | 89.24 | 89.06 | 89.24 | 90.80 | 90.28 |
| 1851 | 90.28 | 89.76 | 89.41 | 89.24 | 89.24 | 88.89 | 89.58 | 89.41 | 89.24 | 89.58 | 89.24 | 90.80 |
| 1852 | 89.93 | 89.93 | 89.24 | 89.41 | 89.58 | 89.06 | 89.58 | 89.76 | 88.72 | 89.24 | 89.24 | 89.06 |
| 1853 | 89.06 | 88.89 | 88.89 | 88.89 | 89.06 | 89.06 | 89.06 | 89.06 | 89.06 | 89.06 | 89.06 | 89.24 |
| 1854 | 89.24 | 89.06 | 89.24 | 89.06 | 89.06 | 89.06 | 89.06 | 89.06 | 89.06 | 89.06 | 89.06 | 89.58 |
| 1855 | 89.58 | 89.93 | 89.76 | 89.41 | 89.24 | 89.41 | 89.24 | 89.24 | 89.06 | 89.06 | 89.06 | 89.35 |
| 1856 | 89.58 | 89.81 | 89.81 | 89.41 | 89.41 | 89.24 | 89.58 | 89.88 | 89.70 | 89.76 | 89.93 | 90.63 |
| 1857 | 91.15 | 91.15 | 89.93 | 89.58 | 89.58 | 88.89 | 89.76 | 89.58 | 89.06 | 89.58 | 90.28 | 92.36 |
| 1858 | 94.11 | 90.24 | 90.10 | 90.10 | 89.67 | 89.17 | 90.10 | 89.77 | 88.99 | 89.26 | 89.77 | 90.61 |
| 1859 | 90.78 | 89.77 | 89.93 | 89.70 | 90.27 | 90.10 | 89.94 | 89.43 | 89.43 | 89.43 | 89.43 | 89.43 |
| 1860 | 89.77 | 89.94 | 89.77 | 89.60 | 89.27 | 89.44 | 89.54 | 89.60 | 89.77 | 89.70 | 89.94 | 89.94 |
| 1861 | 90.84 | 90.60 | 89.94 | 89.94 | 89.84 | 89.44 | 89.77 | 89.44 | 89.77 | 89.44 | 90.10 | 90.44 |
| 1862 | 90.27 | 90.27 | 89.54 | 89.77 | 89.44 | 89.60 | 89.27 | 89.27 | 89.44 | 89.60 | 89.77 | 89.77 |
| 1863 | 89.60 | 89.44 | 89.60 | 89.60 | 89.60 | 89.60 | 89.60 | 89.10 | 89.44 | 89.60 | 89.94 | 90.27 |
| 1864 | 89.94 | 89.60 | 89.60 | 89.60 | 89.54 | 89.60 | 89.60 | 89.50 | 89.77 | 89.44 | 89.44 | 89.44 |
| 1865 | 89.44 | 89.44 | 89.27 | 89.27 | 89.27 | 89.44 | 89.44 | 89.60 | 89.60 | 89.60 | 89.44 | 89.60 |
| 1866 | 89.77 | 89.77 | 89.60 | 89.77 | 89.77 | 90.10 | 90.10 | 89.77 | 89.60 | 89.77 | 89.77 | 89.60 |
| 1867 | 89.77 | 89.60 | 89.44 | 89.44 | 89.54 | 89.44 | 89.44 | 89.38 | 89.34 | 89.44 | 89.44 | 89.50 |
| 1868 | 89.77 | 89.60 | 89.44 | 89.34 | 89.44 | 89.60 | 89.94 | 89.94 | 89.94 | 89.34 | 89.37 | 89.60 |
| 1869 | 89.77 | 89.60 | 89.34 | 89.30 | 89.27 | 89.20 | 89.10 | 89.04 | 88.87 | 88.87 | 88.99 | 88.99 |
| 1870 | 88.99 | 88.99 | 88.99 | 88.99 | 88.99 | 88.94 | 89.84 | 89.27 | 88.99 | 88.94 | 88.94 | 88.94 |
| 1871 | 88.77 | 88.77 | 88.67 | 88.60 | 88.50 | 88.37 | 88.30 | 88.30 | 88.27 | 88.30 | 88.27 | 88.20 |
| 1872 | 88.27 | 88.20 | 88.20 | 88.20 | 88.20 | 88.10 | 88.10 | 88.44 | 88.27 | 88.27 | 87.93 | 87.93 |
| 1873 | 88.42 | 89.00 | 88.90 | 89.35 | 89.75 | 89.35 | 89.40 | 89.40 | 89.10 | 88.80 | 89.00 | 88.75 |
| 1874 | 89.30 | 89.20 | 89.10 | 89.15 | 89.00 | 88.90 | 89.00 | 89.00 | 88.90 | 89.25 | 89.25 | 89.00 |
| 1875 | 89.25 | 89.10 | 89.00 | 88.90 | 88.75 | 88.80 | 89.00 | 89.00 | 89.05 | 89.20 | 89.10 | 89.00 |
| 1876 | 89.15 | 88.90 | 88.90 | 88.90 | 88.90 | 88.85 | 88.85 | 88.85 | 88.90 | 89.00 | 88.90 | 88.90 |
| 1877 | 89.00 | 89.00 | 89.00 | 88.95 | 89.00 | 89.00 | 89.00 | 89.00 | 89.20 | 89.20 | 89.10 | 89.10 |
| 1878 | 89.15 | 89.15 | 89.15 | 89.15 | 89.15 | 89.10 | 89.10 | 89.10 | 89.10 | 89.10 | 89.00 | 89.00 |
| 1879 | 89.10 | 89.10 | 89.10 | 89.10 | 89.10 | 88.90 | 88.90 | 88.85 | 88.85 | 89.15 | 89.10 | 89.05 |
| 1880 | 89.03 | 88.87 | 88.80 | 88.87 | 88.86 | 88.81 | 88.81 | 88.84 | 88.91 | 88.94 | 89.00 | 88.99 |
| 1881 | 88.98 | 89.00 | 88.99 | 88.99 | 89.09 | 88.90 | 88.98 | 89.00 | 89.08 | 89.18 | 89.18 | 89.18 |
| 1882 | 89.21 | 89.20 | 89.16 | 89.15 | 89.15 | 89.13 | 89.14 | 89.14 | 89.08 | 89.05 | 89.11 | 89.22 |
| 1883 | 89.19 | 89.11 | 89.09 | 89.06 | 89.03 | 88.98 | 89.03 | 89.00 | 89.01 | 88.98 | 89.04 | 89.10 |
| 1884 | 89.10 | 89.07 | 89.04 | 89.01 | 89.01 | 88.93 | 89.00 | 89.03 | 89.06 | 89.11 | 89.10 | 89.14 |
| 1885 | 89.11 | 89.10 | 89.08 | 89.15 | 89.20 | 89.11 | 89.13 | 89.19 | 89.23 | 89.29 | 89.27 | 89.27 |
| 1886 | 89.23 | 89.14 | 89.01 | 88.96 | 89.00 | 88.97 | 88.95 | 88.95 | 88.95 | 89.01 | 89.10 | 89.10 |
| 1887 | 89.10 | 89.11 | 89.08 | 89.12 | 89.15 | 89.11 | 89.10 | 89.09 | 89.10 | 89.10 | 89.09 | 89.05 |
| 1888 | 89.07 | 89.10 | 89.12 | 89.12 | 89.05 | 89.04 | 89.00 | 88.97 | 89.01 | 89.12 | 89.15 | 89.15 |
| 1889 | 89.09 | 89.08 | 88.99 | 88.93 | 88.90 | 88.89 | 88.91 | 88.93 | 88.95 | 88.99 | 89.11 | 89.20 |
| 1890 | 89.12 | 89.05 | 89.08 | 89.13 | 89.10 | 89.20 | 89.14 | 89.10 | 89.13 | 89.21 | 89.28 | 89.30 |
| 1891 | 89.24 | 89.25 | 89.13 | 89.04 | 88.90 | 88.94 | 89.03 | 89.12 | 89.18 | 89.20 | 89.21 | 89.20 |
| 1892 | 89.18 | 89.01 | 88.95 | 88.91 | 88.90 | 88.96 | 88.94 | 88.86 | 88.94 | 88.98 | 88.95 | 88.99 |
| 1893 | 88.99 | 88.91 | 88.86 | 88.85 | 88.85 | 88.87 | 88.99 | 89.01 | 89.13 | 89.18 | 89.19 | 89.17 |

**Table A6.1 (cont.).** *Monthly exchange rates on Hamburg. SEK per 100 marks 1804–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1894 | 89.07 | 88.91 | 88.88 | 88.84 | 88.85 | 88.85 | 88.85 | 88.87 | 88.90 | 88.90 | 88.90 | 88.90 |
| 1895 | 88.90 | 88.90 | 88.90 | 88.86 | 88.85 | 88.85 | 88.86 | 88.90 | 88.90 | 88.87 | 88.87 | 88.83 |
| 1896 | 88.88 | 88.93 | 88.93 | 88.90 | 88.89 | 88.90 | 88.90 | 88.90 | 88.95 | 89.06 | 89.10 | 89.13 |
| 1897 | 89.14 | 89.07 | 89.00 | 88.98 | 88.95 | 88.95 | 88.95 | 88.95 | 89.01 | 89.04 | 89.05 | 89.05 |
| 1898 | 89.01 | 88.93 | 88.90 | 88.90 | 88.96 | 88.98 | 89.03 | 89.01 | 89.07 | 89.13 | 89.11 | 89.17 |
| 1899 | 89.20 | 89.20 | 89.22 | 89.18 | 89.08 | 89.02 | 88.96 | 88.99 | 89.05 | 89.12 | 89.15 | 89.09 |
| 1900 | 89.10 | 89.10 | 89.11 | 89.12 | 89.10 | 89.08 | 89.08 | 89.01 | 89.07 | 89.10 | 89.01 | 89.00 |
| 1901 | 89.00 | 88.98 | 88.95 | 88.95 | 88.86 | 88.88 | 88.90 | 88.87 | 88.91 | 88.97 | 88.95 | 88.97 |
| 1902 | 88.96 | 88.94 | 88.95 | 88.95 | 88.95 | 88.95 | 88.90 | 88.90 | 88.88 | 88.90 | 88.87 | 88.91 |
| 1903 | 89.01 | 89.00 | 89.02 | 88.97 | 89.00 | 89.02 | 89.05 | 89.07 | 89.14 | 89.13 | 89.07 | 89.02 |
| 1904 | 89.04 | 89.05 | 89.07 | 89.05 | 89.07 | 89.03 | 89.02 | 88.91 | 89.02 | 89.13 | 89.17 | 89.04 |
| 1905 | 88.92 | 88.93 | 88.88 | 88.80 | 88.77 | 88.80 | 88.87 | 88.87 | 88.91 | 88.91 | 88.98 | 89.07 |
| 1906 | 89.01 | 88.96 | 88.95 | 88.90 | 88.87 | 88.88 | 88.92 | 88.97 | 89.06 | 89.07 | 89.10 | 89.12 |
| 1907 | 89.18 | 89.15 | 89.19 | 89.15 | 89.12 | 89.07 | 89.05 | 89.12 | 89.19 | 89.26 | 89.31 | 89.38 |
| 1908 | 89.36 | 89.18 | 89.22 | 89.22 | 89.20 | 89.22 | 89.07 | 88.97 | 88.98 | 88.94 | 88.87 | 88.89 |
| 1909 | 88.90 | 88.91 | 88.99 | 88.99 | 88.94 | 88.92 | 89.02 | 88.96 | 88.96 | 89.04 | 89.09 | 89.04 |
| 1910 | 89.06 | 89.02 | 89.05 | 88.97 | 88.97 | 88.95 | 88.95 | 88.97 | 88.99 | 88.92 | 88.92 | 88.94 |
| 1911 | 88.97 | 89.00 | 88.95 | 88.90 | 88.90 | 88.89 | 88.90 | 88.86 | 88.95 | 88.99 | 88.95 | 88.91 |
| 1912 | 88.94 | 88.92 | 88.99 | 88.93 | 88.90 | 88.95 | 88.90 | 88.90 | 88.95 | 88.97 | 88.97 | 89.04 |
| 1913 | 89.04 | 89.15 | 89.58 | 89.17 | 89.15 | 89.18 | 89.12 | 89.13 | 89.10 | 89.11 | 89.04 | 88.93 |
| 1914 | 88.90 | 88.90 | 88.98 | 88.94 | 89.01 | 89.01 | 89.00 | 89.16 | 89.26 | 87.62 | 84.97 | 87.41 |

Sources: 1804–33 and 1881–89: 'Växelkurser NN' (unpublished tables, Sveriges Riksbank); 1834–80: *Post och inrikes tidningar* and *Aftonbladet*; 1890–1914: *Riksbankens växelkurser på Hamburg/Berlin, 1890–1914* (unpublished volume, Sveriges Riksbank).

## Appendix A6.2 Quotations on London

As the British currency was unchanged throughout the 19th century, even though it was officially converted into a monometallic gold currency in 1816, calculating consistent series of SEK per £1 is a simple matter. Quotations for bills drawn on London were made in skilling banco per £1 before 1858, in riksdaler riksmynt per £1 between 1858 and 1872 and in kronor per £1 thereafter. Conversion into SEK (kronor) has been done on the basis of 1 SEK = 1 riksdaler riksmynt = 32 skilling banco.

Sterling quotations in the period 1804–89 are from the Stockholm stock exchange, while the Riksbank's official quotations are used for the period 1890–1914.

Observations are monthly mid-range in the periods 1804–42 and 1881–89 and monthly average in 1843–80 and 1890–1914. The sources for periods 1804–42 and 1881–89 are unpublished tables from the Riksbank; daily newspapers are reported to be the sources in that volume. Daily newspapers (*Post och inrikes tidningar, Aftonbladet* and *Göteborgs handels- och sjöfartstidning*) are sources for daily London quotations

in the period 1843–80 from which monthly averages have been calculated. Official quotations on London 1890–1914 are from unpublished material in the Bank.

The most homogeneous series of quotations on London before 1870 are 90-day sterling bills. Consequently the discount that was deducted from these prices has to be added in order to obtain exchange rates short sight or sight. The exact calculations and data sources are presented in the previous section.

**Table A6.2.** *Monthly exchange rates on London. SEK per £1 1804–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1804 | 6.74 | 6.68 | 6.83 | 6.96 | 7.06 | 7.02 | 7.02 | 6.98 | 6.93 | 6.91 | 7.15 | 6.90 |
| 1805 | 6.98 | 7.06 | 7.06 | 7.06 | 7.01 | 6.96 | 6.91 | 6.71 | 6.58 | 6.33 | 6.39 | 6.17 |
| 1806 | 6.36 | 6.60 | 6.71 | 6.58 | 6.90 | 6.74 | 6.76 | 6.80 | 6.64 | 6.76 | 7.07 | 6.91 |
| 1807 | 7.48 | 7.40 | 7.23 | 7.28 | 7.21 | 7.12 | 7.02 | 6.94 | 6.85 | 6.99 | 7.01 | 7.09 |
| 1808 | 7.15 | 6.96 | 6.80 | 6.74 | 6.82 | 6.79 | 6.81 | 6.80 | 6.79 | 6.79 | 6.80 | 6.77 |
| 1809 | 6.76 | 6.76 | 6.88 | 6.94 | 6.93 | 6.91 | 6.91 | 7.07 | 7.10 | 7.04 | 7.06 | 7.15 |
| 1810 | 8.16 | 7.78 | 8.57 | 8.46 | 8.84 | 9.56 | 9.14 | 9.37 | 9.59 | 9.65 | 9.56 | 9.57 |
| 1811 | 9.58 | 9.59 | 9.60 | 9.62 | 9.63 | 9.64 | 9.65 | 9.66 | 9.68 | 9.69 | 9.70 | 9.71 |
| 1812 | 9.72 | 9.74 | 9.75 | 9.76 | 9.77 | 9.78 | 9.80 | 9.81 | 9.41 | 9.60 | 9.81 | 9.87 |
| 1813 | 10.25 | 10.63 | 10.69 | 9.37 | 10.19 | 10.62 | 10.63 | 11.33 | 11.61 | 10.99 | 11.07 | 11.74 |
| 1814 | 11.50 | 11.49 | 11.52 | 11.17 | 10.33 | 10.36 | 10.92 | 11.36 | 11.79 | 11.50 | 11.99 | 12.37 |
| 1815 | 13.07 | 13.23 | 12.12 | 11.88 | 12.64 | 12.51 | 12.64 | 12.64 | 13.02 | 13.40 | 13.54 | 13.54 |
| 1816 | 13.54 | 15.06 | 15.95 | 15.69 | 15.82 | 16.45 | 17.09 | 17.67 | 17.34 | 17.34 | 17.34 | 17.97 |
| 1817 | 16.20 | 14.52 | 13.79 | 15.95 | 15.22 | 15.41 | 14.93 | 14.98 | 14.68 | 13.91 | 13.69 | 14.81 |
| 1818 | 14.15 | 14.43 | 14.37 | 14.33 | 14.14 | 14.80 | 14.49 | 14.53 | 14.28 | 14.01 | 14.36 | 15.06 |
| 1819 | 16.69 | 15.61 | 15.99 | 15.29 | 15.82 | 16.44 | 17.47 | 17.84 | 17.57 | 17.67 | 18.72 | 19.74 |
| 1820 | 19.46 | 18.98 | 18.96 | 19.08 | 19.24 | 19.33 | 19.13 | 18.70 | 17.97 | 16.96 | 18.48 | 18.73 |
| 1821 | 18.48 | 18.45 | 18.54 | 17.85 | 17.06 | 17.40 | 17.43 | 17.97 | 17.37 | 18.05 | 18.48 | 18.22 |
| 1822 | 18.10 | 18.10 | 17.44 | 17.71 | 17.96 | 16.89 | 18.22 | 18.01 | 17.96 | 18.10 | 18.14 | 18.13 |
| 1823 | 18.35 | 18.32 | 18.25 | 18.05 | 18.33 | 18.07 | 17.83 | 18.05 | 18.21 | 18.60 | 18.60 | 18.58 |
| 1824 | 18.49 | 18.38 | 18.46 | 18.53 | 18.51 | 18.48 | 18.55 | 18.58 | 18.60 | 18.59 | 18.57 | 18.60 |
| 1825 | 18.55 | 18.55 | 18.10 | 17.49 | 17.32 | 17.37 | 17.13 | 17.24 | 17.11 | 17.34 | 17.10 | 17.24 |
| 1826 | 17.38 | 17.70 | 18.16 | 18.47 | 18.45 | 19.09 | 19.11 | 19.01 | 19.43 | 19.70 | 19.74 | 19.74 |
| 1827 | 20.12 | 19.69 | 19.99 | 19.73 | 19.78 | 20.09 | 19.69 | 19.58 | 19.08 | 18.79 | 19.23 | 18.86 |
| 1828 | 18.73 | 18.54 | 18.53 | 18.35 | 18.12 | 18.28 | 18.28 | 17.74 | 17.81 | 17.21 | 17.08 | 17.39 |
| 1829 | 17.21 | 17.38 | 17.44 | 17.71 | 17.65 | 17.78 | 17.55 | 17.45 | 17.65 | 18.22 | 18.85 | 18.58 |
| 1830 | 18.50 | 18.78 | 18.79 | 18.79 | 18.85 | 18.86 | 18.28 | 18.59 | 18.46 | 18.78 | 19.74 | 19.33 |
| 1831 | 19.43 | 19.22 | 19.42 | 19.41 | 19.74 | 19.91 | 19.84 | 19.76 | 19.54 | 20.10 | 20.18 | 20.31 |
| 1832 | 20.50 | 20.93 | 20.93 | 21.13 | 21.51 | 21.01 | 21.32 | 21.26 | 20.93 | 21.32 | 21.38 | 21.42 |
| 1833 | 21.55 | 21.63 | 21.58 | 21.47 | 21.47 | 21.51 | 20.72 | 20.01 | 19.36 | 19.92 | 19.55 | 20.12 |
| 1834 | 19.51 | 19.48 | 19.52 | 19.26 | 19.11 | 19.06 | 18.84 | 18.84 | 18.72 | 18.53 | 18.98 | 18.90 |
| 1835 | 18.81 | 18.80 | 18.85 | 18.81 | 18.69 | 18.02 | 18.27 | 18.27 | 18.25 | 18.30 | 18.25 | 18.19 |
| 1836 | 18.26 | 18.36 | 18.31 | 18.26 | 18.17 | 17.76 | 17.74 | 17.75 | 17.76 | 17.77 | 17.91 | 18.02 |
| 1837 | 17.89 | 17.93 | 18.15 | 18.35 | 18.73 | 18.73 | 18.65 | 18.79 | 18.76 | 19.03 | 18.98 | 18.88 |
| 1838 | 18.64 | 18.58 | 18.89 | 18.79 | 18.71 | 18.70 | 18.51 | 18.49 | 18.41 | 18.46 | 18.48 | 18.30 |
| 1839 | 18.36 | 18.23 | 17.96 | 17.63 | 17.73 | 17.76 | 17.84 | 17.72 | 17.79 | 17.64 | 17.95 | 17.95 |
| 1840 | 18.31 | 18.29 | 18.35 | 18.13 | 18.29 | 18.15 | 18.17 | 17.86 | 17.64 | 17.63 | 17.91 | 17.88 |

**Table A6.2 (cont.).** *Monthly exchange rates on London. SEK per £1 1804–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1841 | 17.90 | 18.03 | 18.10 | 18.22 | 18.41 | 18.22 | 18.16 | 18.17 | 18.22 | 18.29 | 18.48 | 18.53 |
| 1842 | 18.67 | 18.75 | 18.67 | 18.61 | 18.37 | 18.36 | 18.56 | 18.53 | 18.28 | 18.56 | 18.81 | 18.69 |
| 1843 | 18.90 | 18.90 | 18.86 | 18.78 | 18.87 | 18.74 | 18.62 | 18.62 | 18.60 | 18.54 | 18.70 | 18.75 |
| 1844 | 18.76 | 18.73 | 18.67 | 18.63 | 18.57 | 18.35 | 18.16 | 18.19 | 18.10 | 18.01 | 18.18 | 18.17 |
| 1845 | 18.28 | 18.36 | 18.21 | 18.20 | 18.15 | 18.19 | 18.17 | 18.10 | 18.09 | 18.02 | 18.00 | 18.10 |
| 1846 | 18.15 | 18.19 | 18.20 | 18.18 | 18.28 | 18.30 | 18.16 | 18.19 | 18.14 | 18.05 | 18.02 | 18.12 |
| 1847 | 17.98 | 17.91 | 17.86 | 17.93 | 18.02 | 17.99 | 17.95 | 17.98 | 18.01 | 18.18 | 18.34 | 18.48 |
| 1848 | 18.46 | 18.33 | 18.66 | 18.89 | 18.97 | 18.61 | 18.49 | 18.51 | 18.34 | 18.35 | 18.61 | 18.78 |
| 1849 | 18.88 | 18.76 | 18.56 | 18.51 | 18.49 | 18.48 | 18.45 | 18.44 | 18.44 | 18.48 | 18.65 | 18.49 |
| 1850 | 18.47 | 18.48 | 18.45 | 18.48 | 18.40 | 18.21 | 18.11 | 18.12 | 18.09 | 18.04 | 18.06 | 17.85 |
| 1851 | 17.85 | 18.01 | 17.95 | 17.87 | 17.81 | 17.84 | 17.87 | 17.90 | 17.89 | 18.01 | 18.12 | 18.19 |
| 1852 | 18.17 | 18.22 | 18.08 | 18.14 | 18.23 | 18.17 | 18.10 | 18.05 | 18.03 | 17.92 | 17.72 | 17.61 |
| 1853 | 17.59 | 17.63 | 17.69 | 17.70 | 17.72 | 17.71 | 17.63 | 17.66 | 17.63 | 17.63 | 17.53 | 17.56 |
| 1854 | 17.55 | 17.58 | 17.49 | 17.44 | 17.56 | 17.62 | 17.64 | 17.71 | 17.73 | 17.74 | 17.71 | 17.66 |
| 1855 | 17.72 | 17.82 | 17.84 | 18.06 | 17.96 | 17.89 | 17.87 | 17.83 | 17.78 | 17.87 | 17.89 | 17.93 |
| 1856 | 18.04 | 18.22 | 18.40 | 18.32 | 18.25 | 18.09 | 17.89 | 17.96 | 17.81 | 17.76 | 17.86 | 17.90 |
| 1857 | 18.01 | 18.12 | 18.01 | 17.93 | 17.89 | 17.78 | 17.78 | 17.88 | 17.77 | 17.75 | 18.04 | 18.45 |
| 1858 | 18.55 | 18.24 | 17.96 | 17.88 | 17.90 | 17.75 | 17.92 | 18.08 | 17.85 | 17.78 | 17.85 | 18.05 |
| 1859 | 18.06 | 17.93 | 17.81 | 17.79 | 17.61 | 17.59 | 17.64 | 17.68 | 17.70 | 17.63 | 17.66 | 17.68 |
| 1860 | 17.69 | 17.77 | 17.75 | 17.77 | 17.73 | 17.68 | 17.70 | 17.76 | 17.74 | 17.71 | 17.81 | 17.93 |
| 1861 | 18.05 | 18.08 | 18.10 | 18.03 | 18.08 | 18.05 | 18.16 | 18.07 | 18.12 | 18.13 | 18.05 | 18.12 |
| 1862 | 18.11 | 18.09 | 17.94 | 17.98 | 17.91 | 17.90 | 17.89 | 17.83 | 17.75 | 17.72 | 17.72 | 17.75 |
| 1863 | 17.77 | 17.86 | 17.79 | 17.85 | 17.86 | 17.85 | 17.90 | 17.96 | 17.85 | 17.77 | 17.84 | 17.85 |
| 1864 | 17.84 | 17.81 | 17.78 | 17.80 | 17.92 | 17.86 | 17.87 | 18.00 | 17.89 | 17.93 | 17.90 | 17.76 |
| 1865 | 17.78 | 17.80 | 17.83 | 17.86 | 17.91 | 17.92 | 17.90 | 17.99 | 17.95 | 17.98 | 17.96 | 17.92 |
| 1866 | 18.03 | 18.14 | 18.10 | 18.07 | 18.03 | 17.86 | 17.99 | 18.15 | 17.90 | 17.90 | 17.93 | 17.88 |
| 1867 | 17.94 | 17.98 | 17.99 | 17.92 | 17.98 | 17.97 | 17.99 | 18.05 | 18.07 | 18.04 | 18.06 | 18.08 |
| 1868 | 18.11 | 18.09 | 18.09 | 18.05 | 18.08 | 18.08 | 18.10 | 18.11 | 18.10 | 18.06 | 18.02 | 18.11 |
| 1869 | 18.14 | 18.15 | 18.12 | 18.17 | 18.17 | 18.15 | 18.14 | 18.11 | 17.98 | 17.92 | 17.93 | 17.99 |
| 1870 | 17.97 | 17.96 | 17.97 | 18.00 | 17.97 | 17.94 | 17.82 | 18.01 | 17.99 | 17.94 | 17.88 | 17.90 |
| 1871 | 17.92 | 17.96 | 17.94 | 17.93 | 17.95 | 17.90 | 17.80 | 17.80 | 17.77 | 17.87 | 17.82 | 17.71 |
| 1872 | 17.75 | 17.78 | 17.76 | 17.82 | 17.88 | 17.84 | 17.90 | 17.94 | 17.84 | 17.96 | 18.04 | 17.97 |
| 1873 | 17.96 | 18.01 | 17.94 | 17.99 | 18.05 | 18.02 | 18.05 | 18.03 | 17.99 | 18.08 | 18.14 | 17.96 |
| 1874 | 18.03 | 18.10 | 18.09 | 18.11 | 18.09 | 18.07 | 18.11 | 18.20 | 18.17 | 18.18 | 18.23 | 18.27 |
| 1875 | 18.27 | 18.25 | 18.25 | 18.27 | 18.28 | 18.28 | 18.26 | 18.15 | 18.13 | 18.09 | 18.08 | 18.12 |
| 1876 | 18.19 | 18.21 | 18.22 | 18.16 | 18.12 | 18.15 | 18.16 | 18.18 | 18.18 | 18.16 | 18.13 | 18.12 |
| 1877 | 18.14 | 18.19 | 18.18 | 18.15 | 18.20 | 18.21 | 18.17 | 18.18 | 18.23 | 18.25 | 18.26 | 18.21 |
| 1878 | 18.21 | 18.17 | 18.19 | 18.21 | 18.21 | 18.19 | 18.22 | 18.28 | 18.29 | 18.24 | 18.24 | 18.22 |
| 1879 | 18.21 | 18.19 | 18.20 | 18.19 | 18.16 | 18.13 | 18.17 | 18.18 | 18.17 | 18.12 | 18.16 | 18.15 |
| 1880 | 18.15 | 18.15 | 18.16 | 18.14 | 18.15 | 18.17 | 18.19 | 18.19 | 18.18 | 18.17 | 18.13 | 18.15 |
| 1881 | 18.16 | 18.22 | 18.21 | 18.23 | 18.23 | 18.22 | 18.23 | 18.23 | 18.23 | 18.24 | 18.22 | 18.21 |
| 1882 | 18.24 | 18.27 | 18.25 | 18.24 | 18.24 | 18.23 | 18.23 | 18.23 | 18.23 | 18.20 | 18.18 | 18.17 |
| 1883 | 18.17 | 18.22 | 18.23 | 18.21 | 18.22 | 18.24 | 18.24 | 18.25 | 18.23 | 18.18 | 18.17 | 18.17 |
| 1884 | 18.19 | 18.24 | 18.25 | 18.22 | 18.20 | 18.20 | 18.20 | 18.19 | 18.18 | 18.18 | 18.22 | 18.26 |
| 1885 | 18.26 | 18.27 | 18.29 | 18.27 | 18.24 | 18.19 | 18.18 | 18.18 | 18.19 | 18.18 | 18.18 | 18.18 |
| 1886 | 18.21 | 18.21 | 18.18 | 18.18 | 18.19 | 18.16 | 18.15 | 18.17 | 18.17 | 18.17 | 18.18 | 18.18 |

**Table A6.2 (cont.).** *Monthly exchange rates on London. SEK per £1 1804–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1887 | 18.20 | 18.18 | 18.19 | 18.17 | 18.17 | 18.16 | 18.15 | 18.19 | 18.22 | 18.20 | 18.16 | 18.14 |
| 1888 | 18.16 | 18.16 | 18.14 | 18.14 | 18.16 | 18.14 | 18.16 | 18.21 | 18.23 | 18.23 | 18.19 | 18.19 |
| 1889 | 18.19 | 18.21 | 18.23 | 18.20 | 18.18 | 18.17 | 18.17 | 18.19 | 18.22 | 18.20 | 18.17 | 18.17 |
| 1890 | 18.21 | 18.23 | 18.20 | 18.18 | 18.17 | 18.16 | 18.21 | 18.24 | 18.19 | 18.20 | 18.22 | 18.20 |
| 1891 | 18.18 | 18.17 | 18.17 | 18.16 | 18.19 | 18.17 | 18.14 | 18.14 | 18.15 | 18.15 | 18.17 | 18.16 |
| 1892 | 18.16 | 18.18 | 18.19 | 18.18 | 18.16 | 18.13 | 18.15 | 18.15 | 18.14 | 18.14 | 18.13 | 18.12 |
| 1893 | 18.12 | 18.16 | 18.17 | 18.16 | 18.20 | 18.16 | 18.16 | 18.21 | 18.19 | 18.14 | 18.14 | 18.14 |
| 1894 | 18.17 | 18.20 | 18.18 | 18.14 | 18.13 | 18.12 | 18.12 | 18.13 | 18.12 | 18.10 | 18.13 | 18.13 |
| 1895 | 18.15 | 18.19 | 18.18 | 18.19 | 18.19 | 18.17 | 18.16 | 18.19 | 18.16 | 18.15 | 18.19 | 18.16 |
| 1896 | 18.18 | 18.21 | 18.20 | 18.17 | 18.16 | 18.13 | 18.13 | 18.14 | 18.14 | 18.15 | 18.17 | 18.16 |
| 1897 | 18.19 | 18.19 | 18.17 | 18.14 | 18.14 | 18.11 | 18.11 | 18.13 | 18.15 | 18.13 | 18.12 | 18.14 |
| 1898 | 18.17 | 18.18 | 18.21 | 18.25 | 18.25 | 18.16 | 18.15 | 18.17 | 18.18 | 18.22 | 18.23 | 18.22 |
| 1899 | 18.23 | 18.22 | 18.22 | 18.24 | 18.23 | 18.20 | 18.21 | 18.24 | 18.22 | 18.25 | 18.23 | 18.27 |
| 1900 | 18.28 | 18.28 | 18.26 | 18.27 | 18.28 | 18.20 | 18.22 | 18.25 | 18.24 | 18.23 | 18.20 | 18.18 |
| 1901 | 18.21 | 18.23 | 18.19 | 18.16 | 18.17 | 18.15 | 18.14 | 18.16 | 18.15 | 18.14 | 18.17 | 18.16 |
| 1902 | 18.16 | 18.19 | 18.20 | 18.21 | 18.22 | 18.21 | 18.20 | 18.21 | 18.19 | 18.18 | 18.17 | 18.18 |
| 1903 | 18.21 | 18.24 | 18.25 | 18.24 | 18.22 | 18.18 | 18.15 | 18.15 | 18.17 | 18.19 | 18.21 | 18.19 |
| 1904 | 18.22 | 18.25 | 18.21 | 18.21 | 18.18 | 18.17 | 18.18 | 18.19 | 18.17 | 18.16 | 18.16 | 18.15 |
| 1905 | 18.17 | 18.21 | 18.19 | 18.18 | 18.18 | 18.18 | 18.19 | 18.18 | 18.17 | 18.18 | 18.18 | 18.17 |
| 1906 | 18.20 | 18.23 | 18.22 | 18.21 | 18.22 | 18.21 | 18.20 | 18.21 | 18.21 | 18.23 | 18.28 | 18.27 |
| 1907 | 18.28 | 18.29 | 18.30 | 18.28 | 18.24 | 18.23 | 18.21 | 18.22 | 18.26 | 18.29 | 18.36 | 18.36 |
| 1908 | 18.33 | 18.26 | 18.25 | 18.23 | 18.21 | 18.20 | 18.16 | 18.15 | 18.15 | 18.16 | 18.18 | 18.19 |
| 1909 | 18.21 | 18.24 | 18.25 | 18.21 | 18.18 | 18.18 | 18.20 | 18.19 | 18.16 | 18.20 | 18.24 | 18.22 |
| 1910 | 18.22 | 18.22 | 18.22 | 18.24 | 18.25 | 18.21 | 18.19 | 18.20 | 18.19 | 18.20 | 18.21 | 18.17 |
| 1911 | 18.21 | 18.23 | 18.20 | 18.19 | 18.18 | 18.16 | 18.19 | 18.19 | 18.21 | 18.25 | 18.20 | 18.19 |
| 1912 | 18.23 | 18.24 | 18.22 | 18.22 | 18.20 | 18.20 | 18.21 | 18.20 | 18.20 | 18.24 | 18.26 | 18.21 |
| 1913 | 18.23 | 18.26 | 18.26 | 18.26 | 18.24 | 18.23 | 18.24 | 18.24 | 18.20 | 18.24 | 18.26 | 18.23 |
| 1914 | 18.23 | 18.18 | 18.19 | 18.20 | 18.24 | 18.25 | 18.25 | 18.36 | 18.63 | 18.85 | 18.99 | 19.19 |

Sources: 1804–42 and 1881–89: 'Växelkurser NN' (unpublished tables, Sveriges Riksbank); 1843–80: *Post och inrikes tidningar* and *Aftonbladet*; 1890–1914: *Riksbankens växelkurser på London, 1890–1914* (unpublished volume, Sveriges Riksbank).

## Appendix A6.3 Quotations on Amsterdam

The currency units in quotations on Amsterdam changed a few times during the period and have been converted into consistent series of SEK/100 gulden. Quotations on Amsterdam were originally made in skilling banco per Holländsk riksdaler kurant between 1804 and 1857. From 1858 to 1872 quotations were made in riksdaler riksmynt per 100 Holländsk gulden and between 1873 and 1914 in kronor per 100 gulden. Conversions into SEK per 100 gulden have been done on the basis of 2.5 Holländsk gulden = 1 Holländsk riksdaler kurant, 1 Holländsk gulden = 1 gulden and 32 skilling banco = 1 riksdaler riksmynt = 1 SEK (krona).

Quotations between 1804 and 1889 are from the Stockholm stock exchange and are monthly mid-range observations. The sources are unpublished tables that most likely were the basis for calculations for the fifth, statistical volume in Sveriges Riksbank (1931); daily newspapers are reported to be the sources in that volume. Monthly averages from the Riksbank's official quotations are used for the period 1890–1914. Official quotations are from unpublished material in the Bank.

Quotations on bills drawn on Amsterdam in the period 1804–52 are u.s.o. since there is no information on periods of maturity. Quotations are short sight or less than 50 days for 1853–80 and sight for 1881–1914.

**Table A6.3.** *Monthly exchange rates on Amsterdam. SEK per 100 gulden 1804–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1804 | 58.3 | 58.1 | 58.8 | 59.4 | 59.7 | 59.7 | 59.7 | 59.5 | 59.5 | 59.5 | 60.0 | 60.3 |
| 1805 | 59.5 | 59.8 | 59.5 | 59.7 | 59.5 | 59.5 | 59.2 | 58.3 | 57.7 | 57.7 | 57.7 | 56.9 |
| 1806 | 56.7 | 56.9 | 58.6 | 59.2 | 60.9 | 59.4 | 59.7 | 60.5 | 60.2 | 60.2 | 61.3 | 65.6 |
| 1807 | 66.9 | 66.7 | 66.6 | 65.6 | 64.4 | 64.7 | 64.1 | 63.9 | 64.1 | 64.7 | 66.3 | 68.1 |
| 1808 | 66.9 | 66.9 | 64.7 | | | | | | | | 66.3 | |
| 1809 | | | | | | | | | 75.0 | 71.9 | | |
| 1810 | 81.3 | 77.5 | | 83.1 | | | 98.1 | 88.8 | 93.1 | 97.5 | 103.8 | 100.0 |
| 1811 | | | | 136.9 | | | | | 126.9 | | 118.8 | |
| 1812 | | 102.5 | 107.5 | | | 107.5 | | 115.0 | 105.0 | 116.3 | 115.0 | |
| 1813 | 113.8 | | 111.3 | | | | | | | | | |
| 1814 | 112.5 | 111.3 | | | 113.8 | 114.4 | 114.1 | 108.1 | 108.1 | 108.8 | 115.0 | 118.1 |
| 1815 | 121.3 | 123.8 | 119.4 | 125.6 | 132.5 | 133.8 | 125.0 | 123.8 | | 123.8 | 123.1 | 125.0 |
| 1816 | 125.0 | 130.0 | 135.3 | 133.1 | 133.1 | 136.6 | 142.5 | 143.5 | 140.4 | 142.5 | 145.5 | 148.2 |
| 1817 | 139.1 | 127.8 | 115.5 | 132.3 | 133.5 | 130.1 | 129.7 | 128.5 | 127.4 | 117.5 | 121.0 | 126.3 |
| 1818 | 123.8 | 127.4 | 128.3 | 129.0 | 126.9 | 131.1 | 130.9 | 130.5 | 127.7 | 125.6 | 128.5 | 132.0 |
| 1819 | 137.2 | 138.2 | 138.8 | 137.4 | 141.1 | 142.6 | 146.3 | 148.5 | 147.5 | 149.3 | 157.5 | 166.3 |
| 1820 | 165.0 | 161.3 | 158.8 | 159.4 | 159.4 | 160.6 | 158.1 | 151.3 | 145.6 | 148.4 | 150.9 | 152.8 |
| 1821 | 151.6 | 149.9 | 150.6 | 147.5 | 138.9 | 137.5 | 139.2 | 139.5 | 140.4 | 141.3 | 146.9 | 148.1 |
| 1822 | 146.6 | 146.6 | 143.0 | 143.1 | 145.6 | 147.2 | 149.0 | 147.8 | 146.3 | 147.4 | 150.6 | 151.0 |
| 1823 | 151.1 | 151.3 | 150.9 | 148.4 | 147.1 | 146.9 | 144.6 | 144.1 | 145.5 | 149.3 | 152.5 | 153.1 |
| 1824 | 153.4 | 153.3 | 154.1 | 155.5 | 155.3 | 155.3 | 155.6 | 154.4 | 154.4 | 155.3 | 155.8 | 156.9 |
| 1825 | 155.9 | 155.2 | 153.8 | 150.0 | 146.4 | 146.1 | 144.4 | 144.4 | 144.4 | 142.4 | 144.6 | 143.8 |
| 1826 | 143.6 | 143.8 | 147.4 | 147.3 | 149.0 | 151.9 | 155.3 | 154.4 | 157.3 | 159.8 | 162.4 | 164.2 |
| 1827 | 164.7 | 162.7 | 163.8 | 163.0 | 163.4 | 163.0 | 164.2 | 163.0 | 160.8 | 158.2 | 159.0 | 158.4 |
| 1828 | 155.4 | 154.4 | 154.7 | 153.1 | 150.2 | 149.7 | 150.3 | 146.6 | 145.9 | 144.6 | 143.4 | 145.0 |
| 1829 | 145.6 | 144.8 | 145.9 | 145.9 | 144.9 | 144.5 | 143.7 | 142.6 | 142.8 | 145.5 | 150.0 | 150.6 |
| 1830 | 149.4 | 150.6 | 153.0 | 152.0 | 152.3 | 152.0 | 150.4 | 149.0 | 149.7 | 152.5 | 161.3 | 163.5 |
| 1831 | 163.1 | 161.9 | 163.1 | 162.5 | 163.9 | 165.0 | 163.9 | 164.4 | 163.2 | 165.3 | 168.4 | 170.3 |
| 1832 | 170.6 | 171.3 | 173.5 | 171.9 | 174.5 | 172.8 | 171.1 | 171.3 | 171.6 | 171.9 | 173.8 | 175.0 |
| 1833 | 175.7 | 177.3 | 178.4 | 178.8 | 176.9 | 176.1 | 173.4 | 166.9 | 162.2 | 162.5 | 163.1 | 164.7 |
| 1834 | 161.9 | 160.5 | 159.7 | 158.0 | 156.0 | 155.8 | 153.8 | 152.7 | 152.4 | 151.3 | 152.4 | 154.1 |
| 1835 | 153.3 | 152.8 | 153.6 | 153.3 | 153.0 | 148.8 | 148.4 | 148.4 | 148.0 | 148.3 | 148.6 | 149.2 |
| 1836 | 148.8 | 150.0 | 150.0 | 149.1 | 149.0 | 147.5 | 145.9 | 144.5 | 144.9 | 145.3 | 146.7 | 149.4 |

**Table A6.3 (cont.).** *Monthly exchange rates on Amsterdam. SEK per 100 gulden 1804–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1837 | 148.0 | 148.1 | 149.1 | 148.4 | 151.3 | 151.1 | 151.5 | 152.3 | 152.1 | 153.8 | 155.6 | 155.9 |
| 1838 | 154.4 | 152.7 | 154.1 | 154.1 | 151.7 | 152.0 | 150.8 | 150.2 | 150.5 | 150.4 | 151.8 | 153.1 |
| 1839 | 153.1 | 152.2 | 151.9 | 148.6 | 147.5 | 147.0 | 146.4 | 146.0 | 145.5 | 145.0 | 146.5 | 150.6 |
| 1840 | 148.4 | 150.9 | 150.0 | 151.6 | 150.6 | 149.9 | 149.4 | 148.3 | 146.6 | 147.8 | 148.1 | 149.2 |
| 1841 | 148.4 | 149.1 | 150.0 | 149.1 | 149.0 | 149.2 | 148.8 | 149.1 | 149.8 | 150.2 | 151.6 | 153.8 |
| 1842 | 152.3 | 152.2 | 152.0 | 150.9 | 150.9 | 149.8 | 149.4 | 150.3 | 148.4 | 149.1 | 153.8 | 154.1 |
| 1843 | 154.2 | 153.8 | 153.8 | 152.3 | 153.1 | 152.8 | 150.6 | 150.9 | 151.6 | 151.3 | 152.5 | 154.5 |
| 1844 | 153.8 | 153.4 | 153.1 | 153.1 | 151.6 | 150.0 | 149.4 | 149.4 | 149.1 | 147.8 | 150.0 | 150.4 |
| 1845 | 150.0 | 149.4 | 149.1 | 148.1 | 147.2 | 147.2 | 147.0 | 146.6 | 146.4 | 145.6 | 145.4 | 147.5 |
| 1846 | 148.1 | 148.8 | 148.3 | 146.1 | 147.3 | 147.8 | 146.9 | 146.9 | 146.8 | 145.8 | 146.9 | 148.4 |
| 1847 | 148.8 | 147.5 | 147.2 | 147.8 | 147.2 | 146.6 | 146.9 | 147.2 | 147.3 | 147.3 | 147.2 | 149.1 |
| 1848 | 150.6 | 150.0 | 151.6 | 152.2 | 154.1 | 152.5 | 152.1 | 152.1 | 151.9 | 151.9 | 153.8 | 154.7 |
| 1849 | 154.5 | 154.4 | 153.1 | 153.5 | 152.8 | 152.2 | 151.9 | 152.2 | 152.3 | 152.2 | 152.5 | 153.2 |
| 1850 | 153.8 | 153.4 | 152.6 | 152.2 | 150.0 | 150.2 | 149.4 | 149.6 | 149.1 | 149.5 | 151.5 | 151.3 |
| 1851 | 151.3 | 151.6 | 151.3 | 150.9 | 149.7 | 150.5 | 150.6 | 151.4 | 150.0 | 150.6 | 151.3 | 152.2 |
| 1852 | 152.7 | 152.5 | 153.1 | 151.9 | 151.3 | 150.8 | 150.1 | 150.6 | 150.1 | 150.2 | 150.6 | 150.6 |
| 1853 | 149.7 | 150.9 | 149.9 | 149.1 | 149.2 | 150.0 | 148.4 | 149.4 | 149.1 | 148.4 | 149.1 | 150.3 |
| 1854 | 150.0 | 150.3 | 150.2 | 149.1 | 149.3 | 149.4 | 149.7 | 149.5 | 149.4 | 149.7 | 149.1 | 149.5 |
| 1855 | 149.7 | 150.3 | 150.9 | 150.6 | 149.2 | 148.6 | 148.8 | 149.4 | 148.6 | 148.6 | 149.5 | 149.4 |
| 1856 | 151.3 | 151.6 | 151.3 | 150.9 | 150.6 | 149.4 | 149.5 | 150.3 | 150.2 | 150.5 | 150.8 | 152.2 |
| 1857 | 152.8 | 153.4 | 152.2 | 150.3 | 150.0 | 149.5 | 150.0 | 150.5 | 149.7 | 149.1 | 149.4 | 153.1 |
| 1858 | 154.1 | | 151.6 | 150.5 | 150.5 | 152.0 | 150.8 | 151.1 | 150.5 | 150.5 | 152.0 | 153.0 |
| 1859 | 153.0 | 152.4 | 151.6 | 151.5 | 150.5 | 150.9 | 151.3 | 150.8 | 151.0 | 151.6 | 152.0 | 151.8 |
| 1860 | 152.0 | 152.0 | 152.3 | 151.5 | 150.3 | 150.0 | 150.3 | 149.8 | 150.3 | 150.5 | | 152.8 |
| 1861 | 152.3 | | 151.5 | 150.5 | 152.1 | 150.0 | 150.5 | 150.4 | 152.3 | 150.5 | 150.8 | 152.8 |
| 1862 | 152.5 | 154.0 | 154.0 | 154.0 | 151.9 | 151.6 | 151.8 | 150.3 | 150.8 | | 152.8 | 153.8 |
| 1863 | 152.3 | 151.0 | 152.0 | 151.9 | 152.0 | 150.5 | 150.1 | 150.5 | 151.5 | 150.5 | 150.4 | 151.0 |
| 1864 | 150.9 | 150.4 | 151.0 | | | | 149.5 | 149.5 | 149.3 | 148.6 | 151.6 | 150.9 |
| 1865 | 151.9 | | | 152.3 | 151.8 | 151.8 | 150.5 | 150.0 | 150.4 | 150.3 | | 150.3 |
| 1866 | 151.5 | 152.0 | 151.5 | 152.5 | | 152.0 | | 153.0 | | 152.0 | 153.0 | 153.0 |
| 1867 | 153.0 | | 152.5 | 152.5 | 152.8 | 152.6 | | | 152.2 | 152.0 | 152.3 | 152.1 |
| 1868 | 152.1 | 152.4 | 152.6 | 152.2 | 152.4 | | 152.6 | | | | 152.0 | 152.0 |
| 1869 | 152.0 | | | 151.8 | | 151.0 | | 151.6 | | 150.5 | 151.5 | 151.9 |
| 1870 | 151.6 | 152.8 | 150.8 | 150.6 | 151.8 | 151.5 | | 150.0 | 152.5 | | | 151.8 |
| 1871 | 151.4 | 151.5 | 151.5 | 151.0 | 150.9 | 149.5 | | | 150.4 | | 150.2 | |
| 1872 | | 149.3 | 149.0 | 148.6 | 148.9 | 148.8 | | | | | 148.8 | |
| 1873 | 149.3 | 150.4 | 149.4 | 149.9 | 150.7 | 150.4 | 150.6 | 150.8 | 150.4 | 151.0 | 151.1 | 150.9 |
| 1874 | 151.3 | 153.1 | 152.9 | 152.4 | 152.8 | 152.9 | 152.4 | 152.8 | 153.0 | 153.4 | 154.3 | 154.8 |
| 1875 | 155.2 | 156.4 | 154.5 | 156.4 | 156.3 | 154.4 | 153.0 | 152.5 | 152.2 | 151.0 | 150.9 | 151.0 |
| 1876 | 151.0 | 151.2 | 151.1 | 151.0 | 150.7 | 150.9 | 150.8 | 150.7 | 150.6 | 150.8 | 151.0 | 150.9 |
| 1877 | 150.9 | 151.1 | 151.3 | 151.5 | 151.1 | 151.4 | 151.2 | 151.1 | 150.7 | 150.8 | 151.0 | 150.6 |
| 1878 | 150.5 | 150.6 | 150.8 | 150.9 | 150.9 | 150.5 | 150.9 | 151.2 | 150.9 | 151.1 | 150.2 | 150.8 |
| 1879 | 150.5 | 151.0 | 150.8 | 151.0 | 151.3 | 151.2 | 151.2 | 151.2 | 150.9 | 150.4 | 150.4 | 150.4 |
| 1880 | 150.5 | 150.9 | 151.0 | 150.7 | 150.4 | 150.6 | 150.3 | 150.2 | 150.1 | 150.0 | 150.1 | 150.1 |
| 1881 | 150.1 | 150.2 | 150.3 | 150.6 | 150.7 | 150.8 | 150.8 | 150.5 | 150.0 | 150.1 | 150.1 | 150.3 |
| 1882 | 150.7 | | | | | | | 150.5 | 150.3 | 150.1 | | |

**Table A6.3 (cont.).** *Monthly exchange rates on Amsterdam. SEK per 100 gulden 1804–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1883 | | | | | 151.4 | | 150.7 | 150.5 | 150.4 | 150.2 | 150.3 | 150.3 |
| 1884 | 150.4 | 150.8 | 150.9 | 150.9 | 150.8 | 150.6 | 150.6 | 150.3 | 150.3 | 150.2 | 150.2 | 150.3 |
| 1885 | 150.6 | 151.1 | 151.2 | 151.3 | 151.2 | 151.1 | 151.1 | 151.0 | 150.8 | 150.7 | 150.9 | 150.9 |
| 1886 | 151.0 | 151.0 | 151.0 | 151.0 | 150.9 | 150.6 | 150.5 | 150.5 | 150.4 | 150.2 | 150.4 | 150.3 |
| 1887 | 150.4 | 150.2 | 150.2 | 150.3 | 150.7 | 150.6 | 150.5 | 150.5 | 150.5 | 150.5 | 150.5 | 150.4 |
| 1888 | 150.6 | 150.8 | 150.7 | 150.7 | 150.6 | 150.5 | 150.6 | 150.8 | 150.6 | 150.5 | 150.5 | 150.5 |
| 1889 | 150.6 | 150.7 | 150.7 | 150.6 | 150.7 | 150.6 | 150.6 | 150.6 | 150.6 | 150.5 | 150.3 | 150.3 |
| 1890 | 150.5 | 150.5 | 150.5 | 150.6 | 150.8 | 150.6 | 150.7 | 150.7 | 150.5 | 150.5 | 150.4 | 150.5 |
| 1891 | 150.8 | 150.6 | 150.7 | 150.6 | 150.6 | 150.5 | 150.5 | 150.4 | 150.2 | 150.2 | 150.4 | 150.5 |
| 1892 | 150.6 | 150.5 | 150.5 | 150.5 | 150.5 | 150.4 | 150.4 | 150.4 | 150.2 | 150.2 | 150.3 | 150.3 |
| 1893 | 150.3 | 150.6 | 150.6 | 150.6 | 150.4 | 150.1 | 149.8 | 150.1 | 150.3 | 150.6 | 150.7 | 150.7 |
| 1894 | 150.9 | 151.0 | 150.8 | 150.5 | 150.4 | 150.3 | 150.3 | 150.1 | 149.8 | 150.0 | 150.3 | 150.2 |
| 1895 | 150.4 | 150.6 | 150.4 | 150.2 | 150.3 | 150.1 | 150.2 | 150.1 | 149.9 | 149.7 | 149.8 | 149.7 |
| 1896 | 149.7 | 149.8 | 150.0 | 150.2 | 150.3 | 149.8 | 150.0 | 150.0 | 149.9 | 149.9 | 150.2 | 150.0 |
| 1897 | 150.4 | 150.5 | 150.3 | 150.2 | 150.3 | 150.2 | 150.1 | 150.1 | 150.0 | 150.2 | 150.4 | 150.3 |
| 1898 | 150.5 | 150.8 | 150.7 | 150.8 | 150.9 | 150.6 | 150.8 | 150.8 | 150.6 | 150.5 | 150.6 | 150.4 |
| 1899 | 150.6 | 150.5 | 150.3 | 150.3 | 150.2 | 149.9 | 150.0 | 150.4 | 150.4 | 151.0 | 151.2 | 151.0 |
| 1900 | 151.3 | 151.1 | 150.5 | 150.7 | 150.9 | 150.5 | 150.7 | 150.6 | 150.5 | 150.8 | 150.9 | 150.7 |
| 1901 | 150.9 | 150.9 | 150.5 | 150.2 | 150.6 | 150.3 | 150.3 | 150.1 | 150.9 | 150.0 | 150.2 | 150.0 |
| 1902 | 150.0 | 150.0 | 150.0 | 150.0 | 150.1 | 150.0 | 150.0 | 150.1 | 150.1 | 150.0 | 149.9 | 149.9 |
| 1903 | 150.1 | 150.3 | 150.3 | 150.4 | 150.4 | 150.1 | 150.4 | 150.4 | 150.4 | 150.7 | 150.9 | 150.9 |
| 1904 | 151.0 | 151.0 | 150.7 | 150.7 | 150.6 | 150.2 | 150.5 | 150.5 | 150.3 | 150.5 | 150.7 | 150.6 |
| 1905 | 150.6 | 150.7 | 150.6 | 150.5 | 150.5 | 150.4 | 150.6 | 150.7 | 150.1 | 150.0 | 149.9 | 150.0 |
| 1906 | 150.5 | 150.3 | 150.1 | 150.0 | 150.1 | 150.1 | 150.3 | 150.6 | 150.5 | 150.6 | 150.7 | 150.7 |
| 1907 | 150.9 | 150.8 | 150.8 | 151.0 | 151.1 | 151.0 | 151.0 | 151.2 | 151.2 | 151.6 | 151.6 | 151.5 |
| 1908 | 151.4 | 151.2 | 150.8 | 150.6 | 150.6 | 150.4 | 150.4 | 150.3 | 150.4 | 150.5 | 150.8 | 150.8 |
| 1909 | 150.9 | 150.7 | 150.6 | 150.8 | 150.7 | 150.4 | 150.6 | 150.5 | 150.3 | 150.3 | 150.3 | 150.2 |
| 1910 | 150.4 | 150.2 | 150.0 | 150.5 | 150.8 | 150.7 | 150.8 | 150.9 | 150.8 | 150.7 | 150.7 | 150.7 |
| 1911 | 150.8 | 150.8 | 150.7 | 150.7 | 150.7 | 150.5 | 150.7 | 150.6 | 150.5 | 150.6 | 150.7 | 150.7 |
| 1912 | 150.9 | 150.8 | 150.7 | 150.8 | 150.8 | 150.7 | 150.8 | 150.8 | 150.8 | 151.1 | 151.0 | 150.8 |
| 1913 | 150.9 | 150.8 | 150.5 | 150.6 | 150.4 | 150.2 | 150.3 | 150.3 | 150.3 | 150.6 | 150.7 | 150.5 |
| 1914 | 150.8 | 150.7 | 150.6 | 150.7 | 150.7 | 150.5 | 150.6 | 150.8 | 155.6 | 160.6 | 161.0 | 161.9 |

Sources: 1804–89: 'Växelkurser NN' (unpublished tables, Sveriges Riksbank); 1890–14: *Riksbankens växelkurser på Amsterdam, 1890–1914* (unpublished volume, Sveriges Riksbank).

## Appendix A6.4 Quotations on Paris

Quotations on Paris were made in skilling banco per franc before 1858 and in riksdaler riksmynt per franc between 1858 and 1872. Conversion into SEK (kronor) has been done on the basis of 32 skilling banco = 1 riksdaler riksmynt = 1 SEK.

Quotations on bills drawn on Paris in francs during the period 1804–89 are from the Stockholm stock exchange, while the Riksbank's official quotations are used for the period 1890–1914.

Observations on franc rates are monthly mid-range in the period 1804–89 and monthly average 1890–1914. The sources for the period 1804–89 are unpublished tables from the Riksbank. Official quotations on Paris 1890–1914 are from unpublished material in the Bank.

The maturity periods of bills drawn on Paris before June 1853 are somewhat unclear. However, it seems quite clear that the rates refer to paper with a longer duration than short sight. A note in the primary tables says that rates from 1853 refer to 90-day paper, so it seems safe to assume that quotations are on at least 90-day paper. Consequently, the discount embedded in the prices has to be added in order to obtain 'true' sight exchange rates. Because interest rate data from Paris are lacking for this period, a standard interest rate of five percent has been used to calculate sight rates. The exact procedure is outlined in the previous section.

**Table A6.4.** *Monthly exchange rates on Paris. SEK per 100 francs 1804–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1804 | 28.74 | 29.40 | 27.42 | 29.53 | 29.53 | 28.61 | 28.08 | 28.21 | 29.53 | 28.61 | 28.48 | 30.06 |
| 1805 | 29.40 | 28.87 | 28.48 | 28.34 | 29.40 | 28.21 | 28.48 | 27.95 | 27.16 | 27.95 | 25.84 | 28.48 |
| 1806 | 28.21 | 26.89 | 27.95 | 27.82 | 29.53 | 26.89 | 30.06 | 28.48 | 28.61 | 30.06 | 30.85 | |
| 1807 | 33.22 | 32.96 | | 33.22 | 32.96 | 30.98 | 31.24 | 30.06 | | | 33.22 | |
| 1808 | 33.22 | 34.01 | 30.85 | | | | | | | | | |
| 1809 | | | | | | | 39.55 | 41.13 | | 37.97 | 39.55 | 38.76 |
| 1810 | 41.13 | | | 41.13 | 42.32 | | | 47.46 | 49.04 | 50.62 | | 56.95 |
| 1811 | | 63.28 | 68.03 | 63.28 | 62.49 | 63.28 | | 64.86 | 63.28 | 63.28 | 62.23 | 57.74 |
| 1812 | 52.21 | 54.58 | 56.95 | | 54.58 | 55.37 | | 57.74 | | 55.37 | 55.37 | 56.95 |
| 1813 | | 56.42 | | 50.62 | | | | | 58.53 | | | |
| 1814 | | | | | | | 55.37 | 52.73 | 53.39 | 53.26 | 55.37 | 56.56 |
| 1815 | 58.53 | 58.53 | 56.95 | | 56.95 | | | | | | 61.70 | 61.30 |
| 1816 | 61.70 | 60.91 | 64.86 | 62.49 | 64.86 | | | 70.40 | 68.16 | 70.40 | 71.19 | 70.00 |
| 1817 | 66.44 | 64.07 | 57.74 | 60.91 | 66.84 | 61.83 | 62.49 | 60.64 | 60.78 | 56.16 | 58.93 | 58.80 |
| 1818 | 60.12 | 59.85 | 61.70 | 60.25 | 58.53 | 61.30 | 62.49 | 61.57 | 59.59 | 57.35 | 58.93 | 63.28 |
| 1819 | 66.44 | 67.10 | 68.03 | 65.65 | 65.65 | 67.76 | 68.42 | 69.61 | 68.69 | 70.14 | 75.94 | 79.89 |
| 1820 | 77.52 | 78.57 | 75.80 | 75.94 | 76.07 | 76.46 | 78.57 | 76.73 | 71.59 | 72.24 | 73.30 | 73.70 |
| 1821 | 71.98 | 73.96 | 74.22 | 72.77 | 69.34 | 66.44 | 69.48 | 70.40 | 70.53 | 68.95 | 72.77 | 71.19 |
| 1822 | 71.45 | 71.72 | 71.19 | 70.53 | 70.27 | 71.98 | 73.43 | 71.32 | 71.19 | 71.45 | 71.85 | 71.98 |
| 1823 | 72.38 | 72.38 | 73.30 | 72.77 | 71.72 | 71.72 | 70.66 | 70.00 | 71.06 | 71.06 | 73.70 | 73.70 |
| 1824 | 72.77 | 72.51 | 72.24 | 73.17 | 73.56 | 73.56 | 73.96 | 73.30 | 74.09 | 73.96 | 73.96 | 74.75 |
| 1825 | 73.83 | 75.15 | 74.88 | 72.64 | 70.93 | 70.79 | 69.87 | 69.21 | 68.82 | 68.55 | 69.34 | 69.21 |
| 1826 | 70.66 | 70.99 | 71.59 | 70.27 | 71.32 | 73.43 | 74.35 | 73.43 | 74.75 | 75.94 | 77.91 | 79.36 |
| 1827 | 80.42 | 79.63 | 78.31 | 77.52 | 77.39 | 78.18 | 78.05 | 77.65 | 76.60 | 74.75 | 75.01 | 75.54 |
| 1828 | 74.35 | 74.49 | 73.96 | 73.43 | 72.11 | 72.24 | 71.72 | 70.53 | 70.53 | 70.00 | 68.03 | 69.21 |
| 1829 | 69.87 | 69.74 | 69.74 | 69.87 | 69.21 | 69.08 | 68.03 | 68.42 | 68.55 | 69.61 | 72.51 | 72.38 |
| 1830 | 72.38 | 72.38 | 73.30 | 73.30 | 73.43 | 73.70 | 72.24 | 72.51 | 72.64 | 73.56 | 77.39 | 78.31 |
| 1831 | 78.31 | 78.05 | 78.31 | 78.31 | 79.23 | 80.68 | 79.50 | 79.10 | 78.57 | 79.36 | 80.02 | 81.21 |

**Table A6.4 (cont.).** *Monthly exchange rates on Paris. SEK per 100 francs 1804–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1832 | 81.47 | 81.61 | 82.79 | 82.53 | 83.06 | 82.13 | 81.67 | 81.61 | 81.87 | 81.74 | 83.45 | 83.32 |
| 1833 | 83.45 | 83.71 | 82.79 | 83.71 | 83.32 | 83.32 | 82.26 | 79.10 | 77.12 | 76.99 | 77.39 | 78.31 |
| 1834 | 77.78 | 77.65 | 76.99 | 76.33 | 75.80 | 75.15 | 74.09 | 74.09 | 73.43 | 73.30 | 73.83 | 74.62 |
| 1835 | 74.35 | 73.83 | 74.22 | 74.09 | 73.96 | 71.72 | 71.72 | 71.19 | 71.72 | 71.26 | 71.26 | 71.06 |
| 1836 | 72.90 | 72.64 | 73.70 | 71.72 | 71.45 | 70.40 | 70.00 | 69.61 | 70.14 | 70.27 | 71.72 | 72.77 |
| 1837 | 72.11 | 71.72 | 71.59 | 72.11 | 73.56 | 72.51 | 72.77 | 73.43 | 73.17 | 74.35 | 74.75 | 74.62 |
| 1838 | 73.56 | 73.30 | 74.22 | 73.96 | 73.43 | 73.56 | 72.77 | 72.51 | 72.38 | 72.38 | 72.51 | 73.30 |
| 1839 | 72.90 | 72.64 | 72.77 | 71.45 | 70.66 | 71.19 | 71.19 | 70.40 | 70.27 | 70.14 | 70.66 | 71.72 |
| 1840 | 72.51 | 73.43 | 73.17 | 72.90 | 72.24 | 72.11 | 71.85 | 71.26 | 71.72 | 71.45 | 71.06 | 71.32 |
| 1841 | 71.59 | 71.59 | 71.45 | 71.98 | 72.24 | 71.98 | 71.92 | 71.92 | 71.98 | 72.24 | 73.17 | 73.83 |
| 1842 | 73.83 | 73.83 | 73.70 | 73.83 | 72.90 | 72.64 | 72.24 | 72.51 | 72.51 | 72.38 | 73.56 | 73.83 |
| 1843 | 74.35 | 74.35 | 74.49 | 74.09 | 73.83 | 73.04 | 72.64 | 72.77 | 73.30 | 72.51 | 73.43 | 73.70 |
| 1844 | 74.09 | 73.96 | 73.96 | 73.30 | 73.04 | 72.24 | 71.72 | 71.32 | 71.72 | 71.06 | 71.45 | 72.11 |
| 1845 | 72.24 | 72.51 | 72.38 | 71.59 | 71.59 | 71.72 | 71.06 | 71.32 | 71.19 | 70.93 | 70.93 | 71.06 |
| 1846 | 71.06 | 71.72 | 71.72 | 71.45 | 71.45 | 71.32 | 70.93 | 70.79 | 70.93 | 70.73 | 71.45 | 71.19 |
| 1847 | 71.06 | 70.79 | 71.19 | 70.66 | 70.14 | 70.53 | 70.27 | 70.79 | 70.79 | 70.93 | 71.19 | 72.11 |
| 1848 | 72.51 | 72.11 | 72.64 | 74.35 | 75.67 | 74.35 | 73.30 | 74.22 | 73.17 | 73.56 | 74.62 | 74.88 |
| 1849 | 75.41 | 75.41 | 75.15 | 73.96 | 74.35 | 74.22 | 73.43 | 73.56 | 73.56 | 73.70 | 73.83 | 73.56 |
| 1850 | 73.43 | 73.83 | 73.96 | 73.30 | 73.30 | 73.04 | 73.17 | 72.24 | 72.24 | 72.24 | 72.90 | 73.04 |
| 1851 | 73.30 | 72.77 | 72.51 | 73.17 | 73.30 | 72.05 | 73.17 | 72.38 | 72.24 | 72.51 | 72.77 | 73.30 |
| 1852 | 72.51 | 72.90 | 72.90 | 72.64 | 72.77 | 73.04 | 72.11 | 72.24 | 72.11 | 71.85 | 71.85 | 71.59 |
| 1853 | 71.72 | 71.59 | 71.98 | 72.11 | 71.45 | 71.45 | 71.09 | 71.61 | 71.61 | 70.83 | 70.83 | 70.83 |
| 1854 | 70.96 | 70.57 | 70.64 | 70.70 | 70.70 | 70.70 | 70.70 | 70.96 | 71.35 | 71.35 | | 71.29 |
| 1855 | | | 71.16 | | | | 71.35 | 70.83 | 71.35 | 71.35 | 70.44 | 70.83 |
| 1856 | | | | | | | | | | | | |
| 1857 | 72.92 | 71.09 | 72.92 | | 71.88 | | | | | | 68.75 | 71.22 |
| 1858 | 70.38 | 70.75 | 70.80 | 70.70 | 70.00 | 72.25 | 71.25 | 72.00 | | 70.50 | 72.00 | 72.50 |
| 1859 | 71.75 | 71.75 | 70.75 | 70.75 | 71.00 | 71.00 | 69.83 | 70.05 | 70.10 | 71.00 | 70.60 | 70.88 |
| 1860 | 71.18 | 70.75 | 71.13 | 70.88 | 70.20 | 70.50 | | 69.90 | 70.50 | 70.80 | 71.13 | 71.38 |
| 1861 | 71.50 | 70.50 | 71.00 | 71.75 | | | | | 71.00 | | 70.63 | 71.00 |
| 1862 | 71.90 | | 71.00 | | 71.50 | 71.45 | | 71.00 | 71.00 | 70.80 | 70.75 | 70.75 |
| 1863 | 70.95 | 71.08 | 70.85 | 71.13 | 70.98 | 70.90 | 70.95 | | 70.60 | | 70.75 | 70.38 |
| 1864 | 71.00 | 70.90 | | | | | | 70.10 | 70.30 | | 70.67 | 70.25 |
| 1865 | 70.50 | | | | | | | | | | | |
| 1866 | | | | | | | | | | | | |
| 1867 | | | | | 71.50 | | | | | | 71.90 | 72.00 |
| 1868 | 72.13 | | | 72.00 | | 71.90 | | | | | | |
| 1869 | | 72.10 | | | | | | | | | | |
| 1870 | | | | | | | | 71.25 | 71.65 | | | |
| 1871 | | | 71.63 | | | 70.95 | 70.95 | 70.50 | | | | |
| 1872 | | | 69.95 | 70.48 | | | | | 69.70 | | | |
| 1873 | 70.28 | 70.70 | 70.73 | 70.80 | 70.93 | 70.50 | 70.70 | 71.10 | 71.05 | 71.08 | 71.10 | 71.10 |
| 1874 | 71.43 | 71.70 | 71.85 | 71.95 | 71.93 | 71.90 | 71.88 | 72.18 | 72.33 | 72.38 | 72.60 | 72.85 |
| 1875 | 72.80 | 72.84 | 72.80 | 72.73 | 72.70 | 72.60 | 72.30 | 72.20 | 72.10 | 72.00 | 71.83 | 71.95 |

**Table A6.4 (cont.).** *Monthly exchange rates on Paris. SEK per 100 francs 1804–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1876 | 72.23 | 72.40 | 72.40 | 72.25 | 72.00 | 71.93 | 71.88 | 72.05 | 72.08 | 72.18 | 72.21 | 72.18 |
| 1877 | 72.30 | 72.34 | 72.39 | 72.50 | 72.43 | 72.48 | 72.23 | 72.20 | 72.38 | 72.33 | 72.28 | 72.30 |
| 1878 | 72.35 | 72.30 | 72.35 | 72.28 | 72.26 | 72.23 | 72.20 | 72.30 | 72.33 | 72.16 | 72.08 | 71.98 |
| 1879 | 72.08 | 72.15 | 72.06 | 72.05 | 71.95 | 71.94 | 71.87 | 71.93 | 71.79 | 71.65 | 71.70 | 71.80 |
| 1880 | 71.88 | 72.00 | 72.00 | 71.92 | 71.85 | 71.79 | 71.75 | 71.79 | 71.68 | 71.65 | 71.65 | 71.71 |
| 1881 | 71.83 | 71.93 | 72.10 | 72.00 | 72.05 | 72.10 | 72.13 | 72.20 | 72.00 | 71.85 | 72.08 | 72.08 |
| 1882 | 72.35 | 72.43 | 72.28 | 72.25 | 72.40 | 72.40 | 72.50 | 72.45 | 72.28 | 72.13 | 72.10 | 72.05 |
| 1883 | 72.13 | 72.33 | 72.25 | 72.23 | 72.23 | 72.15 | 72.15 | 72.10 | 72.08 | 71.93 | 72.00 | 72.05 |
| 1884 | 72.23 | 72.35 | 72.38 | 72.35 | 72.30 | 72.15 | 72.25 | 72.25 | 72.20 | 72.13 | 72.11 | 72.13 |
| 1885 | 72.17 | 72.15 | 72.18 | 72.13 | 72.13 | 72.14 | 72.03 | 72.15 | 72.13 | 72.10 | 72.10 | 72.10 |
| 1886 | 72.18 | 72.28 | 72.35 | 72.40 | 72.25 | 72.03 | 71.90 | 71.90 | 71.93 | 71.95 | 71.88 | 71.73 |
| 1887 | 71.83 | 71.73 | 71.73 | 71.83 | 71.99 | 72.00 | 71.95 | 71.98 | 71.80 | 71.73 | 71.73 | 71.65 |
| 1888 | 71.78 | 72.00 | 71.88 | 71.83 | 71.85 | 71.83 | 71.90 | 71.88 | 71.85 | 71.80 | 71.80 | 71.85 |
| 1889 | 71.93 | 72.05 | 72.01 | 72.04 | 72.10 | 72.20 | 72.25 | 72.25 | 72.18 | 72.13 | 72.00 | 72.03 |
| 1890 | 72.13 | 72.25 | 72.20 | 72.18 | 72.27 | 72.27 | 72.25 | 72.13 | 71.99 | 71.91 | 71.97 | 71.99 |
| 1891 | 72.09 | 72.10 | 72.08 | 72.05 | 72.03 | 71.91 | 71.85 | 71.85 | 71.79 | 71.78 | 71.96 | 72.00 |
| 1892 | 72.07 | 72.20 | 72.20 | 72.20 | 72.17 | 72.08 | 72.15 | 72.15 | 72.12 | 72.06 | 72.00 | 72.05 |
| 1893 | 72.15 | 72.28 | 72.24 | 72.27 | 72.21 | 72.15 | 72.11 | 72.05 | 71.99 | 72.00 | 72.05 | 72.08 |
| 1894 | 72.19 | 72.30 | 72.22 | 72.08 | 72.01 | 72.03 | 72.06 | 72.06 | 71.97 | 71.98 | 72.16 | 72.16 |
| 1895 | 72.15 | 72.21 | 72.07 | 72.07 | 72.15 | 72.09 | 72.10 | 72.03 | 71.94 | 71.96 | 72.13 | 72.00 |
| 1896 | 72.06 | 72.17 | 72.19 | 72.22 | 72.28 | 72.11 | 72.06 | 72.05 | 72.04 | 72.04 | 72.02 | 71.97 |
| 1897 | 72.11 | 72.23 | 72.19 | 72.21 | 72.28 | 72.20 | 72.19 | 72.12 | 72.08 | 72.00 | 72.04 | 71.95 |
| 1898 | 72.03 | 72.08 | 72.00 | 72.09 | 72.10 | 71.92 | 72.05 | 72.01 | 71.94 | 71.96 | 71.98 | 72.08 |
| 1899 | 72.34 | 72.36 | 72.27 | 72.29 | 72.28 | 72.27 | 72.24 | 72.24 | 72.14 | 72.17 | 72.20 | 72.18 |
| 1900 | 72.47 | 72.58 | 72.48 | 72.53 | 72.62 | 72.44 | 72.54 | 72.53 | 72.49 | 72.56 | 72.49 | 72.44 |
| 1901 | 72.52 | 72.38 | 72.21 | 72.15 | 72.22 | 72.02 | 72.03 | 72.08 | 71.99 | 72.07 | 72.29 | 72.21 |
| 1902 | 72.27 | 72.38 | 72.38 | 72.34 | 72.33 | 72.27 | 72.34 | 72.32 | 72.24 | 72.31 | 72.32 | 72.29 |
| 1903 | 72.44 | 72.56 | 72.55 | 72.50 | 72.40 | 72.26 | 72.29 | 72.19 | 72.14 | 72.31 | 72.35 | 72.28 |
| 1904 | 72.40 | 72.47 | 72.40 | 72.46 | 72.41 | 72.17 | 72.10 | 72.08 | 72.07 | 72.24 | 72.27 | 72.13 |
| 1905 | 72.29 | 72.33 | 72.22 | 72.30 | 72.25 | 72.26 | 72.35 | 72.30 | 72.20 | 72.28 | 72.32 | 72.35 |
| 1906 | 72.46 | 72.50 | 72.48 | 72.50 | 72.38 | 72.36 | 72.37 | 72.37 | 72.32 | 72.37 | 72.40 | 72.36 |
| 1907 | 72.52 | 72.47 | 72.35 | 72.47 | 72.56 | 72.51 | 72.44 | 72.58 | 72.62 | 72.79 | 72.87 | 72.88 |
| 1908 | 72.82 | 72.53 | 72.52 | 72.58 | 72.54 | 72.44 | 72.30 | 72.21 | 72.26 | 72.34 | 72.44 | 72.45 |
| 1909 | 72.50 | 72.39 | 72.32 | 72.35 | 72.29 | 72.16 | 72.28 | 72.21 | 72.22 | 72.35 | 72.37 | 72.29 |
| 1910 | 72.37 | 72.37 | 72.30 | 72.26 | 72.24 | 72.17 | 72.21 | 72.16 | 72.10 | 72.04 | 72.05 | 71.95 |
| 1911 | 72.05 | 72.08 | 71.97 | 71.90 | 71.90 | 71.81 | 71.95 | 72.04 | 72.26 | 72.51 | 72.27 | 72.10 |
| 1912 | 72.26 | 72.23 | 72.20 | 72.22 | 72.16 | 72.14 | 72.19 | 72.07 | 72.00 | 72.26 | 72.38 | 72.24 |
| 1913 | 72.39 | 72.37 | 72.31 | 72.37 | 72.37 | 72.26 | 72.28 | 72.24 | 72.11 | 72.19 | 72.18 | 72.02 |
| 1914 | 72.21 | 72.18 | 72.16 | 72.34 | 72.48 | 72.49 | 72.53 | 73.25 | 73.73 | 74.67 | 76.09 | 77.45 |

Sources: 1804–89: 'Växelkurser NN' (unpublished tables, Sveriges Riksbank); 1890–1914: *Riksbankens växelkurser på Paris, 1890–1914* (unpublished volume, Sveriges Riksbank).

## Appendix A6.5 Quotations on Antwerp and Brussels

Belgium adopted an independent franc – equal to the French franc – in 1832 and joined the Latin Monetary Union in 1865. Thus, SEK/franc applies for the whole sample 1873–1914.

Quotations for bills drawn on Antwerp and Brussels in francs during the period 1873–89 are from the Stockholm stock exchange, while the Riksbank's official quotations are used for the period 1890–1914.

Observations on franc rates are monthly mid-range in the period 1873–89 and monthly average for 1890–1914. The sources for the period 1873–89 are unpublished tables from the Riksbank. Official quotations on Antwerp and Brussels for 1890–1914 are from unpublished material in the Bank.

Quotations on Antwerp and Brussels refer to short sight bills of exchange in 1873–89 and to sight bills between 1890 and 1914.

**Table A6.5.** *Monthly exchange rates on Antwerp. SEK per 100 francs 1873–89.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1873 | 70.65 | 71.00 | 71.00 | 70.85 | 70.93 | 70.85 | 70.88 | 71.25 | 71.00 | 71.18 | 71.00 | 70.75 |
| 1874 | 71.15 | 71.58 | 71.70 | 71.83 | 71.90 | 71.83 | 71.83 | 72.13 | 72.28 | 72.33 | 72.53 | 72.73 |
| 1875 | 72.80 | 72.75 | 72.63 | 72.70 | 72.65 | 72.60 | 72.20 | 72.08 | 72.03 | 71.95 | 72.00 | 71.95 |
| 1876 | 72.25 | 72.35 | 72.35 | 72.18 | 71.98 | 71.98 | 71.88 | 71.95 | 72.05 | 71.98 | 72.23 | 72.25 |
| 1877 | 72.28 | 72.25 | 72.34 | 72.40 | 72.48 | 72.45 | 72.20 | 72.20 | 72.25 | 72.25 | 72.25 | 72.40 |
| 1878 | 72.25 | 72.23 | 72.35 | 72.35 | 72.05 | 72.15 | 72.13 | 72.30 | 72.23 | 72.15 | 72.08 | 71.98 |
| 1879 | 72.03 | 72.15 | 72.15 | 72.10 | 71.88 | 71.90 | 71.85 | 72.00 | 71.90 | 71.65 | 71.69 | 71.80 |
| 1880 | 71.83 | 71.95 | 71.99 | 71.88 | 71.72 | 71.78 | 71.75 | 71.77 | 71.68 | 71.50 | 71.78 | 71.80 |
| 1881 | 71.85 | 71.95 | 71.98 | 72.00 | 72.05 | 72.10 | 72.13 | 72.18 | 72.00 | 71.90 | 72.03 | 72.10 |
| 1882 | 72.33 | 72.40 | 72.28 | 72.25 | 72.35 | 72.38 | 72.45 | 72.45 | 72.28 | 72.13 | 72.10 | 72.08 |
| 1883 | 72.13 | 72.33 | 72.25 | 72.23 | 72.23 | 72.15 | 72.15 | 72.10 | 72.08 | 72.00 | 72.00 | 72.08 |
| 1884 | 72.23 | 72.38 | 72.38 | 72.35 | 72.30 | 72.25 | 72.25 | 72.25 | 72.20 | 72.15 | 72.13 | 72.13 |
| 1885 | 72.18 | 72.15 | 72.15 | 72.13 | 72.13 | 72.13 | 72.13 | 72.15 | 72.09 | 72.10 | 72.05 | 72.00 |
| 1886 | 72.13 | 72.28 | 72.35 | 72.40 | 72.40 | 71.95 | 71.85 | 71.90 | | | | 71.75 |
| 1887 | 71.57 | | | | | | | | 71.70 | | | |
| 1888 | 71.75 | | | 71.83 | | | | 71.85 | 71.80 | 71.77 | 71.77 | |
| 1889 | 71.95 | | | 72.00 | | | | | | 72.12 | 71.98 | 72.00 |

Sources*:* 1890–1914: 'Växelkurser NN' (unpublished tables, Sveriges Riksbank).

**Table A6.6.** *Monthly exchange rates on Brussels. SEK per 100 francs 1873–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1873 | | | 70.95 | | | | | | | | | 71.10 |
| 1874 | | | | | | | | | | | | |
| 1875 | | | | | | | | | | 70.90 | | 72.30 |
| 1876 | | | | | | | 71.35 | | | | | |
| 1877 | | | | | | | | | | | | |

**Table A6.6 (cont.).** *Monthly exchange rates on Brussels. SEK per 100 francs 1873–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1878 | | | | | | | | | | | | |
| 1879 | | | | | | | | | | | | |
| 1880 | | | | | | | | | 71.10 | | | |
| 1881 | | | | | | | | 71.00 | | | | |
| 1882 | | | | | | | | | | | 71.07 | 71.10 |
| 1883 | | 71.40 | | | | | | | | | | |
| 1884 | | | | | | | | | | | | |
| 1885 | | | | | | | | | 71.38 | | | 71.87 |
| 1886 | | | | | | 71.95 | | 71.88 | 71.85 | | | 71.60 |
| 1887 | | | | | | 71.90 | | | | 71.75 | | |
| 1888 | | | | | | | 71.80 | 71.30 | | | | |
| 1889 | | | | | 72.08 | 72.08 | | | 71.75 | | 71.90 | 71.95 |
| 1890 | 72.11 | 72.25 | 72.20 | 72.15 | 72.22 | 72.24 | 72.25 | 72.13 | 71.99 | 71.91 | 71.92 | 71.99 |
| 1891 | 72.06 | 72.10 | 72.08 | 72.05 | 72.03 | 71.91 | 71.85 | 71.84 | 71.79 | 71.76 | 71.91 | 71.95 |
| 1892 | 72.02 | 72.15 | 72.19 | 72.16 | 72.15 | 72.08 | 72.15 | 72.15 | 72.12 | 72.06 | 72.00 | 72.00 |
| 1893 | 72.08 | 72.23 | 72.20 | 72.22 | 72.17 | 72.10 | 72.05 | 71.92 | 71.93 | 71.99 | 72.02 | 72.06 |
| 1894 | 72.17 | 72.25 | 72.20 | 72.02 | 72.00 | 71.95 | 72.00 | 72.06 | 71.99 | 72.00 | 72.16 | 72.13 |
| 1895 | 72.15 | 72.12 | 72.03 | 72.05 | 72.05 | 71.99 | 72.04 | 72.03 | 71.95 | 71.95 | 72.03 | 71.94 |
| 1896 | 72.02 | 72.04 | 72.09 | 72.12 | 72.19 | 72.08 | 72.05 | 72.06 | 72.01 | 71.95 | 71.96 | 71.89 |
| 1897 | 72.02 | 72.18 | 72.14 | 72.11 | 72.18 | 72.09 | 72.10 | 72.08 | 72.01 | 71.94 | 71.99 | 71.90 |
| 1898 | 71.98 | 71.99 | 71.95 | 71.95 | 72.00 | 71.90 | 71.99 | 71.98 | 71.81 | 71.87 | 71.82 | 71.84 |
| 1899 | 72.21 | 72.25 | 72.15 | 72.15 | 72.14 | 72.12 | 72.11 | 72.12 | 72.00 | 72.00 | 72.09 | 72.14 |
| 1900 | 72.32 | 72.48 | 72.38 | 72.41 | 72.49 | 72.34 | 72.41 | 72.39 | 72.37 | 72.44 | 72.39 | 72.36 |
| 1901 | 72.41 | 72.33 | 72.16 | 72.07 | 72.12 | 71.93 | 72.00 | 72.04 | 71.96 | 72.02 | 72.17 | 72.08 |
| 1902 | 72.17 | 72.25 | 72.29 | 72.26 | 72.28 | 72.24 | 72.24 | 72.26 | 72.19 | 72.20 | 72.17 | 72.19 |
| 1903 | 72.36 | 72.46 | 72.45 | 72.40 | 72.30 | 72.16 | 72.18 | 72.09 | 72.01 | 72.18 | 72.23 | 72.18 |
| 1904 | 72.29 | 72.34 | 72.24 | 72.28 | 72.23 | 72.13 | 72.12 | 72.13 | 72.08 | 72.15 | 72.13 | 72.02 |
| 1905 | 72.15 | 72.25 | 72.21 | 72.21 | 72.14 | 72.12 | 72.19 | 72.23 | 72.10 | 72.08 | 72.11 | 72.13 |
| 1906 | 72.32 | 72.38 | 72.26 | 72.26 | 72.22 | 72.19 | 72.17 | 72.21 | 72.15 | 72.15 | 72.16 | 72.15 |
| 1907 | 72.21 | 72.25 | 72.23 | 72.28 | 72.32 | 72.30 | 72.28 | 72.37 | 72.40 | 72.55 | 72.72 | 72.78 |
| 1908 | 72.75 | 72.48 | 72.43 | 72.40 | 72.34 | 72.29 | 72.12 | 72.05 | 72.05 | 72.07 | 72.14 | 72.20 |
| 1909 | 72.27 | 72.20 | 72.19 | 72.17 | 72.13 | 72.01 | 72.09 | 72.05 | 72.04 | 72.12 | 72.10 | 72.02 |
| 1910 | 72.05 | 72.05 | 72.01 | 72.04 | 72.01 | 71.95 | 71.96 | 71.89 | 71.83 | 71.77 | 71.83 | 71.83 |
| 1911 | 71.90 | 71.93 | 71.85 | 71.77 | 71.75 | 71.61 | 71.67 | 71.79 | 71.91 | 72.09 | 71.94 | 71.79 |
| 1912 | 71.90 | 71.98 | 71.83 | 71.81 | 71.81 | 71.75 | 71.84 | 71.89 | 71.85 | 72.01 | 72.05 | 71.82 |
| 1913 | 71.95 | 71.96 | 71.87 | 71.96 | 71.91 | 71.79 | 71.83 | 71.84 | 71.69 | 71.75 | 71.75 | 71.58 |
| 1914 | 71.74 | 71.83 | 71.82 | 71.97 | 72.03 | 71.99 | 72.13 | 72.65 | 72.78 | 73.00 | 73.73 | |

Sources: 1873–89: 'Växelkurser NN' (unpublished tables, Sveriges Riksbank); 1890–1914: *Riksbankens växelkurser på Bruxelles, 1890–1914* (unpublished volume, Sveriges Riksbank).

## Appendix A6.6 Quotations on Copenhagen

The Danish courant currency virtually collapsed during the Napoleonic wars, as we have seen earlier. Quotations on Copenhagen were made in skilling banco per Dansk rigsdaler kurant between 1804 and February 1813. After the collapse of the rigsdaler kurant, Denmark adopted a new currency, the silver-based rigsbankrigsdaler, which equalled six rigsdaler kurant. Quotations were made in riksdaler riksmynt per rigsbankrigsdaler after Sweden switched its currency unit in 1858. When Denmark and Sweden formed a Scandinavian Currency Union in 1873 (Norway joined in 1875), Denmark changed to the joint Scandinavian gold-based krone as its official currency. The conversion rate between krone (DKK) and rigsbankrigsdaler was 2:1. Conversion into SEK (kronor) has been based on 1 SEK = 1 riksdaler riksmynt = 32 skilling banco.

Quotations between 1804 and 1889 are from the Stockholm stock exchange and are monthly mid-range observations. The sources are unpublished tables that most likely were the basis for the fifth, statistical volume in Sveriges Riksbank (1931), which in turn was based on daily newspapers. Exchange rates for the period 1882–1914 are cross-calculations of exchange rates on Stockholm and Copenhagen based on end-of-month quotations at the Hamburg stock exchange. The data are bid prices ('geld') from *Hamburger Geld- und Wechsel-Cours im jahre NN. Officielle Ausgabe,* available at Commerzbibliothek at Hamburg stock exchange.

Quotations on bills drawn on Copenhagen in the period 1804–34 are u.s.o. since there is no information on time to maturity.

**Table A6.7.** *Monthly exchange rates on Copenhagen. SEK per 100 DKK 1804–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1804 | 322.3 | 323.4 | 327.0 | 325.8 | 327.0 | 330.5 | 331.6 | 331.6 | 327.0 | 328.1 | 330.5 | 332.8 |
| 1805 | 335.2 | 332.8 | 329.3 | 332.8 | 339.8 | 350.4 | 353.9 | 344.5 | 342.2 | 336.3 | 337.5 | 334.0 |
| 1806 | 336.3 | 336.3 | 341.0 | 341.0 | 348.4 | 339.8 | 342.6 | 343.8 | 337.5 | 338.7 | 344.5 | 358.6 |
| 1807 | 346.9 | 352.7 | 346.9 | 343.8 | 344.5 | 359.8 | 353.9 | 349.2 | 344.5 | 344.5 | 344.5 | 345.7 |
| 1808 | 349.2 | 352.7 | 317.6 | 321.1 | 314.1 | 290.6 | 295.3 | 309.4 | 304.7 | 300.0 | 285.9 | 295.3 |
| 1809 | 288.3 | 271.9 | 300.0 | | | 234.4 | 187.5 | 206.3 | 208.6 | 180.5 | 182.8 | 175.8 |
| 1810 | 154.7 | 178.1 | 171.1 | 166.4 | 166.4 | 189.8 | 178.1 | 159.4 | 157.0 | 137.1 | 152.3 | 168.8 |
| 1811 | 150.0 | 138.3 | 150.0 | 131.3 | 132.4 | 133.6 | 128.9 | 127.7 | 119.5 | 117.2 | 116.0 | 113.7 |
| 1812 | 100.8 | 111.3 | 110.5 | 109.0 | 110.2 | 105.5 | 89.1 | 82.0 | 70.3 | 60.9 | 55.1 | 50.4 |
| 1813 | 53.9 | 51.6 | | | | | | | | | | |
| 1814 | | | 40.6 | 37.1 | 34.4 | 31.6 | 29.7 | 26.6 | 30.5 | 30.3 | 30.3 | 28.9 |
| 1815 | 28.5 | 27.7 | 27.3 | 26.6 | 27.3 | 28.4 | 29.7 | 27.0 | | 27.5 | 27.3 | 27.0 |
| 1816 | 28.1 | 27.5 | 27.3 | 27.1 | 27.0 | 28.1 | 28.9 | 28.7 | 27.5 | 26.9 | 29.4 | 32.8 |
| 1817 | 30.0 | 28.4 | 26.4 | 29.8 | 33.8 | 37.5 | | | | | | |
| 1818 | | | | | | | | | | | | |
| 1819 | | | | | | | | | | | | |
| 1820 | | | | | | | | | | | | |

**Table A6.7 (cont.).** *Monthly exchange rates on Copenhagen. SEK per 100 DKK 1804–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1821 | | | | | | | | | | | | |
| 1822 | | | | | | | | | | | | |
| 1823 | | | | | | | | | | | | |
| 1824 | | | | | | | | | 87.5 | | | |
| 1825 | | | | | | | | | | | | |
| 1826 | | | | | | | | | | | | |
| 1827 | | | | | | | | | | | | |
| 1828 | | | | | | 94.5 | | | | | 93.8 | |
| 1829 | | | | | | | | | | | | |
| 1830 | | | | | | | | | | | | |
| 1831 | | | | | | | | | | | | |
| 1832 | | | | | | | | | | | | |
| 1833 | | | | | | | | | | | | |
| 1834 | | | | | | | | | | | | 102.3 |
| 1835 | 102.3 | 102.3 | 102.4 | 102.0 | 101.4 | 99.2 | 99.0 | 99.0 | 99.2 | 99.6 | 99.7 | 99.8 |
| 1836 | 99.6 | 101.1 | 100.4 | 99.9 | 99.0 | 98.4 | 98.1 | 96.5 | 97.7 | 97.5 | 99.3 | 101.8 |
| 1837 | 102.1 | 99.8 | 99.9 | 100.2 | 102.0 | 100.8 | 101.6 | 102.7 | 100.4 | 103.9 | 104.3 | 104.7 |
| 1838 | 103.6 | 104.1 | 104.3 | 104.7 | 103.8 | 104.3 | 103.8 | 104.5 | 104.7 | 101.6 | 105.3 | 105.6 |
| 1839 | 105.3 | 105.7 | 105.1 | 103.1 | 100.2 | 102.7 | 102.3 | 102.3 | 100.2 | 99.8 | 101.4 | 104.3 |
| 1840 | 104.7 | 105.5 | 103.1 | 104.3 | 105.1 | 105.1 | 105.1 | 104.0 | 104.6 | 104.8 | 105.1 | 105.5 |
| 1841 | 105.1 | 104.7 | 105.1 | 104.4 | 103.8 | 103.9 | 103.6 | 103.5 | 104.3 | 104.2 | 104.8 | 106.3 |
| 1842 | 105.5 | 104.8 | 104.3 | 102.0 | 103.5 | 103.1 | 102.9 | 103.9 | 102.3 | 102.0 | 104.7 | 104.8 |
| 1843 | 105.1 | 103.5 | 104.3 | 102.5 | 102.7 | 100.7 | 99.7 | 101.2 | 102.0 | 102.0 | 104.4 | 104.3 |
| 1844 | 104.7 | 104.7 | 104.3 | 103.9 | 104.0 | 103.9 | 102.7 | 102.3 | 101.2 | 101.0 | 102.1 | 102.0 |
| 1845 | 102.2 | 102.0 | 100.8 | 100.7 | 100.6 | 100.1 | 101.0 | 100.6 | 101.2 | 102.3 | 102.7 | 104.2 |
| 1846 | 104.7 | 102.7 | 102.3 | 101.6 | 102.5 | 101.9 | 101.3 | 101.6 | 102.0 | 103.3 | 102.7 | 103.1 |
| 1847 | 102.7 | 102.0 | 102.1 | 101.2 | 102.0 | 101.6 | 101.6 | 100.8 | 101.6 | 102.0 | 102.3 | 102.2 |
| 1848 | 101.6 | 101.9 | 102.7 | 104.7 | 104.5 | 103.9 | 104.7 | 103.9 | 102.9 | 103.5 | 105.2 | 105.5 |
| 1849 | 105.5 | 103.5 | 102.7 | 102.7 | 101.8 | 102.2 | 102.1 | 102.1 | 101.3 | 101.6 | 102.0 | 102.0 |
| 1850 | 101.4 | 102.1 | 102.0 | 101.2 | 101.0 | 100.8 | 100.5 | 100.8 | 100.6 | 100.6 | 100.5 | 100.4 |
| 1851 | 100.8 | 100.0 | 100.7 | 100.4 | 100.4 | 99.8 | 100.4 | 100.4 | 100.2 | 100.4 | 100.7 | 101.2 |
| 1852 | 101.4 | 101.2 | 101.2 | 99.5 | 99.6 | 100.7 | 100.4 | 100.4 | 100.0 | 100.4 | 101.2 | 100.0 |
| 1853 | 100.4 | 100.8 | 99.3 | 100.0 | 99.7 | 100.4 | 101.2 | 100.2 | 100.4 | 100.8 | 101.2 | 101.6 |
| 1854 | 101.8 | 101.6 | 102.3 | 101.6 | 101.2 | 101.6 | 100.8 | 101.8 | 102.0 | 102.7 | 102.6 | 103.1 |
| 1855 | 103.7 | 102.5 | 103.1 | 103.3 | 103.5 | 103.1 | 103.3 | 102.3 | 102.3 | 102.3 | 102.0 | 102.7 |
| 1856 | 100.4 | 102.0 | 102.0 | 101.2 | 102.3 | 102.0 | 101.6 | 101.6 | 100.8 | 101.2 | 100.8 | 102.3 |
| 1857 | 102.7 | 102.3 | 102.0 | 101.6 | 100.8 | 100.8 | 99.6 | 100.4 | 100.4 | 100.8 | 101.6 | 101.2 |
| 1858 | 104.3 | 101.5 | 102.0 | 102.0 | | 101.8 | 101.6 | 100.3 | 100.5 | 101.0 | 101.8 | 101.8 |
| 1859 | 101.8 | 101.5 | 101.5 | 100.0 | 101.3 | 101.3 | 100.0 | 101.0 | 101.1 | 101.0 | 100.9 | 100.8 |
| 1860 | 101.1 | 100.9 | | 100.9 | 102.3 | 100.0 | 99.6 | 100.3 | 100.3 | 99.9 | 100.9 | 101.0 |
| 1861 | 100.9 | 100.9 | 100.5 | 100.2 | 100.5 | 101.0 | 100.3 | 99.8 | 100.8 | 100.5 | 100.5 | 100.8 |
| 1862 | 101.3 | 101.4 | 101.3 | 101.1 | 100.6 | 100.0 | 100.3 | 100.0 | 100.0 | 99.9 | 100.0 | 99.9 |
| 1863 | 99.9 | 100.4 | 99.7 | 99.7 | 99.6 | 100.0 | 99.4 | 99.8 | 100.0 | 100.3 | 100.6 | 100.8 |
| 1864 | 101.1 | 100.8 | 100.8 | 100.3 | 99.6 | 99.9 | 100.1 | 100.0 | 99.7 | 100.1 | 100.5 | 99.9 |

**Table A6.7 (cont.).** *Monthly exchange rates on Copenhagen. SEK per 100 DKK 1804–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1865 | 100.3 | 99.8 | 99.5 | 99.3 | 99.3 | 99.5 | 99.5 | 99.4 | 99.6 | 99.6 | 99.8 | 99.9 |
| 1866 | 100.0 | 100.5 | 100.4 | 99.8 | 100.0 | 100.5 | 100.0 | 99.8 | 100.5 | 100.5 | 100.5 | 101.0 |
| 1867 | 100.8 | 100.3 | 100.5 | 100.0 | 100.5 | 100.5 | 100.5 | 100.3 | 100.5 | 99.8 | 100.0 | 100.1 |
| 1868 | 99.4 | 100.0 | 100.5 | | 99.9 | 100.4 | 100.3 | 99.8 | 100.0 | 99.9 | 99.8 | 100.1 |
| 1869 | 99.8 | 100.1 | | 99.9 | 99.1 | 99.8 | 99.7 | 100.0 | 99.0 | 99.5 | 99.9 | 99.9 |
| 1870 | 99.4 | 99.3 | 99.8 | | 100.0 | 99.5 | 99.6 | 99.9 | 99.5 | 99.9 | | |
| 1871 | | | | | 99.5 | | 99.1 | 99.0 | 99.3 | | 99.4 | 99.4 |
| 1872 | 99.1 | | | | | | | | | | | |
| 1873 | 98.1 | 98.1 | 98.1 | 98.2 | 98.3 | 98.1 | 98.4 | 98.5 | 98.4 | 98.1 | 97.9 | 97.9 |
| 1874 | 99.5 | 99.8 | 99.6 | 99.4 | 99.6 | 99.6 | 99.6 | 99.6 | 99.6 | 99.8 | | |
| 1875 | 99.9 | 99.9 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | 99.9 | 99.7 |
| 1876 | 99.7 | 99.9 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.7 | 99.8 | | |
| 1877 | | | | | | | | | 100.0 | | | |
| 1878 | | | | 99.9 | | | | | | | | |
| 1879 | | | | | | | 100.0 | | 99.7 | | | |
| 1880 | | | | | | | | | | | | |
| 1881 | | | | | | | | | | | | |
| 1882 | 100.1 | 100.1 | 100.1 | 99.9 | 99.9 | 99.9 | 99.9 | 100.1 | 100.1 | 100.0 | 100.0 | 99.9 |
| 1883 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1884 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1885 | 100.1 | 100.0 | 100.0 | 100.0 | 100.1 | 100.1 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1886 | 100.0 | 100.2 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1887 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 |
| 1888 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 |
| 1889 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1890 | 100.0 | 100.0 | 100.0 | 99.9 | 99.9 | 100.0 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 |
| 1891 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1892 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.1 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1893 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1894 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1895 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1896 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1897 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1898 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1899 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1900 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1901 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1902 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1903 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1904 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1905 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1906 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1907 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1908 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

**Table A6.7 (cont.).** *Monthly exchange rates on Copenhagen. SEK per 100 DKK 1804–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1909 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1910 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1911 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1912 | 100.0 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1913 | 99.9 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 |

Sources: 1804–89: 'Växelkurser NN' (unpublished tables, Sveriges Riksbank); 1890–1914: Cross-calculations of data from *Hamburger Geld- und Wechsel-Cours im jahre NN. Officielle Ausgabe*. Commerzbibliothek, Hamburger Börse.

## Appendix A6.7 Quotations on Christiania/Oslo

Quotations on Norwegian currency in Sweden were made in riksdaler riksmynt per Norsk specie between 1858 and 1872 and in kronor per Norsk specie in 1873 and 1874. Norway joined the Scandinavian Currency Union in 1875 and adopted the joint Scandinavian gold-based krone as its official currency. The conversion rate between krone (NOK) and Norsk specie was 4:1. Conversion into SEK (kronor) has been based on 1 SEK = 1 riksdaler riksmynt.

Quotations between 1858 and 1882 are from the Stockholm stock exchange and are monthly mid-range observations. The sources are unpublished tables for the fifth, statistical volume in Sveriges Riksbank (1931), based in turn on daily newspapers. Exchange rates for the period 1883–1914 are cross-calculations of exchange rates on Stockholm and Christiania, based on end-of-month quotations at the Hamburg stock exchange. The data are bid prices ('geld') gathered from annual volumes of *Hamburger Geld- und Wechsel-Cours im jahre NN. Officielle Ausgabe,* available at Commerzbibliothek at Hamburg stock exchange.

**Table A6.8.** *Monthly exchange rates on Christiania/Oslo. SEK per 100 NOK 1858–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1858 | | | | | | | | | | | | 101.6 |
| 1859 | | | | | | | | | | | | |
| 1860 | | | 98.8 | | 100.0 | | | | 101.0 | 101.0 | 101.0 | |
| 1861 | 101.0 | | | | | | | | 100.0 | | 101.0 | 101.0 |
| 1862 | | | | | | 101.0 | 101.0 | | | 100.3 | 100.5 | |
| 1863 | | | 100.5 | | 99.6 | 100.0 | | | | 100.0 | | 100.5 |
| 1864 | 98.8 | | | | | | | 101.0 | | | | |
| 1865 | | 99.9 | 98.3 | | | | | | 99.0 | | 100.0 | |
| 1866 | | 100.0 | 100.0 | 100.0 | | | 100.0 | | | | | |
| 1867 | | | | | | | | 100.0 | | | | |
| 1868 | | | | | | | | | | | | |
| 1869 | | | | | 100.0 | | | | | | 100.0 | |
| 1870 | | 98.8 | 98.8 | | 98.3 | | | 100.0 | | | | |
| 1871 | | | | | | | | | | | | |

**Table A6.8 (cont.).** *Monthly exchange rates on Christiania/Oslo. SEK per 100 NOK 1858–1914.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1872 | | | | | | | | | | | | |
| 1873 | 99.5 | | | | 99.3 | | 98.5 | | | | | |
| 1874 | | | | | | | | | | | 99.5 | |
| 1875 | | | | | | | | | | | | |
| 1876 | | | | | | | | | | 99.9 | | |
| 1877 | | | | | | 100.0 | | | | | | |
| 1878 | | | | | | | | | | | | |
| 1879 | | | | | | | | | | 99.1 | | |
| 1880 | | | | | | | | | | | | |
| 1881 | | | | | 100.0 | | 100.0 | | | | 100.0 | |
| 1882 | | | | | | | | | | | | |
| 1883 | 100.0 | 99.9 | 99.9 | 99.9 | 99.8 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 |
| 1884 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 |
| 1885 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1886 | 99.9 | 99.9 | 100.0 | 99.8 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1887 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1888 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1889 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 |
| 1890 | 99.9 | 99.9 | 99.9 | 99.9 | 99.9 | 100.0 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 |
| 1891 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1892 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1893 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1894 | 100.0 | 99.9 | 99.9 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1895 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1896 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1897 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1898 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1899 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1900 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1901 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1902 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1903 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1904 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1905 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1906 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1907 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 99.9 |
| 1908 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1909 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1910 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1911 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1912 | 100.0 | 100.0 | 100.0 | 99.9 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| 1913 | 100.0 | 100.0 | 99.9 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

Sources: 1858–89: 'Växelkurser NN' (unpublished tables, Sveriges Riksbank); 1890–1914: Cross calculations of data from *Hamburger Geld- und Wechsel-Cours im jahre NN. Officielle Ausgabe*. Commerzbibliothek, Hamburger Börse.

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# 7.
# From appreciation to depreciation – the exchange rate of the Swedish krona, 1913–2008

**Jan Bohlin**

## 7.1. Introduction

In this chapter, monthly exchange rates of the Swedish krona are presented for the period 1913–2008. The exchange rates are the prices quoted in Stockholm for currencies, in other words, how many Swedish kronor (SEK) equalled a given unit of a foreign currency. The monthly exchange rates are calculated as monthly averages of daily quotations, except for the period 1952–1974, when the monthly rate is the average of the highest and lowest daily quotations in that particular month. During the Second World War and its aftermath, international trade was to a large extent characterised by bilateral trading arrangements and for many currencies there was no active exchange market. Accordingly, the same exchange rate was used for many years and daily quotations are lacking for most currencies. In the 1930s, after the break-up of the Gold Standard, and during the Second World War and its aftermath, clearing exchange rates were often used in international transactions. In most cases, however, the clearing rates closely tracked the official market exchange rates, and the latter are used in this chapter.[1] [2]

To get a better overview of the evolution of the Swedish exchange rate, an exchange rate index has been constructed with the aims of including the currencies of

1 Monthly exchange rates and annual averages of monthly exchange rates are in Appendix A7.1. A more comprehensive dataset can be downloaded from Sveriges Riksbank's website for historical monetary statistics. For the period after 1995, exchange rate data may also be downloaded from Sveriges Riksbank's website.

2 The sources used for constructing monthly exchange rates are given in Appendix A7.1.

countries whose share of Swedish foreign trade (exports + imports) amounted to at least one per cent and of covering at least 80 per cent of Swedish foreign trade. Due to a lack of data, this could not be achieved for some years and some countries. Moreover, the availability of unbroken series of data led to the inclusion in the index of the currencies of some countries whose shares in Swedish foreign trade were less than one per cent in particular years. An obvious example is the Swiss franc. Trade weights have been constructed with the use of official Swedish foreign trade statistics.[3]

Countries' trade shares shift over time and political changes lead to the disappearance of some states and the (re-)birth of new ones. In constructing an exchange rate index, we therefore need to adjust weights periodically. Weights have been adjusted every five years, and an exchange rate index has been calculated for each five-year period. In some cases, political changes, currency reforms and data availability have led to periods being a little longer or shorter.[4]

When interpreting the evolution of the exchange rate index, it is important to take into consideration the evolution of the international monetary system in the 20th century. Several regime shifts have occurred and the evolution of the Swedish exchange rate must be viewed against the background of those changes. The following sections contain an account of the evolution of the Swedish exchange rate under the varying regimes of the international monetary system in the 20th century.

## 7.2. The First World War and the demise of the classical gold standard

### *7.2.1. Swedish exchange rate policy during and after the First World War*

From 1873 until 1914 Sweden was on the gold standard. The fully-fledged gold standard rested on a few central pillars: the unit of account was tied to a certain amount of gold; gold coins circulated domestically and banknotes could be converted into gold on demand; there were no legal restrictions on the melting of gold coins into bullion; and there were no obstacles to the export of gold.[5] When these rules were adhered to, exchange rates between countries on the gold standard were fixed. They could only vary between the 'gold points', which mirrored the cost of transporting gold between countries. The First World War put an end to the classical gold standard. Governments to a large extent financed war efforts by printing

3 SOS Handel (from 1961 SOS Utrikeshandel). From 1977 the trade weight data derive from the website of Statistiska Centralbyrån (Statistics Sweden): www.scb.se.

4 Table A7.19 in Appendix A7.2 documents the chosen sub-periods, the base year for each period and the countries included. It also shows the included countries' shares of total Swedish foreign trade (exports + imports) in the chosen base years.

5 Kenwood and Lougheed (1985, p. 117).

money and the rate of inflation rose. From 1915, many central banks ceased to honour their obligation to exchange banknotes for gold and banned the export of bullion and gold coins. Accordingly, exchange rates started to deviate from the gold parities and there was no longer any mechanism for bringing them back. The only country that stuck to a fully-fledged gold standard during the war was the United States.

When gold started to flow out of Sweden following the outbreak of war, the Riksbank (Sweden's central bank) decided on 2 August, 1914 that banknotes would no longer be convertible into gold.[6] Then, on November 25, 1914, the Riksbank decided to ban the export of gold. This meant that in practice Sweden had left the gold standard. The immediate consequence was a loss of exchange rate stability. Between the autumn of 1914 and March 1915 the krona depreciated by 6–8 per cent against currencies such as sterling, the US dollar and the French franc, while it appreciated against the German mark.

In the spring of 1915 the depreciation of the German mark against the krona accelerated and from April 1915 the krona started to appreciate against 'high-valued currencies' such as sterling and the US dollar. The Riksbank's gold reserves increased again, as did the supply of sterling and US dollars when Swedish export income rose after Swedish timber was removed from the German list of contraband goods. Since gold backing was more than sufficient, the Riksbank reintroduced the convertibility of banknotes for gold at the turn of 1915. However, as the gold export ban was still in force, the Swedish exchange rate could deviate from the old gold parities. In the early months of 1916 the Swedish krona rose above the old parities. Since gold could flow into Sweden and the Riksbank was committed to exchanging banknotes for gold, one might have expected that the krona would be driven down towards the gold parities. However, this did not happen because, according to Heckscher, the gold standard did not function properly; it was no longer a 'bona fide gold standard'.[7] Wartime conditions severely obstructed private shipments of gold to Sweden.[8]

For the Riksbank, being obliged to exchange banknotes for gold at the old parities was bad business, especially since the gold reserves were now deemed to be more than sufficient. Thus, a month or so after it had been reinstalled, gold convertibility was again abandoned on February 8, 1916. However, some remnants of the old gold standard were still in place, since the Scandinavian currency union was still in operation. Accordingly, Norwegian and Danish firms and citizens could still use their own countries' gold coins in Sweden. The currency union prevented the Swedish krona from deviating all that much from the Danish and Norwegian krona. After a meeting of representatives of the Scandinavian central banks at the end of February 1916,

6 The following account of the evolution of Swedish exchange rate policy 1914–24 is based on Heckscher (1926) and Östlind (1945).

7 Heckscher (1926, p. 44).

8 Östlind (1945, p. 38).

*A queue outside the Riksbank to exchange notes for gold at the outbreak of the First World War in 1914.*
Source: Stockholm City Museum.

Norway and Denmark also prohibited the export of gold. In mid April 1916, the central banks of Denmark and Norway also abolished their obligation to exchange gold for banknotes. At the same time, the three Scandinavian central banks all withdrew the right for citizens of their countries to mint gold coins. After this, the only remnant of the old gold standard that still existed was the central banks' possibility of settling debts in gold coins. In this respect the Scandinavian currency union was still in force.

When the Danish and Norwegian krona started to fall against the Swedish from the summer of 1916, gold coins started to be exported from Norway and Denmark to Sweden. The Norwegian central bank used gold coins to settle its liabilities with Sveriges Riksbank. Despite the flow of gold coins to Sweden from Denmark and Norway, the Swedish krona appreciated against its Scandinavian neighbours, since the export of gold coins from the Danish and Norwegian central banks did not affect the valuation of the currencies in the hands of the general public. Gold coins did not circulate and the central banks refused to exchange gold for banknotes. For Sveriges Riksbank, the inflow of gold coins from Denmark and Norway was unwelcome since the appreciation of the Swedish krona meant that gold could be bought more cheaply elsewhere. After negotiations between the Scandinavian central banks in the spring of 1917, the ban on exports on gold was extended to include gold coins.

Despite the gold embargo, gold continued to flow into Sweden. Sweden ran a substantial trade surplus in these years and part of it was regulated with gold payments. The Riksbank willingly converted some of the gold into banknotes because the regulations were such that an increased circulation of banknotes required an increase in the Bank's gold reserves.[9] Another part of the Swedish export surplus was arranged by extending credit to foreign buyers. Swedish exporters were prepared to extend credit to foreign customers denominated in their currencies since the currencies were expected to return to the old gold parities soon after the end of the war, whereupon exporters would earn a nice profit. To understand the financing of the Swedish export surplus during the war years, it must be born in mind that since the middle of the 19th century Sweden had imported massive amounts of capital. Financial assets which Swedish borrowers had pledged to foreigners could now be mobilized to pay for Swedish exports and were accordingly repatriated to Sweden. Especially in Germany this arrangement was a common way of paying for imports from Sweden.[10]

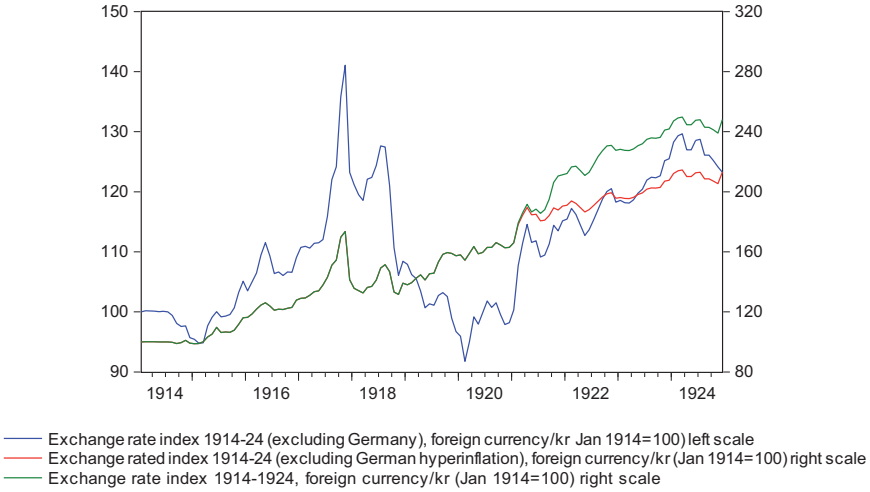
After the Scandinavian gold embargo in April 1916 there was no limit to the krona's appreciation above the old gold parities. Strong appreciation up to November 1917 was followed by depreciation, so that a year later the krona had returned to approximately the same level as two years earlier. The period of depreciation was apparently a result of expectations that the war would soon end and exchange rates would then return to the old gold parities.

Even after its depreciation at the end of 1917, the krona was still above the prewar gold parities, particularly against the German mark but also against sterling and to a lesser extent the US dollar. In 1919–20 the krona's exchange rate followed that of sterling and it accordingly depreciated against the dollar. The dollar's exchange rate against the krona rose above the old gold parities. However, as other currencies depreciated more against the dollar, the krona still appreciated against a trade-weighted average of other currencies.

Economists considered that the gold export ban was responsible for the krona's depreciation against the dollar. In a newspaper article on March 11, 1920, a leading economist, Eli Heckscher, urged the Swedish public to exert their right to exchange banknotes for gold in the Riksbank. His aim was to push the Riksbank into raising the discount rate and thereby help to curb the rate of inflation, which was rising. The immediate effect was that the Riksbank cancelled its obligation to exchange gold for banknotes on March 17.[11] The Riksbank also raised the discount rate and kept it at a high level even when the business cycle turned downwards in the autumn of 1920 and prices started to fall precipitously. In late 1920 the krona started to appreciate again against the dollar; two years later it had returned to the old gold parities and then stabilized at that level. When the ban on gold exports was abolished and the

9 Östlind (1945, pp. 47–48).
10 Schön (2000, pp. 280–81).
11 Heckscher (1926, pp. 112–13).

**Figure 7.1:** *Exchange rate index, 1914–24 (January 1914=100)*




Source: See Appendices A7.2, Table A7.20 to A7.22.

Riksbank again undertook to exchange gold for banknotes, on 1st April 1924 the krona was also formally back on the gold standard.

The return to the gold standard had been preceded by an intense discussion among economists about the goals of monetary and foreign exchange rate policy. The well-known economist Knut Wicksell advocated severe deflation and a return to the price level from 1914, which for him also meant abandoning the gold standard, whereas most economists favoured more lenient deflation and a return to the gold standard. The primary goal for a majority of Swedish economists was price stability, while a return to the price level from 1914 was considered unrealistic. The return to gold was seen as necessary in order to anchor the price level to a fixed norm.

### *7.2.2. The Swedish exchange rate 1914–24*

This section presents a summary view of the Swedish exchange rate during and after the First World War up to the restoration of the gold standard in 1924. Figure 7.1 shows the path of the Swedish krona's exchange rate against a trade-weighted average of Sweden's trading partners in the period 1914–24. Given Germany's large weight in Sweden's foreign trade, the German hyperinflation of 1921–23 has a large impact on the exchange rate index. A separate index that excludes the German hyperinflation has therefore been calculated for these years. The broad picture is nevertheless the same, with and without German hyperinflation. The exchange rate excluding German hyperinflation shows an appreciation of the krona by roughly 100 per cent between 1914 and 1924, which means that in 1924 a Swedish citizen had to pay

*A woman feeding a stove with old German marks in 1923. The inflation notes burned for longer than the firewood that people could buy for the same amount of money.*

only half as many kronor as in 1914 for a trade-weighted basket of foreign currencies. The sharp fluctuations in the krona's exchange rate in 1917–18 are also clear. After the war, the krona continued its upward float until the restoration of the gold standard in the mid-1920s.

Even before the German hyperinflation in 1921–23, the krona's appreciation is to a large extent driven by the depreciation of the German mark; between 1914 and 1920 the mark fell more than 90 per cent from its gold parity of 0.89 to 0.07. It is therefore of some interest to calculate an exchange rate index where Germany is excluded altogether in the period 1914–24. According to such an index[12] (see Figure 7.1, left scale) the krona appreciated by 20–30 per cent between 1914 and 1924; much of this appreciation occurred between the end of hostilities and the restoration of the gold standard in 1924.

Did the krona also appreciate in real terms? In other words, did the krona's purchasing power increase in terms of foreign goods? To answer that question we must look at the evolution of the price level in Sweden and among Sweden's trading part-

12 The same weights (excluding Germany) as in the other indices have been used.

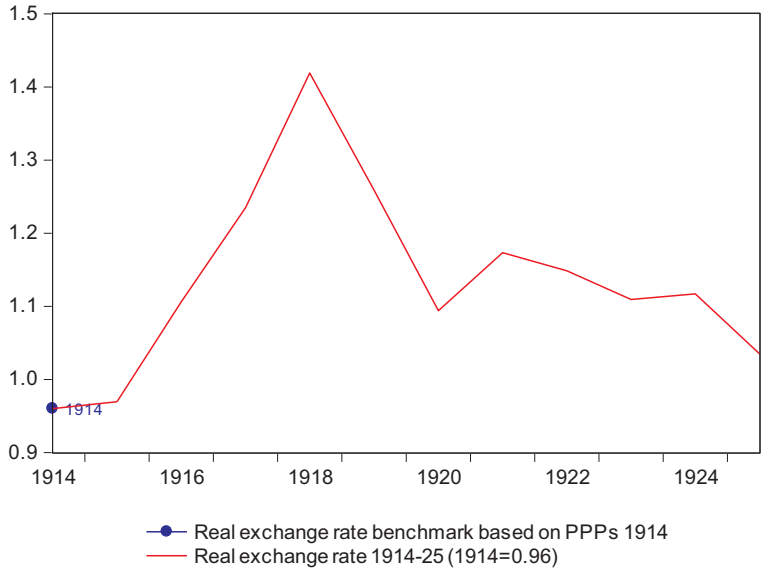
ners. Before doing so, we must discuss the concept of real exchange rates and its relationship to the purchasing power parity doctrine.

The purchasing power parity (PPP) doctrine is an influential theory in international economics on what determines exchange rates.[13] It is based on the law of one price, which states that an identical commodity must fetch the same price everywhere. If, for example, the dollar price of wheat of a given quality is lower in the US than in Sweden, dealers would make a profit by buying wheat in the US and selling it at the higher price in Sweden. This arbitrage would last until the dollar price of wheat is the same in both countries. What applies to a single commodity applies to a bundle of commodities. In its absolute form, the PPP doctrine for exchange rate determination states: $e = P_h/P_f$; where $P_h$ is the price for a bundle of goods in the home country, $P_f$ is the price for the same bundle of goods in a foreign country, and $e$ is the exchange rate (how many units of their own currency home country citizens have to pay for a unit of foreign currency). Because of transport costs and other obstacles to trade, such as tariffs, the PPP doctrine cannot be expected to hold in its absolute version. More common is the relative version of the PPP doctrine, which states that the percentage change in the exchange rate between two countries equals the difference in the percentage rate of price level changes between the two countries, i.e.: $\hat{e} = \hat{P}_h - \hat{P}_f$; where the caret stands for growth rates. This was the version of the PPP doctrine espoused by the Swedish economist Gustaf Cassel, who is often credited with being the originator of the PPP doctrine. When testing the relative version of the PPP doctrine, economists commonly use price index numbers for the various countries, for instance GDP deflators, consumer price indices or wholesale price indices. An obvious problem here is that commodity baskets differ between countries. Moreover, many commodities do not enter international trade. We would therefore not expect commodity arbitrage to directly bring exchange rates into line with changes in price levels. It has been shown that countries at a lower level of development, with tradable sector wages that are lower than in developed countries, also have lower wages and therefore prices in the non-tradable sector compared to developed countries. Their general price level is therefore lower than in more highly developed countries; as this is not mirrored in their exchange rates, their currencies are undervalued.

Another reason why we cannot expect the PPP doctrine to apply directly is that changes in wages and prices are more sluggish than changes in exchange rates. The latter are asset prices and therefore to a large extent governed by expectations. In financially deregulated economies, with high cross-border mobility of finance, exchange rates deviate from what we would expect from the PPP doctrine. Data show that exchange rates can diverge for decades from what would be expected from PPP levels, even for countries at a similar level of development.

13 For an overview of the PPP doctrine, see Sarno (2008).

**Figure 7.2:** *Real exchange rate index 1914–24 (1914=0.96)*




Sources: Exchange rates (Appendix A7.1); consumer price indices (Mitchell 2003b; Mitchell 2003a); purchasing power parities 1914 (Williamson 1995).
Note: Williamson's PPP data pertain to 1905 except for the US and Sweden, for which they pertain to 1909 and 1914. They have been recalculated to 1914 values by means of consumer price index numbers derived from Mitchell. The real exchange rate index is a trade-weighted average (1915 weights) of the real exchange rates of the krona against the currencies of Denmark, Norway, UK, USA and France.

Economists often calculate the real exchange rate, RER, according to the following formula: $RER = P_h/P_f e$. If RER is unity, the currencies are 'fairly' valued. If it is larger than unity, the exchange rate is overvalued, meaning that the home country's citizens have more purchasing power abroad than at home. If it is lower than unity, the exchange rate is undervalued. In practice, RER calculations are done with price index numbers that are set to unity in a common period. From that period we can calculate RERs forwards and backwards, but we do not know whether its value in the period set to unity is 'fair' in the sense that PPPs are equalised. Without such a reference point we cannot tell whether exchange rates are 'overvalued' or 'undervalued' at a certain point in time; at best we can only tell in which direction RERs are headed.

Statistical agencies, such as Eurostat and the OECD, publish PPP benchmarks for recent decades. For earlier periods we have to rely on the efforts of economists and economic historians. The various available PPP benchmarks are not directly comparable with respect to coverage and methods of calculation. They therefore give us only some general idea of the extent of a currency's over- or undervaluation at a point in time. According to a PPP benchmark for 1914, the Swedish krona was slightly

undervalued, with a PPP of 0.96.[14] I have accordingly scaled the Swedish RER to 0.96 for 1914. For the following ten years the RERs have been calculated from annual averages of our monthly exchange rates and consumer price index numbers for the various countries. Because of the distorting effects of the extraordinary German depreciation and hyperinflation, Germany was excluded from the calculations for the period 1914–24.

As shown by Figure 7.2, the exchange rate of the krona seems to have been greatly overvalued at the end of the First World War; by roughly 40 per cent according to our calculation. That the krona was overvalued at that time was also the opinion of contemporary economists.[15] The deflation that followed in 1921–23 was extraordinarily harsh in Sweden, which led to a fast fall in the Swedish RER in the first half of the 1920s; in 1925 it was nearly back at unity, indicating that at that time the krona was possibly only slightly overvalued.

## 7.3. The restoration and fall of the inter-war gold standard

### *7.3.1. Overview of the international monetary system, 1924–39*

After the First World War, currencies continued to float.[16] The inflationary conditions during the war continued in the first post-war years. In some countries, such as Germany, Austria and Hungary, high inflation developed into hyperinflation. In those countries, the stabilization of the price level entailed the creation of new monetary units backed by gold. Austria reconstructed its monetary unit in that way in 1923, Germany and Poland in 1924 and Hungary in 1925.[17] In other countries, among them Sweden and the UK, a combination of a sharp economic downturn and harsh deflationary policies broke inflation in 1921–23, when the price level fell precipitously. Economists, and politicians taking advice from them, argued for a return to the gold standard. A monetary system founded on gold was considered to be the only guarantee of price stability. Countries like Sweden and the UK, where inflation had been contained, went back to gold in 1924 and 1925 at the old parities. Britain's return to gold prompted other countries, such as Australia, the Netherlands and South Africa, to follow suit.[18] Re-establishing the old gold parities took longer in Denmark and Norway; Denmark went back to gold in January 1927, Norway in the

14 Calculated from trade weighted RERs for the Swedish krona against the currencies of Denmark, Norway, Great Britain, USA and France. For later periods Germany is also included in the calculated RER indices. PPP data come from Williamson (1995). The trade weights are from 1915.

15 Östlind (1945, p. 329–30).

16 The following overview of the international monetary system in the inter-war period is largely based on Kenwood and Lougheed (1985, Ch. 12–13) and Eichengreen (1996, Ch. 3).

17 Eichengreen (1996, p. 47).

18 Eichengreen (1996, pp. 47–48).

autumn of 1927.[19] France stabilized its currency at about the same time as Denmark[20] but did so at a fifth of the pre-war gold parity. Like France, Belgium and Italy experienced inflation in the 1920s which was not followed by sharp deflation, as it was in Britain and the Scandinavian countries; they went back to gold in 1925 and 1927, respectively.

By 1927, all the major countries' currencies were convertible into gold at fixed parities. Capital flowed freely across national borders. Everything appeared to be back to normal but in fact the gold standard only lasted another five years. Many factors exerted a strain on the interwar gold standard and caused it to function less smoothly than before the First World War. First, there was the problem of insufficient gold reserves with which to back currencies. The world's gold reserves grew much more slowly than output. The Genoa conference in 1922 therefore decided that central banks should be allowed to hold reserves not only in gold but also in convertible currencies. The interwar gold standard was accordingly a gold exchange standard. An additional problem was the unequal distribution of the available gold reserves. Gold tended to accumulate in just a few countries. The USA possessed almost half of the available gold reserves and in Europe it was France that accumulated gold. The French franc was clearly undervalued at the new parities, while the UK struggled with persistent current-account deficits, apparently because of an overvalued pound. In the context of political democracy it was difficult for the British to pursue deflationary policies, while the French did not permit the price level to rise. The asymmetry in the interwar gold standard was exacerbated by international capital flows in the late 1920s. The USA was the major lender in that decade, while Germany and East European states were the main borrowers.[21] A large part of the international lending was short-term. When the US Federal Reserve raised the interest rate in 1928 to curb the Wall Street boom, the supply of finance to these countries dried up. In the middle of a deep economic crisis, German governments were now forced to adopt deflationary policies to defend the gold standard.

Signs that the gold standard was beginning to crumble first appeared in 1929. Peripheral countries dependent on exporting prime commodities were hard hit by declining export revenues at the same time as capital imports diminished. Argentina, Brazil, Uruguay and other Latin American countries limited gold convertibility in 1929, as did Australia and New Zeeland. Canada introduced an embargo on gold exports.[22] The strains on the inter-war gold standard grew when in November 1931 an Austrian bank, Credit Anstalt, was on the brink of default and was bailed out by the government. The banking crisis led to capital flight that spread to Hungary and Germany. To stem the tide, both countries installed exchange controls that prohib-

19 Klovland (1998, p. 31).

20 France stabilized its currency in late 1926 and went back de jure to the gold standard in June 1928 (Eichengreen 1996, p. 47).

21 Feinstein et al. (1997, Ch 5).

22 Eichengreen (1996, p. 49).

ited the free cross-border flow of capital. Thereby these countries de facto left the gold standard.

The British balance of payments deteriorated sharply in the summer of 1931. Financial capital fled from Britain. Despite interest rate hikes by the Bank of England, arresting the capital flight and defending the gold parity of sterling proved impossible. On September 19, 1931, the Bank of England suspended gold convertibility and devalued the pound by roughly 30 per cent against the gold currencies. Britain's decision was followed by the countries in the British colonial empire and dominions, as well as by the Scandinavian countries, Finland and some other countries, such as Portugal.[23]

After the events of 1931, the international monetary system disintegrated into three blocs. Exchange controls in Austria, Germany and countries in Eastern Europe under German influence prohibited the free cross-border movement of capital. Although their currencies were backed by gold, the use of exchange controls signified that they had left the gold standard. To trade with these countries, governments had to arrange bilateral agreements. The Sterling Bloc consisted of the countries that followed Britain in suspending gold convertibility and pegged their exchange rates to sterling. The remaining gold countries – the USA and the remaining European countries, notably France, Belgium, Switzerland, the Netherlands, Poland and Czechoslovakia – tried to adhere to the gold standard and formed the Gold Bloc. In 1933 the USA devalued the dollar and suspended gold convertibility[24], and in 1934–36 various European gold bloc countries also devalued their currencies. By the mid 1930s there was not much left of the gold standard.

### 7.3.2. The Swedish exchange rate in the 1930s

When the UK left the gold standard in mid-September 1931, Sweden followed suit a week later because the Riksbank's foreign currency reserves were dwindling rapidly.[25] It was disclosed that a considerable part of these reserves consisted of dollar bills of exchange issued by various Krueger enterprises, which were now of dubious value. A policy declaration stated that the primary goal of monetary policy would now be to keep the krona's purchasing power stable. This entailed abandoning the fixed exchange rate regime so the exchange rate could be used to stabilize the price level. The Riksbank did not intervene in the foreign exchange market immediately after Sweden had left the gold standard. The krona started to appreciate against sterling, which fell below 17 kronor, after which the krona started to depreciate again and was back to the old parity at 18.16 in November 1931. The Riksbank then decided to peg the krona to sterling at the old gold parity, a decision that was at odds with the

23 Feinstein et al. (1997, pp. 151-4)

24 Eichengreen (1996, p. 87)

25 The following account of Swedish exchange rate policy in the 1930s is based on Jonung (1979) and Berg and Jonung (1999).

monetary policy declaration two months earlier that the goal of a fixed exchange rate would be abandoned. The peg at the old parity could not be maintained for long. After the Krueger crash in March 1932 the krona depreciated against sterling, which rose above 19.50 kronor in the summer of 1932.

From the spring of 1932 it was abundantly clear that the international depression had hit the Swedish economy and that deflationary forces were building up. This allowed the Riksbank to let the krona depreciate without importing inflation and risking the stated monetary policy goal of price stability. After the US left the gold standard in the spring of 1933, the international currency market became less volatile and the exchange rates of sterling and the US dollar stabilised. In June 1933 the Riksbank decided to peg the krona to sterling at 19.40. The peg was maintained until the outbreak of the Second World War.

Figure 7.3, showing the evolution of our trade-weighted exchange rate index, gives an overview of the Swedish exchange rate in the period 1924–39. After the major currencies had returned to gold in the mid 1920s, the krona was more or less stable until its depreciation in 1931–32; by 1934 its value had fallen by roughly 25 per cent. From the level in 1934 it appreciated slightly up to 1937, mainly due to devaluations in gold bloc countries. Nevertheless, despite a slight appreciation between 1934 and 1937, at the outbreak of the Second World War the krona had depreciated more than 20 per cent compared to the situation before Sweden left the gold standard in 1931.

Did the krona also depreciate in real terms? Swedish economic historiography considers that the krona did depreciate in real terms in the 1920s, since deflation in Sweden was more severe than in most other countries.[26] Furthermore, following the depreciation in 1931–32, the krona's real exchange rate fell even more in the early 1930s.[27] The inter-war depreciation of the Swedish real exchange rate is evident in Figure 7.4. However, the depreciation in the 1920s must be seen in the light of the krona's clear overvaluation in the early 1920s as a result of its appreciation during the First World War. If our real exchange rate index for Sweden against six major trading partners is set at 0.96 for 1914, based on a PPP benchmark for that year, the value for 1926 is close to unity, indicating a 'fair value' for the krona, in which case the depreciation in 1932 led to an undervaluation of the krona by 10–15 per cent in the 1930s. Starting instead from a PPP benchmark for 1927[28], which indicates a 12 per cent overvaluation of the krona in that year, the 1931–32 depreciation only brought it back to a 'fair value'.

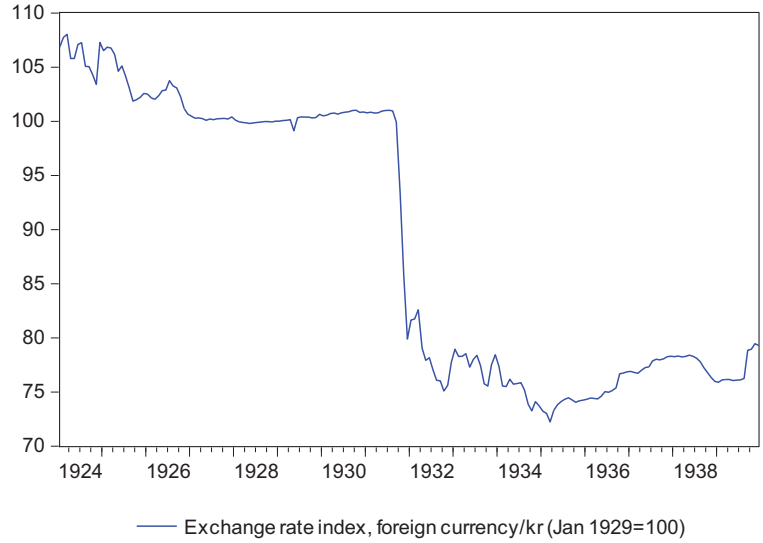
In sum, it seems obvious that the krona did depreciate in real terms in the inter-war period. The extent to which it was 'overvalued' or 'undervalued' during parts of

26 Lundberg (1983).

27 That the devaluation of the Swedish krona as well as the Danish and Norwegian krona also corresponded to a real depreciation has been pointed out by Klovland (1998, pp. 318–21).

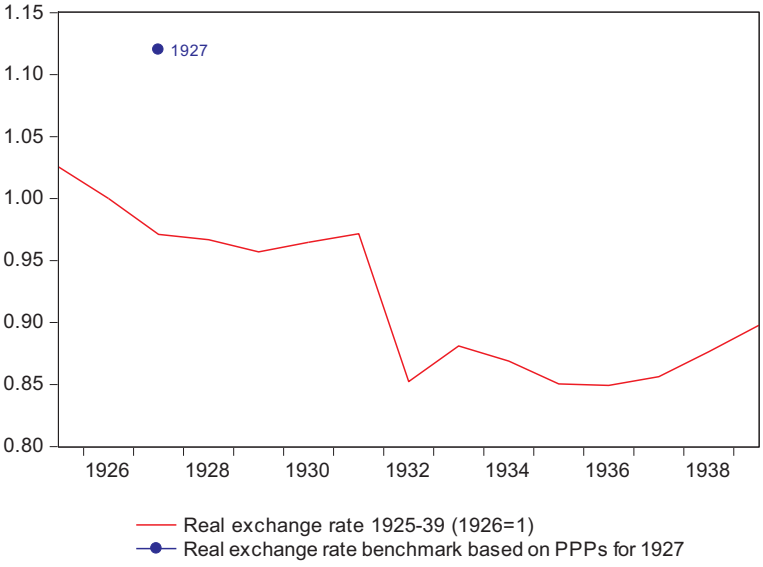
28 Calculated from PPP benchmarks 1927 for Sweden, Denmark, Norway, UK, USA, Germany and France as given in Williamson (1995).

**Figure 7.3:** *Exchange rate index, 1924–39 (January 1929=100)*




Sources: See Appendix A7.2, Table A7.20.

**Figure 7.4:** *Real exchange rate index 1925–39 (1926=1)*




Sources: Exchange rates (Appendix A7.1); consumer price indices (Mitchell 2003b; Mitchell 2003a); purchasing power parities 1927 (Williamson 1995).

Note: The real exchange rate index is a trade-weighted average (1930 weights) of the real exchange rates of the krona against the currencies of Denmark, Norway, UK, USA, Germany and France.

this period is more difficult to determine, given the difficulty of establishing reference points of 'fair value' against which to measure this. An enduring trade surplus may indicate undervaluation. Sweden had a surplus of 1–2 per cent of GDP during the 1920s[29] whereas the surplus was smaller in the 1930s, when the krona depreciated most markedly in real terms. The latter may perhaps be explained by the fact that the krona did not depreciate against the sterling area, while trade with Germany, against which the krona depreciated sharply, was conducted via bilateral negotiations.

## 7.4. The reshaping of the international monetary system after the Second World War: the Bretton Woods system

### *7.4.1. An overview of the international monetary system in the Bretton Woods era*

In July 1944, delegates from 44 allied nations convened in Bretton Woods, New Hampshire, to draw up the guidelines for a new international monetary system.[30] The conference had been preceded by proposals for the functioning of a new international monetary system from Keynes, who headed the British delegation, and Dexter White, the leader of the US delegation. Keynes argued for a system where countries could adjust their exchange rates, in other words an 'adjustable peg system', to achieve external balance. He also suggested the creation of an international clearing system with extensive credit facilities for the participating countries and a new international unit of account which he called bancor. Dexter White's proposal was closer to the old gold standard. He foresaw a system of fixed exchange rates where each national currency was pegged to gold. Exchange rate adjustments would be allowed only after consultations with a new 'International Stabilization Fund'. To support countries with external deficits, Dexter White suggested the creation of credit facilities, the size of which was dependent on quotas paid in gold or in the countries' own currencies to the 'International Stabilization Fund'. The result of the Bretton Woods proceedings was a compromise between the proposals of Keynes and Dexter White, with the latter clearly exerting more influence, corresponding to the USA's leading role in the international economy.

The Bretton Woods system was a fixed exchange rate system. Each country's currency would be pegged to the dollar at a fixed rate, but a deviation of one per cent up or down from this rate would be allowed. The dollar in turn was pegged to gold and exchangeable for it at the rate of 35 dollars per ounce. Only in a situation of 'fundamental disequilibrium' in the external balance was a country allowed to devalue its

29 Krantz and Schön (2007); Edvinsson (2005).

30 The following account of the international monetary system in the period 1944–1973 is primarily based on Eichengreen (1996) and Kenwood and Lougheed (1985).

currency by up to ten per cent after consultation with the International Monetary fund, IMF, a new international agency set up to monitor the system. Through the IMF, the participating countries were also granted a certain amount of credit facilities, dependent on and financed by country quotas, of which 25 percent was to be paid in gold or 'convertible currencies' (meaning the dollar) and the rest in national currency. The size of the quotas reflected each country's economic strength and also determined the country's voting rights in the IMF. To promote economic development, the International Bank for Reconstruction and Development, also called the World Bank, was set up to provide loans to developing countries.

The Bretton Woods system established the dollar as the world's leading reserve currency. In practice, the international monetary system was now based on a dollar standard. Although the dollar was exchangeable for gold, the Bretton Woods system was fundamentally different from the old gold standard. Firstly, it was an 'adjustable peg system'. In other words, it was possible to devalue a currency instead of being obliged to follow a deflationary monetary policy to restore competitiveness. Secondly, countries were allowed to use capital controls to avert volatile capital flows. Thirdly, a new international agency, the IMF, was created to monitor the system. The IMF could also extend credit to countries in trouble and had the right to sanction governments who did not play by the rules.

The new international monetary system agreed upon in Bretton Woods was supposed to become fully operational after five years, when all currencies would be fully convertible. In fact, fifteen years passed before all the major currencies became fully convertible in December 1958. European reconstruction after the Second World War required enormous resources. Countries had difficulties in exporting enough to earn the dollars they needed to pay for goods from the US. A lack of export revenue and a shortage of dollars made it hard for European countries to restore the convertibility of their currencies. A case in point was the British attempt to restore the gold convertibility of sterling in 1947; international reserves diminished so rapidly that after only six weeks the Bank of England was forced to re-suspend gold convertibility in August 1947.

When the US economy went into recession in 1948–49, European countries found it even harder to earn sufficient export revenue. To strengthen their competitiveness, they devalued their currencies by 30 per cent against the dollar in September 1949. The European Recovery and Relief Plan, also called the Marshall Plan, which was put into effect in 1947, helped to alleviate the dollar shortage. To administer this Plan, the Organization for European Economic Cooperation, OEEC, was founded and the European Payment Union, EPU, was set up under its auspices. The EPU was a clearing arrangement for facilitating trade between West European countries. The countries taking part agreed to work towards current account convertibility and also adopted a 'code of liberalization' which mandated the removal of restrictions on currency conversion for trade purposes. Under the EPU, trade restrictions were abolished more quickly among European countries than on imports from the

USA. European countries also used exchange controls to alleviate balance of payments problems; moreover, France resorted to a devaluation in 1957.

In December 1958 Western European countries restored the convertibility of their currencies, which signified that the Bretton Woods system was in full operation. The system lasted for another fifteen years. It soon became apparent that the main problem with the international monetary system had ceased to be insufficient dollar liquidity and was rather a 'dollar overhang'. In 1961, for the first time since the Second World War, other countries' combined reserves of gold and hard currencies exceeded the US gold and currency reserve. Although the USA still had a positive trade balance, its balance of payments had shown a deficit since 1958 as a result of investment and military expenditures abroad. The situation worsened in the 1960s as the US surplus on merchandise trade was gradually undermined by the increasing competitiveness of other industrial nations. The architects of the Bretton Woods system had not foreseen the rapid growth of world trade in the 1950s and '60s. The supply of gold grew much more slowly than world trade and it became increasingly clear that the gold reserves of the US would not suffice if countries with a trade surplus were to insist on exchanging their dollar reserves for gold at official parities. The French president de Gaulle pointed out that the international monetary system gave the US seigniorage privileges that were not available to other countries and on many occasions he threatened to exchange the French dollar reserves for gold. The lack of gold reserves also threatened to drive up the price of gold to well above the official parities. In 1961, eight countries among the Group of Ten created a Gold Pool in order to preserve the official price of gold at 35 dollars per ounce by means of market interventions. This worked until 1967, when sterling came under pressure. France left the Gold Pool in 1968 and was soon followed by Britain. From 1968 a two-tiered system emerged, where the free market price of gold rose high above the official price.

The crisis in the Bretton Woods system in the late 1960s was manifested in the realignment of exchange rates. The fixed rates that had been set in the 1950s were becoming increasingly outdated because countries differed in the development of productivity and hence of competitiveness. For example, West Germany ran persistent current-account surpluses, which indicated that the D-mark was undervalued, while the UK tended to have continual trade deficits, which suggested that sterling was overvalued. In November 1967 sterling was devalued by 15 per cent and two years later, in October 1969, the West German mark was revalued by 10 per cent. Two months earlier, France had devalued the franc by the same amount after a year of student protests and rampant labour unrest.

Critical observers, among them the Belgian monetary economist Robert Triffin, pointed out that the Bretton Woods system had a built-in contradiction. US deficits supplied the world economy with liquidity, since the dollar was the reserve currency, at the same time as growing US deficits undermined the dollar's stability. The US deficits represented a dilemma for countries, such as West Germany, that ran a cur-

rent-account surplus. A devaluation of the dollar would deprive them of some of their savings; if, however, they continued to accumulate dollar reserves they risked inflation since dollars could be exchanged for local currency at a fixed rate. The latter problem was exacerbated by the growing Eurodollar market, which increased liquidity in the banking system outside the control of central banks. To lessen the need for more dollar liquidity, countries in the IMF agreed to create additional credit facilities. The Group of Ten (the central banks in the ten leading countries), had already entered a 'General Agreement to Borrow' in 1962. As of 1970, moreover, countries could accumulate reserves in the form of Special Drawing Rights, which were allocated to countries in relation to their quotas in the IMF.[31]

The Special Drawing Rights and other credit facilities were clearly insufficient to replace the dollar as an international reserve currency. The built-in contradiction of the Bretton Woods system – that the international reserve currency was also a national currency whose stability was being undermined by mounting US deficits – remained. In the spring of 1971 dollars flowed to Western Europe in a steady stream. The Dutch and West German central banks permitted their currencies to float upwards. The US trade balance turned into a deficit in 1971; on August 13 that year the US President, Richard Nixon, announced that the US had suspended the dollar's convertibility into gold and imposed a 10 per cent surcharge on merchandise imports.

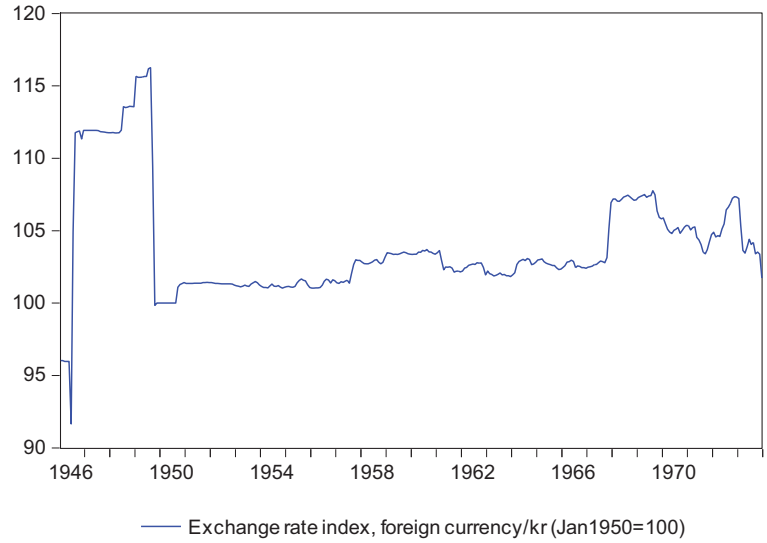
The suspension of gold convertibility removed a central pillar of the Bretton Woods system. In the following months, central banks discussed how the international monetary system could be reformed. At a meeting at the Smithsonian conference centre in New York in December 1971, participants from the Group of Ten countries signed the Smithsonian Agreement. The US 10 per cent import surcharge was rescinded and the dollar was devalued by 8 percent, while the German, Swiss and Benelux currencies were revalued. Moreover, the band within which exchange rates were allowed to float without requiring central bank intervention was widened to ±2 ¼ per cent. Despite Nixon's claim that the Smithsonian Agreement was 'the most significant monetary agreement in the history of the world', nothing really changed. The US dollar continued to be a weak currency. A second devaluation of the dollar, by 10 per cent, against major European currencies was negotiated in 1973 but this time West Germany and other European countries decided to let their currencies float. This put an end to the Bretton Woods fixed exchange rate system.[32]

### *7.4.2. Sweden and the Bretton Woods system*

In the aftermath of the Second World War, an important issue in Swedish economic policy was the prevention of inflation, which was increasing. To stem price increases for imported goods, which spilled over to the home market and fostered inflation,

31 Kenwood and Lougheed (1985, pp. 279–80).
32 Eichengreen (1996, pp. 128–34).

**Figure 7.5:** *Exchange rate index, 1946–73 (January 1950=100)*




Sources: See Appendix A7.2, Table A7.20.

the krona was revalued by 14 per cent in 1946.[33] This had the drawback of weakening the competitive position of Swedish producers. When sterling was devalued by 30 per cent against the US dollar in September 1949, the krona followed suit along with many other European currencies.

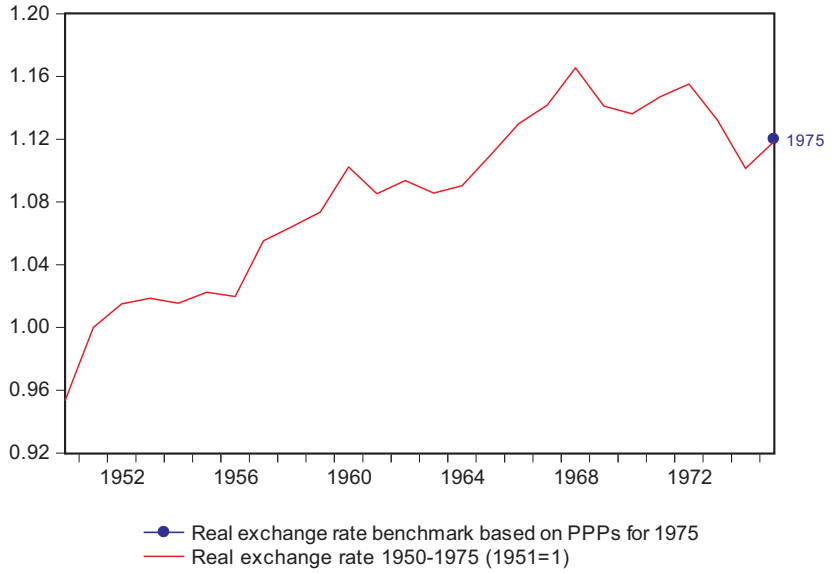
Sweden did not at first participate in the Bretton Woods system since it was considered incompatible with Swedish neutrality in foreign policy. However, Sweden did join in August 1951; the immediate reason seems to have been that the GATT agreements, which Sweden had ratified, presupposed membership of the Bretton Woods institutions. The history of the Swedish exchange rate from adherence to the Bretton Woods system up to its demise in 1973 is intertwined with that of other West European countries. In the 1950s Sweden participated in the EPU and in 1958 the Swedish krona became fully convertible along with other European currencies. The Swedish exchange rate against the dollar was stable from 1949 to 1971. When, at the time of the Smithsonian agreement, the dollar depreciated by 10 per cent against the German mark and other strong currencies, such as the Japanese yen, it depreciated by only 6 per cent against the krona; in other words, Sweden's currency depreciated against the German mark and the Japanese yen.[34]

Figure 7.5 gives an overview of the evolution of the Swedish exchange rate in the

33 The following account of Swedish exchange rate policy under the Bretton Woods system is primarily based on Wihlborg (1993). For Sweden and the Bretton Woods institutions, see also Ahlström and Carlsson (2006).

34 Wihlborg (1993)

**Figure 7.6:** *Real exchange rate index 1950–75 (1951=1)*




Sources: Exchange rates (Appendix A7.1); consumer price indices (Mitchell 2003b; Mitchell 2003a); purchasing power parities 1975 (Williamson 1995).

Note: The real exchange rate index is a trade-weighted average (1975 weights) of the real exchange rates of the krona against the currencies of Denmark, Norway, UK, USA, Germany and France.

period 1946–73, as measured by our trade-weighted exchange rate index. The revaluation in 1946 and the devaluation in 1949 are clearly visible.[35] The krona was then quite stable in the 1950s, with a tendency to appreciate slightly in 1957 and 1958 due to the devaluation of the French franc in these years. The increasing turbulence in international currency markets towards the end of the 1960s is also clearly visible in the graph. The krona appreciated in 1967 due to the devaluation of sterling in 1967 and then depreciated slightly in 1969 due to a revaluation of the West German mark in the autumn. The net result of the exchange rate realignment in late 1971 was a slight appreciation of the krona. Early in 1973, Sweden joined the European snake arrangement, after which the krona floated along with other European currencies.

Figure 7.6 shows the development of the krona's real exchange rates against six main trading partners 1950–75. A PPP benchmark from 1975 indicates that at that time the Swedish krona was overvalued by 12 per cent against a trade-weighted aver-

35 It has been argued (Wihlborg 1993, p. 205) that the 30 per cent devaluation in 1949 was of no great importance since it was done against the US dollar and the Swiss franc, both of which had relatively small weights in Swedish foreign trade. However, our trade-weighted exchange rate index fell by 14 per cent following the devaluation, a not insignificant amount.

age of six main trading partners.[36] In other words, for a Swedish citizen abroad, the krona's purchasing power was on average 12 per cent higher than at home. It was mainly in the 1960s that the krona appreciated in real terms when it revalued nominally against the pound at the same time as the rate of inflation in Sweden (and many other West European countries) was markedly higher than in Germany and the US. All this signifies that the krona appears to have been overvalued when the Bretton Woods system collapsed.

## 7.5. After Bretton Woods, 1973–2008

### *7.5.1. Overview of the international monetary system after the break-up of the Bretton Woods system*

The demise of the Bretton Woods system was a watershed in the history of the international monetary system. The system was no longer anchored to a metallic currency. To safeguard price stability, central banks had to rely on monetary policy, which now could be pursued without regard for its effect on exchange rates.[37]

Currencies now 'floated' against each other. In other words, exchange rates were determined by market forces, without central banks being obliged to intervene in order to stabilize them at some predetermined rate. In practice, however, governments and central banks did not completely disregard the evolution of exchange rates. In many respects, the post-Bretton Woods international monetary system can be characterized as a regime of 'managed floating'.

European central banks tried to limit fluctuations among European currencies that were involved in various forms of European monetary cooperation, while the US and Japan let their currencies float, initially without regard to their value. In the second half of the 1970s the US dollar depreciated against the Japanese yen and the German mark, and sterling weakened even more; this reflected the higher rates of inflation in the US and the UK. After a shift in economic policy doctrine around 1980, both the US and the UK gave priority to combating inflation. The central banks in both countries raised interest rates and their currencies appreciated. Foreign capital was attracted by high interest rates in the US, which led to an even larger appreciation of the dollar.[38] By 1985 many observers were worried that exchange rates were 'misaligned', i.e. they did not reflect economic fundamentals, which led to

36 As before, the real exchange rate index is calculated with respect to Denmark, Norway, Great Britain, Germany, France and the USA. Trade weights derive from 1975. Extrapolating backwards from a level of 1.12 for the real exchange rate in 1975 (according to a PPP benchmark from1975), gives a value close to unity for 1951. We have therefore scaled the real exchange rate index to unity for this year.

37 The following overview of the international monetary system since 1973 is primarily based on Eichengreen (1996, Ch. 5) and Kenwood and Lougheed (1985, Ch. 16, 18)

38 Eichengreen (1996, pp. 146–47)

central bank agreements to rectify them by means of market interventions. When the G5 finance ministers and central bank governors met at the City Plaza Hotel in New York in September 1985, they agreed to press for 'an orderly appreciation of non-dollar currencies' in order to fend off rising protectionist sentiments in the US Congress caused by the dwindling competitiveness of US firms due to the high value of the dollar. After the Plaza accord, the US dollar depreciated rapidly and the Europeans and the Japanese raised concerns that the dollar deprecation had gone too far. At a G7 summit in Louvre in February 1987 it was agreed to stabilize exchange rates at the current levels.[39] These examples show that while the currencies of the major economic powers floated against each other in the 1980s, there were still attempts to realign exchange rates by means of policy coordination.

After the demise of the Bretton Woods system, European countries decided to continue with monetary cooperation in a regime of managed floating. If exchange rates were permitted to drift apart unduly, that could jeopardize the goals of a European economic union, for which a common currency was a central pillar. European monetary cooperation had started after the Smithsonian agreement in 1971, when countries were permitted to let their currencies fluctuate within a band of ±2¼ per cent against the dollar. Theoretically this made it possible for the exchange rate gap between two European currencies to widen by nine percent, namely if one currency depreciated by 4½ per cent against the dollar while another country appreciated by the same amount. To prevent such a drifting apart of exchange rates, European countries agreed that their exchange rates should not deviate by more than ±2¼ per cent against each other, implying a maximum change of 4½ per cent in the exchange rate between any two currencies. This arrangement was named 'the snake in the tunnel'. When the US dollar started to float freely and the tunnel broke up in 1973, European countries decided to continue their commitment to limit mutual exchange rate variations to ±2¼ percent. The arrangement, now named just 'the snake', or 'the snake in the lake', since there was now no tunnel, meant that the European currencies taking part floated as a group against other currencies, such as the dollar and the yen. Apart from the original EEC countries, other European countries, among them Sweden, also participated in the arrangement. The snake countries established short-term credit facilities to member countries with weak currencies and set up a European Monetary Cooperation Fund, whose board was made up of representatives for the national central banks, to monitor monetary policies. However, varying rates of inflation and varying fiscal and monetary policies among the European countries made the snake arrangement difficult to uphold. There were occasional devaluations and revaluations of currencies and countries withdrew and re-joined the snake. For example, France withdrew in January 1974, re-entered in July 1975 and withdrew again in March 1976. The end result was that in the troubled macroeconomic environment of the late 1970s the European countries failed to keep fluctuations in their

39 Eichengreen (1996, pp. 149–50)

mutual exchange rates within the narrow band stipulated by the snake arrangement.[40]

In 1979, European exchange rate collaboration was renewed through a French initiative by setting up the European Monetary System (EMS). The original six EEC countries and the new members Denmark and Ireland participated, while the UK stayed outside. As with the snake, it was agreed that participating countries should strive to keep mutual exchange rate variations within a band of ±2¼ percent, though Italy was granted a wider band of ±6 percent. None of the original participating countries left the EMS in the 1980s but exchange rates were frequently 'realigned', especially in the first half of that decade. Over the course of the 1980s the German mark appreciated against the Italian lira by more than 60 per cent, against the French franc and the Irish pound by more than 40 per cent, and against the Belgian/Luxembourg franc and the Danish krona by more than 30 per cent.[41]

### 7.5.2. *The Swedish krona after the fall of the Bretton Woods system*

Sweden joined the European snake arrangement in March 1973 and for the next two years the krona's exchange rate against the German mark was quite stable. From the mid-1970s Sweden was hard hit by structural crises in manufacturing and a loss of competitiveness due to rising unit labour costs. In October 1976, the Frankfurt realignment of European exchange rates entailed a devaluation of the krona by 3 per cent against the mark. Even so, in 1976 the Swedish exchange rate appreciated against a weighted average of Sweden's trading partners, due to the decline of the US dollar and sterling. In April 1977, the krona was devalued by 6 per cent against the snake currencies. Another devaluation, by 10 per cent, followed in August that year. At the same time, Sweden decided to withdraw from the European currency cooperation in the snake. From now on the Swedish krona was pegged to a basket of 14 currencies, each weighted for its share in Sweden's foreign trade, with a double weight for the US dollar. Further loss of competiveness and concern over current-account deficits led to another 10 per cent devaluation against the currency basket in September 1981.[42] While the devaluations in 1977 and 1981 might be considered defensive, in the sense that they were undertaken to 'rectify' an alleged overvaluation of the krona, manifesting itself in current-account deficits, the next devaluation, in October 1982, was presented as an 'offensive' measure. The new Social Democrat government motivated it as a means to strengthen the profitability and competiveness of manufacturing and to kick-start the economy. The devaluation's obvious 'beggar thy neighbour' nature was criticized by the IMF and also raised concern among Sweden's Nordic neighbours.

In the course of the 1980s Sweden's unit labour costs rose faster than many of its

40 Eichengreen (1996, pp. 152-59).
41 Eichengreen (1996, p. 164).
42 Wihlborg (1993, pp. 226-28).

*Bengt Dennis, Governor of the Riksbank at the time of the EMS crisis in 1992.* Source:http://www.riksbank.se/templates/Page.aspx?id=4231

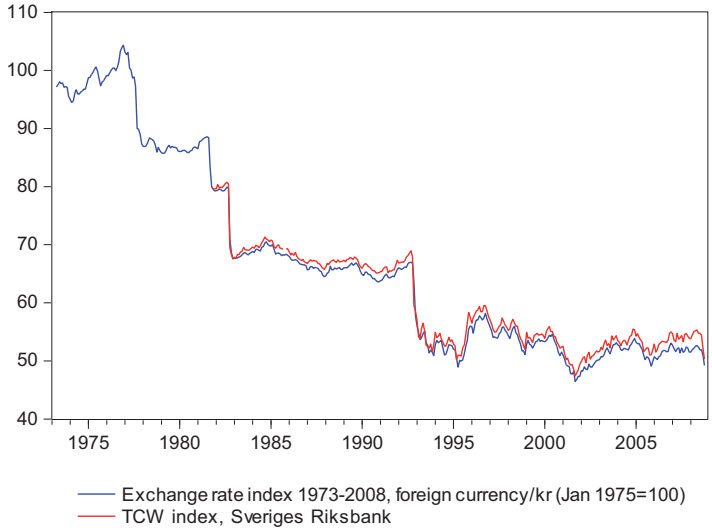
competitors', which eroded the benefits that the Swedish manufacturing industry had obtained from the devaluation in 1982. The Swedish central bank, the Riksbank, declared that there would not be a devaluation this time round. Instead, the krona was tied to the European Currency Unit in May 1991. In the EMS crisis in 1992 the krona was one of the currencies that came under speculative attacks. The Riksbank tried in vain to defend the exchange rate by raising the marginal rate of interest to three digit levels and by purchases in the currency markets. According to the Bank of International Settlements, the Riksbank's reserve losses amounted to more than 10 per cent of Sweden's Gross National Product.[43] On 19 November the Riksbank had to abandon its defence of the krona. Sweden has had a floating exchange rate regime ever since.

The break-up of the Bretton Woods system inaugurated a long period of depreciation of the Swedish krona. This is clear from our exchange rate index for the period 1973–2008, Figure 7.7.[44] The krona drifted upwards in the first few years, mainly due to the depreciation of the US dollar and sterling. Thereafter it was taken down by a series of three devaluations in 1977–82, all of which are clearly visible in the graph. The end result was a depreciation of the krona by 30–35 per cent from the situation at the break-up of the Bretton Woods system.

43 Eichengreen (1996, p. 174).

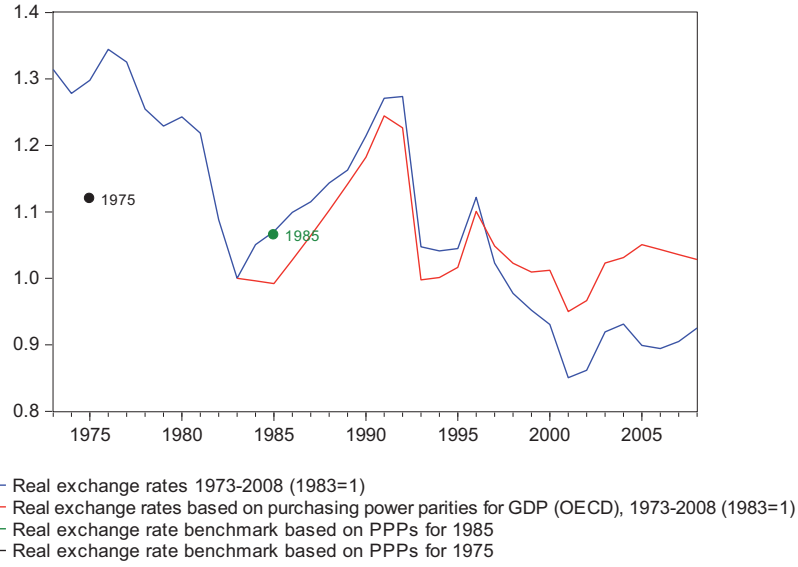
44 From October 1981 the Riksbank publishes an exchange rate index, the TCW index. It is based on fewer currencies and different (fixed) weights from our index. Nevertheless, as can be seen from Figure 7.7, its long-run evolution is similar to our index.

**Figure 7.7:** *Exchange rate index, 1973–2008 (January 1975=100)*




Sources: Exchange rate index see Appendix A.7.2, Table A7.20;TCW index, Sveriges Riksbank's website.
Note: The TCW index starts in October 1981, at which date it has been scaled to the same number as our exchange rate index.

**Figure 7.8:** *Real exchange rate index 1973–2008 (1983=1)*




Sources: Exchange rates (Appendix A7.1); consumer price indices, OECD web site; purchasing power parities 1975 (Williamson 1995); purchasing power parities 1985 (Maddison 1991); purchasing power parities for other years, OECD website.
Note: The real exchange rate index is a trade-weighted average (1985 weights) of the real exchange rates of the krona against the currencies of Denmark, Norway, UK, USA, Germany and France.

The devaluation in the autumn of 1982 was followed by a period of relative stability until the EMS crisis in 1992. When the Riksbank then abandoned the defence of the fixed exchange rate, initiating the current period of floating exchange rates, the krona fell by about 30 per cent, which meant that the value of the krona in the spring of 1993 was roughly half of what it had been when the Bretton Woods system collapsed 20 years earlier. The floating exchange rate system since 1992 has brought a sharp increase in the volatility of the exchange rate, hitherto without any clear trend.[45]

The basic reason for the decline in the value of the Swedish krona was of course that the price level in Sweden rose faster than in its trading partners. The real exchange rate was more stable. From 1995 the OECD has computed Purchasing Power Parities (PPP) for all OECD countries for the years 1995, 1999, 2002 and 2005. Eurostat has constructed PPP data for European countries for the years 1995–98, 1999, 2002 and 2005.[46] Before 1995, PPPs supplied by the OECD and Eurostat are backcasted by means of the implicit GDP price deflator for each country. PPP benchmarks from 1995 onwards make it possible to compute real exchange rates directly, based on relative prices for a given basket of commodities, as shown in Figure 7.8. The krona's real exchange rate against a weighted average of six main trading partners[47] is more or less stable from 1993 to 2008 when computed directly from PPPs and nominal exchange rates. A real exchange index constructed instead from the consumer price indices of the various countries and nominal exchange rates shows a marked depreciation after 1993. The main difference between the two indices is the period 1995–2000, when the information obtained from consumer price indices deviates from the implicit price evolution mirrored by PPPs.[48] As always, it is difficult to fix a point in time when the krona can be said to have been 'fairly' valued. From the OECD and Eurostat PPP data from 1985 it would appear that the krona was approximately 'fairly' valued[49] in 1983 after the 1982 devaluation.[50] We have

45 At the time of writing in February 2009, it remains to be seen whether the current sharp fall in the krona, initiated towards the end of 2008 and ongoing in the first two months of 2009, will be permanent, or whether the krona will bounce back.

46 PPP data can be downloaded from the OECD's website.

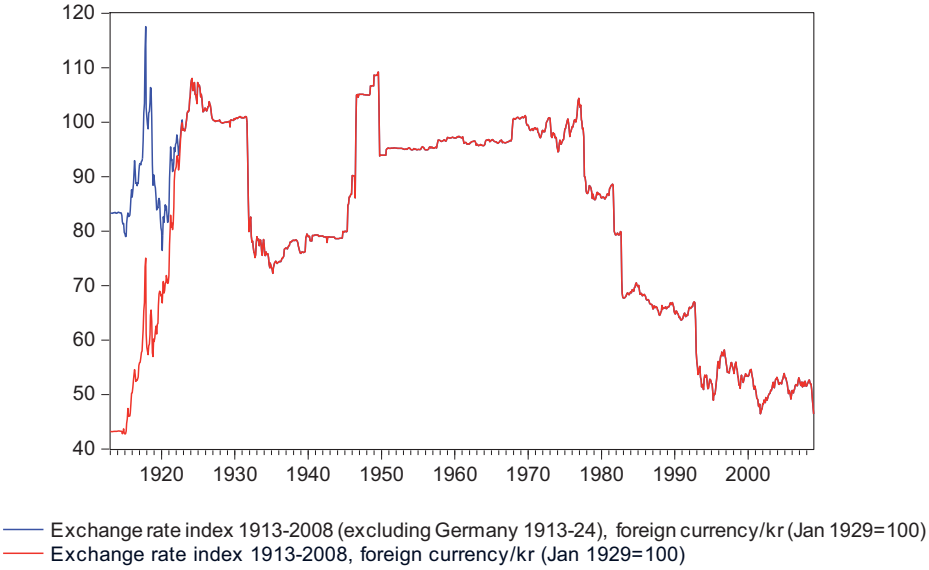
47 The real exchange rate index is calculated with respect to the same six countries as before: USA, UK, Germany, France, Denmark and Norway.

48 No matter how we calculate, the krona seems to be wildly undervalued at the time of writing in February 2009.

49 That the krona was 'fairly valued' in 1983 is based on a real exchange rate of 1.06 in 1985 (calculated from PPP data) for Sweden against a trade-weighted average of six countries (Maddison 1991, p. 197).

50 In 1982, though, the common opinion among observers seems to have been that the krona was undervalued after the devaluation, as measured for example by unit labour costs (Nordin 1991), see also Wihlborg (1991), while it was 'fairly' valued just before the 1982 devaluation. Also, the real exchange rate backcasted by means of price index data from a level of unity in 1983 leads to a much higher overvaluation of the real exchange rate in the mid-1970s than is shown by, for example, the 1975 PPP benchmark, see Figure 7.8. This example illustrates the problems involved in extrapolating by means of price index numbers between benchmark levels.

**Figure 7.9:** *Exchange rate index 1913-2008 (January 1929=100)*




Sources: See Appendices A7.1 and A7.2.

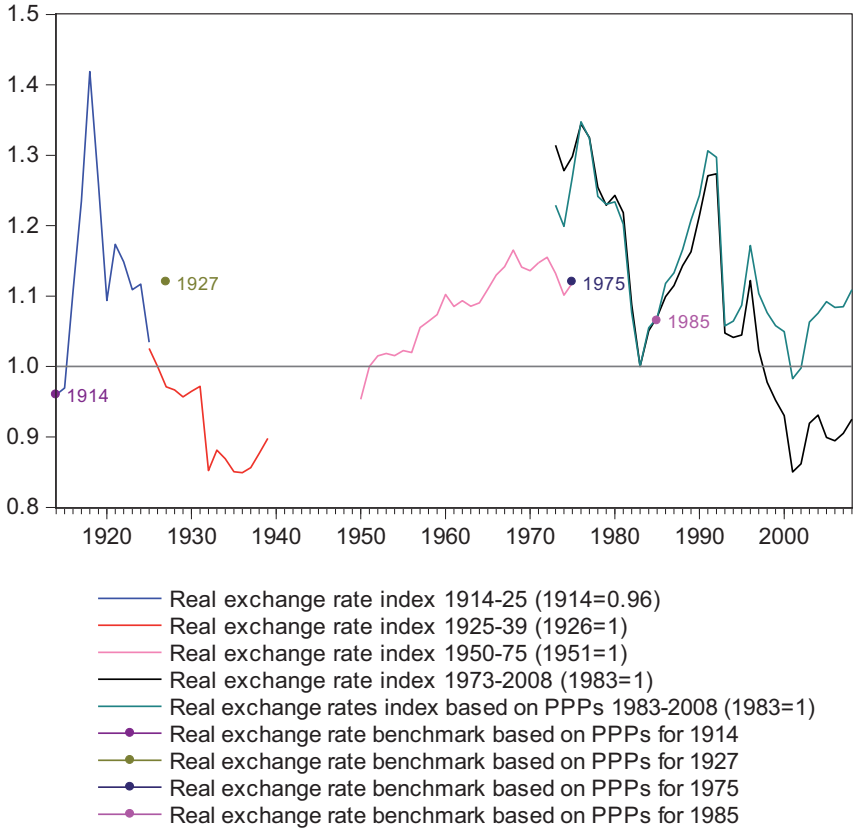
therefore set the real exchange rate index to unity in 1983. From this perspective, the krona was clearly overvalued at the onset of the EMS crisis in 1992. After the depreciation in 1992–93 it became 'fairly' valued again. Its subsequent evolution is, as we have pointed out, dependent on which measure we adopt for the real exchange rate.[51]

## 7.6. A bird's-eye view of the krona's exchange rate, 1913–2008

The history of the Swedish exchange rate since the First World War can be summed up by noting that there were two periods when the value of the krona changed markedly. One was from 1915 to early 1924, when the krona appreciated. The other was 1977–93, when the krona depreciated in several steps. Between 1924 and 1977 there was no long-run change in the value of the krona, event though the depreciation in the 1930s and the appreciation in the aftermath of the Second World War were sig-

51 There is also a large difference in 1973–83 between the real exchange rate calculated from consumer price indices or from PPP data from the OECD. This is strange since the OECD data are supposedly backcasted by means of price indices, namely GDP deflators. The difference would be approximately the same with PPPs based on private consumption backcasted by means of consumer price indices.

**Figure 7.10:** *Real exchange rate indices, 1914–2088*




Sources: See Figures 7.2, 7.4, 7.6 and 7.8.

Note: The real exchange rate index is a trade-weighted average of the real exchange rates of the krona against the currencies of Denmark, Norway, UK, USA, Germany and France, except for 1913–23 when Germany is excluded from the index.

nificant episodes in the history of the Swedish exchange rate. As can be seen from Figure 7.9, showing the long-run evolution of the krona's exchange rate against a trade-weighted average of Sweden's trading partners, the depreciation of Sweden's krona in 1977–92 has brought its value back to much the same level as before the First World War. However, this picture is heavily dependent on the sharp depreciation of the German currency in the period 1913–23. If Germany is excluded from the index for those years, the krona's appreciation during and after the First World War is less pronounced. In this case, since 1913 the krona has depreciated by roughly 40 per cent against a weighted average of trading partners.

The evolution of the Swedish krona's exchange rate must be put in perspective by relating it to regime shifts in the international monetary system. In the periods of fixed exchange rates, i.e. the interwar gold standard and the Bretton Woods system 1951–73, the krona's nominal exchange rate shows only minor fluctuations. For Sweden this was also the case in the periods 1931–51 and 1973–92, when the Riksbank had a target for the exchange rate by pegging the krona to other currencies: sterling in the 1930s and a basket of currencies in the 1970s and 1980s. The major exchange rate realignments that did take place in the period 1931–92 were a result of discretionary decisions by the Riksbank, in other word devaluations or revaluations. In the periods of free floating, i.e. 1915–24 and since 1992/93, the fluctuations were also larger than in other periods. Both periods also signify major changes in the value of the krona; appreciation during the First World War and depreciation after 1992/93. During and after the Second World War there was no functional international monetary system and the krona's exchange rate was pegged to major currencies, such as sterling and the US dollar.

Whether the exchange rate was adjusted by the Riksbank's discretionary decisions or by the interplay of market forces during a period of floating exchange rates, its long-run evolution was connected to the buying power of the krona. Figure 7.10 shows a trade-weighted average of the real exchange rate against six other currencies[52] for various sub-periods. The real exchange rate has been set to unity in a year in which the nominal exchange rate seems to have been close to 'fair value', based on information from PPP data. A value larger than unity indicates overvaluation of the krona, while a value below unity indicates undervaluation. Given that PPP benchmarks are error-prone, as are the price indices used to backcast or forecast from PPP levels, the exact magnitude of the measured real exchange rate should obviously be taken with a pinch of salt. We can be more certain about long-run trends. A first conclusion is that there is no long-run trend in the evolution of the real exchange rate. Real exchange rates can drift in one direction for as long as two decades. Because of the rather long periods during which exchange rates can deviate from what would be predicted from varying inflation rates, many economists have concluded that the purchasing power parity doctrine is of limited value for the determination of exchange rates in the short or medium term. However, as illustrated by Swedish data, over the very long run, real exchange rates do sooner or later mean-revert.

Secondly, there are clearly periods of real appreciation or depreciation, in which a previous period of overshooting/undershooting in the value of the krona is corrected. The appreciation of the krona during the First World War was also a real appreciation. The krona subsequently depreciated in real terms but this should be seen against the background of its high overvaluation in the early 1920s. The devaluation in 1931 also led to a depreciation in real terms, which strengthened the competitiveness of Swedish producers. The krona was probably undervalued in the 1930s, following the 1931 devaluation. During the Bretton Woods period the krona appreciated in real terms against our group of six major trading partners. The devaluations in 1977–81

52 Denmark, Norway, USA, UK, Germany, France. As mentioned, Germany is excluded from the index for the period 1914–24.

addressed a problem of overvaluation of the krona and strengthened the competitiveness of Swedish industry. The same can be said for the depreciation of the krona in 1992/93. Thereafter the krona has depreciated in real terms. Most economists agree that in terms of 'fundamentals' the krona is undervalued today (at the time of writing in February 2009). The depreciation of the krona since the autumn of 2008 is a vivid illustration of the extent to which prices of financial assets are governed by expectations of the future.

# Appendix A7.1: Monthly exchange rates 1913–2008

## *A7.1.1 Sources*

The exchange rates are the currency prices quoted in Stockholm, i.e. the sum in Swedish kronor (SEK) that was equivalent to a given unit of a foreign currency.

In collecting monthly exchange rate data, the following sources have been used:

For the period 1913–19 the monthly exchange rates for sterling, the German reichsmark, the French franc and, from 1915, the US dollar derive from information in *Sveriges riksbank årsbok* (Yearbook of the Swedish Central Bank). All other exchange rates for this period derive from information on monthly exchange rates collected in the archives of Sveriges Riksbank (Sweden's central bank). For the period 1920–79 the exchange rate data derive from *Sveriges riksbank årsbok*, from 1978 *Sveriges riksbank statistisk årsbok* (Statistical Yearbook of the Swedish Central Bank). In this source we lack data on the exchange rate between the Swedish krona and the Japanese yen before 1977. For the period 1960–77 the monthly exchange rates between the Japanese yen and the Swedish krona have been calculated from monthly exchange rates between the Norwegian krona and the Japanese yen and between the Norwegian krona and the Swedish krona as reported on the Norwegian Central Bank's website of exchange rates: http://www.norges-bank.no/english/statistics/exchange/.

For the period 1980–99 the exchange rate data derive from information collected in the archives of *Sveriges riksbank* (Sweden's central bank) except for the Swiss franc and the Icelandic krona in 1980, where the data derive from *Sveriges riksbank statistisk årsbok*. For the period from 2000 onwards the exchange rate data derive from the website of *Sveriges riksbank* (Sweden's central bank): http://www.riksbank.se/templates/stat.aspx?id=15882.

**Table A7.1.** *Monthly exchange rates on UK. SEK per GBP 1913–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | 18.26 | 18.26 | 18.26 | 18.26 | 18.25 | 18.23 | 18.25 | 18.23 | 18.20 | 18.24 | 18.26 | 18.23 |
| 1914 | 18.22 | 18.18 | 18.19 | 18.21 | 18.24 | 18.22 | 18.26 | 18.37 | 18.67 | 18.77 | 18.48 | 19.20 |
| 1915 | 19.26 | 19.41 | 19.40 | 18.70 | 18.38 | 18.13 | 18.33 | 18.24 | 18.11 | 17.87 | 17.25 | 16.94 |
| 1916 | 17.27 | 17.02 | 16.69 | 16.09 | 15.69 | 16.14 | 16.71 | 16.71 | 16.88 | 16.78 | 16.82 | 16.41 |
| 1917 | 16.16 | 16.14 | 16.05 | 15.87 | 15.88 | 15.76 | 15.14 | 14.34 | 14.04 | 12.68 | 11.99 | 13.93 |
| 1918 | 14.23 | 14.50 | 14.61 | 14.07 | 14.01 | 13.78 | 13.40 | 13.44 | 14.28 | 16.07 | 16.89 | 16.46 |
| 1919 | 16.58 | 16.94 | 17.04 | 17.38 | 18.08 | 17.95 | 17.86 | 17.38 | 17.10 | 17.27 | 17.85 | 17.87 |
| 1920 | 17.84 | 18.23 | 18.31 | 18.01 | 18.21 | 18.13 | 17.74 | 17.63 | 17.44 | 17.68 | 18.02 | 17.88 |
| 1921 | 17.57 | 17.45 | 17.23 | 16.73 | 16.96 | 16.89 | 17.27 | 17.30 | 17.12 | 16.85 | 17.11 | 16.95 |
| 1922 | 16.93 | 16.70 | 16.75 | 16.97 | 17.30 | 17.25 | 17.14 | 16.95 | 16.77 | 16.66 | 16.70 | 17.09 |
| 1923 | 17.34 | 17.65 | 17.64 | 17.48 | 17.37 | 17.38 | 17.28 | 17.15 | 17.11 | 17.14 | 16.68 | 16.57 |
| 1924 | 16.28 | 16.39 | 16.33 | 16.40 | 16.40 | 16.27 | 16.43 | 16.91 | 16.78 | 16.87 | 17.19 | 17.41 |
| 1925 | 17.75 | 17.68 | 17.73 | 17.81 | 18.15 | 18.16 | 18.11 | 18.08 | 18.08 | 18.08 | 18.12 | 18.11 |

**Table A7.1 (cont.).** *Monthly exchange rates on UK. SEK per GBP 1913–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1926 | 18.14 | 18.16 | 18.13 | 18.16 | 18.17 | 18.16 | 18.16 | 18.16 | 18.16 | 18.15 | 18.17 | 18.15 |
| 1927 | 18.18 | 18.18 | 18.15 | 18.14 | 18.16 | 18.12 | 18.13 | 18.12 | 18.10 | 18.09 | 18.10 | 18.09 |
| 1928 | 18.14 | 18.16 | 18.18 | 18.19 | 18.19 | 18.19 | 18.15 | 18.14 | 18.13 | 18.14 | 18.15 | 18.13 |
| 1929 | 18.14 | 18.16 | 18.17 | 18.16 | 18.15 | 18.12 | 18.10 | 18.10 | 18.10 | 18.14 | 18.15 | 18.09 |
| 1930 | 18.14 | 18.13 | 18.11 | 18.10 | 18.11 | 18.10 | 18.10 | 18.12 | 18.10 | 18.10 | 18.10 | 18.10 |
| 1931 | 18.14 | 18.15 | 18.14 | 18.15 | 18.14 | 18.15 | 18.15 | 18.16 | 17.63 | 16.94 | 17.93 | 18.03 |
| 1932 | 17.91 | 17.95 | 18.32 | 19.66 | 19.64 | 19.52 | 19.52 | 19.48 | 19.50 | 19.35 | 18.80 | 18.31 |
| 1933 | 18.38 | 18.78 | 18.92 | 19.08 | 19.45 | 19.46 | 19.41 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 |
| 1934 | 19.40 | 19.40 | 19.40 | 19.40 | 19.41 | 19.41 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 |
| 1935 | 19.40 | 19.41 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 |
| 1936 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 |
| 1937 | 19.40 | 19.40 | 19.40 | 19.41 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.41 |
| 1938 | 19.41 | 19.41 | 19.42 | 19.41 | 19.40 | 19.40 | 19.40 | 19.40 | 19.40 | 19.42 | 19.42 | 19.43 |
| 1939 | 19.43 | 19.42 | 19.42 | 19.41 | 19.42 | 19.43 | 19.42 | 19.29 | 16.99 | 16.95 | 16.60 | 16.70 |
| 1940 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 |
| 1941 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 |
| 1942 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 |
| 1943 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 |
| 1944 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 |
| 1945 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 | 16.95 |
| 1946 | 16.96 | 16.95 | 16.95 | 16.95 | 16.94 | 16.92 | 15.47 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 |
| 1947 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 |
| 1948 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 |
| 1949 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 |
| 1950 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 |
| 1951 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 |
| 1952 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.52 | 14.56 |
| 1953 | 14.59 | 14.59 | 14.60 | 14.60 | 14.54 | 14.52 | 14.51 | 14.47 | 14.46 | 14.44 | 14.47 | 14.50 |
| 1954 | 14.51 | 14.53 | 14.55 | 14.57 | 14.54 | 14.52 | 14.53 | 14.52 | 14.51 | 14.54 | 14.56 | 14.54 |
| 1955 | 14.52 | 14.53 | 14.55 | 14.56 | 14.53 | 14.47 | 14.43 | 14.40 | 14.42 | 14.44 | 14.50 | 14.53 |
| 1956 | 14.54 | 14.54 | 14.54 | 14.55 | 14.55 | 14.50 | 14.43 | 14.41 | 14.43 | 14.47 | 14.42 | 14.45 |
| 1957 | 14.49 | 14.52 | 14.49 | 14.51 | 14.49 | 14.46 | 14.47 | 14.44 | 14.47 | 14.49 | 14.51 | 14.50 |
| 1958 | 14.51 | 14.53 | 14.54 | 14.53 | 14.50 | 14.48 | 14.44 | 14.44 | 14.47 | 14.50 | 14.49 | 14.50 |
| 1959 | 14.53 | 14.54 | 14.57 | 14.58 | 14.57 | 14.57 | 14.56 | 14.55 | 14.52 | 14.53 | 14.53 | 14.51 |
| 1960 | 14.52 | 14.53 | 14.54 | 14.52 | 14.52 | 14.48 | 14.51 | 14.50 | 14.53 | 14.53 | 14.55 | 14.54 |
| 1961 | 14.51 | 14.49 | 14.47 | 14.47 | 14.43 | 14.42 | 14.40 | 14.48 | 14.56 | 14.56 | 14.57 | 14.54 |
| 1962 | 14.54 | 14.53 | 14.51 | 14.50 | 14.49 | 14.46 | 14.46 | 14.45 | 14.45 | 14.45 | 14.49 | 14.56 |
| 1963 | 14.54 | 14.60 | 14.55 | 14.56 | 14.54 | 14.53 | 14.53 | 14.55 | 14.53 | 14.54 | 14.54 | 14.54 |
| 1964 | 14.53 | 14.51 | 14.43 | 14.40 | 14.40 | 14.37 | 14.37 | 14.33 | 14.33 | 14.37 | 14.37 | 14.37 |
| 1965 | 14.35 | 14.37 | 14.36 | 14.40 | 14.43 | 14.43 | 14.43 | 14.44 | 14.47 | 14.51 | 14.52 | 14.51 |
| 1966 | 14.51 | 14.50 | 14.43 | 14.43 | 14.41 | 14.41 | 14.42 | 14.42 | 14.43 | 14.45 | 14.45 | 14.45 |
| 1967 | 14.45 | 14.45 | 14.45 | 14.45 | 14.43 | 14.39 | 14.38 | 14.38 | 14.38 | 14.40 | 13.47 | 12.48 |
| 1968 | 12.44 | 12.46 | 12.41 | 12.43 | 12.36 | 12.34 | 12.36 | 12.35 | 12.34 | 12.37 | 12.36 | 12.35 |
| 1969 | 12.36 | 12.39 | 12.39 | 12.38 | 12.36 | 12.38 | 12.37 | 12.35 | 12.35 | 12.36 | 12.40 | 12.40 |
| 1970 | 12.42 | 12.48 | 12.53 | 12.53 | 12.51 | 12.46 | 12.42 | 12.39 | 12.41 | 12.40 | 12.39 | 12.38 |
| 1971 | 12.44 | 12.51 | 12.50 | 12.50 | 12.51 | 12.51 | 12.51 | 12.51 | 12.54 | 12.52 | 12.45 | 12.38 |

**Table A7.1 (cont.).** *Monthly exchange rates on UK. SEK per GBP 1913–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1972 | 12.41 | 12.49 | 12.52 | 12.51 | 12.44 | 12.00 | 11.53 | 11.60 | 11.55 | 11.31 | 11.19 | 11.16 |
| 1973 | 11.20 | 11.12 | 11.11 | 11.21 | 11.25 | 10.86 | 10.31 | 10.32 | 10.21 | 10.17 | 10.41 | 10.57 |
| 1974 | 10.69 | 10.74 | 10.72 | 10.55 | 10.31 | 10.50 | 10.45 | 10.41 | 10.41 | 10.31 | 10.10 | 9.80 |
| 1975 | 9.57 | 9.55 | 9.51 | 9.44 | 9.15 | 8.97 | 9.02 | 9.14 | 9.28 | 9.06 | 9.02 | 8.93 |
| 1976 | 8.90 | 8.88 | 8.59 | 8.16 | 8.01 | 7.88 | 8.00 | 7.88 | 7.55 | 7.00 | 6.92 | 6.99 |
| 1977 | 7.23 | 7.28 | 7.25 | 7.48 | 7.50 | 7.61 | 7.51 | 7.77 | 8.48 | 8.51 | 8.74 | 8.83 |
| 1978 | 9.05 | 9.03 | 8.82 | 8.53 | 8.48 | 8.48 | 8.62 | 8.64 | 8.67 | 8.63 | 8.59 | 8.72 |
| 1979 | 8.73 | 8.77 | 8.91 | 9.11 | 9.06 | 9.18 | 9.55 | 9.46 | 9.24 | 9.05 | 9.02 | 9.20 |
| 1980 | 9.40 | 9.57 | 9.60 | 9.69 | 9.72 | 9.76 | 9.80 | 9.91 | 10.00 | 10.14 | 10.33 | 10.34 |
| 1981 | 10.70 | 10.59 | 10.30 | 10.24 | 10.24 | 10.01 | 9.74 | 9.67 | 9.86 | 10.23 | 10.44 | 10.59 |
| 1982 | 10.61 | 10.66 | 10.56 | 10.49 | 10.49 | 10.59 | 10.62 | 10.62 | 10.68 | 12.16 | 12.27 | 11.92 |
| 1983 | 11.55 | 11.41 | 11.17 | 11.55 | 11.82 | 11.86 | 11.76 | 11.82 | 11.82 | 11.67 | 11.71 | 11.57 |
| 1984 | 11.54 | 11.53 | 11.29 | 11.16 | 11.24 | 11.17 | 10.98 | 10.99 | 10.82 | 10.61 | 10.67 | 10.55 |
| 1985 | 10.25 | 10.22 | 10.56 | 11.16 | 11.23 | 11.35 | 11.70 | 11.53 | 11.47 | 11.33 | 11.25 | 11.15 |
| 1986 | 10.85 | 10.57 | 10.62 | 10.85 | 10.88 | 10.88 | 10.68 | 10.31 | 10.19 | 9.84 | 9.93 | 9.93 |
| 1987 | 9.97 | 9.94 | 10.22 | 10.30 | 10.45 | 10.35 | 10.38 | 10.37 | 10.50 | 10.56 | 10.79 | 10.88 |
| 1988 | 10.77 | 10.65 | 10.89 | 10.05 | 11.05 | 10.87 | 10.82 | 11.01 | 10.85 | 10.90 | 11.02 | 11.12 |
| 1989 | 11.13 | 11.09 | 10.96 | 10.84 | 10.71 | 10.40 | 10.50 | 10.45 | 10.39 | 10.25 | 10.12 | 10.05 |
| 1990 | 10.18 | 10.41 | 10.03 | 10.02 | 10.17 | 10.42 | 10.76 | 10.99 | 10.86 | 10.99 | 10.94 | 10.85 |
| 1991 | 10.91 | 10.89 | 10.78 | 10.72 | 10.63 | 10.61 | 10.66 | 10.66 | 10.65 | 10.61 | 10.55 | 10.45 |
| 1992 | 10.40 | 10.44 | 10.39 | 10.47 | 10.58 | 10.53 | 10.37 | 10.26 | 9.93 | 9.26 | 9.51 | 10.68 |
| 1993 | 11.12 | 10.84 | 11.29 | 11.36 | 11.50 | 11.22 | 11.90 | 12.01 | 12.22 | 12.05 | 12.24 | 12.46 |
| 1994 | 12.16 | 11.80 | 11.80 | 11.68 | 11.61 | 11.90 | 11.99 | 11.94 | 11.78 | 11.66 | 11.69 | 11.72 |
| 1995 | 11.76 | 11.62 | 11.63 | 11.82 | 11.58 | 11.58 | 11.45 | 11.34 | 11.13 | 10.79 | 10.32 | 10.20 |
| 1996 | 10.28 | 10.57 | 10.28 | 10.19 | 10.30 | 10.31 | 10.32 | 10.26 | 10.35 | 10.45 | 11.01 | 11.33 |
| 1997 | 11.72 | 12.02 | 12.29 | 12.51 | 12.53 | 12.73 | 13.05 | 12.82 | 12.32 | 12.36 | 12.76 | 12.94 |
| 1998 | 13.10 | 13.24 | 13.23 | 13.08 | 12.59 | 13.03 | 13.13 | 13.27 | 13.29 | 13.29 | 13.28 | 13.45 |
| 1999 | 12.92 | 12.94 | 13.31 | 13.41 | 13.63 | 13.59 | 13.31 | 13.26 | 13.34 | 13.50 | 13.54 | 13.69 |
| 2000 | 13.89 | 13.85 | 13.74 | 13.81 | 13.71 | 13.20 | 13.48 | 13.81 | 13.84 | 14.47 | 14.37 | 14.12 |
| 2001 | 14.01 | 14.16 | 14.50 | 14.63 | 14.74 | 15.09 | 15.21 | 14.85 | 15.52 | 15.34 | 15.23 | 15.20 |
| 2002 | 14.96 | 15.02 | 14.71 | 14.87 | 14.68 | 14.16 | 14.52 | 14.55 | 14.54 | 14.45 | 14.25 | 14.18 |
| 2003 | 13.96 | 13.68 | 13.50 | 13.28 | 12.85 | 12.96 | 13.13 | 13.21 | 13.01 | 12.91 | 12.98 | 12.85 |
| 2004 | 13.20 | 13.56 | 13.75 | 13.79 | 13.58 | 13.77 | 13.80 | 13.73 | 13.35 | 13.11 | 12.89 | 12.94 |
| 2005 | 12.96 | 13.17 | 13.12 | 13.42 | 13.44 | 13.85 | 13.71 | 13.63 | 13.78 | 13.83 | 14.08 | 13.90 |
| 2006 | 13.58 | 13.67 | 13.64 | 13.44 | 13.67 | 13.45 | 13.39 | 13.60 | 13.74 | 13.75 | 13.51 | 13.43 |
| 2007 | 13.69 | 13.75 | 13.67 | 13.61 | 13.51 | 13.82 | 13.62 | 13.75 | 13.49 | 13.18 | 13.11 | 13.10 |
| 2008 | 12.63 | 12.48 | 12.14 | 11.77 | 11.76 | 11.84 | 11.93 | 11.85 | 11.97 | 12.51 | 12.20 | 11.96 |

**Table A7.2.** *Monthly exchange rates on USA. SEK per USD 1913–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | 3.75 | 3.75 | 3.75 | 3.75 | 3.76 | 3.75 | 3.75 | 3.75 | 3.75 | 3.75 | 3.76 | 3.76 |
| 1914 | 3.76 | 3.75 | 3.75 | 3.75 | 3.75 | 3.75 | 3.75 | 3.79 | 3.85 | 3.86 | 3.92 | 3.97 |
| 1915 | 3.99 | 4.03 | 4.04 | 3.90 | 3.82 | 3.80 | 3.84 | 3.87 | 3.88 | 3.81 | 3.70 | 3.59 |
| 1916 | 3.63 | 3.57 | 3.52 | 3.40 | 3.34 | 3.41 | 3.53 | 3.53 | 3.56 | 3.55 | 3.56 | 3.48 |
| 1917 | 3.41 | 3.40 | 3.38 | 3.37 | 3.35 | 3.33 | 3.20 | 3.02 | 2.96 | 2.67 | 2.54 | 2.96 |
| 1918 | 3.02 | 3.06 | 3.08 | 2.98 | 2.96 | 2.91 | 2.82 | 2.83 | 3.02 | 3.39 | 3.55 | 3.48 |
| 1919 | 3.50 | 3.57 | 3.64 | 3.75 | 3.88 | 3.88 | 4.01 | 4.06 | 4.10 | 4.13 | 4.36 | 4.68 |
| 1920 | 4.85 | 5.41 | 4.99 | 4.60 | 4.75 | 4.62 | 4.59 | 4.88 | 4.97 | 5.09 | 5.26 | 5.12 |
| 1921 | 4.72 | 4.51 | 4.41 | 4.25 | 4.27 | 4.46 | 4.75 | 4.74 | 4.60 | 4.37 | 4.32 | 4.09 |
| 1922 | 4.01 | 3.83 | 3.80 | 3.85 | 3.89 | 3.88 | 3.86 | 3.80 | 3.79 | 3.76 | 3.73 | 3.72 |
| 1923 | 3.73 | 3.76 | 3.75 | 3.75 | 3.75 | 3.77 | 3.77 | 3.76 | 3.77 | 3.74 | 3.79 | 3.79 |
| 1924 | 3.79 | 3.80 | 3.79 | 3.77 | 3.77 | 3.76 | 3.76 | 3.75 | 3.76 | 3.76 | 3.73 | 3.71 |
| 1925 | 3.71 | 3.71 | 3.71 | 3.71 | 3.74 | 3.74 | 3.73 | 3.72 | 3.73 | 3.74 | 3.74 | 3.73 |
| 1926 | 3.74 | 3.74 | 3.73 | 3.74 | 3.74 | 3.73 | 3.73 | 3.74 | 3.74 | 3.74 | 3.75 | 3.74 |
| 1927 | 3.75 | 3.75 | 3.74 | 3.74 | 3.74 | 3.73 | 3.73 | 3.73 | 3.72 | 3.72 | 3.72 | 3.71 |
| 1928 | 3.72 | 3.73 | 3.73 | 3.73 | 3.73 | 3.73 | 3.73 | 3.74 | 3.74 | 3.74 | 3.74 | 3.74 |
| 1929 | 3.74 | 3.74 | 3.75 | 3.75 | 3.74 | 3.74 | 3.73 | 3.73 | 3.73 | 3.73 | 3.72 | 3.71 |
| 1930 | 3.73 | 3.73 | 3.72 | 3.72 | 3.73 | 3.73 | 3.72 | 3.72 | 3.72 | 3.73 | 3.73 | 3.73 |
| 1931 | 3.74 | 3.74 | 3.74 | 3.74 | 3.73 | 3.73 | 3.74 | 3.73 | 3.85 | 4.35 | 4.83 | 5.37 |
| 1932 | 5.22 | 5.19 | 5.06 | 5.23 | 5.35 | 5.36 | 5.50 | 5.60 | 5.62 | 5.73 | 5.74 | 5.58 |
| 1933 | 5.47 | 5.48 | 5.49 | 5.33 | 4.94 | 4.69 | 4.20 | 4.31 | 4.18 | 4.17 | 3.79 | 3.79 |
| 1934 | 3.76 | 3.87 | 3.82 | 3.77 | 3.81 | 3.85 | 3.86 | 3.84 | 3.89 | 3.94 | 3.90 | 3.93 |
| 1935 | 3.97 | 3.99 | 4.07 | 4.02 | 3.97 | 3.94 | 3.92 | 3.91 | 3.94 | 3.96 | 3.95 | 3.94 |
| 1936 | 3.92 | 3.89 | 3.91 | 3.93 | 3.91 | 3.87 | 3.87 | 3.87 | 3.86 | 3.96 | 3.98 | 3.96 |
| 1937 | 3.96 | 3.97 | 3.98 | 3.95 | 3.94 | 3.94 | 3.91 | 3.90 | 3.92 | 3.92 | 3.89 | 3.89 |
| 1938 | 3.89 | 3.87 | 3.90 | 3.90 | 3.91 | 3.92 | 3.94 | 3.98 | 4.05 | 4.08 | 4.13 | 4.16 |
| 1939 | 4.17 | 4.15 | 4.15 | 4.15 | 4.15 | 4.15 | 4.15 | 4.16 | 4.20 | 4.20 | 4.20 | 4.20 |
| 1940 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 |
| 1941 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 |
| 1942 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 |
| 1943 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 |
| 1944 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 |
| 1945 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 |
| 1946 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 4.20 | 3.84 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 |
| 1947 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 |
| 1948 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 |
| 1949 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 3.60 | 4.18 | 5.18 | 5.18 | 5.18 |
| 1950 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 |
| 1951 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 |
| 1952 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 |
| 1953 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 |
| 1954 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 |
| 1955 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 |
| 1956 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 |
| 1957 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 |
| 1958 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 |

**Table A7.2 (cont.).** *Monthly exchange rates on USA. SEK per USD 1913–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1959 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.18 | 5.19 |
| 1960 | 5.19 | 5.19 | 5.18 | 5.17 | 5.18 | 5.17 | 5.17 | 5.16 | 5.17 | 5.17 | 5.17 | 5.18 |
| 1961 | 5.18 | 5.18 | 5.17 | 5.17 | 5.17 | 5.17 | 5.17 | 5.17 | 5.18 | 5.18 | 5.18 | 5.18 |
| 1962 | 5.18 | 5.16 | 5.16 | 5.15 | 5.15 | 5.15 | 5.15 | 5.15 | 5.16 | 5.16 | 5.18 | 5.20 |
| 1963 | 5.19 | 5.19 | 5.20 | 5.20 | 5.20 | 5.19 | 5.19 | 5.20 | 5.20 | 5.20 | 5.20 | 5.20 |
| 1964 | 5.20 | 5.19 | 5.16 | 5.15 | 5.15 | 5.14 | 5.15 | 5.15 | 5.15 | 5.17 | 5.16 | 5.15 |
| 1965 | 5.15 | 5.14 | 5.14 | 5.15 | 5.16 | 5.17 | 5.17 | 5.18 | 5.17 | 5.15 | 5.18 | 5.18 |
| 1966 | 5.18 | 5.18 | 5.16 | 5.17 | 5.16 | 5.17 | 5.17 | 5.17 | 5.18 | 5.18 | 5.18 | 5.18 |
| 1967 | 5.18 | 5.17 | 5.17 | 5.16 | 5.16 | 5.16 | 5.16 | 5.16 | 5.17 | 5.17 | 5.18 | 5.17 |
| 1968 | 5.17 | 5.17 | 5.18 | 5.18 | 5.17 | 5.17 | 5.17 | 5.17 | 5.17 | 5.18 | 5.18 | 5.18 |
| 1969 | 5.18 | 5.18 | 5.17 | 5.17 | 5.18 | 5.18 | 5.17 | 5.17 | 5.18 | 5.17 | 5.17 | 5.17 |
| 1970 | 5.17 | 5.19 | 5.20 | 5.21 | 5.21 | 5.20 | 5.19 | 5.19 | 5.21 | 5.19 | 5.18 | 5.18 |
| 1971 | 5.17 | 5.18 | 5.17 | 5.17 | 5.17 | 5.17 | 5.17 | 5.12 | 5.07 | 5.03 | 4.99 | 4.91 |
| 1972 | 4.84 | 4.80 | 4.78 | 4.79 | 4.76 | 4.75 | 4.74 | 4.74 | 4.74 | 4.75 | 4.75 | 4.75 |
| 1973 | 4.73 | 4.59 | 4.49 | 4.51 | 4.44 | 4.22 | 4.08 | 4.15 | 4.22 | 4.19 | 4.34 | 4.54 |
| 1974 | 4.76 | 4.71 | 4.55 | 4.39 | 4.29 | 4.40 | 4.38 | 4.44 | 4.49 | 4.41 | 4.34 | 4.20 |
| 1975 | 4.05 | 3.99 | 3.93 | 3.99 | 3.95 | 3.93 | 4.13 | 4.33 | 4.45 | 4.41 | 4.40 | 4.42 |
| 1976 | 4.39 | 4.38 | 4.41 | 4.41 | 4.42 | 4.46 | 4.48 | 4.42 | 4.36 | 4.26 | 4.22 | 4.17 |
| 1977 | 4.22 | 4.26 | 4.22 | 4.35 | 4.36 | 4.42 | 4.36 | 4.46 | 4.86 | 4.80 | 4.80 | 4.76 |
| 1978 | 4.67 | 4.65 | 4.61 | 4.61 | 4.66 | 4.62 | 4.55 | 4.45 | 4.43 | 4.30 | 4.38 | 4.39 |
| 1979 | 4.35 | 4.37 | 4.37 | 4.40 | 4.40 | 4.35 | 4.23 | 4.23 | 4.20 | 4.21 | 4.23 | 4.19 |
| 1980 | 4.15 | 4.18 | 4.35 | 4.37 | 4.22 | 4.18 | 4.13 | 4.18 | 4.16 | 4.20 | 4.31 | 4.42 |
| 1981 | 4.45 | 4.62 | 4.62 | 4.69 | 4.90 | 5.06 | 5.19 | 5.31 | 5.43 | 5.55 | 5.49 | 5.55 |
| 1982 | 5.63 | 5.77 | 5.84 | 5.92 | 5.78 | 6.02 | 6.12 | 6.14 | 6.23 | 7.16 | 7.51 | 7.36 |
| 1983 | 7.33 | 7.44 | 7.48 | 7.49 | 7.50 | 7.64 | 7.69 | 7.87 | 7.88 | 7.79 | 7.92 | 8.06 |
| 1984 | 8.18 | 8.02 | 7.74 | 7.84 | 8.09 | 8.11 | 8.31 | 8.36 | 8.58 | 8.69 | 8.58 | 8.85 |
| 1985 | 9.07 | 9.32 | 9.43 | 8.97 | 9.01 | 8.86 | 8.50 | 8.31 | 8.40 | 7.96 | 7.81 | 7.69 |
| 1986 | 7.60 | 7.41 | 7.24 | 7.25 | 7.16 | 7.22 | 7.07 | 6.94 | 6.92 | 6.89 | 6.97 | 6.92 |
| 1987 | 6.61 | 6.51 | 6.42 | 6.32 | 6.25 | 6.35 | 6.44 | 6.49 | 6.38 | 6.36 | 6.08 | 5.96 |
| 1988 | 5.98 | 6.06 | 5.96 | 5.89 | 5.91 | 6.09 | 6.34 | 6.48 | 6.45 | 6.28 | 6.09 | 6.08 |
| 1989 | 6.26 | 6.32 | 6.38 | 6.37 | 6.60 | 6.69 | 6.48 | 6.55 | 6.61 | 6.46 | 6.43 | 6.23 |
| 1990 | 6.19 | 6.12 | 6.17 | 6.13 | 6.06 | 6.10 | 5.96 | 5.78 | 5.77 | 5.65 | 5.57 | 5.62 |
| 1991 | 5.65 | 5.54 | 5.89 | 6.13 | 6.15 | 6.43 | 6.48 | 6.34 | 6.18 | 6.16 | 5.94 | 5.75 |
| 1992 | 5.74 | 5.87 | 6.03 | 5.96 | 5.84 | 5.69 | 5.40 | 5.29 | 5.37 | 5.58 | 6.22 | 6.88 |
| 1993 | 7.25 | 7.53 | 7.74 | 7.44 | 7.33 | 7.41 | 7.96 | 8.05 | 8.02 | 8.01 | 8.26 | 8.36 |
| 1994 | 8.14 | 7.98 | 7.91 | 7.88 | 7.72 | 7.81 | 7.76 | 7.74 | 7.54 | 7.26 | 7.35 | 7.52 |
| 1995 | 7.47 | 7.39 | 7.27 | 7.34 | 7.29 | 7.26 | 7.18 | 7.23 | 7.14 | 6.84 | 6.60 | 6.63 |
| 1996 | 6.72 | 6.88 | 6.73 | 6.72 | 6.80 | 6.68 | 6.64 | 6.62 | 6.64 | 6.60 | 6.62 | 6.81 |
| 1997 | 7.06 | 7.40 | 7.65 | 7.68 | 7.67 | 7.74 | 7.81 | 8.00 | 7.70 | 7.57 | 7.56 | 7.78 |
| 1998 | 8.00 | 8.08 | 7.97 | 7.82 | 7.69 | 7.91 | 7.99 | 8.13 | 7.91 | 7.85 | 7.99 | 8.05 |
| 1999 | 7.82 | 7.95 | 8.22 | 8.32 | 8.44 | 8.51 | 8.46 | 8.26 | 8.22 | 8.15 | 8.34 | 8.48 |
| 2000 | 8.47 | 8.65 | 8.69 | 8.72 | 9.09 | 8.74 | 8.93 | 9.27 | 9.66 | 9.96 | 10.08 | 9.66 |
| 2001 | 9.47 | 9.74 | 10.03 | 10.20 | 10.33 | 10.78 | 10.77 | 10.33 | 10.61 | 10.56 | 10.60 | 10.56 |
| 2002 | 10.44 | 10.56 | 10.34 | 10.31 | 10.05 | 9.56 | 9.34 | 9.46 | 9.35 | 9.28 | 9.07 | 8.95 |
| 2003 | 8.64 | 8.49 | 8.53 | 8.44 | 7.92 | 7.81 | 8.08 | 8.28 | 8.09 | 7.70 | 7.68 | 7.36 |
| 2004 | 7.25 | 7.26 | 7.52 | 7.65 | 7.61 | 7.53 | 7.49 | 7.54 | 7.45 | 7.26 | 6.94 | 6.70 |

**Table A7.2 (cont.).** *Monthly exchange rates on USA. SEK per USD 1913–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2005 | 6.90 | 6.98 | 6.88 | 7.08 | 7.25 | 7.61 | 7.83 | 7.60 | 7.62 | 7.84 | 8.11 | 7.95 |
| 2006 | 7.70 | 7.82 | 7.82 | 7.61 | 7.31 | 7.29 | 7.26 | 7.19 | 7.28 | 7.34 | 7.07 | 6.84 |
| 2007 | 6.98 | 7.02 | 7.02 | 6.84 | 6.81 | 6.96 | 6.70 | 6.85 | 6.69 | 6.45 | 6.33 | 6.47 |
| 2008 | 6.42 | 6.35 | 6.06 | 5.95 | 5.99 | 6.03 | 6.00 | 6.27 | 6.65 | 7.41 | 7.96 | 8.00 |

**Table A7.3a.** *Monthly exchange rates on Germany. SEK per 100 mark 1913–1921, SEK per 1 million mark January 1922 to September 1923, and SEK per 1 trillion mark October 1923 to December 1924.**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | 89.07 | 89.15 | 89.32 | 89.17 | 89.15 | 89.19 | 89.14 | 89.13 | 89.10 | 89.10 | 89.03 | 88.92 |
| 1914 | 88.90 | 88.90 | 88.97 | 88.95 | 88.99 | 89.03 | 89.01 | 89.20 | 89.24 | 87.72 | 84.93 | 87.21 |
| 1915 | 87.44 | 85.93 | 83.41 | 80.36 | 78.97 | 77.69 | 78.58 | 78.61 | 79.29 | 78.34 | 74.66 | 69.36 |
| 1916 | 67.71 | 65.70 | 62.51 | 61.79 | 61.77 | 62.52 | 63.49 | 62.71 | 62.40 | 61.82 | 60.87 | 56.76 |
| 1917 | 57.00 | 56.86 | 54.16 | 52.08 | 51.41 | 47.32 | 45.39 | 42.58 | 41.17 | 37.06 | 37.72 | 53.56 |
| 1918 | 58.38 | 58.86 | 59.94 | 58.46 | 57.87 | 54.80 | 48.97 | 46.65 | 46.00 | 51.59 | 48.63 | 42.24 |
| 1919 | 42.91 | 39.48 | 35.42 | 30.70 | 30.99 | 27.39 | 26.69 | 21.29 | 17.34 | 15.52 | 11.47 | 9.98 |
| 1920 | 8.40 | 5.67 | 6.23 | 7.92 | 10.49 | 12.09 | 11.71 | 10.34 | 8.75 | 7.61 | 7.00 | 7.13 |
| 1921 | 7.40 | 7.47 | 7.12 | 6.79 | 6.99 | 6.58 | 6.25 | 5.70 | 4.55 | 3.09 | 1.75 | 2.21 |
| 1922 | 21388 | 18654 | 14012 | 13518 | 13643 | 12771 | 8231 | 3963 | 2746 | 1396 | 2368 | 523 |
| 1923 | 294.62 | 154.58 | 185.40 | 165.21 | 91.00 | 40.60 | 15.77 | 2.90 | 0.0500 | 1275 | 1.500 | 0.996 |
| 1924 | 0.943 | 0.888 | 0.873 | 0.898 | 0.898 | 0.905 | 0.900 | 0.896 | 0.898 | 0.898 | 0.889 | 0.884 |

* October 11, 1924: 1 Reichsmark = 1,000,000,000,000 Papiermark.

**Table A7.3b.** *Monthly exchange rates on Germany. SEK per 100 reichsmark 1924–1945.**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1924 | | | | | | | | | | | 88.90 | 88.41 |
| 1925 | 88.40 | 88.39 | 88.40 | 88.16 | 89.03 | 88.98 | 88.75 | 88.71 | 88.94 | 89.04 | 89.12 | 89.01 |
| 1926 | 89.01 | 88.99 | 88.89 | 88.98 | 89.03 | 88.90 | 88.97 | 89.02 | 89.11 | 89.11 | 89.05 | 89.09 |
| 1927 | 88.91 | 88.86 | 88.71 | 88.56 | 88.64 | 88.52 | 88.72 | 88.74 | 88.62 | 88.69 | 88.71 | 88.57 |
| 1928 | 88.71 | 88.96 | 89.11 | 89.14 | 89.21 | 89.13 | 89.16 | 89.11 | 89.12 | 89.13 | 89.18 | 89.09 |
| 1929 | 88.95 | 88.84 | 88.86 | 88.81 | 93.35 | 89.13 | 88.96 | 88.94 | 88.95 | 89.03 | 89.07 | 88.85 |
| 1930 | 89.01 | 89.04 | 88.89 | 88.85 | 88.98 | 88.88 | 88.83 | 88.88 | 88.69 | 88.71 | 88.86 | 88.92 |
| 1931 | 88.87 | 88.83 | 88.92 | 88.97 | 88.82 | 88.61 | 88.52 | 88.87 | 91.09 | 102.22 | 115.17 | 127.79 |
| 1932 | 124.21 | 124.11 | 121.41 | 125.65 | 128.42 | 127.97 | 131.24 | 134.20 | 134.44 | 137.09 | 137.30 | 134.07 |
| 1933 | 130.75 | 133.70 | 131.90 | 130.77 | 136.04 | 135.89 | 139.39 | 141.56 | 148.04 | 148.41 | 145.19 | 142.30 |
| 1934 | 145.54 | 150.93 | 151.92 | 149.60 | 150.68 | 148.53 | 148.22 | 151.61 | 156.79 | 159.48 | 156.84 | 158.18 |
| 1935 | 159.53 | 160.10 | 162.35 | 162.34 | 160.48 | 159.61 | 158.41 | 158.23 | 158.81 | 159.59 | 159.09 | 158.79 |
| 1936 | 158.65 | 158.54 | 158.32 | 158.32 | 157.81 | 156.23 | 156.29 | 155.72 | 155.08 | 159.71 | 160.36 | 159.80 |
| 1937 | 159.53 | 160.00 | 160.33 | 159.39 | 158.35 | 158.10 | 157.60 | 157.31 | 157.65 | 157.79 | 157.35 | 157.11 |
| 1938 | 156.94 | 157.01 | 157.30 | 157.25 | 157.46 | 158.10 | 158.71 | 159.89 | 161.99 | 163.74 | 165.83 | 167.42 |

**Table A7.3b (cont.).** *Monthly exchange rates on Germany. SEK per 100 reichsmark 1924–1945.**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1939 | 167.59 | 166.99 | 166.82 | 166.89 | 167.16 | 167.00 | 167.00 | 167.03 | 168.50 | 168.68 | 169.00 | 169.00 |
| 1940 | 169.00 | 169.00 | 169.00 | 169.00 | 168.65 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 |
| 1941 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 |
| 1942 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.60 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 |
| 1943 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 |
| 1944 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 |
| 1945 | 168.50 | 168.50 | 168.50 | 168.50 | 168.50 | | | | | | | |

* 21 June 1948: 1 DEM = 1 reichsmark for essential currency such as wages, payment of rents, etc, and 1 DEM = 10 reichsmark for the remainder in private non-bank credit balance.

**Table A7.3c.** *Monthly exchange rates on Germany. SEK per 100 DEM 1950–2002.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1950 | | | | | | | | | 123.30 | 123.30 | 123.30 | 123.30 |
| 1951 | 123.30 | 123.30 | 123.30 | 123.30 | 123.30 | 123.30 | 123.30 | 123.30 | 123.30 | 123.30 | 123.30 | 123.30 |
| 1952 | 123.30 | 123.30 | 123.30 | 123.30 | 123.30 | 123.30 | 123.30 | 123.30 | 123.30 | 123.30 | 123.30 | 123.30 |
| 1953 | 123.30 | 123.30 | 123.30 | 123.30 | 123.68 | 124.08 | 124.10 | 123.83 | 123.78 | 123.63 | 123.73 | 124.03 |
| 1954 | 124.18 | 124.20 | 124.20 | 124.15 | 123.85 | 123.53 | 123.93 | 124.03 | 123.75 | 123.88 | 123.83 | 123.75 |
| 1955 | 123.70 | 123.53 | 123.48 | 123.65 | 123.75 | 123.63 | 123.48 | 123.25 | 123.33 | 123.35 | 123.68 | 123.95 |
| 1956 | 124.05 | 124.10 | 124.15 | 124.13 | 124.10 | 124.10 | 123.75 | 123.48 | 123.48 | 123.75 | 123.50 | 123.53 |
| 1957 | 123.65 | 123.60 | 123.48 | 123.53 | 123.43 | 123.55 | 123.95 | 123.80 | 123.78 | 123.40 | 123.33 | 123.35 |
| 1958 | 123.43 | 123.70 | 123.73 | 123.88 | 123.93 | 123.90 | 123.80 | 123.63 | 123.83 | 124.10 | 123.98 | 124.00 |
| 1959 | 124.03 | 123.98 | 123.90 | 123.88 | 123.93 | 124.03 | 123.90 | 123.83 | 123.85 | 124.03 | 124.30 | 124.40 |
| 1960 | 124.43 | 124.35 | 124.35 | 124.05 | 124.13 | 124.03 | 123.98 | 123.83 | 123.95 | 123.95 | 124.00 | 124.15 |
| 1961 | 124.10 | 124.05 | 127.33 | 130.35 | 130.18 | 130.18 | 130.00 | 129.55 | 129.68 | 129.50 | 129.33 | 129.58 |
| 1962 | 129.55 | 129.20 | 129.10 | 128.98 | 128.98 | 129.05 | 129.28 | 129.00 | 129.00 | 128.85 | 129.13 | 130.00 |
| 1963 | 129.48 | 129.70 | 130.08 | 130.28 | 130.43 | 130.53 | 130.30 | 130.48 | 130.58 | 130.73 | 130.80 | 130.88 |
| 1964 | 130.68 | 130.63 | 129.85 | 129.53 | 129.45 | 129.48 | 129.63 | 129.48 | 129.58 | 130.05 | 129.88 | 129.71 |
| 1965 | 129.40 | 129.35 | 129.38 | 129.60 | 129.48 | 129.40 | 129.28 | 129.08 | 129.00 | 129.35 | 129.55 | 129.50 |
| 1966 | 129.15 | 128.98 | 128.78 | 128.70 | 128.50 | 129.03 | 129.60 | 129.70 | 129.83 | 130.10 | 130.30 | 130.43 |
| 1967 | 130.25 | 130.28 | 130.18 | 129.95 | 129.88 | 129.60 | 129.08 | 129.05 | 129.15 | 129.33 | 129.85 | 129.78 |
| 1968 | 129.20 | 129.23 | 129.75 | 129.90 | 130.03 | 129.50 | 129.23 | 129.35 | 130.13 | 130.15 | 130.25 | 129.88 |
| 1969 | 129.45 | 129.00 | 129.03 | 129.38 | 130.33 | 129.50 | 129.55 | 129.63 | 132.38 | 138.45 | 140.20 | 140.60 |
| 1970 | 140.40 | 140.75 | 141.58 | 142.78 | 143.63 | 143.08 | 143.08 | 142.80 | 143.38 | 143.08 | 142.78 | 142.23 |
| 1971 | 142.18 | 142.63 | 142.35 | 142.18 | 145.15 | 146.43 | 148.53 | 151.25 | 151.35 | 151.38 | 150.30 | 150.03 |
| 1972 | 149.63 | 150.98 | 150.68 | 150.65 | 149.83 | 150.78 | 150.03 | 148.68 | 148.33 | 148.00 | 148.33 | 148.63 |
| 1973 | 148.83 | 153.38 | 158.88 | 159.58 | 158.90 | 164.90 | 171.75 | 172.50 | 173.63 | 173.38 | 169.50 | 171.38 |
| 1974 | 170.93 | 173.20 | 174.50 | 174.45 | 173.70 | 173.75 | 171.43 | 169.80 | 168.85 | 169.60 | 172.38 | 171.33 |
| 1975 | 171.24 | 171.29 | 169.77 | 167.69 | 167.79 | 167.72 | 167.53 | 167.97 | 170.11 | 170.49 | 169.92 | 168.40 |
| 1976 | 168.48 | 171.11 | 172.33 | 173.86 | 172.59 | 172.92 | 173.76 | 174.71 | 174.77 | 175.35 | 175.08 | 174.67 |
| 1977 | 176.40 | 176.85 | 176.48 | 183.26 | 184.83 | 187.78 | 190.67 | 192.20 | 209.17 | 210.93 | 214.13 | 221.06 |
| 1978 | 220.77 | 223.96 | 226.81 | 225.75 | 221.27 | 221.55 | 221.37 | 222.60 | 224.73 | 233.14 | 230.20 | 233.33 |
| 1979 | 235.43 | 235.54 | 235.05 | 232.14 | 230.63 | 230.62 | 231.79 | 230.98 | 233.83 | 235.68 | 238.46 | 241.38 |

**Table A7.3c (cont.).** *Monthly exchange rates on Germany. SEK per 100 DEM 1950–2002.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1980 | 240.82 | 239.03 | 235.34 | 233.52 | 235.51 | 236.07 | 236.44 | 233.48 | 232.51 | 228.10 | 224.47 | 223.70 |
| 1981 | 221.60 | 214.95 | 218.81 | 217.65 | 213.79 | 212.87 | 212.71 | 212.31 | 230.53 | 246.44 | 246.75 | 245.71 |
| 1982 | 245.29 | 243.80 | 245.39 | 246.99 | 250.61 | 248.32 | 248.32 | 248.07 | 248.98 | 283.30 | 294.10 | 303.97 |
| 1983 | 306.72 | 306.50 | 310.68 | 307.45 | 304.11 | 299.81 | 297.47 | 294.19 | 295.50 | 299.44 | 295.27 | 293.57 |
| 1984 | 291.37 | 296.37 | 298.17 | 296.93 | 294.16 | 296.25 | 291.97 | 289.77 | 283.96 | 283.39 | 287.27 | 285.72 |
| 1985 | 286.41 | 283.25 | 285.32 | 291.30 | 289.37 | 289.43 | 291.32 | 297.98 | 296.11 | 301.29 | 301.28 | 305.54 |
| 1986 | 311.46 | 317.28 | 320.06 | 318.81 | 321.03 | 322.80 | 328.37 | 336.18 | 338.91 | 343.58 | 344.04 | 347.03 |
| 1987 | 356.29 | 356.51 | 350.12 | 348.90 | 350.30 | 348.96 | 348.76 | 349.59 | 352.14 | 352.71 | 361.32 | 363.85 |
| 1988 | 361.57 | 356.93 | 354.85 | 352.28 | 348.92 | 347.58 | 344.37 | 343.44 | 345.29 | 344.88 | 348.34 | 346.74 |
| 1989 | 341.95 | 341.41 | 342.26 | 340.75 | 337.84 | 337.73 | 341.90 | 339.80 | 338.73 | 345.82 | 351.32 | 361.60 |
| 1990 | 364.93 | 364.40 | 361.83 | 362.86 | 364.64 | 361.97 | 363.25 | 368.12 | 367.65 | 370.45 | 374.73 | 376.67 |
| 1991 | 373.70 | 374.54 | 367.79 | 359.63 | 358.69 | 360.63 | 361.84 | 363.08 | 363.96 | 364.57 | 365.03 | 365.82 |
| 1992 | 364.09 | 362.98 | 362.72 | 361.65 | 360.25 | 361.02 | 362.62 | 364.22 | 369.79 | 377.12 | 392.11 | 435.16 |
| 1993 | 449.02 | 459.16 | 469.52 | 466.43 | 456.64 | 449.73 | 463.99 | 474.65 | 494.22 | 489.48 | 483.78 | 488.99 |
| 1994 | 467.05 | 459.40 | 467.45 | 464.14 | 465.49 | 478.68 | 494.29 | 494.90 | 485.97 | 477.63 | 477.56 | 478.91 |
| 1995 | 487.57 | 491.81 | 516.48 | 533.36 | 518.36 | 518.12 | 516.93 | 500.65 | 488.75 | 483.53 | 465.98 | 460.07 |
| 1996 | 460.08 | 469.43 | 455.69 | 446.70 | 443.63 | 437.48 | 441.35 | 446.63 | 441.33 | 432.00 | 438.29 | 439.34 |
| 1997 | 440.02 | 442.22 | 450.95 | 449.31 | 450.73 | 448.77 | 436.41 | 433.89 | 430.56 | 430.99 | 436.58 | 438.03 |
| 1998 | 441.19 | 445.30 | 436.38 | 431.28 | 433.46 | 441.36 | 444.30 | 454.56 | 464.26 | 479.02 | 475.49 | 482.79 |
| 1999 | 464.45 | 455.54 | 457.34 | 455.88 | 458.97 | 451.67 | 447.31 | 447.81 | 441.40 | 446.30 | 441.27 | 439.16 |
| 2000 | 439.49 | 435.17 | 429.23 | 422.84 | 421.24 | 424.98 | 429.89 | 429.29 | 430.10 | 435.96 | 441.10 | 442.93 |
| 2001 | 454.86 | 458.81 | 466.57 | 465.80 | 462.91 | 470.44 | 473.24 | 475.69 | 494.26 | 489.81 | 481.29 | 482.85 |
| 2002 | 471.88 | 469.72 | | | | | | | | | | |

**Table A7.4a.** *Monthly exchange rates on France. SEK per 100 (old) franc 1913–1959.**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | 72.39 | 72.38 | 72.45 | 72.51 | 72.48 | 72.27 | 72.29 | 72.24 | 72.11 | 72.18 | 72.17 | 72.07 |
| 1914 | 72.20 | 72.18 | 72.17 | 72.36 | 72.49 | 72.50 | 72.48 | 73.30 | 74.00 | 74.68 | 76.08 | 77.46 |
| 1915 | 77.48 | 77.60 | 77.01 | 73.64 | 72.01 | 69.93 | 68.91 | 66.81 | 65.85 | 65.30 | 62.22 | 61.54 |
| 1916 | 62.08 | 60.77 | 59.20 | 56.49 | 55.63 | 57.42 | 59.54 | 59.46 | 60.59 | 60.63 | 60.70 | 59.20 |
| 1917 | 58.29 | 58.16 | 57.87 | 58.29 | 58.43 | 57.89 | 55.46 | 52.14 | 51.05 | 46.20 | 43.96 | 51.54 |
| 1918 | 52.59 | 53.58 | 53.76 | 51.94 | 51.79 | 50.83 | 49.47 | 50.12 | 54.98 | 61.89 | 65.52 | 63.76 |
| 1919 | 63.95 | 65.34 | 64.18 | 63.86 | 61.65 | 60.72 | 58.05 | 52.13 | 48.47 | 48.39 | 46.69 | 44.03 |
| 1920 | 41.80 | 38.21 | 35.89 | 28.62 | 32.63 | 36.45 | 37.59 | 35.12 | 33.67 | 35.36 | 31.72 | 30.49 |
| 1921 | 30.44 | 32.52 | 31.35 | 30.88 | 36.01 | 36.23 | 37.28 | 36.89 | 33.83 | 31.69 | 31.10 | 31.89 |
| 1922 | 32.74 | 33.44 | 34.55 | 35.55 | 35.56 | 34.09 | 31.83 | 30.27 | 29.07 | 27.82 | 25.66 | 26.93 |
| 1923 | 25.11 | 23.17 | 23.74 | 25.17 | 25.03 | 23.89 | 22.27 | 21.55 | 22.12 | 22.70 | 21.13 | 20.11 |
| 1924 | 18.03 | 17.01 | 17.87 | 22.05 | 22.05 | 19.92 | 19.41 | 19.97 | 20.08 | 19.77 | 19.78 | 20.13 |
| 1925 | 20.13 | 19.67 | 19.29 | 19.35 | 19.37 | 17.95 | 17.64 | 17.60 | 17.17 | 16.66 | 14.93 | 14.12 |
| 1926 | 14.18 | 13.82 | 13.48 | 12.77 | 11.94 | 11.15 | 9.47 | 10.69 | 10.85 | 11.12 | 12.92 | 14.89 |
| 1927 | 14.91 | 14.78 | 14.68 | 14.67 | 14.70 | 14.66 | 14.67 | 14.65 | 14.65 | 14.64 | 14.65 | 14.65 |
| 1928 | 14.67 | 14.70 | 14.70 | 14.70 | 14.70 | 14.69 | 14.67 | 14.65 | 14.64 | 14.65 | 14.65 | 14.64 |
| 1929 | 14.64 | 14.64 | 14.65 | 14.66 | 14.65 | 14.64 | 14.66 | 14.65 | 14.64 | 14.68 | 14.69 | 14.64 |

**Table A7.4a (cont.).** *Monthly exchange rates on France. SEK per 100 (old) franc 1913–1959.**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1930 | 14.67 | 14.63 | 14.61 | 14.61 | 14.64 | 14.64 | 14.66 | 14.66 | 14.64 | 14.64 | 14.66 | 14.65 |
| 1931 | 14.68 | 14.67 | 14.64 | 14.63 | 14.62 | 14.63 | 14.68 | 14.68 | 15.17 | 17.45 | 19.09 | 21.23 |
| 1932 | 20.66 | 20.62 | 20.11 | 20.89 | 21.35 | 21.43 | 21.86 | 22.22 | 22.23 | 22.76 | 22.72 | 22.02 |
| 1933 | 21.50 | 21.66 | 21.82 | 21.97 | 22.77 | 22.65 | 22.84 | 23.20 | 24.20 | 24.30 | 23.76 | 23.32 |
| 1934 | 24.01 | 25.03 | 25.17 | 24.97 | 25.20 | 25.43 | 25.43 | 25.58 | 26.01 | 26.13 | 25.69 | 25.95 |
| 1935 | 25.96 | 26.31 | 27.00 | 26.55 | 26.22 | 26.06 | 26.02 | 25.93 | 25.98 | 26.11 | 26.02 | 26.04 |
| 1936 | 25.98 | 25.99 | 25.96 | 25.92 | 25.75 | 25.53 | 25.64 | 25.49 | 25.33 | 18.81 | 18.51 | 18.50 |
| 1937 | 18.50 | 18.51 | 18.34 | 17.82 | 17.66 | 17.57 | 15.01 | 14.70 | 14.00 | 13.25 | 13.25 | 13.25 |
| 1938 | 13.07 | 12.81 | 12.30 | 12.20 | 11.11 | 11.00 | 10.99 | 10.98 | 11.00 | 10.96 | 10.95 | 11.03 |
| 1939 | 11.05 | 11.05 | 11.05 | 11.05 | 11.05 | 11.05 | 11.05 | 10.99 | 9.75 | 9.74 | 9.52 | 9.52 |
| 1940 | 9.60 | 9.61 | 9.12 | 8.55 | 7.94 | 8.94 | 9.59 | 9.75 | 9.80 | 9.88 | 9.51 | 9.00 |
| 1941 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 |
| 1942 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 |
| 1943 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 |
| 1944 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | 9.00 | | | |
| 1945 | | | | | | 8.48 | 8.48 | 8.48 | 8.48 | 8.48 | 8.48 | 7.82 |
| 1946 | 3.53 | 3.53 | 3.53 | 3.53 | 3.53 | 8.58 | 3.23 | 3.08 | 3.03 | 3.03 | 3.03 | 3.03 |
| 1947 | 3.03 | 3.03 | 3.03 | 3.03 | 3.03 | 3.03 | 3.03 | 3.03 | 3.03 | 3.03 | 3.03 | 3.03 |
| 1948 | 3.03 | 3.03 | 3.03 | 3.03 | 3.03 | 3.03 | 3.03 | 3.03 | 3.03 | 3.03 | 3.03 | 3.03 |
| 1949 | 1.38 | 1.38 | 1.38 | 1.37 | 1.33 | 1.33 | 1.33 | 1.33 | 1.38 | 1.49 | 1.49 | 1.49 |
| 1950 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 |
| 1951 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 |
| 1952 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 |
| 1953 | 1.49 | 1.49 | 1.49 | 1.49 | 1.48 | 1.48 | 1.49 | 1.49 | 1.49 | 1.48 | 1.48 | 1.49 |
| 1954 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.48 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 |
| 1955 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.49 | 1.48 | 1.48 | 1.49 |
| 1956 | 1.49 | 1.49 | 1.49 | 1.48 | 1.48 | 1.48 | 1.48 | 1.48 | 1.48 | 1.48 | 1.48 | 1.48 |
| 1957 | 1.48 | 1.48 | 1.48 | 1.48 | 1.48 | 1.47 | 1.48 | 1.35 | 1.24 | 1.23 | 1.23 | 1.24 |
| 1958 | 1.24 | 1.24 | 1.24 | 1.24 | 1.24 | 1.24 | 1.24 | 1.24 | 1.24 | 1.24 | 1.23 | 1.15 |
| 1959 | 1.06 | 1.06 | 1.06 | 1.06 | 1.06 | 1.06 | 1.06 | 1.06 | 1.06 | 1.06 | 1.06 | 1.06 |

*January 1, 1960: 1 new franc = 100 old francs.

**Table A7.4b.** *Monthly exchange rates on France. SEK per 100 franc 1960–2002.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1960 | 105.80 | 105.75 | 105.80 | 105.58 | 105.65 | 105.58 | 105.60 | 105.53 | 105.58 | 105.38 | 105.63 | 105.70 |
| 1961 | 105.70 | 105.70 | 105.68 | 105.65 | 105.53 | 105.63 | 105.65 | 105.33 | 105.43 | 105.38 | 105.45 | 105.75 |
| 1962 | 105.68 | 105.50 | 105.40 | 105.30 | 105.28 | 105.25 | 105.25 | 105.23 | 105.35 | 105.35 | 105.70 | 106.10 |
| 1963 | 105.93 | 106.00 | 106.15 | 106.23 | 106.18 | 106.03 | 105.98 | 106.15 | 106.10 | 106.18 | 106.18 | 106.20 |
| 1964 | 106.10 | 105.95 | 105.35 | 105.13 | 105.08 | 105.05 | 105.25 | 105.13 | 105.18 | 105.55 | 105.45 | 105.28 |
| 1965 | 105.13 | 105.08 | 105.05 | 105.25 | 105.35 | 105.58 | 105.65 | 105.75 | 105.65 | 105.70 | 105.80 | 105.80 |
| 1966 | 105.70 | 105.70 | 105.50 | 105.53 | 105.43 | 105.53 | 105.70 | 105.58 | 105.28 | 105.00 | 104.90 | 104.73 |

**Table A7.4b (cont.).** *Monthly exchange rates on France. SEK per 100 franc 1960–2002.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1967 | 104.70 | 104.70 | 104.60 | 104.60 | 105.00 | 105.23 | 105.33 | 105.40 | 105.43 | 105.68 | 105.80 | 105.53 |
| 1968 | 105.15 | 105.15 | 105.43 | 105.20 | 104.53 | 104.18 | 104.15 | 104.05 | 104.03 | 104.18 | 104.48 | 104.75 |
| 1969 | 104.73 | 104.75 | 104.53 | 102.85 | 104.28 | 104.30 | 104.28 | 98.75 | 93.38 | 92.78 | 92.88 | 93.05 |
| 1970 | 93.30 | 93.75 | 94.05 | 94.20 | 94.43 | 94.25 | 94.20 | 94.08 | 94.45 | 94.20 | 94.03 | 93.88 |
| 1971 | 93.80 | 94.00 | 93.85 | 93.88 | 94.13 | 93.63 | 93.88 | 93.03 | 92.05 | 91.15 | 90.58 | 91.43 |
| 1972 | 93.48 | 94.38 | 94.93 | 95.25 | 95.10 | 95.13 | 94.85 | 94.73 | 94.78 | 94.70 | 94.40 | 93.63 |
| 1973 | 93.63 | 96.75 | 99.75 | 99.75 | 99.48 | 100.15 | 100.75 | 98.58 | 99.45 | 99.65 | 99.33 | 98.78 |
| 1974 | 95.45 | 95.35 | 94.88 | 90.75 | 88.55 | 90.15 | 92.60 | 93.25 | 93.95 | 93.45 | 92.50 | 93.28 |
| 1975 | 92.90 | 93.29 | 93.75 | 94.98 | 97.48 | 98.11 | 97.95 | 98.99 | 99.69 | 99.98 | 99.90 | 99.24 |
| 1976 | 98.11 | 98.13 | 95.60 | 94.53 | 94.10 | 94.16 | 92.64 | 89.03 | 88.83 | 85.69 | 84.73 | 83.69 |
| 1977 | 85.01 | 85.59 | 84.84 | 87.76 | 88.11 | 89.61 | 89.91 | 91.21 | 98.91 | 99.03 | 99.07 | 99.35 |
| 1978 | 99.22 | 96.24 | 98.05 | 100.58 | 100.38 | 100.91 | 102.49 | 102.37 | 101.75 | 102.10 | 100.84 | 101.71 |
| 1979 | 102.76 | 102.45 | 102.14 | 101.16 | 99.90 | 99.70 | 99.68 | 99.33 | 100.07 | 100.53 | 101.73 | 103.01 |
| 1980 | 102.91 | 102.06 | 101.00 | 100.83 | 100.99 | 101.55 | 101.98 | 100.87 | 100.15 | 98.77 | 97.11 | 96.74 |
| 1981 | 95.98 | 92.85 | 92.91 | 92.24 | 89.39 | 89.49 | 89.63 | 88.91 | 96.44 | 98.74 | 97.96 | 97.23 |
| 1982 | 96.64 | 95.99 | 95.22 | 94.92 | 96.32 | 92.08 | 89.43 | 88.97 | 88.30 | 100.34 | 104.22 | 107.42 |
| 1983 | 108.33 | 108.22 | 106.91 | 102.62 | 101.20 | 99.77 | 99.04 | 97.88 | 97.93 | 98.08 | 97.14 | 96.36 |
| 1984 | 95.37 | 96.40 | 96.84 | 96.61 | 95.83 | 96.47 | 95.23 | 94.49 | 92.63 | 92.47 | 93.70 | 93.33 |
| 1985 | 93.65 | 92.76 | 93.46 | 95.52 | 95.00 | 95.01 | 95.86 | 97.61 | 97.14 | 98.87 | 98.93 | 100.01 |
| 1986 | 101.57 | 103.48 | 104.16 | 100.69 | 100.86 | 101.36 | 102.12 | 103.25 | 103.61 | 105.05 | 105.30 | 105.88 |
| 1987 | 106.97 | 107.14 | 105.28 | 104.88 | 104.88 | 104.58 | 104.87 | 104.83 | 105.56 | 105.73 | 106.55 | 107.44 |
| 1988 | 107.21 | 105.74 | 104.68 | 103.88 | 103.11 | 103.11 | 102.27 | 101.56 | 101.63 | 101.22 | 102.09 | 101.62 |
| 1989 | 100.44 | 100.38 | 101.07 | 100.89 | 99.98 | 99.65 | 100.94 | 100.71 | 100.43 | 102.00 | 103.44 | 105.96 |
| 1990 | 107.31 | 107.62 | 107.33 | 108.15 | 108.43 | 107.74 | 108.40 | 109.84 | 109.83 | 110.74 | 111.43 | 111.09 |
| 1991 | 110.21 | 110.20 | 108.20 | 106.55 | 105.93 | 106.45 | 106.60 | 106.84 | 106.93 | 106.90 | 106.94 | 107.05 |
| 1992 | 106.76 | 106.62 | 106.84 | 107.00 | 107.15 | 107.26 | 107.48 | 107.40 | 108.75 | 111.17 | 115.90 | 127.63 |
| 1993 | 132.46 | 135.59 | 138.19 | 137.89 | 135.47 | 133.64 | 136.33 | 135.58 | 141.20 | 139.51 | 139.89 | 142.90 |
| 1994 | 137.62 | 135.22 | 137.16 | 135.48 | 135.95 | 140.14 | 144.25 | 144.44 | 142.08 | 139.55 | 139.10 | 138.89 |
| 1995 | 141.09 | 141.43 | 145.75 | 151.81 | 146.52 | 147.58 | 148.51 | 145.53 | 141.75 | 138.50 | 135.08 | 133.54 |
| 1996 | 134.36 | 136.53 | 133.07 | 131.62 | 131.11 | 129.09 | 130.34 | 130.80 | 129.58 | 127.73 | 129.52 | 130.03 |
| 1997 | 130.39 | 130.98 | 133.67 | 133.39 | 133.65 | 132.96 | 129.33 | 128.74 | 128.08 | 128.46 | 130.38 | 130.84 |
| 1998 | 131.75 | 132.84 | 130.17 | 128.69 | 129.24 | 131.64 | 132.52 | 135.59 | 138.45 | 142.87 | 141.81 | 143.96 |
| 1999 | 138.48 | 135.83 | 136.36 | 135.93 | 136.85 | 134.67 | 133.37 | 133.52 | 131.61 | 133.07 | 131.57 | 130.94 |
| 2000 | 131.04 | 129.75 | 127.98 | 126.08 | 125.60 | 126.71 | 128.18 | 128.00 | 128.24 | 129.99 | 131.52 | 132.07 |
| 2001 | 135.62 | 136.80 | 139.12 | 138.89 | 138.02 | 140.27 | 141.10 | 141.83 | 147.37 | 146.04 | 143.50 | 143.97 |
| 2002 | 140.70 | 140.05 | | | | | | | | | | |

**Table A7.5a.** *Monthly exchange rates on Belgium. SEK per 100 (old) franc 1913–1926.**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | 71.95 | 71.96 | 71.87 | 71.96 | 71.91 | 71.79 | 71.83 | 71.84 | 71.69 | 71.75 | 71.75 | 71.58 |
| 1914 | 71.74 | 71.83 | 71.82 | 71.97 | 72.03 | 71.99 | 72.13 | 72.65 | 72.78 | 73.00 | 73.73 | |
| 1915 | | | | | | | | | | | | |
| 1916 | | | | | | | | | | | | |

**Table A7.5a (cont.).** *Monthly exchange rates on Belgium. SEK per 100 (old) franc 1913–1926.**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1917 | | | | | | | | | | | | |
| 1918 | | | | | | | | | | | | |
| 1919 | | | | | | | | | | | | |
| 1920 | 41.82 | 39.32 | 37.55 | 30.62 | 34.26 | 38.40 | 40.11 | 37.63 | 35.89 | 35.40 | 33.78 | 32.30 |
| 1921 | 32.01 | 34.30 | 32.90 | 31.93 | 44.34 | 36.07 | 36.62 | 35.92 | 33.32 | 31.28 | 30.18 | 30.87 |
| 1922 | 31.52 | 31.92 | 32.50 | 32.89 | 32.59 | 32.00 | 30.27 | 28.83 | 27.51 | 26.01 | 23.80 | 24.88 |
| 1923 | 23.03 | 20.50 | 20.74 | 21.88 | 21.68 | 20.55 | 18.55 | 17.70 | 18.58 | 19.55 | 18.24 | 17.59 |
| 1924 | 16.23 | 14.90 | 14.96 | 18.54 | 18.54 | 17.34 | 17.25 | 18.99 | 18.80 | 18.21 | 18.17 | 18.55 |
| 1925 | 18.90 | 18.96 | 18.90 | 18.89 | 18.89 | 17.73 | 17.36 | 17.02 | 16.80 | 17.02 | 17.06 | 17.03 |
| 1926 | 17.02 | 17.05 | 16.06 | 13.88 | 11.85 | 11.21 | 9.31 | 10.45 | 10.32 | 10.53 | | |

* October 25, 1926: 1 Belga = 5 Old Francs.

**Table A7.5b.** *Monthly exchange rates on Belgium. SEK per 100 belgas 1926–1944.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1926 | | | | | | | | | | 52.25 | 52.26 | 52.20 |
| 1927 | 52.15 | 52.20 | 52.05 | 51.98 | 52.03 | 51.97 | 52.02 | 51.94 | 51.88 | 51.80 | 51.89 | 51.93 |
| 1928 | 51.72 | 51.96 | 52.03 | 52.09 | 52.13 | 52.11 | 52.10 | 52.06 | 52.05 | 52.05 | 52.05 | 52.03 |
| 1929 | 52.05 | 52.06 | 52.05 | 52.04 | 52.01 | 51.94 | 51.95 | 51.96 | 51.72 | 52.10 | 52.10 | 51.98 |
| 1930 | 51.98 | 51.98 | 51.96 | 51.98 | 52.09 | 52.03 | 52.06 | 52.06 | 51.97 | 51.99 | 52.03 | 52.11 |
| 1931 | 52.15 | 52.13 | 52.08 | 51.99 | 51.96 | 52.00 | 52.18 | 52.16 | 53.83 | 61.57 | 67.59 | 74.90 |
| 1932 | 73.17 | 72.96 | 71.29 | 74.03 | 75.49 | 75.29 | 76.83 | 78.34 | 78.46 | 80.19 | 80.39 | 78.13 |
| 1933 | 76.26 | 77.24 | 77.81 | 78.21 | 81.07 | 80.80 | 81.60 | 83.03 | 86.60 | 86.97 | 84.73 | 83.02 |
| 1934 | 85.33 | 88.82 | 89.37 | 88.65 | 89.55 | 90.32 | 90.24 | 91.28 | 92.71 | 92.81 | 91.18 | 92.25 |
| 1935 | 93.01 | 93.46 | 93.66 | 68.70 | 67.67 | 67.20 | 66.78 | 66.41 | 66.73 | 66.96 | 66.88 | 66.75 |
| 1936 | 66.70 | 66.65 | 66.77 | 66.75 | 66.58 | 65.74 | 65.89 | 65.43 | 65.45 | 67.18 | 67.71 | 67.42 |
| 1937 | 67.11 | 67.25 | 67.41 | 67.02 | 66.75 | 66.75 | 66.25 | 66.03 | 66.37 | 66.27 | 66.35 | 66.36 |
| 1938 | 66.04 | 65.99 | 66.04 | 66.10 | 66.19 | 66.67 | 66.92 | 67.54 | 68.65 | 69.41 | 70.16 | 70.55 |
| 1939 | 70.73 | 70.25 | 70.13 | 70.28 | 71.00 | 71.00 | 70.86 | 70.79 | 72.80 | 71.79 | 70.33 | 70.75 |
| 1940 | 71.58 | 71.88 | 71.65 | 71.43 | 70.72 | 70.60 | 70.60 | 69.52 | 68.01 | 67.85 | 67.21 | 67.21 |
| 1941 | 67.21 | 67.40 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 |
| 1942 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 |
| 1943 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 |
| 1944 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | 67.50 | | | |

**Table A7.5c.** *Monthly exchange rates on Belgium. SEK per 100 BEF 1945–2002.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1945 | | | | | | 9.60 | 9.60 | 9.60 | 9.60 | 9.60 | 9.60 | 9.60 |
| 1946 | 9.60 | 9.60 | 9.60 | 9.60 | 9.60 | 9.60 | 8.77 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 |
| 1947 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 |
| 1948 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 |
| 1949 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.23 | 8.87 | 10.37 | 10.37 | 10.37 |
| 1950 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 |
| 1951 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 |
| 1952 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 | 10.37 |
| 1953 | 10.37 | 10.38 | 10.39 | 10.38 | 10.37 | 10.39 | 10.39 | 10.36 | 10.34 | 10.34 | 10.35 | 10.38 |
| 1954 | 10.41 | 10.42 | 10.42 | 10.39 | 10.36 | 10.35 | 10.38 | 10.41 | 10.40 | 10.42 | 10.44 | 10.43 |
| 1955 | 10.43 | 10.43 | 10.43 | 10.42 | 10.41 | 10.38 | 10.37 | 10.38 | 10.39 | 10.39 | 10.41 | 10.43 |
| 1956 | 10.43 | 10.43 | 10.44 | 10.43 | 10.43 | 10.43 | 10.41 | 10.39 | 10.39 | 10.39 | 10.37 | 10.35 |
| 1957 | 10.35 | 10.35 | 10.33 | 10.33 | 10.32 | 10.33 | 10.36 | 10.40 | 10.39 | 10.37 | 10.38 | 10.39 |
| 1958 | 10.41 | 10.43 | 10.42 | 10.43 | 10.42 | 10.41 | 10.41 | 10.41 | 10.43 | 10.42 | 10.41 | 10.42 |
| 1959 | 10.39 | 10.38 | 10.38 | 10.40 | 10.41 | 10.39 | 10.40 | 10.39 | 10.38 | 10.38 | 10.39 | 10.39 |
| 1960 | 10.41 | 10.42 | 10.41 | 10.40 | 10.40 | 10.39 | 10.37 | 10.32 | 10.37 | 10.40 | 10.43 | 10.45 |
| 1961 | 10.42 | 10.39 | 10.40 | 10.36 | 10.35 | 10.38 | 10.42 | 10.42 | 10.43 | 10.42 | 10.42 | 10.43 |
| 1962 | 10.43 | 10.40 | 10.39 | 10.38 | 10.38 | 10.38 | 10.38 | 10.39 | 10.39 | 10.39 | 10.42 | 10.46 |
| 1963 | 10.44 | 10.44 | 10.45 | 10.46 | 10.44 | 10.43 | 10.42 | 10.44 | 10.43 | 10.44 | 10.45 | 10.46 |
| 1964 | 10.45 | 10.44 | 10.38 | 10.36 | 10.36 | 10.35 | 10.37 | 10.37 | 10.39 | 10.43 | 10.43 | 10.40 |
| 1965 | 10.39 | 10.39 | 10.39 | 10.41 | 10.42 | 10.44 | 10.45 | 10.46 | 10.44 | 10.45 | 10.46 | 10.45 |
| 1966 | 10.44 | 10.43 | 10.40 | 10.39 | 10.39 | 10.40 | 10.42 | 10.43 | 10.40 | 10.38 | 10.39 | 10.39 |
| 1967 | 10.39 | 10.42 | 10.42 | 10.41 | 10.42 | 10.41 | 10.41 | 10.42 | 10.43 | 10.45 | 10.46 | 10.44 |
| 1968 | 10.42 | 10.44 | 10.44 | 10.43 | 10.43 | 10.40 | 10.38 | 10.36 | 10.32 | 10.31 | 10.34 | 10.35 |
| 1969 | 10.34 | 10.35 | 10.32 | 10.33 | 10.33 | 10.31 | 10.33 | 10.33 | 10.32 | 10.37 | 10.43 | 10.44 |
| 1970 | 10.43 | 10.47 | 10.51 | 10.51 | 10.51 | 10.49 | 10.48 | 10.47 | 10.51 | 10.49 | 10.46 | 10.45 |
| 1971 | 10.44 | 10.46 | 10.44 | 10.44 | 10.45 | 10.42 | 10.43 | 10.49 | 10.67 | 10.75 | 10.82 | 10.81 |
| 1972 | 10.90 | 10.97 | 10.91 | 10.89 | 10.86 | 10.86 | 10.83 | 10.82 | 10.80 | 10.77 | 10.80 | 10.79 |
| 1973 | 10.81 | 11.08 | 11.41 | 11.32 | 11.31 | 11.32 | 11.43 | 11.33 | 11.43 | 11.47 | 11.35 | 11.30 |
| 1974 | 11.28 | 11.46 | 11.47 | 11.38 | 11.42 | 11.52 | 11.55 | 11.50 | 11.43 | 11.44 | 11.48 | 11.41 |
| 1975 | 11.44 | 11.48 | 11.46 | 11.34 | 11.30 | 11.25 | 11.24 | 11.31 | 11.37 | 11.32 | 11.28 | 11.20 |
| 1976 | 11.18 | 11.22 | 11.25 | 11.33 | 11.30 | 11.25 | 11.28 | 11.34 | 11.36 | 11.43 | 11.43 | 11.45 |
| 1977 | 11.51 | 11.54 | 11.52 | 11.98 | 12.09 | 12.27 | 12.30 | 12.56 | 13.59 | 13.58 | 13.65 | 14.09 |
| 1978 | 14.26 | 14.41 | 14.59 | 14.50 | 14.20 | 14.14 | 14.07 | 14.16 | 14.28 | 14.80 | 14.68 | 14.76 |
| 1979 | 14.94 | 14.96 | 14.87 | 14.65 | 14.41 | 14.37 | 14.48 | 14.44 | 14.56 | 14.62 | 14.72 | 14.83 |
| 1980 | 14.83 | 14.73 | 14.54 | 14.56 | 14.67 | 14.75 | 14.78 | 14.61 | 14.50 | 14.24 | 13.98 | 13.91 |
| 1981 | 13.79 | 13.34 | 13.36 | 13.30 | 13.12 | 13.03 | 12.99 | 13.00 | 14.10 | 14.76 | 14.71 | 14.52 |
| 1982 | 14.42 | 14.08 | 13.18 | 13.09 | 13.28 | 13.07 | 13.03 | 12.97 | 12.94 | 14.62 | 15.16 | 15.51 |
| 1983 | 15.65 | 15.61 | 15.79 | 15.44 | 15.24 | 15.01 | 14.87 | 14.69 | 14.66 | 14.71 | 14.54 | 14.44 |
| 1984 | 14.29 | 14.49 | 14.58 | 14.54 | 14.46 | 14.54 | 14.41 | 14.36 | 14.10 | 14.02 | 14.24 | 14.23 |
| 1985 | 14.32 | 14.12 | 14.20 | 14.47 | 14.39 | 14.37 | 14.47 | 14.74 | 14.65 | 14.87 | 14.90 | 15.00 |
| 1986 | 15.25 | 15.51 | 15.64 | 15.65 | 15.73 | 15.81 | 15.96 | 16.24 | 16.37 | 16.56 | 16.57 | 16.69 |
| 1987 | 17.17 | 17.23 | 16.91 | 16.85 | 16.90 | 16.85 | 16.84 | 16.85 | 16.97 | 16.96 | 17.28 | 17.40 |
| 1988 | 17.30 | 17.08 | 16.97 | 16.85 | 16.72 | 16.63 | 16.46 | 16.40 | 16.48 | 16.47 | 16.64 | 16.56 |
| 1989 | 16.34 | 16.30 | 16.35 | 16.29 | 16.15 | 16.15 | 16.35 | 16.26 | 16.20 | 16.48 | 16.75 | 17.22 |
| 1990 | 17.42 | 17.48 | 17.44 | 17.56 | 17.69 | 17.62 | 17.65 | 17.91 | 17.88 | 18.00 | 18.17 | 18.21 |

**Table A7.5c (cont.).** *Monthly exchange rates on Belgium. SEK per 100 BEF 1945–2002.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1991 | 18.14 | 18.20 | 17.44 | 17.49 | 17.69 | 17.62 | 17.65 | 17.63 | 17.67 | 17.69 | 17.74 | 17.76 |
| 1992 | 16.68 | 17.62 | 17.86 | 17.59 | 17.45 | 17.54 | 17.58 | 17.68 | 17.94 | 18.31 | 19.06 | 21.15 |
| 1993 | 21.81 | 22.27 | 22.79 | 22.65 | 22.22 | 21.88 | 22.48 | 22.34 | 23.02 | 22.49 | 22.80 | 23.40 |
| 1994 | 22.45 | 22.29 | 22.68 | 22.54 | 22.62 | 23.25 | 23.98 | 24.03 | 23.61 | 23.22 | 23.21 | 23.27 |
| 1995 | 23.67 | 23.88 | 25.02 | 25.93 | 25.19 | 25.22 | 25.14 | 24.35 | 23.76 | 23.50 | 22.67 | 22.39 |
| 1996 | 22.38 | 22.83 | 22.17 | 21.74 | 21.58 | 21.27 | 21.43 | 21.68 | 21.43 | 20.97 | 21.27 | 21.31 |
| 1997 | 21.34 | 21.43 | 21.86 | 21.78 | 21.84 | 21.75 | 21.13 | 21.01 | 20.86 | 20.89 | 21.17 | 21.23 |
| 1998 | 21.39 | 21.58 | 21.15 | 20.90 | 21.01 | 21.40 | 21.54 | 22.04 | 22.51 | 23.22 | 23.05 | 23.40 |
| 1999 | 22.52 | 22.09 | 22.17 | 22.10 | 22.25 | 21.90 | 21.69 | 21.71 | 21.40 | 21.64 | 21.39 | 21.29 |
| 2000 | 21.31 | 21.10 | 20.81 | 20.50 | 20.42 | 20.60 | 20.84 | 20.81 | 20.85 | 21.14 | 21.39 | 21.47 |
| 2001 | 22.05 | 22.25 | 22.62 | 22.58 | 22.44 | 22.81 | 22.94 | 23.06 | 23.96 | 23.75 | 23.33 | 23.41 |
| 2002 | 22.88 | 22.77 | | | | | | | | | | |

**Table A7.6.** *Monthly exchange rates on Switzerland. SEK per 100 CHF 1915–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1915 | | | | | | | | | | 71.96 | 69.53 | 68.06 |
| 1916 | 70.37 | 68.55 | 67.37 | 65.81 | 63.47 | 64.86 | 66.96 | 66.39 | 66.99 | 67.14 | 68.28 | 68.78 |
| 1917 | 67.97 | 67.87 | 67.35 | 65.52 | 65.54 | 67.00 | 69.07 | 67.76 | 63.17 | 58.06 | 57.67 | 68.13 |
| 1918 | 67.62 | 68.46 | 70.07 | 70.09 | 72.20 | 73.00 | 71.39 | 69.32 | 67.77 | 69.58 | 71.76 | 71.31 |
| 1919 | 71.80 | 73.07 | 73.84 | 75.89 | 77.14 | 73.20 | 71.96 | 71.97 | 73.06 | 73.75 | 78.90 | 85.52 |
| 1920 | 86.60 | 88.35 | 84.24 | 82.24 | 83.94 | 83.89 | 80.84 | 81.06 | 80.74 | 81.00 | 81.63 | 79.02 |
| 1921 | 73.90 | 73.65 | 74.98 | 74.03 | 76.33 | 76.04 | 78.80 | 79.97 | 79.29 | 79.85 | 81.32 | 79.56 |
| 1922 | 78.09 | 75.16 | 74.55 | 74.99 | 74.78 | 73.89 | 73.81 | 72.41 | 71.26 | 69.46 | 68.79 | 70.39 |
| 1923 | 70.21 | 70.99 | 70.11 | 68.65 | 67.81 | 67.76 | 66.27 | 67.68 | 67.51 | 67.84 | 66.97 | 66.45 |
| 1924 | 66.33 | 66.60 | 66.14 | 67.04 | 67.04 | 66.73 | 68.51 | 70.91 | 71.12 | 72.19 | 72.00 | 72.00 |
| 1925 | 71.83 | 71.49 | 71.17 | 71.82 | 72.35 | 72.59 | 72.40 | 72.32 | 72.10 | 72.11 | 72.14 | 72.14 |
| 1926 | 72.22 | 72.02 | 71.89 | 72.18 | 72.38 | 72.31 | 72.36 | 72.27 | 72.33 | 72.32 | 72.33 | 72.24 |
| 1927 | 72.23 | 72.14 | 71.96 | 71.85 | 71.96 | 71.93 | 71.98 | 71.92 | 71.81 | 71.70 | 71.71 | 71.62 |
| 1928 | 71.75 | 71.75 | 71.79 | 71.84 | 71.88 | 71.88 | 71.99 | 71.98 | 72.00 | 72.05 | 72.07 | 72.06 |
| 1929 | 72.03 | 72.01 | 72.06 | 72.12 | 72.13 | 71.79 | 71.84 | 71.89 | 71.99 | 72.14 | 72.21 | 72.15 |
| 1930 | 72.13 | 71.99 | 72.09 | 72.15 | 72.21 | 72.20 | 72.32 | 72.37 | 72.29 | 72.38 | 72.32 | 72.36 |
| 1931 | 72.38 | 72.13 | 72.06 | 71.99 | 72.00 | 72.41 | 72.66 | 72.92 | 75.31 | 85.80 | 94.28 | 105.28 |
| 1932 | 102.44 | 102.00 | 98.54 | 102.63 | 105.48 | 105.35 | 107.84 | 109.89 | 109.18 | 111.53 | 111.33 | 108.46 |
| 1933 | 106.06 | 106.92 | 107.18 | 107.99 | 112.27 | 111.57 | 113.02 | 114.99 | 120.01 | 120.63 | 117.80 | 115.48 |
| 1934 | 118.67 | 123.28 | 123.92 | 122.76 | 124.25 | 125.45 | 125.76 | 126.86 | 128.89 | 129.50 | 126.78 | 127.68 |
| 1935 | 128.68 | 129.25 | 133.06 | 130.51 | 128.90 | 128.94 | 128.79 | 128.23 | 128.35 | 129.03 | 128.34 | 128.04 |
| 1936 | 128.18 | 128.64 | 128.57 | 128.25 | 126.73 | 125.69 | 126.97 | 126.29 | 122.59 | 91.92 | 91.86 | 91.47 |
| 1937 | 91.17 | 91.00 | 91.03 | 90.56 | 90.38 | 90.32 | 89.92 | 89.95 | 90.37 | 90.49 | 90.25 | 90.10 |
| 1938 | 90.05 | 90.16 | 90.13 | 89.95 | 89.56 | 89.82 | 90.39 | 91.33 | 91.76 | 93.00 | 93.91 | 94.55 |
| 1939 | 91.41 | 91.36 | 94.23 | 93.48 | 93.75 | 93.99 | 93.98 | 94.15 | 95.96 | 95.30 | 95.25 | 95.25 |
| 1940 | 95.25 | 95.14 | 94.55 | 94.55 | 94.55 | 94.79 | 95.68 | 95.93 | 96.06 | 97.58 | 97.80 | 97.80 |
| 1941 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 |
| 1942 | 97.00 | 97.00 | 97.00 | 97.00 | 97.00 | 97.00 | 97.00 | 97.00 | 97.00 | 97.00 | 97.00 | 97.00 |
| 1943 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 |

**Table A7.6 (cont.).** *Monthly exchange rates on Switzerland. SEK per 100 CHF 1915–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1944 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 |
| 1945 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.80 | 97.65 |
| 1946 | 97.65 | 97.65 | 97.66 | 97.65 | 97.65 | 97.85 | 89.28 | 83.70 | 83.70 | 83.70 | 88.70 | 83.70 |
| 1947 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 |
| 1948 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 |
| 1949 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 83.70 | 94.18 | 118.50 | 118.50 | 118.50 |
| 1950 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 |
| 1951 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 |
| 1952 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 | 118.50 |
| 1953 | 118.50 | 118.50 | 118.53 | 118.75 | 118.88 | 119.03 | 119.25 | 119.00 | 118.85 | 118.75 | 118.68 | 118.73 |
| 1954 | 118.93 | 119.18 | 119.23 | 119.25 | 119.00 | 118.85 | 119.10 | 119.15 | 119.05 | 119.10 | 119.03 | 118.93 |
| 1955 | 118.78 | 118.75 | 118.73 | 118.70 | 118.78 | 118.55 | 118.63 | 118.53 | 118.58 | 118.48 | 118.68 | 118.83 |
| 1956 | 118.88 | 118.88 | 118.93 | 118.80 | 118.75 | 118.80 | 118.63 | 118.53 | 118.38 | 118.50 | 118.23 | 118.23 |
| 1957 | 118.38 | 118.35 | 118.30 | 118.35 | 118.30 | 118.43 | 118.73 | 118.85 | 118.93 | 118.45 | 118.38 | 118.38 |
| 1958 | 118.53 | 118.48 | 118.55 | 118.65 | 118.65 | 118.53 | 118.50 | 118.43 | 118.70 | 118.83 | 118.58 | 119.38 |
| 1959 | 120.13 | 120.13 | 119.90 | 119.90 | 119.90 | 120.15 | 120.20 | 120.13 | 119.90 | 119.50 | 119.48 | 119.98 |
| 1960 | 120.00 | 119.73 | 119.63 | 119.33 | 119.68 | 119.90 | 119.88 | 119.85 | 119.95 | 120.05 | 120.15 | 120.38 |
| 1961 | 120.25 | 119.83 | 119.80 | 119.75 | 119.43 | 119.65 | 119.90 | 119.88 | 120.13 | 119.78 | 119.80 | 120.08 |
| 1962 | 120.00 | 119.55 | 119.05 | 118.75 | 119.05 | 119.45 | 119.43 | 119.28 | 119.40 | 119.45 | 119.95 | 120.40 |
| 1963 | 119.90 | 120.05 | 120.05 | 120.23 | 120.25 | 120.15 | 120.10 | 120.40 | 120.50 | 120.55 | 120.50 | 120.60 |
| 1964 | 120.45 | 120.08 | 119.28 | 119.18 | 119.28 | 119.28 | 119.30 | 119.15 | 119.33 | 119.75 | 119.73 | 119.50 |
| 1965 | 119.20 | 118.90 | 118.50 | 118.60 | 118.80 | 119.38 | 119.68 | 120.03 | 119.90 | 120.00 | 120.00 | 120.08 |
| 1966 | 119.75 | 119.48 | 119.10 | 119.40 | 119.63 | 119.83 | 119.98 | 119.70 | 119.63 | 119.63 | 119.88 | 119.93 |
| 1967 | 119.60 | 119.43 | 119.43 | 119.53 | 119.73 | 119.58 | 119.48 | 119.15 | 119.10 | 119.38 | 119.95 | 119.88 |
| 1968 | 119.20 | 118.95 | 119.65 | 119.48 | 119.90 | 120.30 | 120.53 | 120.43 | 120.33 | 120.48 | 120.60 | 120.68 |
| 1969 | 120.15 | 120.13 | 120.30 | 119.93 | 119.78 | 120.08 | 120.13 | 120.25 | 120.50 | 120.08 | 119.80 | 120.08 |
| 1970 | 120.00 | 120.78 | 120.93 | 121.08 | 120.93 | 120.55 | 120.68 | 120.68 | 121.00 | 120.00 | 120.03 | 120.15 |
| 1971 | 120.20 | 120.53 | 120.35 | 120.33 | 123.78 | 126.38 | 126.33 | 127.88 | 127.93 | 126.75 | 125.88 | 125.48 |
| 1972 | 124.25 | 124.78 | 124.10 | 124.35 | 123.48 | 126.00 | 125.98 | 125.33 | 125.13 | 125.13 | 125.40 | 126.08 |
| 1973 | 128.53 | 137.38 | 140.75 | 139.70 | 140.70 | 138.73 | 144.75 | 140.93 | 140.30 | 138.10 | 137.70 | 141.50 |
| 1974 | 143.70 | 148.40 | 148.93 | 146.03 | 148.05 | 147.05 | 148.13 | 148.83 | 150.45 | 152.25 | 157.90 | 159.73 |
| 1975 | 160.47 | 161.07 | 158.93 | 155.69 | 157.36 | 157.35 | 158.26 | 161.32 | 164.35 | 165.23 | 165.73 | 167.43 |
| 1976 | 168.50 | 170.56 | 171.96 | 174.42 | 177.61 | 180.45 | 180.15 | 178.18 | 176.27 | 174.22 | 173.00 | 170.16 |
| 1977 | 169.48 | 168.89 | 165.40 | 172.28 | 172.98 | 177.66 | 180.62 | 185.32 | 204.57 | 210.89 | 218.26 | 229.06 |
| 1978 | 235.36 | 244.20 | 243.34 | 242.31 | 237.46 | 244.83 | 252.35 | 266.80 | 281.99 | 279.46 | 262.17 | 261.67 |
| 1979 | 260.68 | 261.08 | 260.17 | 256.38 | 254.79 | 255.55 | 256.73 | 255.14 | 260.12 | 259.35 | 256.84 | 261.71 |
| 1980 | 260.71 | 255.23 | 247.21 | 249.33 | 253.77 | 255.37 | 257.20 | 253.07 | 253.85 | 249.33 | 253.77 | 255.37 |
| 1981 | 244.80 | 236.85 | 239.96 | 238.72 | 237.55 | 244.25 | 247.67 | 244.95 | 268.16 | 294.25 | 307.57 | 305.61 |
| 1982 | 304.87 | 305.04 | 309.45 | 302.26 | 297.35 | 290.39 | 292.04 | 291.70 | 291.64 | 330.38 | 342.26 | 358.40 |
| 1983 | 372.39 | 369.21 | 363.06 | 364.83 | 364.19 | 361.70 | 363.58 | 363.77 | 364.47 | 369.19 | 365.10 | 367.36 |
| 1984 | 366.05 | 363.16 | 360.56 | 358.51 | 356.70 | 355.50 | 345.41 | 345.90 | 343.47 | 344.40 | 348.58 | 346.30 |
| 1985 | 341.61 | 333.39 | 335.72 | 347.28 | 343.97 | 344.73 | 351.64 | 362.83 | 359.98 | 367.45 | 367.00 | 365.25 |
| 1986 | 367.78 | 378.85 | 379.77 | 381.02 | 386.13 | 391.71 | 404.93 | 417.30 | 418.44 | 419.60 | 413.27 | 414.37 |
| 1987 | 424.60 | 422.24 | 417.72 | 422.74 | 426.41 | 420.82 | 419.68 | 422.25 | 425.06 | 425.12 | 439.66 | 446.77 |
| 1988 | 444.29 | 435.34 | 429.40 | 425.98 | 418.99 | 417.71 | 414.52 | 409.50 | 409.07 | 407.46 | 415.08 | 411.86 |

**Table A7.6 (cont.).** *Monthly exchange rates on Switzerland. SEK per 100 CHF 1915–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1989 | 402.36 | 401.44 | 397.80 | 387.05 | 380.61 | 391.17 | 397.00 | 394.31 | 391.35 | 395.67 | 397.28 | 401.61 |
| 1990 | 406.53 | 412.80 | 408.12 | 411.66 | 427.03 | 427.75 | 427.73 | 441.38 | 441.77 | 440.83 | 443.07 | 440.38 |
| 1991 | 443.49 | 437.83 | 425.69 | 425.22 | 423.16 | 420.36 | 417.57 | 416.41 | 416.29 | 416.61 | 412.90 | 413.22 |
| 1992 | 409.76 | 403.84 | 399.55 | 393.52 | 391.64 | 398.36 | 405.32 | 406.75 | 419.53 | 425.28 | 435.54 | 483.93 |
| 1993 | 490.88 | 496.61 | 508.77 | 509.89 | 506.18 | 503.92 | 525.14 | 537.52 | 564.95 | 556.54 | 553.75 | 570.60 |
| 1994 | 552.98 | 547.15 | 553.06 | 547.84 | 546.07 | 566.93 | 585.78 | 587.14 | 583.12 | 574.06 | 567.74 | 565.72 |
| 1995 | 579.87 | 581.23 | 619.98 | 647.73 | 625.28 | 626.70 | 621.07 | 604.57 | 600.89 | 596.89 | 577.58 | 569.37 |
| 1996 | 570.15 | 562.70 | 551.35 | 551.35 | 542.28 | 531.65 | 538.12 | 550.43 | 539.65 | 524.82 | 519.85 | 514.41 |
| 1997 | 507.14 | 509.47 | 521.89 | 526.05 | 536.49 | 537.47 | 527.32 | 527.80 | 523.17 | 521.49 | 537.48 | 541.21 |
| 1998 | 543.26 | 551.66 | 535.74 | 519.91 | 520.31 | 529.37 | 527.57 | 543.74 | 563.84 | 586.86 | 577.63 | 593.04 |
| 1999 | 565.97 | 557.31 | 560.89 | 556.66 | 560.11 | 554.03 | 545.38 | 547.32 | 538.98 | 547.67 | 537.71 | 536.47 |
| 2000 | 533.70 | 529.65 | 523.17 | 525.45 | 529.30 | 532.68 | 542.06 | 541.37 | 549.68 | 563.48 | 567.05 | 572.38 |
| 2001 | 581.70 | 584.38 | 594.16 | 595.93 | 590.19 | 604.21 | 611.50 | 614.33 | 647.99 | 647.25 | 641.96 | 640.06 |
| 2002 | 625.94 | 621.79 | 616.90 | 623.00 | 633.00 | 619.59 | 633.80 | 632.35 | 626.17 | 621.56 | 618.69 | 618.61 |
| 2003 | 627.67 | 623.58 | 627.77 | 612.48 | 604.26 | 592.11 | 594.17 | 599.57 | 586.16 | 581.95 | 576.42 | 580.01 |
| 2004 | 583.43 | 583.67 | 589.22 | 590.08 | 592.48 | 601.93 | 602.22 | 597.53 | 589.43 | 587.30 | 591.55 | 584.95 |
| 2005 | 585.27 | 586.14 | 586.69 | 592.30 | 595.11 | 601.70 | 605.07 | 601.58 | 602.79 | 608.45 | 619.06 | 609.84 |
| 2006 | 601.31 | 599.48 | 599.10 | 592.48 | 599.87 | 592.00 | 587.37 | 583.76 | 585.45 | 582.13 | 571.83 | 566.03 |
| 2007 | 562.12 | 566.32 | 576.59 | 564.39 | 557.80 | 564.28 | 554.53 | 569.13 | 563.95 | 549.45 | 563.10 | 568.05 |
| 2008 | 582.02 | 582.32 | 598.57 | 587.40 | 573.67 | 580.99 | 584.43 | 579.73 | 599.58 | 647.74 | 668.37 | 694.15 |

**Table A7.7.** *Monthly exchange rates on Netherlands. SEK per 100 NLG 1913–2002.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | 150.85 | 150.95 | 150.49 | 150.64 | 150.43 | 150.17 | 150.31 | 150.25 | 150.29 | 150.63 | 150.67 | 150.46 |
| 1914 | 150.81 | 150.72 | 150.56 | 150.66 | 150.73 | 150.53 | 150.60 | 150.84 | 155.57 | 160.57 | 161.03 | 161.90 |
| 1915 | 161.27 | 163.58 | 162.20 | 155.18 | 152.56 | 151.85 | 154.41 | 155.93 | 156.66 | 156.87 | 155.18 | 153.85 |
| 1916 | 159.99 | 151.66 | 149.01 | 144.43 | 136.44 | 141.55 | 146.09 | 145.01 | 145.62 | 144.85 | 144.75 | 140.59 |
| 1917 | 138.56 | 137.72 | 136.43 | 136.17 | 137.27 | 136.66 | 139.35 | 126.12 | 124.35 | 115.49 | 111.32 | 127.48 |
| 1918 | 130.07 | 135.13 | 140.70 | 140.24 | 146.11 | 147.21 | 145.81 | 145.64 | 144.87 | 145.73 | 148.85 | 146.69 |
| 1919 | 146.33 | 146.82 | 147.09 | 151.06 | 153.91 | 152.22 | 152.69 | 151.54 | 152.89 | 156.23 | 164.10 | 177.60 |
| 1920 | 182.87 | 201.36 | 182.42 | 169.84 | 172.90 | 166.70 | 160.60 | 160.32 | 155.45 | 157.19 | 158.71 | 158.52 |
| 1921 | 154.69 | 154.05 | 151.93 | 148.14 | 151.94 | 149.04 | 151.47 | 147.36 | 146.02 | 145.81 | 150.78 | 148.59 |
| 1922 | 147.42 | 144.39 | 145.06 | 146.09 | 150.29 | 150.27 | 149.59 | 147.57 | 146.87 | 146.42 | 146.56 | 148.15 |
| 1923 | 147.62 | 148.90 | 148.69 | 147.24 | 147.10 | 147.83 | 148.06 | 148.13 | 148.30 | 148.53 | 145.08 | 144.85 |
| 1924 | 143.04 | 143.10 | 141.40 | 141.37 | 141.37 | 141.29 | 142.88 | 146.08 | 144.89 | 147.18 | 149.46 | 150.09 |
| 1925 | 150.06 | 149.16 | 148.26 | 148.45 | 150.25 | 150.13 | 149.47 | 149.95 | 150.15 | 150.23 | 150.52 | 150.21 |
| 1926 | 150.20 | 149.82 | 149.57 | 149.95 | 150.35 | 150.03 | 150.07 | 150.00 | 149.98 | 149.79 | 149.94 | 149.79 |
| 1927 | 149.84 | 149.99 | 149.67 | 149.45 | 149.71 | 149.58 | 149.70 | 149.48 | 149.21 | 149.35 | 150.00 | 149.88 |
| 1928 | 150.17 | 150.10 | 150.05 | 150.23 | 150.42 | 150.37 | 150.37 | 149.97 | 149.91 | 150.02 | 150.22 | 150.16 |
| 1929 | 150.10 | 149.92 | 150.03 | 150.39 | 150.51 | 150.10 | 149.80 | 149.64 | 149.76 | 150.06 | 150.22 | 149.74 |
| 1930 | 149.93 | 149.57 | 149.41 | 149.56 | 149.98 | 149.79 | 149.73 | 149.90 | 149.99 | 150.14 | 150.05 | 150.15 |
| 1931 | 150.38 | 150.00 | 149.78 | 149.97 | 149.96 | 150.20 | 150.55 | 150.79 | 155.30 | 176.70 | 194.53 | 217.03 |
| 1932 | 210.49 | 210.20 | 204.58 | 212.93 | 217.75 | 217.37 | 222.05 | 226.34 | 226.40 | 231.38 | 231.46 | 217.36 |

**Table A7.7 (cont.).** *Monthly exchange rates on Netherlands. SEK per 100 NLG 1913–2002.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1933 | 220.31 | 221.56 | 222.68 | 224.71 | 233.34 | 231.88 | 235.04 | 239.21 | 249.38 | 250.44 | 244.27 | 239.11 |
| 1934 | 245.60 | 255.61 | 257.31 | 255.94 | 258.77 | 261.53 | 261.41 | 262.62 | 267.03 | 268.50 | 263.41 | 260.67 |
| 1935 | 268.16 | 269.50 | 277.07 | 271.41 | 269.12 | 267.37 | 266.89 | 265.30 | 266.31 | 268.38 | 267.74 | 267.28 |
| 1936 | 267.24 | 267.11 | 267.29 | 266.87 | 264.37 | 262.17 | 263.62 | 262.66 | 257.23 | 213.28 | 214.87 | 216.26 |
| 1937 | 217.03 | 217.25 | 217.97 | 216.77 | 216.39 | 216.70 | 215.72 | 215.23 | 216.50 | 216.94 | 215.93 | 216.56 |
| 1938 | 216.76 | 217.08 | 217.08 | 217.10 | 216.80 | 217.09 | 217.19 | 217.57 | 218.54 | 222.19 | 224.79 | 226.72 |
| 1939 | 226.46 | 222.96 | 220.66 | 221.01 | 223.01 | 221.34 | 221.53 | 222.86 | 225.13 | 224.30 | 221.00 | 224.20 |
| 1940 | 224.73 | 224.28 | 223.57 | 323.50 | 333.50 | 333.50 | 323.50 | 223.50 | 223.50 | 223.15 | 223.97 | 222.97 |
| 1941 | 222.97 | 223.32 | 223.50 | 223.60 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 |
| 1942 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 323.50 | 223.50 | 223.50 | 223.50 | 223.50 |
| 1943 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 |
| 1944 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | 223.50 | | | |
| 1945 | | | | | | | | | | | 157.75 | 157.75 |
| 1946 | 158.50 | 158.50 | 158.50 | 158.50 | 158.50 | 158.50 | 144.94 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 |
| 1947 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 |
| 1948 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 |
| 1949 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 135.90 | 136.12 | 136.55 | 136.55 | 136.55 |
| 1950 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 |
| 1951 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 |
| 1952 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.55 | 136.53 |
| 1953 | 136.48 | 136.90 | 137.20 | 136.95 | 136.83 | 137.18 | 137.25 | 136.98 | 136.45 | 136.28 | 136.25 | 136.63 |
| 1954 | 136.93 | 137.05 | 136.98 | 136.90 | 136.90 | 136.75 | 136.95 | 136.98 | 136.90 | 137.08 | 137.25 | 137.30 |
| 1955 | 137.30 | 137.25 | 137.13 | 137.03 | 136.98 | 136.35 | 136.00 | 136.05 | 136.40 | 136.38 | 136.75 | 137.08 |
| 1956 | 137.10 | 136.98 | 136.83 | 136.75 | 136.58 | 136.23 | 135.93 | 135.70 | 135.93 | 136.33 | 136.13 | 136.03 |
| 1957 | 136.08 | 136.23 | 136.10 | 136.35 | 136.10 | 135.88 | 136.10 | 135.98 | 136.33 | 136.50 | 136.63 | 136.88 |
| 1958 | 137.20 | 137.03 | 136.93 | 136.93 | 137.00 | 136.93 | 136.85 | 136.80 | 137.10 | 137.28 | 137.10 | 137.10 |
| 1959 | 137.28 | 137.33 | 137.28 | 137.35 | 137.35 | 137.40 | 137.35 | 137.25 | 137.18 | 137.30 | 137.38 | 137.55 |
| 1960 | 137.60 | 137.58 | 137.53 | 137.23 | 137.35 | 137.23 | 137.18 | 137.03 | 137.10 | 137.23 | 137.15 | 137.43 |
| 1961 | 137.20 | 136.68 | 140.33 | 144.05 | 143.90 | 144.05 | 144.03 | 143.68 | 143.50 | 143.68 | 143.83 | 143.78 |
| 1962 | 143.63 | 142.95 | 142.98 | 143.28 | 143.40 | 143.38 | 143.45 | 143.08 | 143.25 | 143.28 | 143.63 | 144.48 |
| 1963 | 144.13 | 144.23 | 144.55 | 144.83 | 144.70 | 144.33 | 144.10 | 144.10 | 144.10 | 144.45 | 144.48 | 144.50 |
| 1964 | 144.28 | 143.95 | 143.13 | 142.70 | 142.50 | 142.23 | 142.48 | 142.50 | 142.73 | 143.45 | 143.78 | 143.50 |
| 1965 | 143.30 | 143.20 | 143.03 | 143.23 | 143.38 | 143.53 | 143.73 | 143.93 | 143.78 | 144.00 | 143.90 | 143.68 |
| 1966 | 143.33 | 143.00 | 142.85 | 142.43 | 142.33 | 141.78 | 143.50 | 143.35 | 143.18 | 143.18 | 143.30 | 143.33 |
| 1967 | 143.45 | 143.38 | 143.20 | 143.05 | 143.28 | 143.23 | 143.33 | 143.60 | 143.73 | 144.03 | 144.15 | 143.98 |
| 1968 | 143.63 | 143.45 | 143.55 | 143.23 | 143.08 | 143.05 | 143.03 | 142.55 | 142.33 | 142.45 | 143.20 | 143.65 |
| 1969 | 143.35 | 143.08 | 142.85 | 142.58 | 142.30 | 142.35 | 142.43 | 143.08 | 143.45 | 143.85 | 143.68 | 143.15 |
| 1970 | 142.53 | 142.78 | 143.38 | 143.43 | 143.63 | 143.53 | 143.85 | 144.13 | 144.68 | 144.55 | 144.13 | 143.88 |
| 1971 | 143.93 | 144.15 | 143.90 | 143.65 | 145.68 | 145.58 | 145.53 | 148.15 | 149.40 | 149.95 | 150.88 | 149.50 |
| 1972 | 150.23 | 151.18 | 150.28 | 149.20 | 148.35 | 149.50 | 149.20 | 147.60 | 146.80 | 146.73 | 147.30 | 147.33 |
| 1973 | 148.18 | 152.75 | 154.98 | 153.48 | 153.60 | 155.35 | 157.50 | 156.88 | 162.55 | 166.48 | 163.18 | 162.78 |
| 1974 | 163.90 | 166.23 | 166.53 | 165.23 | 165.33 | 165.55 | 166.73 | 166.30 | 165.60 | 165.93 | 166.15 | 165.00 |
| 1975 | 164.88 | 165.58 | 165.88 | 164.43 | 163.97 | 163.04 | 162.10 | 163.76 | 165.90 | 165.64 | 165.55 | 164.36 |
| 1976 | 164.16 | 164.55 | 163.94 | 164.15 | 162.80 | 162.75 | 164.03 | 165.12 | 167.10 | 167.28 | 167.65 | 167.57 |
| 1977 | 168.60 | 169.31 | 169.16 | 176.04 | 177.53 | 178.54 | 178.62 | 183.47 | 197.43 | 197.30 | 198.50 | 204.23 |

**Table A7.7 (cont.).** *Monthly exchange rates on Netherlands. SEK per 100 NLG 1913–2002.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1978 | 206.01 | 208.86 | 212.16 | 211.38 | 206.91 | 206.56 | 205.07 | 205.60 | 206.95 | 214.33 | 212.75 | 215.30 |
| 1979 | 218.09 | 218.13 | 217.76 | 214.70 | 211.74 | 210.27 | 210.62 | 210.45 | 212.44 | 212.45 | 214.07 | 218.22 |
| 1980 | 218.22 | 216.81 | 214.49 | 212.78 | 213.81 | 215.22 | 216.22 | 214.49 | 213.83 | 210.30 | 207.18 | 206.07 |
| 1981 | 203.94 | 197.35 | 197.78 | 196.32 | 192.33 | 191.49 | 191.22 | 191.25 | 207.85 | 223.07 | 224.98 | 224.38 |
| 1982 | 223.82 | 222.34 | 223.04 | 222.67 | 225.55 | 224.65 | 224.83 | 225.46 | 227.31 | 259.78 | 269.72 | 275.53 |
| 1983 | 278.59 | 277.98 | 279.11 | 272.97 | 270.45 | 267.52 | 265.89 | 263.04 | 264.23 | 266.90 | 263.48 | 261.66 |
| 1984 | 259.29 | 262.74 | 264.17 | 263.27 | 261.44 | 262.89 | 258.76 | 256.92 | 251.84 | 251.30 | 254.69 | 253.18 |
| 1985 | 253.54 | 250.16 | 252.34 | 257.60 | 256.33 | 256.76 | 258.78 | 264.93 | 263.28 | 267.20 | 267.48 | 271.36 |
| 1986 | 276.34 | 280.89 | 283.50 | 282.81 | 285.11 | 286.68 | 291.43 | 298.23 | 300.22 | 304.07 | 304.56 | 307.08 |
| 1987 | 315.85 | 315.86 | 310.03 | 309.26 | 310.78 | 309.83 | 309.85 | 310.33 | 312.85 | 313.48 | 321.10 | 323.40 |
| 1988 | 321.81 | 317.94 | 315.94 | 314.07 | 311.43 | 309.27 | 305.36 | 304.22 | 306.07 | 305.96 | 308.91 | 307.29 |
| 1989 | 303.00 | 302.50 | 303.44 | 302.08 | 299.72 | 299.86 | 303.23 | 301.41 | 300.47 | 306.32 | 311.40 | 320.45 |
| 1990 | 323.51 | 323.39 | 321.37 | 322.36 | 324.24 | 321.57 | 322.35 | 326.76 | 326.20 | 328.65 | 332.19 | 333.93 |
| 1991 | 331.48 | 332.34 | 326.33 | 319.19 | 318.37 | 321.18 | 321.18 | 322.18 | 322.98 | 323.33 | 324.30 | 324.61 |
| 1992 | 323.30 | 322.54 | 322.24 | 321.51 | 320.04 | 320.45 | 321.60 | 323.08 | 328.38 | 335.08 | 348.57 | 387.26 |
| 1993 | 399.42 | 407.96 | 417.68 | 415.07 | 407.11 | 401.00 | 412.62 | 421.85 | 440.08 | 435.51 | 433.24 | 436.52 |
| 1994 | 417.15 | 409.68 | 415.97 | 413.33 | 414.75 | 427.05 | 440.68 | 440.75 | 433.48 | 426.33 | 426.07 | 427.19 |
| 1995 | 434.94 | 438.73 | 460.61 | 476.30 | 463.09 | 463.06 | 461.47 | 447.05 | 436.29 | 431.70 | 416.07 | 410.90 |
| 1996 | 410.85 | 419.22 | 407.03 | 399.45 | 396.82 | 390.58 | 393.24 | 398.16 | 393.69 | 385.08 | 390.77 | 391.56 |
| 1997 | 391.85 | 393.67 | 400.73 | 399.52 | 400.78 | 398.89 | 387.55 | 385.23 | 382.31 | 382.53 | 387.35 | 388.71 |
| 1998 | 391.48 | 395.07 | 387.17 | 383.09 | 384.62 | 391.57 | 394.10 | 403.09 | 411.57 | 424.74 | 421.71 | 428.38 |
| 1999 | 412.20 | 404.30 | 405.89 | 404.60 | 407.34 | 400.86 | 396.99 | 397.44 | 391.75 | 396.10 | 391.63 | 389.76 |
| 2000 | 390.05 | 386.22 | 380.95 | 375.28 | 373.86 | 377.17 | 381.54 | 381.00 | 381.73 | 386.92 | 391.48 | 393.11 |
| 2001 | 403.69 | 407.20 | 414.09 | 413.41 | 410.84 | 417.52 | 420.00 | 422.18 | 438.67 | 434.71 | 427.15 | 428.53 |
| 2002 | 418.80 | 416.88 | | | | | | | | | | |

**Table A7.8.** *Monthly exchange rates on Denmark. SEK per 100 DKK 1913–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 1914 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 1915 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 99.62 | 99.08 | 98.10 |
| 1916 | 99.46 | 99.93 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 99.02 | 97.47 | 96.60 | 95.88 | 94.19 |
| 1917 | 93.28 | 93.47 | 96.45 | 95.57 | 95.83 | 96.18 | 93.69 | 91.71 | 91.06 | 86.13 | 86.43 | 93.11 |
| 1918 | 92.88 | 93.45 | 94.16 | 92.87 | 92.28 | 90.21 | 88.33 | 88.30 | 90.52 | 92.82 | 95.02 | 92.72 |
| 1919 | 92.40 | 92.76 | 93.03 | 93.88 | 93.72 | 92.46 | 91.19 | 88.66 | 89.84 | 88.97 | 90.67 | 87.60 |
| 1920 | 85.88 | 80.41 | 83.99 | 82.10 | 79.17 | 77.24 | 75.26 | 72.84 | 69.43 | 71.03 | 70.31 | 76.24 |
| 1921 | 84.81 | 83.79 | 76.73 | 77.33 | 77.34 | 76.97 | 75.39 | 76.72 | 81.54 | 82.63 | 79.97 | 79.85 |
| 1922 | 80.32 | 79.11 | 80.96 | 81.74 | 83.36 | 84.14 | 83.20 | 81.97 | 79.94 | 76.02 | 75.47 | 76.84 |
| 1923 | 74.07 | 71.91 | 72.32 | 71.13 | 70.13 | 67.86 | 66.30 | 68.55 | 68.29 | 66.62 | 65.70 | 67.95 |
| 1924 | 65.13 | 61.25 | 59.82 | 64.02 | 64.02 | 63.45 | 60.53 | 61.08 | 63.83 | 66.05 | 65.56 | 65.56 |
| 1925 | 66.23 | 66.17 | 67.08 | 68.58 | 70.39 | 71.40 | 79.59 | 87.09 | 92.04 | 92.16 | 93.22 | 93.02 |
| 1926 | 92.83 | 95.10 | 97.56 | 97.89 | 98.04 | 98.96 | 99.06 | 99.30 | 99.39 | 99.56 | 99.84 | 99.81 |
| 1927 | 99.89 | 99.93 | 99.67 | 99.68 | 99.85 | 99.80 | 99.89 | 99.91 | 99.69 | 99.62 | 99.62 | 99.38 |

**Table A7.8 (cont.).** *Monthly exchange rates on Denmark. SEK per 100 DKK 1913–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1928 | 99.72 | 99.83 | 99.89 | 99.95 | 100.01 | 99.99 | 99.89 | 99.79 | 99.74 | 99.77 | 99.79 | 99.78 |
| 1929 | 99.80 | 99.82 | 99.82 | 99.85 | 99.76 | 99.57 | 99.46 | 99.44 | 99.45 | 99.72 | 99.74 | 99.56 |
| 1930 | 99.72 | 99.79 | 99.73 | 99.65 | 99.66 | 99.69 | 99.70 | 99.77 | 99.67 | 99.69 | 99.71 | 99.73 |
| 1931 | 99.89 | 99.95 | 99.92 | 99.93 | 99.92 | 99.94 | 99.93 | 99.95 | 98.41 | 96.22 | 99.84 | 99.70 |
| 1932 | 98.86 | 99.04 | 101.04 | 108.16 | 107.80 | 106.90 | 105.86 | 104.15 | 101.38 | 100.94 | 98.25 | 95.42 |
| 1933 | 93.01 | 84.13 | 84.66 | 85.42 | 87.06 | 87.09 | 87.02 | 86.98 | 86.75 | 86.75 | 86.85 | 86.85 |
| 1934 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.86 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 |
| 1935 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 |
| 1936 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 |
| 1937 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.85 | 86.72 | 86.74 |
| 1938 | 86.75 | 86.77 | 86.79 | 86.75 | 86.75 | 86.75 | 86.75 | 86.75 | 86.75 | 86.83 | 86.80 | 86.81 |
| 1939 | 86.84 | 86.79 | 86.81 | 86.79 | 86.80 | 86.83 | 86.77 | 86.72 | 81.24 | 81.25 | 81.25 | 81.25 |
| 1940 | 81.25 | 81.25 | 81.25 | 81.25 | 81.25 | 81.25 | 81.25 | 81.25 | 81.25 | 81.25 | 81.25 | 81.25 |
| 1941 | 81.25 | 81.25 | 81.25 | 81.25 | 81.25 | 81.25 | 81.25 | 81.25 | 81.25 | 81.25 | 81.25 | 81.25 |
| 1942 | 83.02 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 |
| 1943 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 |
| 1944 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 |
| 1945 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.90 | 87.78 | 87.55 | 87.55 | 87.55 | 87.55 |
| 1946 | 87.55 | 87.55 | 87.65 | 87.55 | 87.55 | 87.55 | 80.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 |
| 1947 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 |
| 1948 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 |
| 1949 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 |
| 1950 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 |
| 1951 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 |
| 1952 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 |
| 1953 | 75.05 | 75.05 | 75.05 | 75.05 | 75.05 | 75.13 | 75.13 | 74.93 | 74.85 | 74.68 | 74.73 | 74.90 |
| 1954 | 75.08 | 75.13 | 75.05 | 75.05 | 74.90 | 74.75 | 74.95 | 74.98 | 74.85 | 74.95 | 75.05 | 75.08 |
| 1955 | 75.08 | 75.13 | 75.20 | 75.18 | 75.00 | 74.78 | 74.69 | 74.63 | 74.73 | 74.93 | 75.18 | 75.33 |
| 1956 | 75.40 | 75.38 | 75.30 | 75.25 | 75.10 | 75.00 | 74.80 | 74.65 | 74.73 | 74.98 | 74.75 | 74.78 |
| 1957 | 74.90 | 74.93 | 74.80 | 74.75 | 74.67 | 74.67 | 74.90 | 74.83 | 74.93 | 74.98 | 75.00 | 75.05 |
| 1958 | 75.13 | 75.20 | 75.28 | 75.18 | 75.10 | 75.03 | 74.85 | 74.85 | 74.98 | 75.08 | 75.05 | 75.08 |
| 1959 | 75.18 | 75.18 | 75.28 | 75.33 | 75.25 | 75.33 | 75.28 | 75.25 | 75.23 | 75.25 | 75.23 | 75.20 |
| 1960 | 75.20 | 75.18 | 75.23 | 75.13 | 75.03 | 74.95 | 75.08 | 75.03 | 75.20 | 75.18 | 75.20 | 75.23 |
| 1961 | 75.10 | 74.98 | 75.00 | 74.90 | 74.70 | 74.73 | 74.70 | 74.98 | 75.28 | 75.25 | 75.23 | 75.40 |
| 1962 | 75.30 | 75.10 | 75.03 | 74.90 | 74.80 | 74.80 | 74.75 | 74.60 | 74.58 | 74.60 | 74.90 | 75.35 |
| 1963 | 75.18 | 75.28 | 75.38 | 75.45 | 75.35 | 75.30 | 75.25 | 75.28 | 75.38 | 75.40 | 75.38 | 75.45 |
| 1964 | 75.30 | 75.10 | 74.75 | 74.68 | 74.60 | 74.50 | 74.58 | 74.38 | 74.40 | 74.70 | 74.60 | 74.58 |
| 1965 | 74.48 | 74.45 | 74.40 | 74.58 | 74.68 | 74.68 | 74.68 | 74.70 | 74.90 | 75.20 | 75.25 | 75.30 |
| 1966 | 75.25 | 75.10 | 74.93 | 74.95 | 74.75 | 74.75 | 74.88 | 74.78 | 75.00 | 75.15 | 75.03 | 75.13 |
| 1967 | 75.03 | 74.83 | 74.88 | 74.83 | 74.70 | 74.58 | 74.50 | 74.50 | 74.63 | 74.75 | 72.10 | 69.53 |
| 1968 | 69.48 | 69.45 | 69.58 | 69.55 | 69.40 | 69.30 | 69.05 | 68.88 | 68.98 | 69.10 | 69.10 | 69.25 |
| 1969 | 69.15 | 69.00 | 69.05 | 68.93 | 68.83 | 68.93 | 68.90 | 68.83 | 68.93 | 68.93 | 69.15 | 69.20 |
| 1970 | 69.18 | 69.38 | 69.60 | 69.50 | 69.48 | 69.43 | 69.35 | 69.23 | 69.55 | 69.43 | 69.25 | 69.28 |
| 1971 | 69.23 | 69.33 | 69.23 | 69.15 | 69.10 | 69.10 | 69.08 | 69.25 | 69.68 | 69.45 | 69.18 | 68.88 |
| 1972 | 68.90 | 68.85 | 68.78 | 68.68 | 68.45 | 68.38 | 68.13 | 68.50 | 68.60 | 68.85 | 69.13 | 69.45 |
| 1973 | 69.20 | 71.08 | 73.25 | 73.05 | 72.30 | 72.43 | 73.25 | 73.13 | 73.95 | 74.13 | 73.15 | 73.65 |

**Table A7.8 (cont.).** *Monthly exchange rates on Denmark. SEK per 100 DKK 1913–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1974 | 72.75 | 73.35 | 73.60 | 73.10 | 73.35 | 73.68 | 74.10 | 73.65 | 72.60 | 73.33 | 73.73 | 73.10 |
| 1975 | 72.34 | 72.23 | 72.51 | 72.31 | 72.40 | 72.40 | 72.49 | 72.73 | 73.48 | 73.26 | 72.99 | 72.03 |
| 1976 | 71.34 | 71.50 | 71.85 | 73.10 | 73.07 | 72.86 | 72.73 | 72.80 | 72.82 | 72.42 | 71.62 | 71.51 |
| 1977 | 71.75 | 71.97 | 72.05 | 72.87 | 72.68 | 73.31 | 73.20 | 74.07 | 78.80 | 78.71 | 78.58 | 80.14 |
| 1978 | 81.14 | 82.02 | 82.56 | 82.22 | 81.91 | 81.96 | 81.27 | 81.01 | 81.63 | 83.98 | 83.40 | 83.81 |
| 1979 | 84.95 | 85.09 | 84.34 | 83.46 | 81.76 | 80.13 | 80.72 | 80.24 | 80.94 | 80.67 | 80.52 | 78.04 |
| 1980 | 77.20 | 76.64 | 75.48 | 75.01 | 75.40 | 76.04 | 76.43 | 75.60 | 75.23 | 74.17 | 73.14 | 73.03 |
| 1981 | 72.15 | 69.86 | 69.71 | 69.24 | 68.05 | 67.84 | 67.95 | 67.64 | 73.58 | 76.87 | 76.72 | 75.87 |
| 1982 | 75.17 | 74.13 | 72.77 | 72.70 | 73.92 | 72.39 | 71.82 | 71.28 | 70.92 | 80.50 | 83.98 | 86.34 |
| 1983 | 87.17 | 86.85 | 86.94 | 86.64 | 85.34 | 83.85 | 82.87 | 81.79 | 82.28 | 82.84 | 81.98 | 81.19 |
| 1984 | 80.55 | 81.35 | 81.47 | 80.91 | 80.44 | 80.83 | 79.92 | 79.57 | 78.44 | 78.49 | 79.60 | 79.77 |
| 1985 | 80.23 | 79.25 | 79.84 | 81.19 | 80.60 | 80.72 | 81.15 | 82.39 | 81.73 | 83.14 | 83.34 | 84.32 |
| 1986 | 85.05 | 86.17 | 86.73 | 86.50 | 86.88 | 87.21 | 87.89 | 89.44 | 89.68 | 91.28 | 91.28 | 91.92 |
| 1987 | 94.03 | 94.51 | 93.11 | 92.63 | 93.19 | 92.78 | 92.07 | 91.29 | 91.51 | 91.91 | 93.72 | 94.48 |
| 1988 | 94.25 | 93.45 | 92.79 | 91.85 | 91.21 | 91.49 | 90.67 | 89.92 | 90.01 | 89.61 | 90.38 | 89.91 |
| 1989 | 88.41 | 87.87 | 87.92 | 87.69 | 86.88 | 86.88 | 88.09 | 87.56 | 87.26 | 88.85 | 90.56 | 93.17 |
| 1990 | 94.25 | 94.69 | 94.58 | 95.27 | 95.81 | 95.20 | 95.54 | 96.40 | 96.38 | 97.20 | 97.86 | 97.83 |
| 1991 | 97.21 | 97.45 | 95.91 | 94.09 | 93.86 | 93.76 | 93.58 | 93.91 | 94.18 | 94.35 | 94.11 | 94.02 |
| 1992 | 93.83 | 93.65 | 93.48 | 93.40 | 93.26 | 93.71 | 94.21 | 94.44 | 95.59 | 97.68 | 101.80 | 112.51 |
| 1993 | 116.40 | 119.54 | 122.27 | 121.45 | 118.83 | 117.48 | 119.93 | 116.50 | 120.69 | 120.99 | 122.12 | 124.69 |
| 1994 | 120.21 | 117.84 | 119.31 | 118.34 | 118.90 | 122.13 | 125.83 | 125.16 | 123.28 | 122.03 | 122.00 | 122.04 |
| 1995 | 123.75 | 124.60 | 128.97 | 135.30 | 132.41 | 132.76 | 132.70 | 129.13 | 126.05 | 124.53 | 120.25 | 118.79 |
| 1996 | 118.95 | 121.35 | 117.95 | 115.77 | 114.94 | 113.43 | 114.48 | 115.53 | 114.55 | 112.67 | 114.11 | 114.79 |
| 1997 | 115.37 | 115.94 | 118.22 | 117.94 | 118.36 | 117.86 | 114.58 | 113.90 | 113.09 | 113.19 | 114.70 | 115.01 |
| 1998 | 115.83 | 116.84 | 114.48 | 113.12 | 113.74 | 115.88 | 116.55 | 119.34 | 121.89 | 125.98 | 125.06 | 126.91 |
| 1999 | 122.05 | 119.83 | 120.34 | 119.96 | 120.76 | 118.88 | 117.62 | 117.76 | 116.13 | 117.44 | 116.06 | 115.44 |
| 2000 | 115.44 | 114.32 | 112.73 | 111.01 | 110.49 | 111.41 | 112.73 | 112.58 | 112.73 | 114.49 | 115.71 | 116.17 |
| 2001 | 119.19 | 120.24 | 122.25 | 122.07 | 121.35 | 123.43 | 124.33 | 124.97 | 129.91 | 128.82 | 126.43 | 126.86 |
| 2002 | 124.17 | 123.65 | 121.90 | 122.85 | 124.04 | 122.67 | 124.76 | 124.58 | 123.51 | 122.56 | 122.22 | 122.44 |
| 2003 | 123.47 | 123.11 | 124.17 | 123.34 | 123.29 | 122.76 | 123.70 | 124.25 | 122.11 | 121.26 | 120.89 | 121.17 |
| 2004 | 122.68 | 123.22 | 123.91 | 123.21 | 122.72 | 122.97 | 123.68 | 123.60 | 122.28 | 121.82 | 121.16 | 120.79 |
| 2005 | 121.69 | 122.05 | 122.02 | 123.02 | 123.50 | 124.37 | 126.42 | 125.25 | 125.19 | 126.28 | 128.25 | 126.60 |
| 2006 | 124.89 | 125.14 | 125.97 | 125.08 | 125.22 | 123.85 | 123.50 | 123.40 | 124.29 | 124.14 | 122.11 | 121.24 |
| 2007 | 121.83 | 123.19 | 124.81 | 124.00 | 123.51 | 125.39 | 123.46 | 125.23 | 124.70 | 123.12 | 124.56 | 126.34 |
| 2008 | 126.61 | 125.66 | 126.14 | 125.65 | 124.88 | 125.68 | 126.82 | 125.97 | 128.17 | 132.07 | 135.93 | 143.87 |

**Table A7.9.** *Monthly exchange rates on Norway. SEK per 100 NKK 1913–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 1914 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| 1915 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 99.70 |
| 1916 | 99.56 | 99.98 | 100.00 | 100.13 | 100.41 | 100.00 | 100.00 | 99.95 | 99.15 | 98.26 | 97.98 | 96.10 |
| 1917 | 95.15 | 95.05 | 98.52 | 98.07 | 98.04 | 97.60 | 94.93 | 92.01 | 91.32 | 86.19 | 86.95 | 95.90 |
| 1918 | 97.02 | 96.43 | 95.70 | 93.87 | 92.68 | 91.33 | 89.03 | 88.81 | 92.45 | 94.66 | 97.61 | 96.62 |

**Table A7.9 (cont.).** *Monthly exchange rates on Norway. SEK per 100 NKK 1913–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1919 | 97.15 | 97.41 | 96.19 | 96.49 | 98.31 | 97.95 | 96.48 | 94.71 | 94.56 | 94.59 | 96.80 | 95.80 |
| 1920 | 93.27 | 93.18 | 88.84 | 90.96 | 87.83 | 80.61 | 75.92 | 72.83 | 69.40 | 70.46 | 70.14 | 75.65 |
| 1921 | 82.87 | 80.56 | 71.70 | 68.04 | 67.37 | 65.43 | 63.84 | 62.00 | 59.33 | 55.16 | 61.28 | 62.32 |
| 1922 | 63.09 | 63.83 | 67.72 | 71.68 | 72.05 | 66.70 | 64.49 | 65.45 | 63.58 | 67.25 | 68.68 | 70.38 |
| 1923 | 69.71 | 69.93 | 68.42 | 67.13 | 62.18 | 62.78 | 61.21 | 60.78 | 60.69 | 58.91 | 56.00 | 56.83 |
| 1924 | 53.99 | 50.95 | 51.65 | 52.44 | 52.44 | 51.07 | 50.59 | 52.19 | 52.14 | 53.73 | 54.94 | 56.01 |
| 1925 | 56.75 | 56.65 | 57.20 | 60.00 | 62.93 | 63.55 | 67.41 | 70.16 | 77.09 | 75.82 | 76.18 | 76.04 |
| 1926 | 76.16 | 78.03 | 80.36 | 80.94 | 81.02 | 82.57 | 82.01 | 82.01 | 82.05 | 88.57 | 94.99 | 94.75 |
| 1927 | 95.76 | 96.80 | 97.49 | 96.78 | 96.35 | 96.65 | 96.61 | 96.84 | 98.14 | 97.92 | 98.44 | 98.67 |
| 1928 | 99.03 | 99.23 | 99.43 | 99.69 | 99.89 | 99.87 | 99.85 | 99.79 | 99.74 | 99.75 | 99.78 | 99.70 |
| 1929 | 99.75 | 99.82 | 99.88 | 99.89 | 99.78 | 99.60 | 99.49 | 99.47 | 99.47 | 99.73 | 99.75 | 99.50 |
| 1930 | 99.64 | 99.66 | 99.69 | 99.65 | 99.72 | 99.72 | 99.70 | 99.74 | 99.64 | 99.69 | 99.71 | 99.72 |
| 1931 | 99.89 | 99.91 | 99.94 | 99.94 | 99.93 | 99.94 | 99.93 | 99.97 | 99.80 | 96.41 | 99.22 | 98.75 |
| 1932 | 97.84 | 97.75 | 99.17 | 100.36 | 99.06 | 97.09 | 97.30 | 97.98 | 98.32 | 98.30 | 96.34 | 94.69 |
| 1933 | 94.79 | 96.52 | 97.20 | 97.89 | 99.24 | 98.57 | 97.79 | 97.94 | 97.75 | 97.75 | 97.75 | 97.75 |
| 1934 | 97.67 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 |
| 1935 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 |
| 1936 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 | 97.60 |
| 1937 | 97.60 | 97.60 | 97.60 | 97.60 | 97.65 | 97.65 | 97.65 | 97.65 | 97.65 | 97.65 | 97.61 | 97.64 |
| 1938 | 97.65 | 97.66 | 97.69 | 97.65 | 97.62 | 97.60 | 97.60 | 97.60 | 97.60 | 97.70 | 97.69 | 97.70 |
| 1939 | 97.74 | 97.68 | 97.70 | 97.65 | 97.70 | 97.73 | 97.66 | 97.48 | 96.00 | 96.00 | 96.00 | 96.00 |
| 1940 | 96.00 | 95.93 | 95.54 | 95.55 | 95.55 | 95.55 | 95.55 | 95.55 | 95.55 | 95.55 | 95.55 | 95.55 |
| 1941 | 95.61 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 |
| 1942 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 |
| 1943 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 |
| 1944 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 | 95.65 |
| 1945 | 95.65 | 95.65 | 95.65 | 95.65 | 90.52 | 84.65 | 84.65 | 84.65 | 84.65 | 84.65 | 84.65 | 84.65 |
| 1946 | 84.65 | 84.85 | 84.65 | 84.85 | 84.65 | 84.65 | 77.39 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 |
| 1947 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 |
| 1948 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 |
| 1949 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 |
| 1950 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 |
| 1951 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 |
| 1952 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 |
| 1953 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 | 72.55 |
| 1954 | 72.65 | 72.75 | 72.80 | 72.90 | 72.80 | 72.65 | 72.75 | 72.70 | 72.63 | 72.73 | 72.88 | 72.78 |
| 1955 | 72.65 | 72.73 | 72.85 | 72.88 | 72.73 | 72.43 | 72.22 | 72.15 | 72.25 | 72.38 | 72.65 | 72.78 |
| 1956 | 72.83 | 72.80 | 72.83 | 72.85 | 72.85 | 72.60 | 72.33 | 72.25 | 72.35 | 72.53 | 72.43 | 72.63 |
| 1957 | 72.75 | 72.73 | 72.68 | 72.70 | 72.60 | 72.50 | 72.55 | 72.43 | 72.68 | 72.73 | 72.68 | 72.58 |
| 1958 | 72.63 | 72.73 | 72.78 | 72.70 | 72.60 | 72.50 | 72.38 | 72.35 | 72.48 | 72.63 | 72.55 | 72.55 |
| 1959 | 72.70 | 72.73 | 72.78 | 72.88 | 72.85 | 72.90 | 72.85 | 72.83 | 72.70 | 72.73 | 72.70 | 72.65 |
| 1960 | 72.65 | 72.60 | 72.68 | 72.65 | 72.65 | 72.50 | 72.53 | 72.50 | 72.63 | 72.63 | 72.68 | 72.70 |
| 1961 | 72.60 | 72.50 | 72.48 | 72.45 | 72.28 | 72.23 | 72.20 | 72.48 | 72.83 | 72.83 | 72.78 | 72.80 |
| 1962 | 72.70 | 72.60 | 72.50 | 72.43 | 72.35 | 72.28 | 72.25 | 72.20 | 72.20 | 72.23 | 72.48 | 72.80 |
| 1963 | 72.68 | 72.75 | 72.83 | 72.88 | 72.85 | 72.78 | 72.68 | 72.78 | 72.68 | 72.73 | 72.70 | 72.75 |
| 1964 | 72.68 | 72.55 | 72.18 | 72.10 | 72.08 | 72.03 | 72.05 | 71.93 | 71.98 | 72.20 | 72.15 | 72.10 |

**Table A7.9 (cont.).** *Monthly exchange rates on Norway. SEK per 100 NKK 1913–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1965 | 71.98 | 72.00 | 71.95 | 72.15 | 72.25 | 72.30 | 72.38 | 72.48 | 72.48 | 72.60 | 72.60 | 72.60 |
| 1966 | 72.58 | 72.48 | 72.30 | 72.28 | 72.23 | 72.28 | 72.38 | 72.45 | 72.50 | 72.55 | 72.55 | 72.60 |
| 1967 | 72.48 | 72.43 | 72.38 | 72.33 | 72.28 | 72.28 | 72.25 | 72.30 | 72.33 | 72.45 | 72.55 | 72.55 |
| 1968 | 72.50 | 72.50 | 72.60 | 72.58 | 72.53 | 72.55 | 72.53 | 72.43 | 72.48 | 72.58 | 72.65 | 72.63 |
| 1969 | 72.58 | 72.60 | 72.60 | 72.60 | 72.60 | 72.68 | 72.63 | 72.48 | 72.55 | 72.43 | 72.48 | 72.55 |
| 1970 | 72.50 | 72.73 | 72.98 | 73.00 | 72.90 | 72.83 | 72.80 | 72.70 | 72.98 | 72.83 | 72.65 | 72.70 |
| 1971 | 72.53 | 72.65 | 72.55 | 72.60 | 72.73 | 72.80 | 72.88 | 73.65 | 73.98 | 73.68 | 73.15 | 72.80 |
| 1972 | 72.35 | 72.28 | 72.53 | 72.75 | 72.55 | 73.18 | 72.93 | 72.63 | 71.95 | 72.10 | 72.05 | 72.13 |
| 1973 | 72.00 | 74.38 | 76.25 | 76.60 | 76.80 | 77.45 | 77.50 | 75.95 | 76.48 | 76.65 | 78.00 | 80.73 |
| 1974 | 81.05 | 81.35 | 81.33 | 80.55 | 81.15 | 80.63 | 81.43 | 81.15 | 81.10 | 80.20 | 79.70 | 79.25 |
| 1975 | 79.45 | 79.80 | 80.23 | 80.03 | 79.84 | 80.23 | 79.75 | 79.32 | 79.61 | 79.80 | 79.78 | 79.63 |
| 1976 | 79.05 | 79.46 | 79.63 | 80.35 | 80.55 | 80.46 | 80.20 | 80.33 | 80.35 | 80.27 | 80.24 | 80.08 |
| 1977 | 80.09 | 80.57 | 80.48 | 82.42 | 82.77 | 83.79 | 82.99 | 84.20 | 88.74 | 87.70 | 88.12 | 90.83 |
| 1978 | 90.96 | 88.43 | 86.80 | 86.02 | 85.72 | 85.57 | 84.41 | 84.68 | 85.11 | 87.33 | 86.62 | 86.33 |
| 1979 | 86.03 | 85.91 | 85.89 | 85.60 | 84.89 | 84.37 | 83.92 | 84.08 | 84.36 | 84.90 | 84.34 | 84.20 |
| 1980 | 84.60 | 85.62 | 86.24 | 86.43 | 86.00 | 86.02 | 85.83 | 85.97 | 86.08 | 85.77 | 86.01 | 85.51 |
| 1981 | 85.07 | 85.31 | 85.56 | 85.94 | 86.57 | 85.72 | 85.15 | 85.98 | 91.09 | 93.93 | 94.47 | 96.06 |
| 1982 | 96.04 | 96.72 | 97.01 | 97.41 | 97.10 | 97.48 | 96.45 | 92.12 | 90.42 | 99.92 | 103.82 | 104.91 |
| 1983 | 104.07 | 104.69 | 104.39 | 105.05 | 105.60 | 105.34 | 105.15 | 105.50 | 106.22 | 106.46 | 106.20 | 104.60 |
| 1984 | 104.05 | 104.19 | 103.29 | 103.31 | 103.61 | 103.81 | 101.34 | 100.85 | 99.75 | 98.11 | 98.73 | 98.84 |
| 1985 | 99.02 | 98.77 | 99.64 | 100.86 | 100.65 | 100.59 | 100.63 | 101.03 | 100.90 | 100.84 | 100.30 | 100.64 |
| 1986 | 100.75 | 101.80 | 101.66 | 101.45 | 96.42 | 94.88 | 94.75 | 94.43 | 94.41 | 93.79 | 92.67 | 91.98 |
| 1987 | 92.40 | 92.99 | 92.81 | 93.45 | 94.14 | 94.69 | 95.47 | 95.66 | 96.15 | 96.05 | 94.80 | 93.40 |
| 1988 | 94.27 | 94.52 | 94.15 | 95.02 | 95.66 | 95.68 | 94.73 | 94.21 | 93.40 | 93.16 | 92.87 | 93.53 |
| 1989 | 94.02 | 94.22 | 94.11 | 93.90 | 93.65 | 93.24 | 93.24 | 93.09 | 92.91 | 93.22 | 93.33 | 94.02 |
| 1990 | 94.52 | 94.60 | 93.71 | 93.63 | 94.14 | 94.31 | 94.64 | 95.18 | 95.16 | 95.56 | 96.07 | 96.20 |
| 1991 | 95.67 | 95.85 | 94.34 | 92.61 | 92.22 | 92.53 | 92.78 | 92.90 | 93.01 | 93.06 | 93.01 | 92.90 |
| 1992 | 93.64 | 92.58 | 92.46 | 92.38 | 92.34 | 92.35 | 92.32 | 92.35 | 92.48 | 92.44 | 96.17 | 103.43 |
| 1993 | 105.56 | 107.97 | 110.42 | 109.95 | 107.94 | 106.36 | 108.92 | 109.37 | 113.25 | 111.89 | 111.85 | 112.68 |
| 1994 | 108.37 | 106.48 | 107.68 | 107.01 | 107.40 | 110.25 | 113.03 | 112.83 | 110.77 | 109.69 | 109.27 | 109.68 |
| 1995 | 111.47 | 112.02 | 115.80 | 118.71 | 115.92 | 116.41 | 116.30 | 114.07 | 111.63 | 109.66 | 105.63 | 104.30 |
| 1996 | 104.77 | 107.46 | 104.73 | 103.52 | 103.41 | 102.29 | 102.95 | 103.28 | 102.88 | 101.76 | 104.25 | 105.38 |
| 1997 | 109.55 | 111.73 | 112.44 | 110.27 | 108.69 | 107.54 | 105.05 | 104.82 | 105.26 | 107.04 | 107.16 | 107.43 |
| 1998 | 107.00 | 106.93 | 105.14 | 103.93 | 103.28 | 104.45 | 104.77 | 105.42 | 104.44 | 105.68 | 107.30 | 106.22 |
| 1999 | 105.11 | 103.00 | 105.09 | 107.17 | 108.97 | 108.13 | 107.02 | 105.98 | 104.99 | 105.34 | 105.32 | 106.01 |
| 2000 | 105.81 | 105.09 | 103.47 | 101.46 | 100.48 | 100.81 | 102.80 | 103.66 | 104.74 | 106.53 | 107.97 | 106.54 |
| 2001 | 108.02 | 109.33 | 111.85 | 112.29 | 113.22 | 115.93 | 116.14 | 115.53 | 120.93 | 119.78 | 118.79 | 118.05 |
| 2002 | 116.49 | 117.97 | 117.35 | 119.71 | 122.70 | 122.99 | 125.14 | 124.48 | 124.57 | 124.02 | 123.99 | 124.58 |
| 2003 | 125.05 | 121.31 | 117.62 | 116.99 | 116.21 | 111.73 | 110.83 | 111.73 | 110.61 | 109.38 | 109.65 | 109.69 |
| 2004 | 106.33 | 104.59 | 108.11 | 110.50 | 111.26 | 110.41 | 108.54 | 110.30 | 108.78 | 109.98 | 110.57 | 109.15 |
| 2005 | 110.18 | 109.22 | 111.01 | 112.06 | 113.70 | 117.28 | 118.94 | 118.02 | 119.65 | 120.24 | 122.25 | 118.35 |
| 2006 | 115.86 | 115.92 | 117.79 | 119.00 | 119.75 | 117.65 | 116.06 | 115.23 | 112.29 | 110.28 | 110.42 | 110.76 |
| 2007 | 109.80 | 113.56 | 114.37 | 113.84 | 113.11 | 115.83 | 115.77 | 116.84 | 118.62 | 119.30 | 117.04 | 117.52 |
| 2008 | 118.58 | 117.82 | 118.05 | 117.69 | 118.37 | 117.33 | 117.53 | 117.83 | 117.38 | 114.60 | 114.85 | 114.46 |

**Table A7.10a.** *Monthly exchange rates on Finland. SEK per 100 (old) mark 1913–1962.**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | 72.04 | 72.05 | 72.05 | 72.05 | 72.04 | 72.00 | 72.00 | 72.00 | 72.00 | 72.02 | 71.98 | 71.90 |
| 1914 | 71.88 | 71.85 | 71.85 | 71.85 | 71.88 | 71.90 | 71.89 | 71.70 | 71.61 | 70.95 | 67.63 | 66.00 |
| 1915 | 66.00 | 67.95 | 66.90 | 65.15 | 62.05 | 57.38 | 55.73 | 54.48 | 55.37 | 55.97 | 53.24 | 50.76 |
| 1916 | 50.32 | 51.65 | 51.48 | 49.59 | 47.31 | 48.75 | 50.68 | 50.58 | 53.70 | 52.26 | 50.18 | 48.18 |
| 1917 | 47.62 | 46.98 | 46.60 | 45.90 | 46.46 | 47.77 | 51.23 | 45.77 | 42.53 | 35.24 | 31.29 | 41.38 |
| 1918 | 45.87 | | | | 46.96 | 41.77 | 34.86 | 35.26 | 34.22 | 35.58 | 41.98 | 38.79 |
| 1919 | 38.81 | 37.89 | 36.66 | 38.94 | 39.02 | 34.32 | 29.87 | 26.92 | 23.24 | 18.18 | 16.46 | 14.48 |
| 1920 | 18.04 | 21.94 | 26.10 | 25.39 | 24.76 | 21.58 | 18.36 | 15.73 | 15.69 | 13.38 | 11.38 | 12.67 |
| 1921 | 14.99 | 14.92 | 11.82 | 9.70 | 9.18 | 7.73 | 7.90 | 7.16 | 6.64 | 6.71 | 8.14 | 7.80 |
| 1922 | 7.64 | 7.73 | 7.97 | 7.45 | 8.17 | 8.49 | 8.27 | 8.12 | 8.26 | 8.73 | 9.52 | 9.32 |
| 1923 | 9.26 | 9.89 | 10.36 | 10.35 | 10.37 | 10.42 | 10.43 | 10.40 | 10.18 | 10.18 | 10.04 | 9.40 |
| 1924 | 9.53 | 9.61 | 9.56 | 9.38 | 9.38 | 9.46 | 9.45 | 9.44 | 9.43 | 9.45 | 9.40 | 9.35 |
| 1925 | 9.36 | 9.36 | 9.36 | 9.37 | 9.45 | 9.45 | 9.37 | 9.41 | 9.43 | 9.43 | 9.45 | 9.43 |
| 1926 | 9.43 | 9.43 | 9.42 | 9.38 | 9.43 | 9.42 | 9.42 | 9.42 | 9.43 | 9.43 | 9.32 | 9.36 |
| 1927 | 9.44 | 9.45 | 9.43 | 9.42 | 9.42 | 9.41 | 9.42 | 9.41 | 9.39 | 9.37 | 9.37 | 9.34 |
| 1928 | 9.38 | 9.39 | 9.39 | 9.39 | 9.39 | 9.39 | 9.40 | 9.42 | 9.42 | 9.43 | 9.43 | 9.41 |
| 1929 | 9.41 | 9.42 | 9.43 | 9.42 | 9.42 | 9.40 | 9.39 | 9.39 | 9.40 | 9.37 | 9.37 | 9.34 |
| 1930 | 9.38 | 9.39 | 9.39 | 9.38 | 9.39 | 9.38 | 9.38 | 9.37 | 9.38 | 9.38 | 9.39 | 9.39 |
| 1931 | 9.41 | 9.41 | 9.41 | 9.41 | 9.40 | 9.40 | 9.41 | 9.42 | 9.65 | 9.71 | 9.11 | 7.67 |
| 1932 | 7.76 | 8.11 | 8.46 | 9.17 | 9.17 | 9.06 | 8.36 | 8.15 | 8.42 | 8.34 | 8.26 | 8.14 |
| 1933 | 8.17 | 8.36 | 8.40 | 8.46 | 8.64 | 8.64 | 8.61 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 |
| 1934 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 |
| 1935 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 |
| 1936 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 |
| 1937 | 8.60 | 8.60 | 8.60 | 8.61 | 8.61 | 8.60 | 8.61 | 8.61 | 8.60 | 8.60 | 8.60 | 8.60 |
| 1938 | 8.60 | 8.61 | 8.62 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 |
| 1939 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.60 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 |
| 1940 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 |
| 1941 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.69 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 |
| 1942 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 |
| 1943 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 |
| 1944 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 |
| 1945 | 8.59 | 8.59 | 8.59 | 8.59 | 8.59 | 4.91 | 4.72 | 3.51 | 3.51 | 3.31 | 3.12 | 3.12 |
| 1946 | 3.12 | 3.12 | 3.12 | 3.12 | 3.12 | 3.12 | 2.86 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 |
| 1947 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 |
| 1948 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 |
| 1949 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 | 2.69 | 2.32 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 |
| 1950 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 |
| 1951 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 |
| 1952 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 |
| 1953 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 |
| 1954 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 |
| 1955 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 |
| 1956 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 |
| 1957 | 2.27 | 2.27 | 2.27 | 2.27 | 2.27 | 2.26 | 2.26 | 2.26 | 1.95 | 1.63 | 1.63 | 1.63 |
| 1958 | 1.64 | 1.64 | 1.64 | 1.64 | 1.64 | 1.64 | 1.64 | 1.64 | 1.64 | 1.64 | 1.64 | 1.64 |

**Table A7.10a (cont.).** *Monthly exchange rates on Finland. SEK per 100 (old) mark 1913–1962.**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1959 | 1.63 | 1.63 | 1.63 | 1.63 | 1.63 | 1.63 | 1.63 | 1.63 | 1.63 | 1.63 | 1.63 | 1.63 |
| 1960 | 1.63 | 1.63 | 1.63 | 1.63 | 1.63 | 1.63 | 1.63 | 1.63 | 1.63 | 1.63 | 1.63 | 1.63 |
| 1961 | 1.63 | 1.63 | 1.63 | 1.62 | 1.62 | 1.62 | 1.62 | 1.62 | 1.62 | 1.62 | 1.62 | 1.62 |
| 1962 | 1.62 | 1.62 | 1.62 | 1.62 | 1.62 | 1.61 | 1.61 | 1.61 | 1.61 | 1.61 | 1.62 | 1.62 |

* January 1, 1963: 1 new markkaa = 100 old markkaa.

**Table A7.10b.** *Monthly exchange rates on Finland. SEK per 100 (new) mark 1963–2002.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1963 | 161.10 | 161.25 | 161.50 | 161.63 | 161.58 | 161.43 | 161.38 | 161.55 | 161.58 | 161.63 | 161.68 | 161.80 |
| 1964 | 161.80 | 161.68 | 160.88 | 160.28 | 160.10 | 160.00 | 160.10 | 159.90 | 160.10 | 160.80 | 160.95 | 160.55 |
| 1965 | 160.30 | 160.23 | 159.98 | 160.15 | 160.35 | 160.60 | 160.85 | 160.88 | 160.78 | 161.00 | 161.03 | 161.00 |
| 1966 | 160.88 | 160.93 | 160.50 | 160.58 | 160.48 | 160.53 | 160.85 | 160.80 | 160.85 | 161.00 | 160.95 | 160.95 |
| 1967 | 160.93 | 160.83 | 160.75 | 160.45 | 160.50 | 160.35 | 160.38 | 160.48 | 160.63 | 142.28 | 123.88 | 123.48 |
| 1968 | 123.28 | 123.53 | 123.80 | 123.95 | 123.90 | 123.90 | 123.90 | 123.80 | 123.75 | 123.90 | 124.08 | 124.05 |
| 1969 | 123.95 | 124.00 | 123.90 | 123.93 | 123.65 | 123.33 | 123.13 | 123.05 | 123.20 | 122.98 | 123.25 | 123.45 |
| 1970 | 123.60 | 124.15 | 124.70 | 124.90 | 124.98 | 124.63 | 124.70 | 124.53 | 125.00 | 124.80 | 124.38 | 124.28 |
| 1971 | 124.18 | 124.35 | 124.13 | 124.03 | 123.63 | 123.38 | 123.80 | 123.08 | 122.18 | 121.20 | 120.30 | 118.50 |
| 1972 | 116.93 | 116.13 | 115.55 | 116.08 | 115.33 | 115.00 | 114.68 | 114.75 | 114.78 | 114.70 | 114.28 | 114.05 |
| 1973 | 113.70 | 115.40 | 115.88 | 116.73 | 115.55 | 112.88 | 112.75 | 113.93 | 114.18 | 113.55 | 116.78 | 118.85 |
| 1974 | 121.15 | 120.65 | 119.85 | 117.85 | 116.63 | 119.63 | 120.00 | 118.65 | 117.90 | 116.28 | 116.28 | 115.95 |
| 1975 | 114.57 | 114.44 | 112.48 | 112.00 | 111.25 | 111.33 | 112.90 | 114.48 | 115.74 | 113.99 | 114.01 | 114.42 |
| 1976 | 114.36 | 114.55 | 114.89 | 114.77 | 114.29 | 114.40 | 115.32 | 113.88 | 112.50 | 110.60 | 110.13 | 109.75 |
| 1977 | 111.07 | 111.42 | 111.12 | 108.10 | 107.06 | 108.58 | 108.63 | 109.23 | 116.67 | 116.11 | 115.27 | 115.68 |
| 1978 | 116.58 | 113.88 | 110.81 | 110.25 | 109.29 | 108.11 | 108.33 | 108.38 | 109.03 | 109.39 | 109.55 | 109.66 |
| 1979 | 110.06 | 110.28 | 110.18 | 109.96 | 109.95 | 109.92 | 110.14 | 110.31 | 110.20 | 111.83 | 111.87 | 112.43 |
| 1980 | 112.49 | 112.47 | 113.03 | 114.63 | 114.37 | 114.60 | 114.53 | 114.46 | 114.18 | 113.98 | 114.02 | 114.36 |
| 1981 | 114.70 | 113.77 | 113.62 | 113.47 | 113.73 | 114.06 | 114.49 | 115.03 | 120.93 | 125.69 | 126.45 | 127.20 |
| 1982 | 127.84 | 128.02 | 127.95 | 128.56 | 128.57 | 129.01 | 129.54 | 129.44 | 129.85 | 133.70 | 136.06 | 137.71 |
| 1983 | 138.01 | 138.37 | 138.13 | 138.08 | 138.11 | 138.10 | 137.86 | 137.94 | 138.25 | 138.22 | 137.94 | 137.92 |
| 1984 | 137.90 | 138.44 | 138.03 | 139.01 | 139.21 | 139.42 | 138.29 | 138.02 | 136.96 | 136.54 | 137.34 | 137.47 |
| 1985 | 136.87 | 136.30 | 137.74 | 139.45 | 139.30 | 139.36 | 139.59 | 140.11 | 139.82 | 140.31 | 140.32 | 140.41 |
| 1986 | 140.54 | 141.22 | 141.48 | 141.71 | 140.41 | 139.22 | 139.71 | 140.69 | 140.95 | 140.98 | 140.83 | 141.24 |
| 1987 | 142.96 | 143.15 | 142.75 | 143.28 | 144.01 | 143.75 | 143.93 | 144.43 | 145.57 | 146.23 | 147.19 | 147.49 |
| 1988 | 148.34 | 147.38 | 147.28 | 147.35 | 146.99 | 146.63 | 145.10 | 145.40 | 145.95 | 145.99 | 147.17 | 147.43 |
| 1989 | 147.67 | 147.44 | 148.77 | 152.14 | 151.79 | 151.29 | 151.71 | 150.95 | 150.01 | 151.16 | 151.23 | 152.95 |
| 1990 | 154.25 | 155.14 | 153.53 | 153.52 | 154.50 | 154.24 | 155.28 | 156.28 | 155.81 | 156.23 | 156.55 | 156.20 |
| 1991 | 155.08 | 154.43 | 153.80 | 153.45 | 152.51 | 152.42 | 150.93 | 149.60 | 149.45 | 149.65 | 142.33 | 134.79 |
| 1992 | 133.73 | 132.95 | 132.97 | 132.74 | 132.64 | 132.55 | 132.55 | 132.63 | 122.05 | 118.85 | 123.32 | 134.10 |
| 1993 | 134.00 | 129.58 | 129.59 | 132.89 | 133.82 | 133.73 | 137.72 | 138.09 | 138.63 | 139.39 | 142.38 | 145.32 |
| 1994 | 142.79 | 143.01 | 143.04 | 143.61 | 142.73 | 144.00 | 149.25 | 150.65 | 151.62 | 155.26 | 155.81 | 155.03 |
| 1995 | 157.67 | 159.03 | 165.93 | 172.12 | 169.03 | 169.00 | 169.00 | 168.10 | 163.45 | 160.22 | 155.65 | 153.11 |
| 1996 | 151.40 | 151.24 | 146.36 | 142.11 | 143.02 | 143.03 | 144.75 | 147.80 | 146.34 | 144.38 | 145.59 | 147.03 |
| 1997 | 147.98 | 148.79 | 150.88 | 149.80 | 149.41 | 149.75 | 147.25 | 145.13 | 143.86 | 143.77 | 144.91 | 144.96 |

**Table A7.10b (cont.).** *Monthly exchange rates on Finland. SEK per 100 (new) mark 1963–2002.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1998 | 145.77 | 146.82 | 143.80 | 140.35 | 142.62 | 145.22 | 146.17 | 149.46 | 152.52 | 157.41 | 156.36 | 158.80 |
| 1999 | 152.78 | 149.85 | 150.44 | 149.96 | 150.98 | 148.57 | 147.14 | 147.31 | 145.20 | 146.81 | 145.15 | 144.46 |
| 2000 | 144.57 | 143.15 | 141.19 | 139.09 | 138.57 | 139.79 | 141.41 | 141.21 | 141.48 | 143.41 | 145.10 | 145.70 |
| 2001 | 149.62 | 150.93 | 153.48 | 153.22 | 152.27 | 154.75 | 155.67 | 156.48 | 162.59 | 161.12 | 158.32 | 158.83 |
| 2002 | 155.22 | 154.51 | | | | | | | | | | |

**Table A7.11.** *Monthly exchange rates on Italy. SEK per 100 ITL 1920–2002.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1920 | | | | | | | | | | 20.20 | 19.49 | 18.54 |
| 1921 | 17.35 | 16.90 | 17.02 | 19.87 | 23.05 | 22.73 | 21.99 | 20.60 | 19.95 | 17.68 | 18.13 | 18.55 |
| 1922 | 17.67 | 18.84 | 19.76 | 20.83 | 20.61 | 19.45 | 17.80 | 17.26 | 16.30 | 15.84 | 16.96 | 18.81 |
| 1923 | 18.48 | 18.30 | 18.32 | 18.91 | 18.34 | 17.43 | 16.42 | 16.30 | 16.79 | 17.34 | 16.84 | 16.69 |
| 1924 | 16.71 | 16.73 | 16.47 | 16.88 | 16.88 | 16.44 | 16.27 | 16.81 | 16.62 | 16.51 | 16.29 | 16.09 |
| 1925 | 15.57 | 15.40 | 15.20 | 15.35 | 15.33 | 14.48 | 13.77 | 13.72 | 15.16 | 15.05 | 15.07 | 15.16 |
| 1926 | 15.16 | 15.11 | 15.05 | 15.10 | 14.54 | 13.82 | 12.70 | 12.43 | 13.80 | 15.58 | 15.96 | 16.72 |
| 1927 | 16.37 | 16.32 | 16.96 | 19.04 | 20.37 | 21.08 | 20.55 | 20.42 | 20.32 | 20.38 | 20.35 | 20.08 |
| 1928 | 19.75 | 19.80 | 19.76 | 19.72 | 19.70 | 19.66 | 19.65 | 19.64 | 19.59 | 19.64 | 19.65 | 19.61 |
| 1929 | 19.60 | 19.56 | 19.61 | 19.51 | 19.63 | 19.59 | 19.57 | 19.57 | 19.58 | 19.56 | 19.53 | 19.46 |
| 1930 | 19.51 | 19.55 | 19.55 | 19.53 | 19.57 | 19.56 | 19.54 | 19.51 | 19.52 | 19.53 | 19.54 | 19.56 |
| 1931 | 19.58 | 19.58 | 19.59 | 19.59 | 19.56 | 19.56 | 19.57 | 19.58 | 20.11 | 23.00 | 25.22 | 28.00 |
| 1932 | 26.77 | 27.30 | 26.74 | 27.47 | 28.10 | 27.99 | 28.52 | 29.13 | 29.32 | 29.80 | 29.81 | 28.99 |
| 1933 | 28.40 | 28.47 | 28.61 | 29.07 | 30.50 | 30.36 | 31.20 | 31.49 | 32.88 | 32.97 | 32.17 | 31.51 |
| 1934 | 32.27 | 33.59 | 33.12 | 32.56 | 32.73 | 33.47 | 33.29 | 33.63 | 34.10 | 34.28 | 33.57 | 33.86 |
| 1935 | 34.25 | 34.25 | 34.45 | 33.57 | 32.97 | 32.79 | 32.59 | 32.50 | 32.50 | 32.50 | 32.50 | 32.50 |
| 1936 | 32.50 | 32.50 | 32.50 | 32.50 | 31.57 | 31.00 | 31.00 | 31.00 | 30.56 | 23.10 | 21.25 | 21.08 |
| 1937 | 21.00 | 21.21 | 21.25 | 21.17 | 21.00 | 21.00 | 20.94 | 20.85 | 20.84 | 20.75 | 20.67 | 20.65 |
| 1938 | 20.65 | 20.55 | 20.62 | 20.65 | 20.69 | 20.73 | 20.87 | 21.08 | 21.43 | 21.62 | 21.86 | 22.08 |
| 1939 | 22.13 | 22.05 | 22.00 | 22.00 | 22.00 | 22.00 | 22.00 | 22.00 | 22.42 | 22.03 | 21.77 | 21.75 |
| 1940 | 21.75 | 21.55 | 21.80 | 21.30 | 21.36 | 21.40 | 21.40 | 21.40 | 21.40 | 21.40 | 21.40 | 21.40 |
| 1941 | 21.40 | 21.37 | 21.35 | 21.35 | 21.44 | 22.25 | 22.25 | 22.25 | 22.25 | 22.25 | 22.25 | 22.25 |
| 1942 | 21.96 | 21.95 | 21.99 | 22.00 | 22.00 | 22.00 | 22.00 | 22.00 | 22.00 | 22.00 | 22.00 | 22.00 |
| 1943 | 22.20 | 22.20 | 22.20 | 22.20 | 22.20 | 22.20 | 22.20 | 22.20 | 22.20 | 22.20 | 22.20 | 22.20 |
| 1944 | 22.20 | 22.20 | 22.20 | 22.20 | 22.20 | 22.20 | 22.20 | 22.20 | 22.20 | | | |
| 1945 | | | | | | | | | | | | |
| 1946 | | | | | | | | | | | | |
| 1947 | 14.63 | 14.63 | 14.60 | 14.58 | 14.58 | 14.58 | 14.58 | 14.58 | 14.58 | 14.58 | 14.58 | 14.58 |
| 1948 | | | | | | | | | | | | |
| 1949 | | | | | | | | | | | 0.83 | 0.83 |
| 1950 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| 1951 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| 1952 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| 1953 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| 1954 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| 1955 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |

**Table A7.11 (cont.).** *Monthly exchange rates on Italy. SEK per 100 ITL 1920–2002.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1956 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| 1957 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.84 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| 1958 | 0.83 | 0.83 | 0.84 | 0.84 | 0.83 | 0.83 | 0.83 | 0.83 | 0.84 | 0.83 | 0.83 | 0.83 |
| 1959 | 0.83 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| 1960 | 0.84 | 0.84 | 0.83 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| 1961 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| 1962 | 0.84 | 0.84 | 0.85 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.84 | 0.83 | 0.84 | 0.84 |
| 1963 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 |
| 1964 | 0.84 | 0.84 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| 1965 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| 1966 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.86 | 0.84 | 0.83 | 0.83 | 0.83 | 0.83 |
| 1967 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.84 | 0.84 | 0.83 |
| 1968 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.84 | 0.84 | 0.84 | 0.84 | 0.84 | 0.83 |
| 1969 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 |
| 1970 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.83 | 0.84 | 0.84 | 0.84 | 0.83 |
| 1971 | 0.83 | 0.83 | 0.83 | 0.84 | 0.84 | 0.83 | 0.83 | 0.84 | 0.83 | 0.83 | 0.82 | 0.82 |
| 1972 | 0.82 | 0.82 | 0.82 | 0.83 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 | 0.82 |
| 1973 | 0.82 | 0.80 | 0.79 | 0.78 | 0.76 | 0.72 | 0.72 | 0.73 | 0.76 | 0.75 | 0.75 | 0.76 |
| 1974 | 0.75 | 0.73 | 0.73 | 0.70 | 0.69 | 0.68 | 0.69 | 0.68 | 0.68 | 0.67 | 0.65 | 0.64 |
| 1975 | 0.63 | 0.63 | 0.63 | 0.63 | 0.63 | 0.63 | 0.64 | 0.65 | 0.66 | 0.65 | 0.65 | 0.65 |
| 1976 | 0.63 | 0.58 | 0.54 | 0.51 | 0.52 | 0.53 | 0.54 | 0.54 | 0.53 | 0.51 | 0.50 | 0.49 |
| 1977 | 0.49 | 0.49 | 0.49 | 0.50 | 0.50 | 0.51 | 0.50 | 0.51 | 0.56 | 0.55 | 0.55 | 0.55 |
| 1978 | 0.55 | 0.55 | 0.55 | 0.55 | 0.54 | 0.54 | 0.55 | 0.54 | 0.54 | 0.54 | 0.53 | 0.53 |
| 1979 | 0.53 | 0.53 | 0.53 | 0.52 | 0.52 | 0.52 | 0.52 | 0.52 | 0.52 | 0.51 | 0.52 | 0.52 |
| 1980 | 0.52 | 0.52 | 0.51 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.49 | 0.48 | 0.48 | 0.47 |
| 1981 | 0.47 | 0.46 | 0.45 | 0.44 | 0.43 | 0.43 | 0.43 | 0.43 | 0.46 | 0.47 | 0.46 | 0.46 |
| 1982 | 0.46 | 0.46 | 0.45 | 0.45 | 0.45 | 0.48 | 0.45 | 0.45 | 0.44 | 0.50 | 0.51 | 0.53 |
| 1983 | 0.54 | 0.54 | 0.53 | 0.52 | 0.51 | 0.51 | 0.51 | 0.50 | 0.49 | 0.49 | 0.49 | 0.49 |
| 1984 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.47 | 0.46 | 0.46 | 0.46 | 0.47 |
| 1985 | 0.47 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.45 | 0.45 | 0.44 | 0.45 | 0.45 | 0.45 |
| 1986 | 0.46 | 0.47 | 0.47 | 0.47 | 0.47 | 0.47 | 0.48 | 0.49 | 0.49 | 0.50 | 0.50 | 0.50 |
| 1987 | 0.51 | 0.50 | 0.49 | 0.49 | 0.49 | 0.48 | 0.48 | 0.49 | 0.49 | 0.49 | 0.49 | 0.50 |
| 1988 | 0.49 | 0.49 | 0.48 | 0.48 | 0.47 | 0.47 | 0.47 | 0.47 | 0.47 | 0.47 | 0.47 | 0.47 |
| 1989 | 0.47 | 0.47 | 0.47 | 0.47 | 0.47 | 0.47 | 0.47 | 0.48 | 0.47 | 0.47 | 0.48 | 0.49 |
| 1990 | 0.49 | 0.49 | 0.49 | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 | 0.49 | 0.50 | 0.50 | 0.50 |
| 1991 | 0.50 | 0.50 | 0.50 | 0.49 | 0.48 | 0.49 | 0.49 | 0.49 | 0.48 | 0.49 | 0.49 | 0.48 |
| 1992 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 | 0.46 | 0.43 | 0.46 | 0.49 |
| 1993 | 0.49 | 0.49 | 0.49 | 0.48 | 0.50 | 0.49 | 0.50 | 0.50 | 0.51 | 0.50 | 0.49 | 0.50 |
| 1994 | 0.48 | 0.47 | 0.47 | 0.49 | 0.48 | 0.49 | 0.50 | 0.49 | 0.48 | 0.47 | 0.46 | 0.46 |
| 1995 | 0.46 | 0.46 | 0.43 | 0.43 | 0.44 | 0.44 | 0.45 | 0.45 | 0.44 | 0.43 | 0.41 | 0.42 |
| 1996 | 0.42 | 0.44 | 0.43 | 0.43 | 0.44 | 0.43 | 0.44 | 0.44 | 0.44 | 0.43 | 0.44 | 0.45 |
| 1997 | 0.45 | 0.45 | 0.45 | 0.45 | 0.46 | 0.46 | 0.45 | 0.44 | 0.44 | 0.44 | 0.45 | 0.45 |
| 1998 | 0.45 | 0.45 | 0.44 | 0.44 | 0.44 | 0.45 | 0.45 | 0.46 | 0.47 | 0.48 | 0.48 | 0.49 |
| 1999 | 0.47 | 0.46 | 0.46 | 0.46 | 0.46 | 0.46 | 0.45 | 0.45 | 0.45 | 0.45 | 0.45 | 0.44 |
| 2000 | 0.44 | 0.44 | 0.43 | 0.43 | 0.43 | 0.43 | 0.43 | 0.43 | 0.43 | 0.44 | 0.45 | 0.45 |
| 2001 | 0.46 | 0.46 | 0.47 | 0.47 | 0.47 | 0.48 | 0.48 | 0.48 | 0.50 | 0.49 | 0.49 | 0.49 |
| 2002 | 0.48 | 0.47 | | | | | | | | | | |

**Table A7.12.** *Monthly exchange rates on euro. SEK per EUR 1998–2008.**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1998 | 8.71 | 8.79 | 8.65 | 8.55 | 8.54 | 8.72 | 8.78 | 8.96 | 9.13 | 9.44 | 9.35 | 9.48 |
| 1999 | 9.08 | 8.91 | 8.94 | 8.92 | 8.98 | 8.83 | 8.75 | 8.76 | 8.63 | 8.73 | 8.63 | 8.59 |
| 2000 | 8.60 | 8.51 | 8.40 | 8.27 | 8.24 | 8.31 | 8.41 | 8.40 | 8.41 | 8.53 | 8.63 | 8.66 |
| 2001 | 8.90 | 8.97 | 9.13 | 9.11 | 9.05 | 9.20 | 9.26 | 9.30 | 9.67 | 9.58 | 9.41 | 9.44 |
| 2002 | 9.23 | 9.19 | 9.06 | 9.13 | 9.22 | 9.12 | 9.27 | 9.25 | 9.17 | 9.11 | 9.08 | 9.09 |
| 2003 | 9.18 | 9.15 | 9.22 | 9.16 | 9.15 | 9.11 | 9.19 | 9.24 | 9.07 | 9.01 | 8.99 | 9.02 |
| 2004 | 9.14 | 9.18 | 9.23 | 9.17 | 9.13 | 9.14 | 9.20 | 9.19 | 9.10 | 9.06 | 9.00 | 8.98 |
| 2005 | 9.05 | 9.08 | 9.09 | 9.17 | 9.19 | 9.26 | 9.43 | 9.34 | 9.34 | 9.42 | 9.57 | 9.44 |
| 2006 | 9.32 | 9.34 | 9.40 | 9.33 | 9.34 | 9.23 | 9.21 | 9.21 | 9.27 | 9.26 | 9.10 | 9.04 |
| 2007 | 9.08 | 9.18 | 9.30 | 9.24 | 9.20 | 9.34 | 9.19 | 9.32 | 9.29 | 9.18 | 9.28 | 9.42 |
| 2008 | 9.43 | 9.37 | 9.40 | 9.37 | 9.32 | 9.37 | 9.46 | 9.40 | 9.56 | 9.84 | 10.12 | 10.72 |

* 1 Euro = 13.7603 Austrian schillings = 40.3399 Belgian francs = 2.20371 Dutch gulden = 5.94573 Finnish markka = 6.55957 French francs = 1.95583 German Mark = 0.787564 Irish pounds = 1936.27 Italian lire = 40.3399 Luxembourg francs = 200.482 Portuguese escudos = 166.386 Spanish pesetas = 340.750 Greek drachmas.

**Table A7.13.** *Monthly exchange rates on Japan. SEK per 100 JPY 1960–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1960 | 1.45 | 1.45 | 1.46 | 1.44 | 1.45 | 1.45 | 1.46 | 1.45 | 1.46 | 1.46 | 1.45 | 1.46 |
| 1961 | 1.46 | 1.46 | 1.46 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.45 | 1.44 | 1.44 | 1.45 |
| 1962 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.45 | 1.45 | 1.46 | 1.46 |
| 1963 | 1.46 | 1.46 | 1.46 | 1.45 | 1.45 | 1.45 | 1.44 | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 |
| 1964 | 1.45 | 1.44 | 1.44 | 1.43 | 1.43 | 1.43 | 1.43 | 1.43 | 1.44 | 1.44 | 1.44 | 1.45 |
| 1965 | 1.45 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.45 | 1.45 | 1.45 |
| 1966 | 1.45 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 |
| 1967 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.44 | 1.45 | 1.44 |
| 1968 | 1.44 | 1.44 | 1.45 | 1.44 | 1.44 | 1.45 | 1.45 | 1.45 | 1.46 | 1.46 | 1.46 | 1.46 |
| 1969 | 1.46 | 1.46 | 1.46 | 1.46 | 1.46 | 1.46 | 1.46 | 1.45 | 1.46 | 1.46 | 1.46 | 1.46 |
| 1970 | 1.46 | 1.46 | 1.47 | 1.47 | 1.46 | 1.46 | 1.46 | 1.46 | 1.47 | 1.47 | 1.46 | 1.46 |
| 1971 | 1.46 | 1.46 | 1.46 | 1.46 | 1.46 | 1.46 | 1.46 | 1.48 | 1.54 | 1.56 | 1.56 | 1.56 |
| 1972 | 1.57 | 1.59 | 1.59 | 1.60 | 1.58 | 1.59 | 1.59 | 1.59 | 1.58 | 1.59 | 1.59 | 1.59 |
| 1973 | 1.59 | 1.68 | 1.72 | 1.72 | 1.70 | 1.63 | 1.56 | 1.59 | 1.61 | 1.59 | 1.59 | 1.64 |
| 1974 | 1.64 | 1.63 | 1.64 | 1.61 | 1.56 | 1.56 | 1.53 | 1.48 | 1.52 | 1.49 | 1.46 | 1.41 |
| 1975 | 1.37 | 1.38 | 1.38 | 1.38 | 1.37 | 1.35 | 1.41 | 1.47 | 1.50 | 1.47 | 1.47 | 1.46 |
| 1976 | 1.45 | 1.47 | 1.48 | 1.49 | 1.49 | 1.51 | 1.53 | 1.53 | 1.53 | 1.48 | 1.44 | 1.43 |
| 1977 | 1.47 | 1.51 | 1.52 | 1.60 | 1.59 | 1.63 | 1.66 | 1.69 | 1.83 | 1.90 | 1.98 | 1.99 |
| 1978 | 1.96 | 1.95 | 2.01 | 2.09 | 2.08 | 2.17 | 2.29 | 2.38 | 2.35 | 2.35 | 2.30 | 2.26 |
| 1979 | 2.22 | 2.20 | 2.14 | 2.04 | 2.03 | 2.00 | 1.96 | 1.95 | 1.90 | 1.84 | 1.74 | 1.75 |
| 1980 | 1.75 | 1.72 | 1.76 | 1.76 | 1.86 | 1.92 | 1.88 | 1.87 | 1.95 | 2.01 | 2.03 | 2.11 |
| 1981 | 2.21 | 2.25 | 2.22 | 2.19 | 2.23 | 2.27 | 2.24 | 2.28 | 2.37 | 2.40 | 2.47 | 2.55 |
| 1982 | 2.51 | 2.46 | 2.43 | 2.43 | 2.45 | 2.41 | 2.41 | 2.38 | 2.38 | 2.65 | 2.85 | 3.04 |
| 1983 | 3.15 | 3.16 | 3.15 | 3.16 | 3.20 | 3.19 | 3.20 | 3.22 | 3.25 | 3.35 | 3.37 | 3.45 |
| 1984 | 3.50 | 3.44 | 3.44 | 3.49 | 3.51 | 3.48 | 3.43 | 3.46 | 3.50 | 3.53 | 3.53 | 3.58 |

**Table A7.13 (cont.).** *Monthly exchange rates on Japan. SEK per 100 JPY 1960–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1985 | 3.58 | 3.59 | 3.65 | 3.57 | 3.58 | 3.56 | 3.52 | 3.51 | 3.55 | 3.71 | 3.84 | 3.80 |
| 1986 | 3.80 | 4.01 | 4.06 | 4.14 | 4.29 | 4.31 | 4.46 | 4.51 | 4.48 | 4.42 | 4.28 | 4.26 |
| 1987 | 4.29 | 4.25 | 4.24 | 4.43 | 4.46 | 4.40 | 4.29 | 4.41 | 4.46 | 4.44 | 4.50 | 4.63 |
| 1988 | 4.69 | 4.69 | 4.69 | 4.72 | 4.74 | 4.80 | 4.77 | 4.85 | 4.80 | 4.87 | 4.95 | 4.93 |
| 1989 | 4.93 | 4.96 | 4.90 | 4.83 | 4.77 | 4.65 | 4.61 | 4.64 | 4.56 | 4.55 | 4.48 | 4.39 |
| 1990 | 4.26 | 4.18 | 4.03 | 3.87 | 3.95 | 3.97 | 4.00 | 3.93 | 4.17 | 4.35 | 4.33 | 4.22 |
| 1991 | 4.22 | 4.26 | 4.30 | 4.47 | 4.46 | 4.60 | 4.69 | 4.63 | 4.59 | 4.71 | 4.58 | 4.48 |
| 1992 | 4.56 | 4.58 | 4.54 | 4.47 | 4.47 | 4.76 | 4.30 | 4.19 | 4.38 | 4.61 | 5.02 | 5.55 |
| 1993 | 5.80 | 6.23 | 6.61 | 6.63 | 6.64 | 6.91 | 7.39 | 7.76 | 7.61 | 7.50 | 7.66 | 7.62 |
| 1994 | 7.30 | 7.50 | 7.53 | 7.63 | 7.45 | 7.60 | 7.87 | 7.75 | 7.63 | 7.37 | 7.50 | 7.51 |
| 1995 | 7.49 | 7.52 | 8.01 | 8.79 | 8.01 | 8.58 | 8.23 | 7.65 | 7.11 | 6.79 | 6.47 | 6.51 |
| 1996 | 6.37 | 6.51 | 6.36 | 6.27 | 6.40 | 6.14 | 6.08 | 6.14 | 6.05 | 5.88 | 5.90 | 6.00 |
| 1997 | 5.99 | 6.02 | 6.25 | 6.12 | 6.47 | 6.78 | 6.78 | 6.78 | 6.38 | 6.26 | 6.04 | 6.01 |
| 1998 | 6.18 | 6.43 | 6.18 | 5.93 | 5.70 | 5.62 | 5.68 | 5.61 | 5.88 | 6.49 | 6.64 | 6.86 |
| 1999 | 6.92 | 6.82 | 6.87 | 6.97 | 6.93 | 7.05 | 7.07 | 7.29 | 7.67 | 7.69 | 7.96 | 8.27 |
| 2000 | 8.07 | 7.91 | 8.16 | 8.28 | 8.41 | 8.24 | 8.28 | 8.58 | 9.05 | 9.19 | 9.25 | 8.62 |
| 2001 | 8.11 | 8.38 | 8.28 | 8.24 | 8.48 | 8.82 | 8.64 | 8.51 | 8.94 | 8.71 | 8.66 | 8.32 |
| 2002 | 7.88 | 7.91 | 7.89 | 7.88 | 7.96 | 7.74 | 7.91 | 7.95 | 7.75 | 7.49 | 7.46 | 7.32 |
| 2003 | 7.27 | 7.11 | 7.20 | 7.04 | 6.76 | 6.60 | 6.81 | 6.97 | 7.03 | 7.03 | 7.03 | 6.82 |
| 2004 | 6.81 | 6.82 | 6.94 | 7.11 | 6.79 | 6.88 | 6.85 | 6.83 | 6.77 | 6.66 | 6.62 | 6.46 |
| 2005 | 6.68 | 6.65 | 6.54 | 6.60 | 6.79 | 7.00 | 6.99 | 6.87 | 6.86 | 6.83 | 6.85 | 6.71 |
| 2006 | 6.67 | 6.64 | 6.67 | 6.50 | 6.55 | 6.37 | 6.28 | 6.20 | 6.22 | 6.18 | 6.03 | 5.84 |
| 2007 | 5.80 | 5.83 | 5.99 | 5.76 | 5.64 | 5.68 | 5.51 | 5.87 | 5.82 | 5.57 | 5.70 | 5.77 |
| 2008 | 5.95 | 5.93 | 6.01 | 5.80 | 5.75 | 5.64 | 5.62 | 5.74 | 6.24 | 7.41 | 8.21 | 8.77 |

**Table A7.14.** *Monthly exchange rates on Czech Republic. SEK per 100 CSK 1922–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1922 | 6.70 | 7.18 | 6.70 | 7.65 | 7.64 | 7.56 | 8.57 | 11.15 | 12.15 | 12.58 | 12.00 | 11.65 |
| 1923 | 10.83 | 11.20 | 11.24 | 11.29 | 11.26 | 11.36 | 11.36 | 11.15 | 11.36 | 11.36 | 11.16 | 11.23 |
| 1924 | 11.18 | 11.18 | 11.18 | 11.18 | 11.18 | 11.12 | 11.18 | 11.21 | 11.22 | 11.31 | 11.27 | 11.30 |
| 1925 | 11.25 | 11.06 | 11.10 | 11.11 | 11.19 | 11.15 | 11.12 | 11.10 | 11.16 | 11.17 | 11.19 | 11.18 |
| 1926 | 11.15 | 11.15 | 11.15 | 11.13 | 11.15 | 11.13 | 11.10 | 11.10 | 11.13 | 11.15 | 11.15 | 11.15 |
| 1927 | 11.15 | 11.15 | 11.15 | 11.15 | 11.15 | 11.15 | 11.15 | 11.13 | 11.09 | 11.07 | 11.10 | 11.05 |
| 1928 | 11.08 | 11.10 | 11.10 | 11.10 | 11.10 | 11.08 | 11.11 | 11.15 | 11.15 | 11.15 | 11.15 | 11.13 |
| 1929 | 11.12 | 11.13 | 11.13 | 11.12 | 11.12 | 11.11 | 11.10 | 11.10 | 11.10 | 11.07 | 11.06 | 11.06 |
| 1930 | 11.07 | 11.07 | 11.07 | 11.06 | 11.09 | 11.10 | 11.08 | 11.07 | 11.08 | 11.08 | 11.09 | 11.09 |
| 1931 | 11.10 | 11.09 | 11.10 | 11.10 | 11.08 | 11.09 | 11.10 | 11.11 | 11.46 | 13.37 | 14.52 | 16.28 |
| 1932 | 15.84 | 15.75 | 15.51 | 16.05 | 16.31 | 16.47 | 16.74 | 16.99 | 17.07 | 17.52 | 17.47 | 16.93 |
| 1933 | 16.59 | 16.63 | 16.69 | 16.85 | 17.55 | 17.53 | 17.58 | 17.88 | 18.72 | 19.98 | 18.38 | 17.93 |
| 1934 | 18.58 | 17.82 | 16.25 | 16.07 | 16.32 | 16.53 | 16.37 | 16.59 | 16.83 | 16.97 | 16.78 | 16.93 |
| 1935 | 16.87 | 17.01 | 17.50 | 17.34 | 17.06 | 16.73 | 16.69 | 16.55 | 16.62 | 16.76 | 16.67 | 16.62 |
| 1936 | 16.64 | 16.60 | 16.60 | 16.60 | 16.49 | 16.37 | 16.40 | 16.26 | 16.19 | 15.09 | 14.27 | 14.23 |
| 1937 | 14.06 | 14.10 | 14.10 | 14.03 | 14.00 | 13.97 | 13.84 | 13.80 | 13.87 | 13.88 | 13.76 | 13.75 |
| 1938 | 13.75 | 13.77 | 13.82 | 13.81 | 13.72 | 13.73 | 13.77 | 13.86 | 14.07 | 14.21 | 14.30 | 14.45 |
| 1939 | 14.52 | 14.50 | 14.50 | 14.50 | 14.50 | 14.40 | 14.40 | 14.41 | 14.60 | 14.60 | 14.60 | 14.60 |

**Table A7.14 (cont.).** *Monthly exchange rates on Czech Republic. SEK per 100 CSK 1922–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1940 | 14.60 | 14.57 | 14.49 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 14.50 | 16.23 | | |
| | | | | | | | | | | | | |
| 1998 | 22.63 | 23.43 | 23.44 | 23.20 | 23.61 | 23.71 | 24.96 | 25.32 | 25.81 | 26.73 | 26.75 | 26.86 |
| 1999 | 25.47 | 23.64 | 23.55 | 23.49 | 23.81 | 23.77 | 23.91 | 23.98 | 23.69 | 23.74 | 23.73 | 23.82 |
| 2000 | 23.58 | 23.84 | 23.56 | 22.78 | 22.53 | 23.10 | 23.61 | 23.75 | 23.74 | 24.18 | 24.93 | 24.87 |
| 2001 | 25.32 | 25.90 | 26.39 | 26.37 | 26.33 | 27.10 | 27.33 | 27.33 | 28.30 | 28.55 | 28.27 | 29.01 |
| 2002 | 28.81 | 28.90 | 28.84 | 30.09 | 30.18 | 30.07 | 31.22 | 30.05 | 30.37 | 29.69 | 29.53 | 29.19 |
| 2003 | 29.14 | 28.94 | 29.05 | 28.94 | 29.16 | 29.02 | 28.85 | 28.62 | 28.02 | 28.17 | 28.13 | 27.93 |
| 2004 | 27.90 | 27.95 | 28.00 | 28.20 | 28.52 | 28.89 | 29.16 | 29.05 | 28.78 | 28.79 | 28.78 | 29.28 |
| 2005 | 29.87 | 30.31 | 30.53 | 30.43 | 30.39 | 30.83 | 31.24 | 31.57 | 31.84 | 31.75 | 32.67 | 32.58 |
| 2006 | 32.45 | 32.87 | 32.82 | 32.75 | 33.02 | 32.56 | 32.39 | 32.65 | 32.65 | 32.73 | 32.49 | 32.52 |
| 2007 | 32.63 | 32.53 | 33.14 | 33.01 | 32.59 | 32.71 | 32.39 | 33.47 | 33.71 | 33.56 | 34.74 | 35.89 |
| 2008 | 36.20 | 36.89 | 37.35 | 37.42 | 37.13 | 38.53 | 40.19 | 38.68 | 39.11 | 39.71 | 40.24 | 41.14 |

**Table A7.15.** *Monthly exchange rates on Poland. SEK per 100 zloty 1930–39 and per PLN 1998–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1930 | 41.94 | 41.93 | 41.89 | 41.85 | 41.90 | 41.89 | 41.85 | 41.88 | 41.89 | 41.88 | 41.88 | 41.87 |
| 1931 | 41.97 | 41.93 | 41.95 | 41.94 | 41.86 | 41.90 | 41.95 | 42.00 | 43.30 | 49.89 | 54.60 | 60.88 |
| 1932 | 59.46 | 58.85 | 57.95 | 59.57 | 60.84 | 60.93 | 62.34 | 63.48 | 63.64 | 65.06 | 65.22 | 63.72 |
| 1933 | 62.10 | 62.26 | 62.76 | 63.64 | 65.92 | 65.63 | 65.80 | 66.96 | 69.88 | 70.65 | 68.90 | 67.52 |
| 1934 | 69.27 | 72.37 | 72.73 | 72.12 | 72.64 | 73.25 | 73.50 | 73.88 | 75.16 | 75.48 | 74.14 | 74.62 |
| 1935 | 75.59 | 75.78 | 77.76 | 76.39 | 75.23 | 74.85 | 74.71 | 74.35 | 74.40 | 74.84 | 74.64 | 74.53 |
| 1936 | 74.53 | 74.58 | 74.46 | 74.25 | 73.94 | 73.42 | 73.75 | 73.21 | 73.08 | 75.34 | 75.25 | 75.25 |
| 1937 | 75.25 | 75.43 | 75.72 | 75.46 | 75.00 | 75.00 | 74.59 | 74.10 | 74.50 | 74.50 | 74.15 | 74.00 |
| 1938 | 74.00 | 74.00 | 74.18 | 74.50 | 74.30 | 74.37 | 74.53 | 75.23 | 76.83 | 77.46 | 78.16 | 79.11 |
| 1939 | 79.37 | 78.77 | 78.57 | 78.65 | 78.50 | 78.50 | 78.50 | 78.44 | 81.00 | 81.00 | 81.00 | 81.00 |
| | | | | | | | | | | | | |
| 1998 | 2.27 | 2.28 | 2.30 | 2.28 | 2.25 | 2.27 | 2.31 | 2.29 | 2.20 | 2.25 | 2.32 | 2.32 |
| 1999 | 2.22 | 2.10 | 2.08 | 2.09 | 2.15 | 2.15 | 2.18 | 2.09 | 2.02 | 1.99 | 1.96 | 2.04 |
| 2000 | 2.07 | 2.08 | 2.12 | 2.07 | 2.02 | 1.99 | 2.07 | 2.13 | 2.15 | 2.15 | 2.21 | 2.23 |
| 2001 | 2.30 | 2.38 | 2.47 | 2.53 | 2.60 | 2.71 | 2.57 | 2.44 | 2.51 | 2.56 | 2.59 | 2.63 |
| 2002 | 2.57 | 2.52 | 2.50 | 2.54 | 2.49 | 2.37 | 2.27 | 2.27 | 2.25 | 2.25 | 2.30 | 2.28 |
| 2003 | 2.25 | 2.20 | 2.13 | 2.13 | 2.12 | 2.05 | 2.07 | 2.12 | 2.03 | 1.96 | 1.95 | 1.94 |
| 2004 | 1.94 | 1.90 | 1.94 | 1.93 | 1.93 | 1.99 | 2.06 | 2.08 | 2.08 | 2.10 | 2.11 | 2.17 |
| 2005 | 2.22 | 2.28 | 2.26 | 2.21 | 2.20 | 2.28 | 2.30 | 2.31 | 2.38 | 2.40 | 2.41 | 2.45 |
| 2006 | 2.44 | 2.46 | 2.42 | 2.38 | 2.40 | 2.30 | 2.31 | 2.36 | 2.34 | 2.37 | 2.38 | 2.37 |
| 2007 | 2.34 | 2.36 | 2.39 | 2.42 | 2.43 | 2.45 | 2.44 | 2.45 | 2.45 | 2.48 | 2.54 | 2.62 |
| 2008 | 2.61 | 2.62 | 2.66 | 2.72 | 2.74 | 2.78 | 2.90 | 2.86 | 2.84 | 2.76 | 2.72 | 2.27 |

**Table A7.16.** *Monthly exchange rates on Latvia. SEK per 100 lats 1930–40 and per LVL 1998–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1930 | 71.89 | 71.93 | 71.94 | 71.90 | 71.93 | 71.94 | 71.90 | 71.88 | 71.90 | 71.87 | 71.84 | 71.83 |
| 1931 | 71.96 | 71.97 | 71.99 | 72.00 | 71.96 | 71.95 | 71.98 | 72.12 | 72.13 | 77.63 | 90.20 | |
| 1932 | | | | | | | | | | | | |
| 1933 | | | | | | | | | | | | |
| 1934 | | | | | | | | | | | | |
| 1935 | | | | | | | | | | | | |
| 1936 | | | | | | | | | | | | |
| 1937 | | | | | | | | | | | 77.35 | 77.35 |
| 1938 | 77.35 | 77.42 | 77.50 | 77.50 | 77.50 | 77.50 | 77.50 | 77.50 | 77.56 | 77.96 | 77.75 | 77.75 |
| 1939 | 77.75 | 77.75 | 77.75 | 77.75 | 77.75 | 77.75 | 77.75 | 77.41 | 76.93 | 79.02 | 79.50 | 79.50 |
| 1940 | 79.50 | 79.30 | 78.47 | 78.68 | 79.83 | 80.00 | 80.00 | 80.00 | 80.00 | 80.00 | 80.00 | 80.00 |
| | | | | | | | | | | | | |
| 1998 | 13.51 | 13.74 | 13.52 | 13.24 | 13.05 | 13.28 | 13.36 | 13.48 | 13.37 | 13.60 | 13.78 | 14.01 |
| 1999 | 13.70 | 13.77 | 14.00 | 14.10 | 14.26 | 14.24 | 14.06 | 13.95 | 14.00 | 14.06 | 14.24 | 14.48 |
| 2000 | 14.46 | 14.53 | 14.63 | 14.70 | 14.99 | 14.62 | 14.87 | 15.27 | 15.69 | 16.01 | 16.05 | 15.48 |
| 2001 | 15.35 | 15.72 | 16.06 | 16.20 | 16.39 | 16.98 | 16.97 | 16.54 | 17.13 | 17.04 | 16.96 | 16.86 |
| 2002 | 16.42 | 16.46 | 16.27 | 16.31 | 16.13 | 15.61 | 15.57 | 15.69 | 15.51 | 15.30 | 15.10 | 15.04 |
| 2003 | 14.81 | 14.68 | 14.74 | 14.57 | 14.08 | 13.91 | 14.20 | 14.43 | 14.21 | 13.89 | 13.89 | 13.62 |
| 2004 | 13.63 | 13.71 | 13.99 | 14.11 | 13.93 | 13.93 | 13.94 | 13.96 | 13.76 | 13.54 | 13.24 | 13.02 |
| 2005 | 13.00 | 13.05 | 13.05 | 13.17 | 13.21 | 13.30 | 13.55 | 13.42 | 13.41 | 13.53 | 13.74 | 13.55 |
| 2006 | 13.39 | 13.39 | 13.39 | 13.39 | 13.39 | 13.39 | 13.39 | 13.39 | 13.39 | 13.39 | 13.39 | 12.95 |
| 2007 | 13.02 | 13.12 | 13.12 | 13.13 | 13.21 | 13.41 | 13.18 | 13.36 | 13.24 | 13.05 | 13.25 | 13.51 |
| 2008 | 13.51 | 13.44 | 13.49 | 13.44 | 13.34 | 13.33 | 13.45 | 13.35 | 13.54 | 13.88 | 14.27 | 15.13 |

**Table A7.17.** *Monthly exchange rates on Estonia. SEK per 100 krooni 1930–40 and per EEK 1998–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1930 | 99.58 | 99.48 | 99.41 | 99.30 | 99.33 | 99.27 | 99.23 | 99.39 | 99.37 | 99.29 | 99.35 | 99.33 |
| 1931 | 99.46 | 99.56 | 99.63 | 99.60 | 99.56 | 99.45 | 99.49 | 99.77 | 99.83 | 107.67 | 125.17 | |
| 1932 | | | | | | | | | | | | |
| 1933 | | | | | | | | | | | | |
| 1934 | | | | | | | | | | | | |
| 1935 | | | | | | | | | | | | |
| 1936 | | | | | | | | | | | | |
| 1937 | | | | | | | | | | | 107.25 | 107.25 |
| 1938 | 107.25 | 107.25 | 107.25 | 107.25 | 107.25 | 107.25 | 107.25 | 107.25 | 107.25 | 107.25 | 107.25 | 107.35 |
| 1939 | 107.50 | 107.50 | 107.42 | 107.35 | 107.50 | 107.50 | 107.50 | 107.33 | 100.60 | 101.00 | 101.00 | 101.00 |
| 1940 | 101.00 | 101.00 | 101.00 | 101.00 | 101.00 | 101.00 | 101.00 | 101.00 | 101.00 | 101.00 | 101.00 | 101.00 |
| | | | | | | | | | | | | |
| 1998 | 0.55 | 0.56 | 0.55 | 0.54 | 0.54 | 0.55 | 0.56 | 0.57 | 0.58 | 0.59 | 0.59 | 0.60 |
| 1999 | 0.58 | 0.57 | 0.57 | 0.57 | 0.57 | 0.56 | 0.56 | 0.56 | 0.55 | 0.56 | 0.55 | 0.55 |
| 2000 | 0.55 | 0.54 | 0.54 | 0.53 | 0.53 | 0.53 | 0.54 | 0.54 | 0.54 | 0.54 | 0.55 | 0.55 |
| 2001 | 0.57 | 0.57 | 0.58 | 0.58 | 0.58 | 0.59 | 0.59 | 0.59 | 0.62 | 0.61 | 0.60 | 0.60 |

**Table A7.17 (cont.).** *Monthly exchange rates on Estonia. SEK per 100 krooni 1930–40 and per EEK 1998–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2002 | 0.59 | 0.59 | 0.58 | 0.58 | 0.59 | 0.58 | 0.59 | 0.59 | 0.59 | 0.58 | 0.58 | 0.58 |
| 2003 | 0.59 | 0.58 | 0.59 | 0.59 | 0.59 | 0.58 | 0.59 | 0.59 | 0.58 | 0.58 | 0.57 | 0.58 |
| 2004 | 0.58 | 0.59 | 0.59 | 0.59 | 0.58 | 0.58 | 0.59 | 0.59 | 0.58 | 0.58 | 0.58 | 0.57 |
| 2005 | 0.58 | 0.58 | 0.58 | 0.59 | 0.59 | 0.59 | 0.60 | 0.60 | 0.60 | 0.60 | 0.61 | 0.60 |
| 2006 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.59 | 0.59 | 0.59 | 0.59 | 0.59 | 0.58 | 0.58 |
| 2007 | 0.58 | 0.59 | 0.59 | 0.59 | 0.59 | 0.60 | 0.59 | 0.60 | 0.59 | 0.59 | 0.59 | 0.60 |
| 2008 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.60 | 0.61 | 0.63 | 0.65 | 0.69 |

**Table A7.18.** *Monthly exchange rates on Lithuania. SEK per 100 litas 1932–40 and per LTL 1998–2008.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1932 | | | | | | | | | | | | 56.12 |
| 1933 | 55.50 | 55.61 | 55.76 | 55.40 | 59.08 | 58.83 | 58.89 | 59.66 | 62.56 | 62.73 | 61.29 | 60.09 |
| 1934 | 61.69 | 64.21 | 64.71 | 64.16 | 64.80 | 65.37 | 65.29 | 65.70 | 67.02 | 67.06 | 65.96 | 66.35 |
| 1935 | 67.34 | 67.51 | 69.17 | 68.25 | 67.23 | 66.86 | 66.70 | 66.38 | 66.40 | 66.96 | 66.83 | 66.71 |
| 1936 | 66.77 | 66.68 | 66.59 | 66.50 | 66.08 | 65.42 | 65.75 | 65.54 | 65.45 | 67.26 | 67.75 | 67.50 |
| 1937 | 67.50 | 67.50 | 67.59 | 67.45 | 67.25 | 67.25 | 66.76 | 66.30 | 66.46 | 66.74 | 66.35 | 66.25 |
| 1938 | 66.25 | 66.25 | 66.25 | 66.25 | 66.31 | 66.49 | 66.91 | 67.11 | 68.85 | 69.62 | 70.17 | 70.66 |
| 1939 | 70.78 | 70.31 | 70.37 | 70.50 | 70.50 | 70.50 | 70.42 | 70.25 | 70.88 | 71.25 | 71.25 | 71.25 |
| 1940 | 71.25 | 71.32 | 71.70 | 71.70 | 71.98 | 72.00 | 72.00 | 72.00 | 72.00 | 72.00 | 72.00 | 72.00 |
| | | | | | | | | | | | | |
| 1998 | 2.00 | 2.02 | 1.99 | 1.96 | 1.92 | 1.98 | 2.00 | 2.03 | 1.98 | 1.96 | 2.00 | 2.01 |
| 1999 | 1.96 | 1.99 | 2.05 | 2.08 | 2.11 | 2.13 | 2.11 | 2.06 | 2.06 | 2.04 | 2.08 | 2.12 |
| 2000 | 2.13 | 2.16 | 2.14 | 2.15 | 2.27 | 2.23 | 2.23 | 2.32 | 2.40 | 2.49 | 2.52 | 2.42 |
| 2001 | 2.37 | 2.43 | 2.51 | 2.55 | 2.58 | 2.69 | 2.69 | 2.58 | 2.65 | 2.64 | 2.65 | 2.64 |
| 2002 | 2.61 | 2.66 | 2.63 | 2.65 | 2.67 | 2.64 | 2.68 | 2.68 | 2.66 | 2.64 | 2.63 | 2.63 |
| 2003 | 2.66 | 2.65 | 2.67 | 2.65 | 2.65 | 2.64 | 2.66 | 2.68 | 2.63 | 2.61 | 2.60 | 2.61 |
| 2004 | 2.65 | 2.66 | 2.67 | 2.66 | 2.64 | 2.65 | 2.66 | 2.66 | 2.63 | 2.62 | 2.61 | 2.60 |
| 2005 | 2.62 | 2.63 | 2.63 | 2.65 | 2.66 | 2.68 | 2.73 | 2.70 | 2.70 | 2.73 | 2.77 | 2.73 |
| 2006 | 2.70 | 2.70 | 2.72 | 2.70 | 2.70 | 2.68 | 2.67 | 2.67 | 2.69 | 2.68 | 2.64 | 2.62 |
| 2007 | 2.63 | 2.66 | 2.69 | 2.68 | 2.67 | 2.70 | 2.66 | 2.70 | 2.69 | 2.66 | 2.69 | 2.73 |
| 2008 | 2.73 | 2.71 | 2.72 | 2.71 | 2.70 | 2.72 | 2.74 | 2.72 | 2.77 | 2.85 | 2.93 | 3.10 |

# Appendix A7.2: Exchange rate index January 1913– December 2008

**Table A7.19:** *Periods for which separate exchange rate indices are calculated, the countries included in the indices and the percentage of Sweden's foreign trade covered by countries included.*

| Period (weights pertaining to year) | Countries whose currencies are included in the exchange rate index | Percentage of Sweden's total foreign trade (imports + exports) for countries included in the index |
|---|---|---|
| 1913,1–1916,1 (1915) | UK, USA, Germany, France, Denmark, Norway, Finland, Austria, Russia | 88.2 (excl. Germany 58.2) |
| 1916,1–1921,1 (1915) | UK, USA, Germany, France, Switzerland, Netherlands, Denmark, Norway | 83.6 (excl. Germany 53.6) |
| 1921,1–1924,2 (1920) | UK, USA, Germany, France, Belgium, Switzerland, Netherlands, Denmark, Norway, Finland, Italy Spain | 86.8 (excl. Germany 74.5) |
| 1924,2–1930,1 (1925) | UK, USA, Germany, France, Belgium, Switzerland, Netherlands, Denmark, Norway, Finland, Italy, Spain, Czechoslovakia | 85.5 |
| 1930,1–1935,1 (1930) | UK, USA, Germany, France, Belgium, Switzerland, Netherlands, Denmark, Norway, Finland, Italy, Spain, Czechoslovakia, Poland | 86.5 |
| 1935,1–1940,1 (1935) | UK, USA, Germany, France, Belgium, Switzerland, Netherlands, Denmark, Norway, Finland, Italy, Czechoslovakia, Poland | 84 |
| 1940,1–1943,1 (1940) | UK, USA, Germany, France, Belgium, Switzerland, Netherlands, Denmark, Norway, Finland, Italy | 82.2 |
| 1943,1–1944,9 (1943) | UK, USA, Germany, France, Belgium, Switzerland, Netherlands, Denmark, Norway, Finland, Italy, Portugal, Argentina | 83.6 |
| 1944,9–1945,5 (1944) | UK, USA, Germany, Switzerland, Netherlands, Denmark, Norway, Finland, Portugal, Argentina | 79.7 |
| 1945,5–1945,12 (1945) | UK, USA, Switzerland, Denmark, Norway, Finland, Argentina | 66.2 |
| 1945,12–1950,1 (1946) | UK, USA, France, Belgium, Switzerland, Netherlands, Denmark, Norway, Finland, Argentina | 66.1 |
| 1950,1–1950,9 (1950) | UK, USA, France, Belgium, Switzerland, Netherlands, Denmark, Norway, Finland, Italy, Argentina, Brazil | 60.5 |
| 1950,9–1955,1 (1950) | UK, USA, France, Belgium, Switzerland, Netherlands, Denmark, Norway, Finland, Italy, Argentina, Brazil | 72.1 |
| 1955,1–1960,1 (1955) | UK, USA, Germany, France, Belgium, Switzerland, Netherlands, Denmark, Norway, Finland, Italy | 81.7 |
| 1960,1–1965,1(1960) | See, previous period | 76.7 |
| 1965,1–1970,1 (1965) | UK, USA, Germany, France, Belgium, Switzerland, Netherlands, Denmark, Norway, Finland, Italy, Spain, Austria, Canada, Japan | 82.2 |
| 1970,1–1975,1 (1970) | See previous period | 85.9 |
| 1975,1–1980,1 (1975) | See previous period | 82 |

| Period (weights pertaining to year) | Countries whose currencies are included in the exchange rate index | Percentage of Sweden's total foreign trade (imports + exports) for countries included in the index |
|---|---|---|
| 1980,1–1985,1 (980) | See previous period | 76.5 |
| 1985,–1990,1 (1985) | See previous period | 82.4 |
| 1990,1–1995,1 (1990) | UK, USA, Germany, France, Belgium, Switzerland, Netherlands, Denmark, Norway, Finland, Italy, Spain, Austria, Canada, Japan, Portugal,Australia | 85.3 |
| 1995,1–2000,1 (1995) | UK, USA, Germany, France, Belgium, Switzerland, Netherlands, Denmark, Norway, Finland, Italy, Spain, Austria, Canada, Japan, Portugal, Australia | 83.7 |
| 2000,1–2002,2 (2000) | UK, USA, Germany, France, Belgium, Switzerland, Netherlands, Denmark, Norway, Finland, Italy, Spain, Canada, Japan, Australia, Czech Republic, Poland, Estonia, P.R.China, Hong Kong, Turkey, Taiwan, Mexico, Malaysia, Russia | 88 |
| 2002,2–2005,1 (2000) | Euro-land (Germany, France Belgium, Netherlands, Finland, Italy, Spain, Austria, Portugal, Ireland, Greece), UK, USA, Switzerland, Denmark, Norway, Canada, Japan, Australia, Czech Republic, Poland, Estonia, P.R. China, Hong Kong, Turkey, Taiwan, Mexico, Malaysia, Russia | 91.1 |
| 2005,1– (2005) | Euro-land (Germany, France Belgium, Netherlands, Finland, Italy, Spain, Austria, Portugal, Ireland, Greece), UK, USA, Switzerland, Denmark, Norway, Canada, Japan, Australia, Czech Republic, Hungary, Poland, Latvia, Estonia, Lithuania, P. R. China, Hong Kong, Turkey, Mexico, Russia | 90.3 |

**Table A7.20.** *Exchange rate index 1913-2008, SEK/foreign currency (January 1929 = 100).*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | 231.44 | 231.51 | 231.67 | 231.56 | 231.62 | 231.42 | 231.42 | 231.37 | 231.27 | 231.42 | 231.49 | 231.26 |
| 1914 | 231.23 | 231.00 | 231.09 | 231.12 | 231.25 | 231.19 | 231.26 | 231.84 | 233.70 | 232.34 | 228.92 | 233.30 |
| 1915 | 233.93 | 233.81 | 231.08 | 223.83 | 219.75 | 210.80 | 217.50 | 216.91 | 217.26 | 214.54 | 207.00 | 199.11 |
| 1916 | 198.82 | 194.91 | 189.80 | 185.65 | 183.38 | 186.58 | 190.95 | 189.80 | 190.20 | 188.87 | 187.94 | 180.82 |
| 1917 | 179.23 | 178.89 | 176.37 | 173.32 | 172.50 | 167.63 | 161.68 | 153.00 | 149.65 | 136.23 | 133.28 | 163.54 |
| 1918 | 160.68 | 172.45 | 174.46 | 169.69 | 168.81 | 163.88 | 154.98 | 152.69 | 157.48 | 173.60 | 175.62 | 166.20 |
| 1919 | 167.48 | 165.84 | 162.34 | 159.85 | 163.70 | 159.07 | 158.62 | 150.86 | 146.09 | 145.01 | 145.49 | 146.95 |
| 1920 | 146.38 | 149.75 | 145.45 | 141.36 | 145.75 | 144.82 | 141.91 | 141.86 | 139.19 | 140.48 | 142.12 | 141.87 |
| 1921 | 139.29 | 128.92 | 124.31 | 120.65 | 123.93 | 122.71 | 124.59 | 122.97 | 118.50 | 112.14 | 109.83 | 123.93 |
| 1922 | 108.97 | 106.76 | 106.56 | 108.04 | 109.67 | 108.59 | 106.02 | 103.49 | 101.71 | 100.32 | 100.14 | 101.61 |
| 1923 | 101.29 | 101.59 | 101.67 | 101.20 | 100.26 | 99.68 | 98.44 | 98.05 | 98.11 | 97.87 | 95.89 | 95.64 |
| 1924 | 93.58 | 92.82 | 92.57 | 94.51 | 94.51 | 93.37 | 93.24 | 95.18 | 95.19 | 95.88 | 96.70 | 93.21 |
| 1925 | 93.87 | 93.59 | 93.67 | 94.18 | 95.58 | 95.13 | 95.98 | 96.99 | 98.17 | 98.03 | 97.84 | 97.50 |
| 1926 | 97.55 | 97.88 | 98.02 | 97.70 | 97.25 | 97.20 | 96.38 | 96.85 | 97.01 | 97.77 | 98.84 | 99.35 |
| 1927 | 99.55 | 99.71 | 99.70 | 99.76 | 99.92 | 99.80 | 99.85 | 99.77 | 99.76 | 99.73 | 99.79 | 99.59 |

**Table A7.20 (cont.).** *Exchange rate index 1913-2008, SEK/foreign currency (January 1929 = 100).*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1928 | 99.89 | 100.05 | 100.12 | 100.15 | 100.21 | 100.15 | 100.11 | 100.07 | 100.04 | 100.04 | 100.07 | 99.99 |
| 1929 | 100.00 | 99.93 | 99.90 | 99.85 | 100.89 | 99.68 | 99.61 | 99.62 | 99.63 | 99.69 | 99.67 | 99.36 |
| 1930 | 99.51 | 99.45 | 99.29 | 99.25 | 99.35 | 99.22 | 99.17 | 99.12 | 99.01 | 98.99 | 99.20 | 99.16 |
| 1931 | 99.22 | 99.18 | 99.24 | 99.23 | 99.07 | 99.01 | 99.00 | 99.05 | 100.07 | 107.09 | 116.61 | 125.17 |
| 1932 | 122.48 | 122.32 | 121.09 | 126.50 | 128.34 | 127.95 | 129.82 | 131.45 | 131.52 | 133.19 | 132.24 | 128.61 |
| 1933 | 126.67 | 127.76 | 127.72 | 127.34 | 129.36 | 128.20 | 127.59 | 129.20 | 131.99 | 132.38 | 129.02 | 127.49 |
| 1934 | 128.89 | 132.40 | 132.46 | 131.28 | 132.07 | 131.95 | 131.84 | 133.04 | 135.37 | 136.52 | 134.94 | 135.65 |
| 1935 | 136.58 | 136.96 | 138.43 | 136.44 | 135.48 | 134.93 | 134.54 | 134.32 | 134.65 | 135.05 | 134.81 | 134.68 |
| 1936 | 134.54 | 134.36 | 134.42 | 134.49 | 134.02 | 133.27 | 133.37 | 133.11 | 132.65 | 130.42 | 130.31 | 130.11 |
| 1937 | 130.03 | 130.22 | 130.34 | 129.82 | 129.43 | 129.35 | 128.42 | 128.17 | 128.26 | 128.10 | 127.78 | 127.73 |
| 1938 | 127.62 | 127.52 | 127.66 | 127.62 | 127.40 | 127.57 | 127.86 | 128.41 | 128.41 | 130.17 | 131.02 | 131.70 |
| 1939 | 131.76 | 131.37 | 131.31 | 131.32 | 131.47 | 131.42 | 131.38 | 131.16 | 126.81 | 126.66 | 125.86 | 126.13 |
| 1940 | 126.67 | 126.59 | 126.50 | 127.85 | 127.77 | 127.94 | 127.95 | 126.29 | 126.25 | 126.33 | 126.25 | 126.13 |
| 1941 | 126.13 | 126.14 | 126.14 | 126.14 | 126.17 | 126.46 | 126.56 | 126.46 | 126.46 | 126.46 | 126.46 | 126.46 |
| 1942 | 126.42 | 126.67 | 126.68 | 126.69 | 126.69 | 126.69 | 126.72 | 128.35 | 126.69 | 126.69 | 126.69 | 126.69 |
| 1943 | 126.80 | 126.80 | 126.80 | 126.80 | 126.80 | 126.79 | 126.79 | 126.79 | 127.13 | 127.22 | 127.22 | 127.22 |
| 1944 | 127.22 | 127.22 | 127.20 | 127.18 | 127.07 | 127.10 | 127.12 | 127.09 | 127.06 | 125.08 | 125.30 | 125.29 |
| 1945 | 125.06 | 125.08 | 125.21 | 125.20 | 124.98 | 118.02 | 117.74 | 115.97 | 115.94 | 115.65 | 115.28 | 115.29 |
| 1946 | 110.88 | 110.89 | 110.95 | 110.96 | 110.96 | 116.18 | 101.50 | 95.27 | 95.22 | 95.18 | 95.64 | 95.13 |
| 1947 | 95.13 | 95.13 | 95.13 | 95.13 | 95.13 | 95.13 | 95.15 | 95.21 | 95.22 | 95.23 | 95.26 | 95.27 |
| 1948 | 95.27 | 95.27 | 95.28 | 95.28 | 95.28 | 95.12 | 93.77 | 93.82 | 93.79 | 93.74 | 93.76 | 93.77 |
| 1949 | 92.05 | 92.11 | 92.11 | 92.11 | 92.07 | 92.07 | 91.65 | 91.59 | 97.30 | 106.64 | 106.48 | 106.48 |
| 1950 | 106.48 | 106.48 | 106.48 | 106.48 | 106.48 | 106.48 | 106.48 | 106.48 | 105.34 | 105.13 | 105.06 | 104.99 |
| 1951 | 105.06 | 105.06 | 105.05 | 105.06 | 105.04 | 105.04 | 105.04 | 105.04 | 104.99 | 104.99 | 104.98 | 105.00 |
| 1952 | 105.00 | 105.03 | 105.06 | 105.06 | 105.07 | 105.08 | 105.08 | 105.08 | 105.08 | 105.08 | 105.11 | 105.17 |
| 1953 | 105.23 | 105.25 | 105.30 | 105.26 | 105.18 | 105.24 | 105.27 | 105.10 | 105.01 | 104.92 | 105.01 | 105.16 |
| 1954 | 105.28 | 105.35 | 105.35 | 105.38 | 105.25 | 105.10 | 105.26 | 105.27 | 105.20 | 105.31 | 105.39 | 105.34 |
| 1955 | 105.28 | 105.27 | 105.31 | 105.34 | 105.27 | 105.01 | 104.84 | 104.74 | 104.83 | 104.87 | 105.15 | 105.34 |
| 1956 | 105.39 | 105.39 | 105.38 | 105.38 | 105.35 | 105.18 | 104.90 | 104.75 | 104.81 | 105.03 | 104.80 | 104.87 |
| 1957 | 105.00 | 105.05 | 104.94 | 104.98 | 104.89 | 104.82 | 105.04 | 104.35 | 103.71 | 103.40 | 103.43 | 103.44 |
| 1958 | 103.55 | 103.65 | 103.68 | 103.67 | 103.61 | 103.53 | 103.42 | 103.37 | 103.55 | 103.67 | 103.56 | 103.21 |
| 1959 | 102.91 | 102.93 | 102.97 | 103.02 | 103.01 | 103.03 | 102.98 | 102.93 | 102.85 | 102.91 | 102.97 | 103.00 |
| 1960 | 103.03 | 103.01 | 103.01 | 102.86 | 102.88 | 102.74 | 102.79 | 102.69 | 102.84 | 102.86 | 102.94 | 103.01 |
| 1961 | 102.90 | 102.75 | 103.45 | 104.09 | 103.89 | 103.92 | 103.89 | 103.97 | 104.25 | 104.19 | 104.18 | 104.23 |
| 1962 | 104.18 | 103.97 | 103.93 | 103.77 | 103.73 | 103.69 | 103.71 | 103.60 | 103.63 | 103.61 | 103.92 | 104.45 |
| 1963 | 104.17 | 104.36 | 104.43 | 104.53 | 104.48 | 104.41 | 104.31 | 104.45 | 104.42 | 104.51 | 104.52 | 104.57 |
| 1964 | 104.46 | 104.31 | 103.71 | 103.50 | 103.44 | 103.36 | 103.45 | 103.30 | 103.37 | 103.74 | 103.69 | 103.57 |
| 1965 | 103.40 | 103.38 | 103.32 | 103.52 | 103.62 | 103.69 | 103.73 | 103.79 | 103.79 | 103.96 | 104.07 | 104.05 |
| 1966 | 103.92 | 103.81 | 103.56 | 103.52 | 103.41 | 103.52 | 103.93 | 103.82 | 103.85 | 103.94 | 103.94 | 103.99 |
| 1967 | 103.91 | 103.88 | 103.83 | 103.74 | 103.72 | 103.59 | 103.48 | 103.53 | 103.59 | 103.24 | 101.30 | 99.58 |
| 1968 | 99.34 | 99.34 | 99.48 | 99.49 | 99.37 | 99.22 | 99.17 | 99.10 | 99.20 | 99.32 | 99.42 | 99.40 |
| 1969 | 99.25 | 99.18 | 99.13 | 99.06 | 99.24 | 99.15 | 99.13 | 98.81 | 99.07 | 100.12 | 100.54 | 100.63 |
| 1970 | 100.58 | 100.95 | 101.33 | 101.50 | 101.60 | 101.38 | 101.32 | 101.21 | 101.59 | 101.38 | 101.18 | 101.06 |
| 1971 | 101.08 | 101.36 | 101.21 | 101.17 | 101.86 | 102.03 | 102.36 | 102.87 | 102.97 | 102.70 | 102.17 | 101.67 |
| 1972 | 101.52 | 101.83 | 101.75 | 101.81 | 101.31 | 100.97 | 100.05 | 99.87 | 99.65 | 99.31 | 99.20 | 99.22 |

**Table A7.20 (cont.).** *Exchange rate index 1913-2008, SEK/foreign currency (January 1929 = 100).*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1973 | 99.31 | 101.08 | 102.75 | 102.93 | 102.50 | 101.99 | 102.33 | 102.20 | 102.98 | 102.86 | 103.01 | 104.68 |
| 1974 | 105.25 | 105.80 | 105.62 | 104.14 | 103.43 | 104.22 | 104.23 | 103.85 | 103.68 | 103.34 | 103.32 | 102.23 |
| 1975 | 101.29 | 101.22 | 100.73 | 100.33 | 99.75 | 99.42 | 100.14 | 101.35 | 102.71 | 102.03 | 101.80 | 101.32 |
| 1976 | 100.86 | 100.94 | 100.41 | 99.96 | 99.60 | 99.59 | 100.01 | 99.43 | 98.58 | 96.81 | 96.19 | 95.84 |
| 1977 | 96.92 | 97.36 | 96.97 | 99.61 | 99.90 | 101.31 | 101.15 | 102.83 | 111.12 | 111.23 | 112.35 | 114.48 |
| 1978 | 115.02 | 115.09 | 114.90 | 114.19 | 113.17 | 113.31 | 113.48 | 113.89 | 114.73 | 116.35 | 115.26 | 116.03 |
| 1979 | 116.49 | 116.64 | 116.58 | 116.06 | 115.21 | 114.80 | 115.39 | 115.01 | 115.25 | 115.24 | 115.45 | 116.09 |
| 1980 | 116.22 | 116.19 | 115.97 | 115.95 | 116.07 | 116.45 | 116.44 | 116.06 | 115.95 | 115.33 | 115.18 | 115.37 |
| 1981 | 115.58 | 114.00 | 113.81 | 113.49 | 113.19 | 113.05 | 112.88 | 113.09 | 119.94 | 125.09 | 125.71 | 126.14 |
| 1982 | 126.10 | 126.02 | 125.61 | 125.78 | 126.17 | 126.17 | 125.82 | 125.15 | 125.33 | 140.99 | 145.86 | 147.51 |
| 1983 | 147.74 | 147.74 | 147.62 | 147.32 | 147.13 | 146.48 | 145.88 | 145.72 | 146.17 | 146.47 | 145.99 | 145.59 |
| 1984 | 145.28 | 145.66 | 144.54 | 144.46 | 144.81 | 145.10 | 143.73 | 143.44 | 142.27 | 141.86 | 142.78 | 143.16 |
| 1985 | 143.34 | 142.82 | 144.41 | 146.24 | 145.94 | 145.85 | 146.14 | 146.83 | 146.43 | 146.67 | 146.30 | 146.65 |
| 1986 | 147.08 | 148.06 | 148.51 | 148.55 | 148.28 | 148.50 | 149.21 | 149.94 | 150.12 | 150.30 | 150.27 | 150.68 |
| 1987 | 152.23 | 152.12 | 150.95 | 151.03 | 151.67 | 151.27 | 151.42 | 151.80 | 152.65 | 152.93 | 154.42 | 155.05 |
| 1988 | 154.76 | 153.59 | 153.19 | 150.82 | 152.26 | 152.17 | 151.57 | 151.90 | 151.59 | 151.29 | 152.11 | 152.07 |
| 1989 | 151.46 | 151.40 | 151.44 | 150.90 | 150.29 | 149.62 | 150.41 | 150.04 | 149.55 | 150.47 | 151.40 | 153.22 |
| 1990 | 154.21 | 154.49 | 153.10 | 153.21 | 154.12 | 154.18 | 154.85 | 155.93 | 155.73 | 156.60 | 157.17 | 157.16 |
| 1991 | 156.65 | 156.52 | 155.43 | 154.47 | 154.02 | 155.30 | 155.62 | 155.27 | 154.77 | 155.11 | 153.55 | 152.09 |
| 1992 | 151.49 | 151.83 | 152.07 | 151.60 | 151.16 | 151.32 | 149.88 | 149.45 | 149.26 | 149.69 | 157.13 | 173.27 |
| 1993 | 178.76 | 181.93 | 186.37 | 185.20 | 182.96 | 181.37 | 188.18 | 189.85 | 194.72 | 192.91 | 194.04 | 196.46 |
| 1994 | 189.45 | 186.75 | 188.25 | 187.48 | 186.84 | 191.30 | 195.94 | 195.59 | 192.51 | 189.44 | 189.66 | 190.21 |
| 1995 | 192.29 | 192.62 | 198.03 | 204.45 | 199.57 | 200.23 | 199.38 | 195.30 | 190.77 | 186.84 | 180.21 | 178.48 |
| 1996 | 178.98 | 182.56 | 177.76 | 175.29 | 175.35 | 173.13 | 174.07 | 175.29 | 174.26 | 171.90 | 174.87 | 176.75 |
| 1997 | 179.12 | 181.37 | 185.05 | 184.74 | 185.22 | 185.46 | 182.84 | 182.11 | 179.15 | 179.11 | 181.04 | 182.25 |
| 1998 | 183.93 | 185.69 | 182.52 | 179.81 | 178.78 | 182.28 | 183.48 | 186.72 | 188.83 | 193.41 | 193.26 | 195.69 |
| 1999 | 189.19 | 186.89 | 189.13 | 189.70 | 191.59 | 189.75 | 187.73 | 187.25 | 185.86 | 187.37 | 186.82 | 187.34 |
| 2000 | 187.62 | 186.93 | 185.49 | 183.78 | 184.50 | 183.20 | 186.14 | 188.29 | 190.57 | 194.44 | 196.34 | 194.17 |
| 2001 | 196.02 | 198.73 | 202.63 | 203.49 | 204.01 | 209.05 | 209.53 | 207.51 | 215.34 | 213.59 | 211.34 | 211.25 |
| 2002 | 207.05 | 207.28 | 204.27 | 205.88 | 206.31 | 202.25 | 204.26 | 204.36 | 202.74 | 201.11 | 199.77 | 199.42 |
| 2003 | 199.12 | 197.04 | 197.30 | 195.67 | 193.04 | 191.41 | 193.64 | 195.24 | 191.91 | 189.46 | 189.36 | 188.21 |
| 2004 | 189.43 | 190.21 | 192.73 | 192.98 | 191.69 | 191.92 | 192.37 | 192.68 | 190.24 | 189.02 | 187.09 | 185.74 |
| 2005 | 187.88 | 188.89 | 188.68 | 190.88 | 192.29 | 196.09 | 199.38 | 197.14 | 197.85 | 199.98 | 203.63 | 200.53 |
| 2006 | 197.15 | 198.19 | 199.06 | 197.12 | 196.40 | 193.85 | 193.11 | 193.02 | 193.91 | 193.74 | 190.45 | 188.50 |
| 2007 | 189.70 | 191.97 | 193.72 | 192.16 | 191.38 | 194.73 | 191.50 | 194.27 | 193.37 | 190.81 | 191.57 | 194.22 |
| 2008 | 193.96 | 192.62 | 191.72 | 190.29 | 189.96 | 191.00 | 192.61 | 192.66 | 196.44 | 203.27 | 208.96 | 215.60 |

**Table A7.21.** *Exchange rate index excluding Germany 1913–24.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | 120.05 | 120.05 | 120.05 | 120.05 | 120.10 | 119.93 | 119.98 | 119.94 | 119.85 | 119.98 | 120.11 | 120.01 |
| 1914 | 120.03 | 119.80 | 119.84 | 119.89 | 120.00 | 119.93 | 120.04 | 120.72 | 122.38 | 123.03 | 122.88 | 125.40 |
| 1915 | 125.76 | 126.61 | 126.54 | 122.85 | 121.09 | 119.99 | 121.01 | 120.89 | 120.57 | 119.26 | 116.25 | 114.20 |
| 1916 | 115.95 | 114.32 | 112.73 | 109.64 | 107.60 | 109.80 | 112.83 | 112.54 | 113.19 | 112.54 | 112.60 | 110.07 |
| 1917 | 108.39 | 108.22 | 108.51 | 107.73 | 107.63 | 107.13 | 103.56 | 98.36 | 96.67 | 88.40 | 85.08 | 97.41 |
| 1918 | 100.35 | 100.44 | 101.24 | 98.31 | 98.08 | 96.54 | 94.04 | 94.18 | 99.16 | 108.46 | 113.14 | 110.70 |
| 1919 | 111.22 | 113.02 | 113.73 | 115.99 | 119.21 | 118.45 | 118.72 | 116.83 | 116.28 | 117.04 | 121.37 | 124.12 |
| 1920 | 125.11 | 130.81 | 126.35 | 121.02 | 122.54 | 120.16 | 117.88 | 119.15 | 118.24 | 120.51 | 122.58 | 122.23 |
| 1921 | 119.62 | 111.44 | 107.66 | 104.76 | 107.57 | 107.33 | 109.96 | 109.64 | 107.85 | 104.90 | 105.74 | 109.76 |
| 1922 | 103.96 | 102.39 | 103.28 | 104.88 | 106.48 | 105.60 | 104.10 | 102.56 | 101.07 | 100.00 | 99.59 | 101.49 |
| 1923 | 101.22 | 101.56 | 101.62 | 101.16 | 100.24 | 99.67 | 98.44 | 98.05 | 98.11 | 97.87 | 95.89 | 95.64 |
| 1924 | 93.58 | 92.82 | 92.57 | 94.51 | 94.51 | 93.37 | 93.24 | 95.18 | 95.19 | 95.88 | 96.70 | 93.21 |
| 1925 | 93.87 | 93.59 | 93.67 | 94.18 | 95.58 | 95.13 | 95.98 | 96.99 | 98.17 | 98.03 | 97.84 | 97.50 |

**Table A7.22.** *Exchange rate index excluding German hyperinflation.*

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | 198.77 | 198.82 | 198.97 | 198.87 | 198.92 | 198.75 | 198.75 | 198.71 | 198.62 | 198.75 | 198.81 | 198.61 |
| 1914 | 198.58 | 198.39 | 198.47 | 198.49 | 198.60 | 198.55 | 198.62 | 199.10 | 200.71 | 199.54 | 196.60 | 200.37 |
| 1915 | 200.90 | 200.80 | 198.46 | 192.23 | 188.73 | 181.04 | 186.79 | 186.29 | 186.58 | 184.25 | 177.78 | 171.00 |
| 1916 | 170.75 | 167.39 | 163.00 | 159.44 | 157.49 | 160.24 | 163.99 | 163.01 | 163.35 | 162.21 | 161.40 | 155.29 |
| 1917 | 153.93 | 153.63 | 151.47 | 148.85 | 148.14 | 143.96 | 138.85 | 131.40 | 128.53 | 117.00 | 114.46 | 140.45 |
| 1918 | 138.00 | 148.10 | 149.83 | 145.73 | 144.98 | 140.74 | 133.10 | 131.13 | 135.25 | 149.09 | 150.83 | 142.74 |
| 1919 | 143.84 | 142.42 | 139.42 | 137.28 | 140.59 | 136.61 | 136.22 | 129.56 | 125.46 | 124.54 | 124.95 | 126.20 |
| 1920 | 125.71 | 128.61 | 124.92 | 121.41 | 125.17 | 124.37 | 121.88 | 121.84 | 119.54 | 120.65 | 122.05 | 121.84 |
| 1921 | 119.62 | 111.44 | 107.66 | 104.76 | 107.57 | 107.33 | 109.96 | 109.64 | 107.85 | 104.90 | 105.74 | 109.84 |
| 1922 | 103.96 | 102.39 | 103.28 | 104.88 | 106.48 | 105.60 | 104.10 | 102.56 | 101.07 | 100.00 | 99.59 | 101.49 |
| 1923 | 101.22 | 101.56 | 101.62 | 101.16 | 100.24 | 99.67 | 98.44 | 98.05 | 98.11 | 97.87 | 95.89 | 95.64 |
| 1924 | 93.58 | 92.82 | 92.57 | 94.51 | 94.51 | 93.37 | 93.24 | 95.18 | 95.19 | 95.88 | 96.70 | 93.21 |
| 1925 | 93.87 | 93.59 | 93.67 | 94.18 | 95.58 | 95.13 | 95.98 | 96.99 | 98.17 | 98.03 | 97.84 | 97.50 |

Because of the rapid German inflation during World War One and the hyperinflation in 1921–23, separate exchange indices have been calculated that exclude Germany in the periods 1913–24 and 1921–23.

# Appendix A7.3: Summary tables of annual rates

**Table A7.23.** *Annual exchange rates 1913–2008.*

| Year | UK | USA | Germany | France | Belgium | Switzer-land | Nether-lands | Den-mark | Norway | Finland |
|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | 18.24 | 3.75 | 89.12 | 72.29 | 71.82 | | 150.51 | 100.00 | 100.00 | 72.01 |
| 1914 | 18.41 | 3.80 | 88.41 | 73.47 | 72.33 | | 153.64 | 100.00 | 100.00 | 70.89 |
| 1915 | 18.32 | 3.85 | 79.25 | 69.64 | | 69.83 | 156.59 | 99.73 | 99.97 | 58.97 |
| 1916 | 16.60 | 3.51 | 62.45 | 59.28 | | 67.06 | 145.73 | 98.53 | 99.29 | 50.36 |
| 1917 | 14.76 | 3.12 | 47.52 | 53.87 | | 65.32 | 130.24 | 92.68 | 94.06 | 43.69 |
| 1918 | 14.60 | 3.08 | 52.37 | 54.78 | | 70.19 | 142.98 | 91.94 | 93.81 | 39.21 |
| 1919 | 17.43 | 3.95 | 23.43 | 55.92 | | 74.92 | 154.16 | 91.24 | 96.36 | 27.95 |
| 1920 | 17.92 | 4.92 | 8.38 | 34.62 | 36.28 | 82.76 | 168.41 | 76.81 | 80.25 | 18.09 |
| 1921 | 17.12 | 4.45 | 4.99 | 33.25 | 33.96 | 77.27 | 149.96 | 79.37 | 66.21 | 9.02 |
| 1922 | 16.93 | 3.83 | 59.67* | 31.28 | 29.39 | 73.08 | 147.38 | 80.21 | 67.01 | 8.28 |
| 1923 | 17.23 | 3.76 | 0.73* | 22.94 | 19.81 | 68.17 | 147.52 | 69.19 | 62.71 | 10.10 |
| 1924 | 16.63 | 3.76 | 89.7 | 19.62 | 17.48 | 68.84 | 144.31 | 63.32 | 52.65 | 9.45 |
| 1925 | 17.99 | 3.73 | 88.74 | 17.72 | 17.86 | 72.04 | 149.73 | 78.12 | 66.18 | 9.40 |
| 1926 | 18.15 | 3.74 | 89.01 | 12.17 | 52.24 | 72.24 | 149.96 | 98.09 | 83.43 | 9.41 |
| 1927 | 18.13 | 3.73 | 88.69 | 14.69 | 51.99 | 71.90 | 149.66 | 99.74 | 97.20 | 9.41 |
| 1928 | 18.16 | 3.73 | 89.09 | 14.67 | 52.03 | 71.92 | 150.16 | 99.84 | 99.64 | 9.40 |
| 1929 | 18.13 | 3.73 | 89.30 | 14.65 | 52.00 | 72.03 | 150.02 | 99.67 | 99.68 | 9.40 |
| 1930 | 18.11 | 3.73 | 88.88 | 14.64 | 52.02 | 72.23 | 149.85 | 99.71 | 99.69 | 9.38 |
| 1931 | 17.97 | 3.99 | 94.84 | 15.72 | 55.78 | 77.64 | 160.86 | 99.46 | 99.46 | 9.27 |
| 1932 | 18.99 | 5.43 | 129.91 | 21.56 | 76.16 | 106.15 | 218.87 | 102.24 | 97.84 | 8.44 |
| 1933 | 19.20 | 4.61 | 138.52 | 22.81 | 81.37 | 112.72 | 234.11 | 86.86 | 97.57 | 8.52 |
| 1934 | 19.40 | 3.85 | 152.30 | 25.38 | 90.19 | 125.28 | 259.80 | 86.85 | 97.61 | 8.60 |
| 1935 | 19.40 | 3.96 | 159.77 | 26.18 | 72.89 | 129.17 | 268.69 | 86.85 | 97.60 | 8.60 |
| 1936 | 19.40 | 3.91 | 157.89 | 23.73 | 66.52 | 116.99 | 250.92 | 86.85 | 97.60 | 8.60 |
| 1937 | 19.40 | 3.93 | 158.37 | 15.84 | 66.66 | 90.46 | 216.58 | 86.83 | 97.63 | 8.60 |
| 1938 | 19.41 | 3.98 | 160.10 | 11.51 | 67.50 | 91.20 | 219.05 | 86.77 | 97.65 | 8.60 |
| 1939 | 18.50 | 4.17 | 167.64 | 10.55 | 70.89 | 94.00 | 222.86 | 84.90 | 97.11 | 8.60 |
| 1940 | 16.95 | 4.20 | 168.68 | 9.26 | 69.83 | 95.80 | 254.26 | 81.25 | 95.62 | 8.59 |
| 1941 | 16.95 | 4.20 | 168.50 | 9.00 | 67.47 | 97.80 | 223.45 | 81.25 | 95.65 | 8.60 |
| 1942 | 16.95 | 4.20 | 168.51 | 9.00 | 67.50 | 97.00 | 230.49 | 87.48 | 95.65 | 8.59 |
| 1943 | 16.95 | 4.20 | 168.50 | 9.00 | 67.50 | 97.80 | 223.50 | 87.90 | 95.65 | 8.59 |
| 1944 | 16.95 | 4.20 | 168.50 | | | 97.80 | 223.50 | 87.90 | 95.65 | 8.59 |
| 1945 | 16.95 | 4.20 | | 8.38 | 9.60 | 97.79 | 157.75 | 87.77 | 88.66 | 5.24 |
| 1946 | 15.76 | 3.91 | | 3.55 | 8.93 | 91.35 | 147.56 | 81.50 | 78.82 | 2.91 |
| 1947 | 14.50 | 3.60 | | 3.03 | 8.23 | 83.70 | 135.90 | 75.05 | 72.55 | 2.69 |
| 1948 | 14.50 | 3.60 | | 3.03 | 8.23 | 83.70 | 135.90 | 75.05 | 72.55 | 2.69 |
| 1949 | 14.50 | 3.99 | | 1.39 | 8.77 | 92.20 | 136.08 | 75.05 | 72.55 | 2.48 |
| 1950 | 14.50 | 5.18 | 123.30 | 1.49 | 10.37 | 118.50 | 136.55 | 75.05 | 72.55 | 2.27 |
| 1951 | 14.50 | 5.18 | 123.30 | 1.49 | 10.37 | 118.50 | 136.55 | 75.05 | 72.55 | 2.27 |
| 1952 | 14.51 | 5.18 | 123.30 | 1.49 | 10.37 | 118.50 | 136.55 | 75.05 | 72.55 | 2.27 |
| 1953 | 14.52 | 5.18 | 123.67 | 1.49 | 10.37 | 118.79 | 136.78 | 74.96 | 72.55 | 2.27 |
| 1954 | 14.54 | 5.18 | 123.94 | 1.49 | 10.40 | 119.06 | 137.00 | 74.98 | 72.75 | 2.27 |

**Table A7.23 (cont.).** *Annual exchange rates 1913–2008.*

| Year | UK | USA | Germany | France | Belgium | Switzer-land | Nether-lands | Den-mark | Norway | Finland |
|---|---|---|---|---|---|---|---|---|---|---|
| 1955 | 14.49 | 5.18 | 123.56 | 1.49 | 10.40 | 118.66 | 136.72 | 74.98 | 72.55 | 2.27 |
| 1956 | 14.48 | 5.18 | 123.84 | 1.48 | 10.41 | 118.62 | 136.37 | 75.01 | 72.60 | 2.27 |
| 1957 | 14.49 | 5.18 | 123.57 | 1.38 | 10.35 | 118.48 | 136.26 | 74.86 | 72.63 | 2.06 |
| 1958 | 14.49 | 5.18 | 123.82 | 1.23 | 10.42 | 118.65 | 137.02 | 75.06 | 72.57 | 1.64 |
| 1959 | 14.54 | 5.18 | 124.00 | 1.06 | 10.39 | 119.94 | 137.33 | 75.25 | 72.77 | 1.63 |
| 1960 | 14.52 | 5.17 | 124.10 | 105.63 | 10.40 | 119.87 | 137.30 | 75.13 | 72.61 | 1.63 |
| 1961 | 14.49 | 5.17 | 128.63 | 105.57 | 10.40 | 119.85 | 142.36 | 75.02 | 72.54 | 1.62 |
| 1962 | 14.49 | 5.16 | 129.17 | 105.45 | 10.40 | 119.48 | 143.40 | 74.89 | 72.42 | 1.61 |
| 1963 | 14.54 | 5.19 | 130.35 | 106.11 | 10.44 | 120.27 | 144.37 | 75.34 | 72.75 | 161.51 |
| 1964 | 14.40 | 5.16 | 129.83 | 105.37 | 10.39 | 119.52 | 143.10 | 74.68 | 72.17 | 160.59 |
| 1965 | 14.43 | 5.16 | 129.36 | 105.48 | 10.43 | 119.42 | 143.55 | 74.77 | 72.31 | 160.59 |
| 1966 | 14.44 | 5.17 | 129.42 | 105.38 | 10.40 | 119.66 | 142.96 | 74.97 | 72.43 | 160.77 |
| 1967 | 14.16 | 5.17 | 129.70 | 105.16 | 10.42 | 119.52 | 143.53 | 74.05 | 72.38 | 152.20 |
| 1968 | 12.38 | 5.17 | 129.71 | 104.60 | 10.38 | 120.04 | 143.10 | 69.26 | 72.54 | 123.82 |
| 1969 | 12.37 | 5.17 | 132.22 | 99.91 | 10.35 | 120.10 | 143.01 | 68.98 | 72.56 | 123.48 |
| 1970 | 12.44 | 5.19 | 142.46 | 94.07 | 10.48 | 120.56 | 143.70 | 69.39 | 72.80 | 124.55 |
| 1971 | 12.49 | 5.11 | 146.93 | 92.94 | 10.55 | 124.28 | 146.67 | 69.22 | 73.00 | 122.71 |
| 1972 | 11.88 | 4.76 | 149.54 | 94.61 | 10.85 | 125.00 | 148.63 | 68.72 | 72.45 | 115.18 |
| 1973 | 10.72 | 4.37 | 164.51 | 98.82 | 11.29 | 139.04 | 157.22 | 72.70 | 76.54 | 115.00 |
| 1974 | 10.41 | 4.44 | 171.98 | 92.82 | 11.44 | 149.89 | 165.70 | 73.36 | 80.74 | 118.39 |
| 1975 | 9.22 | 4.16 | 169.15 | 97.15 | 11.33 | 161.06 | 164.58 | 72.60 | 79.79 | 113.46 |
| 1976 | 7.87 | 4.36 | 173.29 | 91.47 | 11.32 | 174.58 | 165.08 | 72.30 | 80.08 | 113.27 |
| 1977 | 7.83 | 4.48 | 193.05 | 91.36 | 12.53 | 186.84 | 182.82 | 74.78 | 84.32 | 111.53 |
| 1978 | 8.68 | 4.52 | 225.41 | 100.54 | 14.40 | 253.88 | 209.29 | 82.24 | 86.48 | 110.24 |
| 1979 | 9.10 | 4.29 | 234.27 | 101.03 | 14.65 | 258.20 | 214.06 | 81.71 | 84.87 | 110.59 |
| 1980 | 9.85 | 4.24 | 233.19 | 100.40 | 14.50 | 253.66 | 213.25 | 75.27 | 85.84 | 113.92 |
| 1981 | 10.21 | 5.06 | 224.12 | 93.42 | 13.65 | 257.93 | 203.10 | 71.21 | 88.31 | 117.64 |
| 1982 | 10.95 | 6.26 | 258.16 | 95.66 | 13.75 | 308.95 | 234.64 | 75.34 | 97.37 | 130.48 |
| 1983 | 11.64 | 7.67 | 300.84 | 101.04 | 15.05 | 365.73 | 269.25 | 84.12 | 105.27 | 138.08 |
| 1984 | 11.04 | 8.27 | 291.23 | 94.93 | 14.35 | 352.79 | 258.34 | 80.10 | 101.63 | 138.05 |
| 1985 | 11.09 | 8.59 | 293.14 | 96.13 | 14.54 | 351.54 | 259.90 | 81.48 | 100.32 | 139.12 |
| 1986 | 10.46 | 7.13 | 328.92 | 103.10 | 15.99 | 397.35 | 291.57 | 88.31 | 96.52 | 140.75 |
| 1987 | 10.39 | 6.35 | 353.25 | 105.72 | 17.02 | 426.01 | 313.52 | 92.93 | 94.33 | 144.55 |
| 1988 | 10.83 | 6.13 | 349.56 | 103.16 | 16.71 | 419.79 | 310.64 | 91.28 | 94.26 | 146.75 |
| 1989 | 10.57 | 6.45 | 343.36 | 101.31 | 16.40 | 394.76 | 304.44 | 88.41 | 93.58 | 150.58 |
| 1990 | 10.54 | 5.92 | 366.76 | 108.98 | 17.75 | 427.20 | 325.52 | 95.91 | 94.81 | 155.12 |
| 1991 | 10.67 | 6.05 | 364.91 | 107.39 | 17.73 | 422.30 | 323.93 | 94.69 | 93.40 | 149.76 |
| 1992 | 10.22 | 5.81 | 372.28 | 109.85 | 18.01 | 413.75 | 330.68 | 96.32 | 93.70 | 129.98 |
| 1993 | 11.67 | 7.77 | 470.23 | 137.35 | 22.51 | 526.37 | 418.78 | 120.05 | 109.65 | 136.18 |
| 1994 | 11.81 | 7.71 | 475.83 | 139.13 | 23.09 | 564.61 | 424.25 | 121.40 | 109.35 | 147.98 |
| 1995 | 11.25 | 7.13 | 497.99 | 142.99 | 24.20 | 603.82 | 444.59 | 127.34 | 112.58 | 163.42 |
| 1996 | 10.47 | 6.71 | 445.88 | 131.13 | 21.67 | 541.15 | 397.93 | 115.69 | 103.88 | 146.06 |
| 1997 | 12.50 | 7.63 | 440.65 | 130.89 | 21.35 | 526.31 | 391.53 | 115.66 | 108.05 | 147.19 |
| 1998 | 13.16 | 7.95 | 452.11 | 134.86 | 21.92 | 548.87 | 401.09 | 118.71 | 105.37 | 148.66 |

**Table A7.23 (cont.).** *Annual exchange rates 1913–2008.*

| Year | UK | USA | Germany | France | Belgium | Switzer-land | Nether-lands | Den-mark | Norway | Finland |
|---|---|---|---|---|---|---|---|---|---|---|
| 1999 | 13.37 | 8.26 | 450.52 | 134.33 | 21.84 | 550.63 | 399.85 | 118.50 | 106.00 | 148.20 |
| 2000 | 13.85 | 9.15 | 431.80 | 128.75 | 20.94 | 542.26 | 383.23 | 113.30 | 104.09 | 142.04 |
| 2001 | 14.87 | 10.32 | 472.90 | 141.00 | 22.93 | 612.33 | 419.71 | 124.11 | 114.92 | 155.56 |
| 2002 | 14.57 | 9.71 | | | | 624.26 | | 123.28 | 121.96 | |
| 2003 | 13.19 | 8.08 | | | | 600.25 | | 122.79 | 114.13 | |
| 2004 | 13.45 | 7.35 | | | | 591.12 | | 122.67 | 109.03 | |
| 2005 | 13.57 | 7.46 | | | | 599.41 | | 124.54 | 115.83 | |
| 2006 | 13.57 | 7.37 | | | | 588.30 | | 124.06 | 115.04 | |
| 2007 | 13.52 | 6.76 | | | | 563.27 | | 124.17 | 115.44 | |
| 2008 | 12.08 | 6.55 | | | | 605.42 | | 128.84 | 117.03 | |

* SEK per 1 million mark.

Note:

UK: SEK per GBP

USA: SEK per USD

Germany: SEK per 100 mark 1913-1921, SEK per 1 million mark 1922-1923, SEK per 100 reichsmark 1924-1945, SEK per DEM 1950-2001.

France: SEK per 100 (old) franc 1913-1959, SEK per 100 franc 1960-2001.

Belgium: SEK per 100 (old) franc 1913-1925, SEK per 100 belgas 1926-1943, SEK per 100 BEF 1945-2001.

Switzerland: SEK per 100 CHF 1915-2008

Netherlands: SEK per 100 NLG 1913-2001

Denmark: SEK per 100 DKK 1913-2008

Norway: SEK per 100 NKK 1913-2008

Finland: SEK per 100 (old) mark 1913-1962, SEK per 100 (new) mark 1963-2001

The annual averages have been calculated as geometric averages of monthly exchange rates.

**Table A7.24.** *Annual exchange rates and the exchange rate index 1913–2008.*

| | Italy | Euro | Japan | Czech Repub-lic | Poland | Latvia | Estonia | Lithu-ania | Ex-change rate index (ERI) | ERI excl. Ger-many 1913-24 | ERI excl. German hyperin-flation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1913 | | | | | | | | | 231.46 | 120.01 | 198.78 |
| 1914 | | | | | | | | | 231.52 | 121.15 | 198.83 |
| 1915 | | | | | | | | | 218.56 | 121.20 | 187.70 |
| 1916 | | | | | | | | | 188.92 | 111.96 | 162.25 |
| 1917 | | | | | | | | | 170.42 | 99.06 | 146.36 |
| 1918 | | | | | | | | | 165.70 | 101.05 | 142.31 |
| 1919 | | | | | | | | | 155.73 | 117.11 | 133.74 |

**Table A7.24 (cont.).** *Annual exchange rates and the exchange rate index 1913–2008.*

| | Italy | Euro | Japan | Czech Republic | Poland | Latvia | Estonia | Lithuania | Exchange rate index (ERI) | ERI excl. Germany 1913-24 | ERI excl. German hyperinflation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1920 | | | | | | | | | 143.38 | 122.17 | 123.14 |
| 1921 | 19.37 | | | | | | | | 122.44 | 108.79 | 108.80 |
| 1922 | 18.28 | | | 9.02 | | | | | 105.10 | 102.93 | 102.93 |
| 1923 | 17.49 | | | 11.23 | | | | | 99.12 | 99.10 | 99.10 |
| 1924 | 16.56 | | | 11.21 | | | | | 94.22 | 94.22 | 94.22 |
| 1925 | 14.92 | | | 11.15 | | | | | 95.86 | 95.86 | 95.86 |
| 1926 | 14.61 | | | 11.14 | | | | | 97.65 | | |
| 1927 | 19.28 | | | 11.12 | | | | | 99.74 | | |
| 1928 | 19.68 | | | 11.12 | | | | | 100.07 | | |
| 1929 | 19.56 | | | 11.10 | | | | | 99.82 | | |
| 1930 | 19.54 | | | 11.08 | 41.89 | 71.90 | 99.36 | | 99.23 | | |
| 1931 | 20.93 | | | 11.93 | 44.99 | 74.00 | 102.41 | | 103.19 | | |
| 1932 | 28.31 | | | 16.54 | 61.71 | | | | 127.90 | | |
| 1933 | 30.59 | | | 17.67 | 65.94 | | | 58.73 | 128.71 | | |
| 1934 | 33.37 | | | 16.82 | 73.25 | | | 65.18 | 133.02 | | |
| 1935 | 33.11 | | | 16.87 | 75.25 | | | 67.19 | 135.57 | | |
| 1936 | 28.85 | | | 15.95 | 74.25 | | | 66.44 | 132.91 | | |
| 1937 | 20.94 | | | 13.93 | 74.81 | | | 66.95 | 128.97 | | |
| 1938 | 21.06 | | | 13.94 | 75.53 | 77.57 | 107.26 | 67.57 | 128.65 | | |
| 1939 | 22.01 | | | 14.51 | 79.43 | 78.05 | 105.22 | 70.69 | 129.70 | | |
| 1940 | 21.46 | | | 14.68 | | 79.65 | 101.00 | 71.83 | 126.87 | | |
| 1941 | 21.88 | | | | | | | | 126.34 | | |
| 1942 | 21.99 | | | | | | | | 126.80 | | |
| 1943 | 22.20 | | | | | | | | 126.93 | | |
| 1944 | 22.20 | | | | | | | | 126.66 | | |
| 1945 | | | | | | | | | 119.87 | | |
| 1946 | | | | | | | | | 103.75 | | |
| 1947 | 14.59 | | | | | | | | 95.18 | | |
| 1948 | | | | | | | | | 94.51 | | |
| 1949 | | | | | | | | | 95.86 | | |
| 1950 | 0.83 | | | | | | | | 106.03 | | |
| 1951 | 0.83 | | | | | | | | 105.03 | | |
| 1952 | 0.83 | | | | | | | | 105.08 | | |
| 1953 | 0.83 | | | | | | | | 105.16 | | |
| 1954 | 0.83 | | | | | | | | 105.29 | | |
| 1955 | 0.83 | | | | | | | | 105.10 | | |
| 1956 | 0.83 | | | | | | | | 105.10 | | |
| 1957 | 0.83 | | | | | | | | 104.42 | | |
| 1958 | 0.83 | | | | | | | | 103.54 | | |
| 1959 | 0.84 | | | | | | | | 102.96 | | |
| 1960 | 0.84 | | 1.45 | | | | | | 102.89 | | |
| 1961 | 0.84 | | 1.45 | | | | | | 103.81 | | |

**Table A7.24 (cont.).** *Annual exchange rates and the exchange rate index 1913–2008.*

| | Italy | Euro | Japan | Czech Republic | Poland | Latvia | Estonia | Lithuania | Exchange rate index (ERI) | ERI excl. Germany 1913-24 | ERI excl. German hyperinflation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1962 | 0.84 | | 1.45 | | | | | | 103.85 | | |
| 1963 | 0.84 | | 1.45 | | | | | | 104.43 | | |
| 1964 | 0.83 | | 1.44 | | | | | | 103.66 | | |
| 1965 | 0.83 | | 1.44 | | | | | | 103.69 | | |
| 1966 | 0.83 | | 1.44 | | | | | | 103.77 | | |
| 1967 | 0.83 | | 1.44 | | | | | | 103.11 | | |
| 1968 | 0.83 | | 1.45 | | | | | | 99.32 | | |
| 1969 | 0.83 | | 1.46 | | | | | | 99.44 | | |
| 1970 | 0.83 | | 1.46 | | | | | | 101.25 | | |
| 1971 | 0.83 | | 1.49 | | | | | | 101.95 | | |
| 1972 | 0.82 | | 1.59 | | | | | | 100.53 | | |
| 1973 | 0.76 | | 1.63 | | | | | | 102.38 | | |
| 1974 | 0.69 | | 1.54 | | | | | | 104.09 | | |
| 1975 | 0.64 | | 1.42 | | | | | | 101.00 | | |
| 1976 | 0.53 | | 1.49 | | | | | | 99.00 | | |
| 1977 | 0.52 | | 1.69 | | | | | | 103.58 | | |
| 1978 | 0.54 | | 2.18 | | | | | | 114.61 | | |
| 1979 | 0.52 | | 1.97 | | | | | | 115.68 | | |
| 1980 | 0.50 | | 1.88 | | | | | | 115.93 | | |
| 1981 | 0.45 | | 2.30 | | | | | | 117.05 | | |
| 1982 | 0.47 | | 2.53 | | | | | | 130.29 | | |
| 1983 | 0.51 | | 3.24 | | | | | | 146.65 | | |
| 1984 | 0.47 | | 3.49 | | | | | | 143.92 | | |
| 1985 | 0.45 | | 3.62 | | | | | | 145.63 | | |
| 1986 | 0.48 | | 4.25 | | | | | | 149.12 | | |
| 1987 | 0.49 | | 4.40 | | | | | | 152.29 | | |
| 1988 | 0.47 | | 4.79 | | | | | | 152.27 | | |
| 1989 | 0.47 | | 4.69 | | | | | | 150.85 | | |
| 1990 | 0.50 | | 4.10 | | | | | | 155.06 | | |
| 1991 | 0.49 | | 4.50 | | | | | | 154.90 | | |
| 1992 | 0.47 | | 4.61 | | | | | | 153.06 | | |
| 1993 | 0.50 | | 7.00 | | | | | | 187.65 | | |
| 1994 | 0.48 | | 7.55 | | | | | | 190.26 | | |
| 1995 | 0.44 | | 7.56 | | | | | | 193.02 | | |
| 1996 | 0.43 | | 6.17 | | | | | | 175.83 | | |
| 1997 | 0.45 | | 6.32 | | | | | | 182.27 | | |
| 1998 | 0.46 | 8.92 | 6.09 | 24.66 | 2.28 | 13.49 | 0.56 | 1.99 | 186.13 | | |
| 1999 | 0.46 | 8.81 | 7.28 | 23.88 | 2.09 | 14.07 | 0.56 | 2.06 | 188.21 | | |
| 2000 | 0.44 | 8.45 | 8.49 | 23.70 | 2.11 | 15.10 | 0.54 | 2.28 | 188.41 | | |
| 2001 | 0.48 | 9.25 | 8.50 | 27.16 | 2.52 | 16.51 | 0.59 | 2.58 | 206.79 | | |
| 2002 | | 9.16 | 7.76 | 29.74 | 2.38 | 15.78 | 0.59 | 2.65 | 203.71 | | |
| 2003 | | 9.12 | 6.97 | 28.66 | 2.08 | 14.25 | 0.58 | 2.64 | 193.42 | | |

**Table A7.24 (cont.).** *Annual exchange rates and the exchange rate index 1913–2008.*

| | Italy | Euro | Japan | Czech Republic | Poland | Latvia | Estonia | Lithuania | Exchange rate index (ERI) | ERI excl. Germany 1913-24 | ERI excl. German hyperinflation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2004 | | 9.13 | 6.79 | 28.60 | 2.02 | 13.73 | 0.58 | 2.64 | 190.50 | | |
| 2005 | | 9.28 | 6.78 | 31.16 | 2.31 | 13.33 | 0.59 | 2.69 | 195.20 | | |
| 2006 | | 9.25 | 6.34 | 32.66 | 2.38 | 13.35 | 0.59 | 2.68 | 194.52 | | |
| 2007 | | 9.25 | 5.74 | 33.35 | 2.45 | 13.22 | 0.59 | 2.68 | 192.44 | | |
| 2008 | | 9.61 | 6.35 | 38.52 | 2.70 | 13.67 | 0.61 | 2.78 | 196.44 | | |

Note:
Italy: SEK per 100 ITL 1920–2001
Euro: SEK per EUR 1998–2008
Japan: SEK per 100 JPY 1960–2008
Czech Republic: SEK per 100 CSK 1922–2008
Poland: SEK per 100 zloty 1930–39 and per PLN 1998–2008
Latvia: SEK per 100 lats 1930–40 and per LVL 1998–2008
Estonia: SEK per 100 krooni 1930–40 and per EEK 1998–2008
Lithuania: SEK per 100 litas 1932–40 and per LTL 1998–2008
The annual averages have been calculated as geometric averages of monthly exchange rates.

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# 8.
# The evolution of Swedish consumer prices, 1290–2008[1]

**Rodney Edvinsson and Johan Söderberg**

## 8.1. Introduction

The purpose of this chapter is to describe the construction of a Consumer Price Index (CPI) for Sweden 1290–2008. The aim is not to present new empirical material, but rather to use the rich empirical material collected in earlier studies on the price history of Sweden to construct a price index that as far as possible uses a consistent method over time.[2]

The chapter also discusses some theoretical and conceptual problems in relation to constructing a historical CPI. An index covering a span from the Middle Ages to the present raises much more questions than modern-type consumer price indices. It raises the issue of what inflation actually is.

## 8.2. Methodological issues

A price index is a measure of the level of prices in the compared year (*t*) in relation to the level of prices in the price reference period (*0*). A volume (or real) index is derived by dividing the ratio between nominal values in two years by the price index, a procedure termed 'deflation'. The price indices can be constructed in various ways, depending on how the individual prices are weighted.

The two most common price indices are the CPI and the GDP deflator in market prices (the deflator is used to transform nominal values into volume values, and can be seen as a price index). The GDP deflator is in a certain sense a broader price

1 We want to thank Ulf Jonsson, Astrid Kander, Per Simonsson and Daniel Waldenström for commenting earlier versions of this chapter.

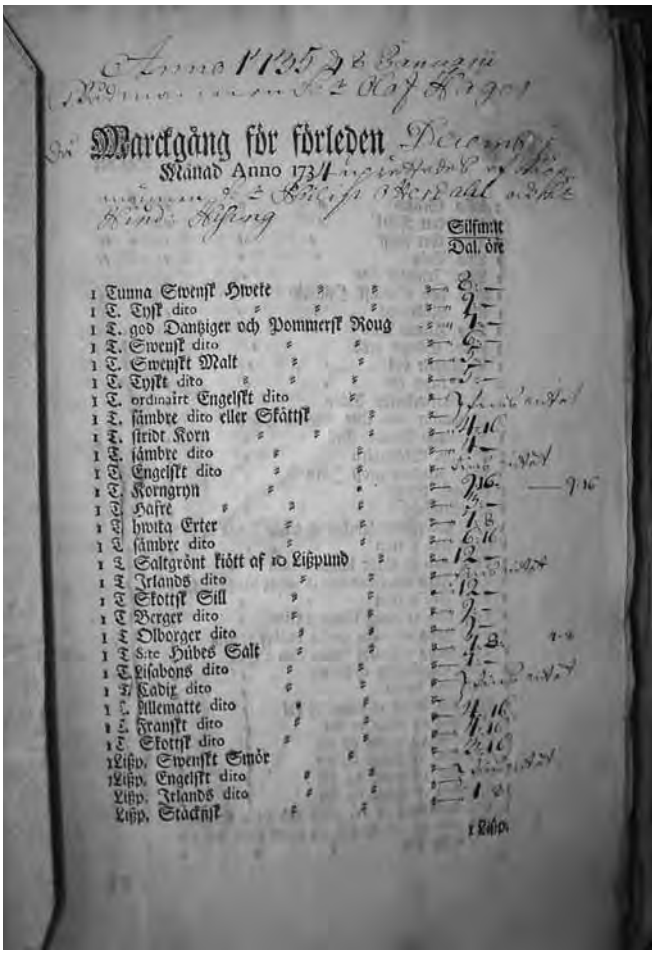
2 The terminology of this chapter follows as closely as possible the one used in *Consumer price index manual* (ILO and others, 2004).


*A store in Stockholm in 1910.*
Source: Stockholm City Museum.

index, and is a weighted average of the price indices for the final demand of households and NPISH (Non-Profit Institutions Serving Households), government final demand, gross fixed capital formation and net export.

The CPI should not be confused with the deflator of household and NPISH final consumption used in the national accounts; they are based on different methods.[3] The deflator of household and NPISH final demand shall include all types of consumption. This is not necessarily the case in calculations of a CPI. A CPI can be based on a narrower range of goods and services, for example, only private consumption in towns. The CPI normally also covers a smaller number of households (for example, the wealthiest households are sometimes excluded). Often imputed values of rents for self-owned dwellings are included, while imputed values of agricultural products for own use are excluded. The latter are included in the deflator of household and NPISH final demand. The index principles of the two indices often differ. While the CPI mostly uses quantities from an earlier period, for example in a Laspeyres price index, the national accounts mostly use quantities of a later period,

3 ILO and others (2004, p. 58).



Marckgång för förleden Månad Anno 1734

| | | Silfvermt Dal. öre |
|---|---|---|
| 1 T. | Tunna Swenſk Hwete | 2 — |
| 1 T. | Tyſk dito | 1 — |
| 1 T. | god Dantziger och Pommerſk Roug | 1 — |
| 1 T. | Swenſk dito | 6 — |
| 1 T. | Swenſkt Malt | 5 — |
| 1 T. | Tyſkt dito | 5 — |
| 1 T. | ordinairt Engelſkt dito | 3 — |
| 1 T. | ſämbre dito eller Skåttſk | 4 16 |
| 1 T. | ſtridt Korn | 4 — |
| 1 T. | ſämbre dito | 3 — |
| 1 T. | Engelſkt dito | 2 16 — 2 16 |
| 1 T. | Korngryn | 2 16 — 2 16 |
| 1 T. | Hafre | 2 — |
| 1 T. | hwita Erter | 7 8 |
| 1 T. | ſämbre dito | 6 16 |
| 1 T. | Saltgrönt kiött af 10 Lißpund | 12 — |
| 1 T. | Irlands dito | 12 — |
| 1 T. | Skottſk Sill | 2 — |
| 1 T. | Berger dito | 2 — |
| 1 T. | Oldorger dito | 4 8 |
| 1 T. | Ste Hubes Salt | 4 — |
| 1 T. | Liſabons dito | 3 — |
| 1 T. | Cadiz dito | 3 — |
| 1 T. | Allematte dito | 4 16 |
| 1 T. | Franſkt dito | 4 16 |
| 1 T. | Skottſk dito | 2 16 |
| 1 Lißp. | Swenſkt Smör | 1 — |
| 1 Lißp. | Engelſkt dito | 1 — |
| Lißp. | Irlands dito | 1 — |
| Lißp. | Stackfiſk | 1 Rdr. |

*There are a number of sources for pre-industrial prices in Sweden. These are price notations in Göteborg from December 1734 according to the market scales, which were semi-market prices.* Source: Göteborgs rådhusrätts och magistrats arkiv före år 1900, L 1, vol. 6 (Göteborgs landsarkiv).

for example in a Paasche price index. The differences between the index principles are usually quite small if an annual chain index is applied.

One problem with price indices is that the pattern of consumption changes over time. Comparison over time becomes increasingly difficult. This makes chaining necessary, i.e. the price reference period is changed regularly, and the different consecutive time series are linked to each other with one common period as the base period. Chaining is preferable if the studied period is very long, as is the case with a historical CPI. The price level in the 21st century cannot be reasonably estimated on the basis of consumption weights pertaining to the 17th century. The preferred option is an annual chain index, but this presupposes knowledge of the composition of consumption in every year, which can be difficult to obtain for a historical price index (although historical national accounts could provide certain information in

The Christmas Fair*, by Georg von Rosen (1843–1923).*
Source: Nationalmuseum.

that direction). The second best option is to change the weights regularly, although not as often as annually. The period with a common price reference year or period is named a deflation period. This is also the chosen option in the present study for the period before 1914.

Furthermore, there is a theoretical difference between the cost of a representative basket of consumption products and the cost of guaranteeing a certain level of utility or welfare of a consumer. The former is called a Consumer Price Index, while the latter is a Cost-of-Living Index. A CPI measures the average change of prices, and is therefore best represented by the concept of a basket of products, a so-called Lowe

type index. This purpose also reflects the central bank concept of inflation, even though the CPI is not specifically designed to measure general inflation. The main purpose of a Cost-of-Living Index is, however, not to provide a general measure of inflation, but rather to serve as an instrument for deflating nominal wages in order to calculate real wages.[4] For example, the introduction of potatoes in the late 18th century enabled consumers to partly switch from rye and barley to potatoes. If the weight reference period is situated earlier in time, when potatoes were not part of consumption, a constant basket index will overestimate the cost of living in later periods compared to earlier periods.

Nevertheless, a Consumer Price Index (CPI) can be assumed to roughly approximate a Cost-Of-Living Index (COLI), especially if the basket of consumed products is changed regularly and a chain index is constructed.

There are also some price indices that can be assumed to better approximate a COLI, which has to do with consumer preferences and cross-elasticities of demand for the consumed products (i.e. the responsiveness of the quantity demanded for a good to the price change of another good). The more often the weight reference period is changed, when a chain index is constructed, the more such a price index tends to, at least theoretically, approach a COLI. The substitution effects depend on the cross-elasticity of various products.[5] Since we do not have access to annual changes in the composition of consumer products for earlier periods, the annual fluctuations in relative prices are actually the most reliable indicator of annual fluctuations in relative consumption quantities. Another problem is that the cross-elasticity of demand can vary significantly both between products and between types of expenditure at a more aggregated level. The price elasticity of individual foodstuffs can be high, but the price elasticity of food expenditures as a whole is probably quite low.

The main consideration behind constructing a historical CPI in this study is the central bank concept of inflation and to a lesser degree the notion of a cost-of-living index. This partly stands in contrast to previous studies on the cost of living in Sweden, for example Gunnar Myrdal's *The Cost of Living in Sweden 1830–1930*, whose main purpose was to 'serve as a means for the investigation of real wages in Sweden'.[6]

This study mainly uses the Laspeyres formula. The weights are quite difficult to estimate and the calculations are based on estimates of expenditure shares during certain base periods, which is possible if the Laspeyres formula is used. The Laspeyres price index is a measure of the level of prices of products $i$ in period $t$ in relation to period $0$, the price reference period, which for the Laspeyres price index is the same as the weight reference period, $b$, the period of the quantities, $q$:

4 Statistiska centralbyrån (2001, pp. 7–9).
5 Grytten (2004).
6 Myrdal (1933, p. 49).

$$P_{0,t}^{L} = \frac{\sum_{i} p_{t,i} q_{0,i}}{\sum_{i} p_{0,i} q_{0,i}} = \sum_{i} \left( \frac{p_{t,i}}{p_{0,i}} s_{i}^{0,0} \right) \quad (1)$$

Formula 1 shows that the Laspeyres price index can be rewritten as a weighted arithmetic average of the price relatives using the expenditure shares in the price reference period ($s_i^{0,0}$) as weights.

Prior to 1850, consumption patterns generally did not change as much as they have done later. In a long-term perspective, volume GDP per capita was stagnant. Hence, the deflation periods are longer for the earlier periods.

Furthermore, the further back in time, the fewer the products that could be represented by longer price data time series; moreover, the data are often restricted to some or only one region. This of course makes it virtually impossible to construct an annual chain index, whereby the quantities are changed every year. The weights and the duration of deflation periods must take this into account.

Calculations of a CPI for modern times normally ignore barter transactions.[7] However, if the economy is dominated by barter transactions, such an approach is problematic. One theoretical problem is that prices only relate to goods sold on the market, while most produced goods were not traded. However, the existence of a market implies that producers had the alternative of either consuming the product or selling it on the market. Hence, there was an alternative cost for the use of product, which could be measured in price terms. Such an alternative cost would, of course, be lower than the market price since we have to deduct various transaction costs involved in trade. Nevertheless, the alternative cost should be related to the market price to some degree.

Periods of hyperinflation or high inflation also cause problems for the construction of a historical CPI. This is because in such periods prices can be expressed in prices of different types, one in the debased currency and one in a more stable currency unit, for example a foreign currency or previously minted coins in precious metal. At the end of such inflation periods the currency unit is often changed by devaluing the weaker currency, causing prices to fall back to previous levels. This is specifically addressed in this study by constructing two different CPIs, one that can be used to deflate other price series and another that better functions as a measure of inflation.

## 8.3. The currency unit for the CPI in this study

Since 1873, the Swedish currency unit has been the krona (SEK). However, before that year, the Swedish currency was changed on numerous occasions (see Chapters 2, 3, 4 and 6), which must be taken account of when constructing a historical CPI.

7 ILO and others, (2004, p. 19).

There were also periods, most notably 1624–1803, when domestic currencies existed side-by-side, with a fluctuating exchange rate between them. The development of a price index expressed in one of these currencies may, therefore, differ from the development of a price index expressed in another currency. As a general rule, the CPI should follow the currency that was used most frequently in transactions. Table 8.1 presents the currencies that are followed by the Consumer Price Index of this study for different periods.

**Table 8.1:** *The currencies followed by the Consumer Price Index presented in this study.*

| Period | Currency |
|---|---|
| 1290–1624 | Mark penningar |
| 1624–1776 | Mark kopparmynt (in 1624 equal to mark penningar) |
| 1776–89 | Riksdaler specie (in 1776 equal to 72 marks kopparmynt) |
| 1789–1855 | Riksdaler riksgälds (in 1789 equal to the riksdaler specie) |
| 1855–73 | Riksdaler riksmynt (in 1855 equal to riksdaler riksgälds) |
| 1873 onwards | Krona (SEK) |

The currencies in Table 8.1 are the basis for the construction of a first variant of a CPI, which we call a deflator index. It is an index of prices expressed in the main currency unit: 1 SEK = 72 marks. This index is most suitable for deflating other price series, i.e. to estimate real or relative prices (see section 8.9 for concrete examples). However, a second variant, an inflation index, is also constructed to take into consideration times of very high inflation, when inflation money was circulated which later was replaced by a more stable currency. This occurred in six periods: 1351–4, 1361–4, 1521–4, 1561–76, 1590–3 and 1715–9. At the end of these inflation periods, the inflation coins could be exchanged for new coins, albeit at a much lower rate than was nominally assigned to the inflation coins. When prices were expressed in proper coins, they have been converted into prices in inflation coins by using the exchange rate between the inflation coins and proper coins.

This could be compared to modern times when zeros have been struck from inflation notes on various occasions, for example when the new mark was introduced in Germany in 1924 and was set equal to one trillion old marks. The introduction of new notes implies that prices of products are sold at a lower nominal figure, but in such a situation an inflation index should not record any dramatic deflation, since this is just a matter of changing one currency for another. This is most clearly shown when prices are recorded in both currencies during the overlapping period.

Genuine deflation can occur following a period of inflation, when the inflation money is appreciated for various reasons. An example of this is the deflation in Sweden in the early 1920s, when the CPI fell by more than 30 per cent. The direct cause was the reintroduction of the same relation of the krona to gold as before the First World War (see also Chapter 7).

*Hungary in 1946, illustrating the effects of hyperinflation.*

The inflation index is based on the exchange rate between the inflation money and the new coins that were introduced (see Chapters 3 and 4), and the annual change in the deflator index is corrected accordingly.

There were also two other inflation periods, 1624–1665 and 1789–1834, where it is not clear which currency to follow. The deflator index in these cases follows the inflation coins. The difference between those two periods and the six periods mentioned above is that in the former the inflation currency became the main currency afterwards, while in the periods 1351–4, 1361–4, 1521–4, 1561–76, 1590–3 and 1715–9 the old currency was restored.

The problem is most clearly illustrated by the development of the deflator index between 1574 and 1576, during which this index records a fall by 82 per cent. This should, however, not be interpreted as a period of severe deflation. What happened was that a new mark was introduced in 1575 with a higher fine silver content than the old mark (see Chapter 4). For example, while a 4-öre coin (a half mark) of 1572 contained 0.5142 grams fine silver, a 4-öre coin of 1575 contained 3.088 grams fine silver, i.e. a six-fold increase.[8]

8 Wallroth (1918, pp. 37 and 41).

The *Consumer Price Manual* argues that it is not necessary to refrain from having more than one CPI:[9]

'There is no necessity to have only a single CPI. When only a single CPI is compiled and published, there is a risk that it may be used for purposes for which it is not appropriate. More than one CPI could be published in order to meet different analytic or policy needs.'

The deflator and inflation indices, respectively, partly reflect different purposes of price indices. If the price index is to measure the cost-of-living in order to deflate nominal wages over time or to estimate the real price of various goods, then a deflator index could be used. However, if the price index is to measure inflation, the inflation index should be preferable, since a simple deflator does not always reflect actual inflation when currencies with the same name, but at different exchange rates, are used through time.

The two CPIs are presented in Table A8.1. To calculate price indices expressed in other Swedish currencies (for example riksdaler banco instead of riksdaler riksgälds in 1789–1803, or daler carolin instead of daler kopparmynt in 1624–1777), the exchange rates presented in Chapter 4 can be used to transform the CPI of this study.

## 8.4. The period 1290–1539

The data for constructing a CPI for the period 1290–1539 are based on price data collected by Bo Franzén and Johan Söderberg (2006).[10]

From the early 15th century the price data are quite rich for the most important commodities, though not for every year. Before that period, only a few years and a few commodities can be covered. The missing years have been interpolated for various commodities. The price of barley or unspecified grain has been interpolated using the price of rye, and vice versa. The interpolations are based on silver prices (see section 8.4.4 below); only in the second stage are they transformed into nominal prices.

The best data exist for seven goods: grain, beer, salt, oxen, butter, wax, and iron. Only for these goods, it seems, can price series covering fifty years or more be assembled. Grain prices are the most frequent. Before 1500, grain prices usually refer to unspecified grain or barley, not to rye, which was more expensive. The cultivation of rye gradually spread at the expense of barley, but the latter crop still dominated in the 16th century. The CPI of the present study also uses data on the prices of three other goods – rye, hops and copper. For these three goods data exist mainly from the 1460s onwards.

Though the focus on these goods is motivated by the state of the sources, the mix

9 ILO and others (2004, p. 33).

10 See also Söderberg (2007).

has some advantages. Iron and butter were Swedish export articles. During the Middle Ages, iron (and copper) became the dominant export articles from Sweden. Salt is the only good that was always imported. It also was the only imported good, besides hops in the late Middle Ages, that was vital in popular consumption. Oxen were exported in certain periods, but the beef trade was also subject to substantial changes in organization. Grain was of course the most essential good in the domestic economy, but in foreign trade it was rather marginal. Beer was an increasingly popular and important consumption good. The beer market widened during the late Middle Ages. This is closely linked to the increased use of hops in brewing, making for a more tasteful and durable beer. Compared to these goods, wax played a smaller role in the economy. It was mainly used for making candles for religious ceremonies.

### 8.4.1. Sources

The major part of the price quotations are from the province of Uppland, which included Stockholm, the largest town. Uppland probably was the most commercialized part of medieval Sweden, at least from the late 14th century.

Several oxen and butter prices, however, are from the southern province of Småland, bordering on Denmark. This reflects the regional division of labour, in which Småland and some western provinces had a prominent role in cattle-raising, but also the fact that oxen and cows were sometimes used as partial payment in land sales.

Finland was part of the kingdom of Sweden in the medieval era. For this reason, Finnish prices are also included, though their number is not large. Nearly all of them come from Turku (Åbo) in south-western Finland, which appears to have been fairly price-integrated with Uppland.

The majority of the price quotations stem from market transactions carried out by various institutions. Three sources are of particular importance:

Parish churches regularly sold the surplus of grain that resulted from tithes delivered by their tenants.[11] Many grain price quotations, and most wax prices, refer to transactions involving these churches.

The accounts of the City of Stockholm report many kinds of purchase. For instance, the City bought considerable amounts of beer to be consumed on festive occasions. About seven litres of beer per person was consumed at the annual May feast in Stockholm City Hall in the 1460s.

A third, very useful source is the large collection of medieval letters that has been published on the Internet by Riksarkivet (The National Archives): 'Svenskt Diplomatariums huvudkartotek över medeltidsbreven'. Currently, more than 40,000 documents have been registered and are digitally searchable. These documents report many market transactions in various goods. Some prices are valuations in connection

11 See, e.g., Andræ (1965).

*From an exhibition at the Museum of National Antiquities, Stockholm.*
*No Swedish market price notations for consumer goods exist before 1290. However, a few prices are recorded in the provincial laws, mainly in connection with various fines. According to the Gutalag from the early 13th century, a dead person's relatives could demand the following payments for manslaughter:*
*- Slave – 225 grams of silver (above)*
*- Free non-Gotlander – 2 kg of silver (middle)*
*- Free Gotlander – 4.8 kg of silver (below).*

with land transactions or the bequeathing of property. These prices seem to conform well to outright market prices.

Price tariffs set by the authorities are not used in this study. Tariffs generally aimed at lowering market prices during dearth, and it is not known to what extent such maximum prices were followed.

### 8.4.2. Units of measurement

For beer, one barrel is assumed to comprise 117.5 litres.[12]

For butter and wax, prices are often given per *lispund.* The *lispund* is assumed to equal 6.647 kg, which is the weight known from the 16th century.[13] Butter prices could also be given per barrel. This constitutes a problem, since there were at least three barrels in use in the butter trade: one of 13 (or 13½), one of 16 and one of 18 *lispund*.[14] The use of the 13 (or 13½) *lispund* barrel seems to have been limited to West Sweden, whereas the 16 *lispund* barrel was commonly used in Uppland and other parts of East Sweden. The 18 *lispund* barrel is documented from southern Sweden.

For copper, prices are usually given per ship pound (*skeppund* = 20 *lispund*). The weight of the medieval ship pound is not known for certain but was probably about 133 kg, which is the weight known from the 16th century.[15]

12 Sahlgren (1981, col. 58), and Morell (1988, p. 33).
13 Morell (1988, p. 10).
14 Hammarström (1956, p. 380 n 20), Dovring (1947, p. 204), and Jansson (1995, p. 274).
15 Jansson (1981, col. 544), and Morell (1988, pp. 10 and 46).

For grain, one *last* is assumed to equal 45 hectolitres.[16]

For iron, prices are usually given per *last* or *fat* (1 *last* = 12 *fat*). The weight of the medieval *fat* is not known for certain but is generally assumed to have been about 170 kg.[17] Hence, the iron *last* would correspond to about 2,040 kg. Prices refer to cut pieces of iron (osmonds), not to bar iron, which was not introduced until after the medieval period.

For salt, prices are usually given per barrel. The salt barrel is assumed to equal 15 *lispund* according to a regulation from 1478.[18] The *lispund* is assumed to equal 6.647 kg.[19] Consequently a barrel of salt is assumed to amount to 99.7 kg.

### 8.4.3. Nominal prices

Prices are expressed in the nominal currency, *mark penningar* (which during the late Middle Ages commonly was labelled *mark örtug*). Throughout the Middle Ages the following relations were defined in the monetary system (see also Chapter 3):

1 *mark penningar* = 8 *öre* = 24 *örtug* = 192 *penningar*.[20]

### 8.4.4. Silver prices

As mentioned above, the interpolation of missing values is based on so-called silver prices, which express prices in grams of silver per modern metric weight or volume unit. Silver prices also facilitate comparisons with international prices. It is particularly during periods of debasement, followed by recoinage, that interpolating missing values using silver prices is preferable to interpolating such values based on nominal prices, since the latter method could completely miss price increases caused by such debasements.

The fine silver content of the Swedish mark was gradually reduced during the Middle Ages, which is discussed further in Chapter 3. People were aware of this and therefore often specified the exchange ratio between the currency actually used and the stable silver mark (*mark lödig*) that was to be applied in each particular economic transaction. The gross weight of the silver mark is here, as in previous research, assumed to be 210.6 grams of silver, although the fine silver content was somewhat lower (assumed in Chapter 3 to be between 184 and 197 grams).

The calculation of the silver price of the various goods is based on these exchange rates. One example: in 1346, the price of an ox was 3 mark penningar. At the same time, the exchange rate of mark penningar to the silver mark was 5.0. For that year

16 Jansson (1981, col. 132).

17 *Nationalencyklopedin*, article 'Fat'.

18 *Stockholms stads tänkeböcker 1474-1483* (p. 183).

19 Morell (1988).

20 For the period after 1450 it is not completely clear whether some of the prices were expressed in mark penningar or mark danska, equal to ¾ mark penningar (see Chapter 3).

the fine silver content of the silver mark was 197 grams according to Chapter 3. Thus, one mark penningar was exchanged for 197/5 ≈ 39 grams of fine silver. The silver price of this ox of 3 mark penningar then equals (3/5)*197 ≈ 118 grams of fine silver.

### 8.4.5. Index construction

The index is constructed differently for each of the periods 1290–1330, 1330–1420 and 1420–1539 (see Table 8.2). For the period 1420–1539 ten commodities are covered: grain, rye, bear, butter, iron, copper, oxen, wax, salt and hops. With the exception of 1445, price data exist for at least one commodity in every year of this period. For 1330–1420 the price index is based on seven commodities: grain, rye, bear, butter, iron, copper and oxen. For 1290–1330 the index is mainly based on the price of grain, complemented with some annual data on the price of butter.

For the period 1420–1539, rye, grain and beer weigh most heavily (55 per cent), since vegetable products were the most important part of consumption.[21] The five per cent weight given to beer may seem rather small, but here we assume that the price of beer was largely determined by the price of rye and grain. Animal products (butter and oxen) are assumed to have accounted for 25 per cent of the total budget. The weight for non-food products is only 12 per cent. The relative weights for earlier periods are the same as for 1420–1539 (see Table 8.2), with the difference that some commodities are missing.

The annual fluctuations of the CPI in the period 1420–1539 should be interpreted with caution, since not all years could be covered. For the period 1290–1420, the CPI is an indicator, not of annual fluctuations, but rather of the long-term trend.

**Table 8.2.** *The weights (in per cent) in the present study for calculating the CPI in 1290–1539.*

| Period | Grain | Rye | Beer | Butter | Iron | Copper | Oxen | Wax | Salt | Hops | Sum |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1290–1330 | 46.15 | 30.77 | | 23.08 | | | | | | | 100 |
| 1330–1420 | 33.71 | 22.47 | 5.62 | 16.85 | 6.74 | 3.37 | 11.24 | | | | 100 |
| 1420–1539 | 30.00 | 20.00 | 5.00 | 15.00 | 6.00 | 3.00 | 10.00 | 3.00 | 3.00 | 5.00 | 100 |

### 8.4.6. Possible high inflation in the 1350s and 1360s

Periods of high inflation caused by debasement cycles are reliably documented from the 16th century onwards. Prior to that, there are indications of two debasement cycles following the Black Death, roughly in 1351–4 and 1361–4, as discussed fur-

21 See Jansson, Andersson Palm, och Söderberg (1991), for a further discussion on the budget composition in the 16th century.

ther in Chapter 3. The fine silver content of the debased *penning* coins was less than 1/5 and 1/10, respectively, of the fine silver content of previously minted *penning* coins (minted in 1332–50), suggesting an inflation rate of more than 1000 per cent if prices followed debasement.[22]

Prices are missing for several years. The only price data that exist to support the hypothesis of high inflation is a price notation for copper in 1361, which cost 50 mark penningar per ship pound. This was 100 per cent above the price in 1366–67 and five times the price in 1333. It may be suspected that the debased coins were exchanged for newer, better coins at a significant discount, although the debased coins may also have functioned as token coins, i.e. circulated substantially above their intrinsic metal value. In this study it is assumed (as in Chapter 3) that the debased coins were devalued by two thirds in 1354 and by half in 1364; this is the basis for calculating the difference between the deflator index and the inflation index for this period.

### 8.4.7. The high-inflation period of 1521–23

In 1521–23 Christian II and Gustav Eriksson (Vasa) minted so called klipping coins with a very low silver content compared to their nominal value, which is discussed further in Chapter 3.

It is not completely clear how common the klipping coins were in trade in these years, or whether the older, better coins dominated trade instead. The older coins were probably hoarded and taken out of circulation in those years, but returned as means of payment from 1524 onwards.[23] For foreign trade there are many examples of foreign coins being used as means of payment, but this was also common during periods of low inflation. According to Ingrid Hammarström, prices increased many times over in 1522 and 1523, not only for foreign products but also for domestic ones, which favours the hypothesis that the klipping coins were, in fact, the main coins in circulation.[24]

As discussed in Chapter 3, in early 1524 the klipping coin was devalued by one third. However, the exchange rates of mark lödig in proper and klipping coins, respectively, suggests that the klipping coins were worth less than half (19.25/50) of their nominal value in proper coins. In this study it is therefore assumed that 1 new mark = 50/19.25 old marks, which is the basis for calculating the difference between the deflator index and the inflation index for this period.

## 8.5. The period 1539–1732

Eli Heckscher has constructed a price index for Sweden for the period 1540–1620 based on Stockholm prices. This price index has been improved by Johan Söderberg,

22 Franzén (2006, pp. 77 and 232).
23 Hildebrand (1983, p. 870), and Thordeman (1936, p. 51).
24 Hammarström (1956, p. 388).

with additional data. Söderberg has constructed a Laspeyres-type cost-of-living index for Stockholm for the period 1539–1719.[25] This is the basis of the present CPI. One difference for the period 1539–1620 is that the price of rye has been changed from the consumption year to the harvest year (which is the practice internationally). The price index for the period 1719–32 is based on data presented in Fregert and Gustafsson (2005), which in turn are based on Stockholm prices in Jansson *et al.* (1991).

The prices in Jansson *et al.* (1991) have been collected from various accounts, most importantly those of the Town Council of Stockholm and of Stockholm Castle.[26] Price scales set by the authorities have not been used, since they cannot be assumed to reflect market prices. Substantial quantities were traded on the market, and the price data are therefore to be seen as producer prices. The citizens of Stockholm most probably had to pay higher prices for their daily needs but in this context it is important that the sources are of the same character throughout the period.

The most important source for food prices during the first half of the 17th century is the accounts of Stockholm Castle. This material provides information about the purchases in cash of various commodities, as well as deliveries in kind from the castles and counties. From 1650 the main source in Jansson *et al.* (1991) is the food prices on the accounts of the orphanage of Stockholm (*Allmänna barnhuset*). The accounts of Danviken Hospital provide some complementary information.

The main source for prices of building materials in Jansson *et al.* (1991) is the accounts of the Town Council of Stockholm. This material contains detailed descriptions of the building works initiated by the Town Council and the wages of various building workers. Also the Church accounts (for example, those of Storkyrkoförsamlingen and the German Church) provide information on prices of building materials as well as wages. Cloth prices are gathered from the accounts of Stockholm Castle (*klädkammaren*, Slottsarkivet).

The grain price for the period 1600–27 is the average of the prices of rye and barley. For the years when rye and barley prices are missing, the price of grain (*spannmål*) has been used. This type of price generally referred to rye and barley in equal amounts, although the proportion could have shifted somewhat over time. For the period 1635–1719, Jansson *et al.* (1991) draw on the grain prices presented by Hegardt for the sales of Uppsala Academy in Stockholm.[27] These are barley prices from Uppland.[28]

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25 Söderberg (2002) and Jansson, Andersson Palm, och Söderberg (1991).

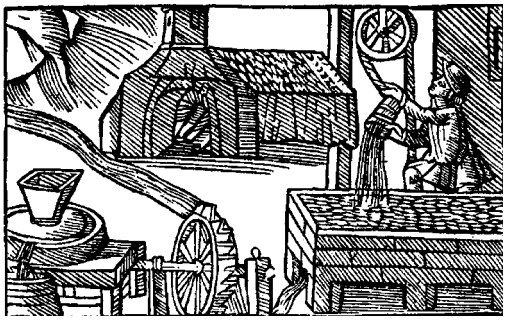
26 On the accounts of the Town Council of Stockholm during the first decades of the 17th century, see Sandström (1983) and Ericson (1988). See also Söderberg (1987).

27 Hegardt (1975).

28 The price of barley was somewhat lower than the price of rye and therefore also somewhat lower than the price of grain ('spannmål'), which consisted of half rye and half barley. However, the price difference between barley and grain was most probably not so large that a systematic distortion would arise when the price series of grain ('spannmål') up to 1635 is linked to Hegardt's barley price thereafter. In 1600–20, the price of rye in the accounts of Crown trade at Stockholm (the 'handling') was, on average, 15 per cent above the price of barley.

*Beer brewing*

*Exchange without money. The Nordic people to the left offer flour, dried pike fish, axes, scissors, knives, and cloth. The Russians to the right offer skins, arrows, butter, and bows.*



*Processing barley*

*Foreign wines*

*Drawings by Olaus Magnus.*

Certain lacunae in the accounts make the source material more problematic for some of the years before 1635. Grain prices in the years around 1630 are not available for Stockholm, so the price series of Kungsåra Church in Västmanland county are used instead in Jansson *et al.* (1991) (with corrections by Kurt Ågren).[29] This series starts in 1624 and continues for a very long period. For the period 1635–49, the price level in the Kungsåra accounts was somewhat above the price level of the sales of Uppsala Academy in Stockholm. Hegardt's prices are 7.8 per cent below the prices in Kungsåra. To correct for this difference in price levels in Västmanland and Stockholm, the Kungsåra prices for the period 1628–34 have been reduced by this difference in Jansson *et al.* (1991). Some quotations that exist for Stockholm for those years do not seem to differ significantly from the calculated prices based on Kungsåra accounts.

For weights and measures, information about changes is often lacking, especially before 1600. Here, the following assumptions concern the grain barrel in Stockholm. The medieval grain barrel of 117.5 litres is assumed to have been in use until 1570, when it increased to 127 litres. By 1600, it had grown further to 146.6 litres, using a linear interpolation from 1570. The barrel was further changed to 156 litres in 1665 and to 165 litres in 1739.[30] The pound, which was used to weigh butter and meat, also increased on several occasions. Furthermore, the barrel in which salted commodities and fish were measured was changed in 1665. The assumption in Jansson *et al.* (1991) follows Mats Morell in the case of the pound as well as the fish barrel.[31] Prices have been interpolated for the years when direct data are missing.

### 8.5.1. The high-inflation period 1561–76

In the period 1560–75 the mark coin was debased continually, which caused substantial price increases, as discussed further in Chapter 4.

In 1575 a recoinage took place and one new mark was exchanged for 6.5 marks

29 von Schwerin (1903, pp. 25 onwards). The series was used by Heckscher, but some corrections have been made to the series by Kurt Ågren (1964, pp. 25 onwards) after checking the original accounts.

30 As in Hegardt (1975, p. 202), the assumption in Jansson *et al.* (1991) is that the grain barrel was not changed in Mälardalen by the decision on targets, measures and weights in 1638. It is likely that the so-called old Stockholm barrel of 146.6 litres continued to be used throughout the first half of the 17th century. Hence, Jansson *et al.* (1991) makes the same assumption as Hannerberg and Morell that the Royal decree on weights and measurement in 1605 did not entail any change in the barrel used in the Mälardalen region. See Hannerberg (1946, p. 423), and Morell (1988, p. 36).

31 Morell (1988). The pound used as measure for commodities such as butter, tallow and meat, was according to Morell changed from 6.04 kg to 8.31 kg in 1605. In 1634 the pound was increased to 8.43 kg and in 1665 to 8.5 kg. The fish barrel (the same as the salt and flour barrel) was increased from 117.5 to 125.6 litres. Jansson *et al.* (1991) assumes that the barrel for lime and tar was increased by the same amount in 1665. In Jansson *et al.* (1991) the prices are transformed to the measures and weights that were valid from 1665 onwards.

minted 1571–74,[32] which is the basis for estimating the inflation index from the deflator index.

The deflator index shows a high figure in both 1574 and 1575, followed by an 80 per cent decrease in 1576. This would imply that the prices were still expressed in the old currency in 1575. To calculate an inflation index, the ratio of the deflator index in 1576 to 1575 is multiplied by the factor 6.5, based on the exchange rate between new and old marks.

### 8.5.2. The high-inflation period 1590–93

In the final years of the reign of Johan III (d. 1592), the value of the Swedish mark deteriorated rapidly and the rampant inflation caused much confusion, as discussed further in Chapter 4.

In 1593 and 1594 the debased coins were exchanged for new coins, and the worst one-mark coins were reduced to ¼ of their face value. In this study it is therefore assumed that 1 new mark = 4 old marks.

The price material, for example the accounts of Crown trade (*Handlingsräkenskaperna*) that form the basis for the deflator index, often displays a surprising stability in the early 1590s, which would suggest that the debased coins were accepted at their face value and did not cause any substantial inflation. Thus the deflator index does not show any increase in the recorded price level (it actually indicates a slight fall). Exactly which currency the CPI follows is not completely clear, but it does not show the expected upward trend. The effect of debasement on prices came with a time lag. As discussed in Chapter 4, it was not until 1592 that the debasement had a significant impact on prices and exchange rates, but it was in that year that a recoinage took place and prices were reported in the new coins. Thus the deflator index partly conceals the inflation of 1592.

To calculate the inflation index from the deflator index in the period 1589–93, the deflator index is adjusted according to the exchange rate of the silver daler in the period 1589–92 (see Chapter 4) while the relation 1 new mark = 4 old marks is assumed for 1593. Between 1589 and 1593 the inflation index increased by 291 per cent.

### 8.5.3. The inflation period 1715–19

Another period of high inflation occurred in 1715–19, as a consequence of the circulation of token coins, as discussed in more detail in Chapter 4. Although initially the coin tokens did not cause any large price increase, at the end of this period prices did rise significantly. In 1719 the value of the coin tokens was reduced by 50 per cent; for that year it is therefore assumed here that 1 daler silvermynt in token coins = ½ daler silvermynt in proper money.

32 Wallroth (1918, p. 23).


*The emergency coins that were minted towards the end of the Great Nordic Wars circulated at the nominal value of 1 daler silvermynt, the equivalent in 1716 of an unskilled labourer's wage for two days' work in Stockholm. 'Hoppet' (The Hope), the last emergency coin, minted in 1719, circulated at the nominal value of 2 öre silvermynt, which in that year was equivalent to an unskilled labourer's wage in Stockholm for only 45 minutes' work.*
*Photo: The Royal Coin Cabinet, Stockholm.*

One question is whether the prices on which the deflator index is based are in proper coins or in token coins. The price of rye is based on proper coins,[33] while the prices of other products are probably in token coins. Since regulations depressed prices in token coins in Stockholm, the assumption in this study is that the basis for the deflator index was, in fact, prices in proper coins.

In order to calculate an inflation index for 1717 and 1718 it is necessary to estimate the price level in token coins and in proper coins, which involves setting the exchange rate between the two types of currency (see Chapter 4). To transform the deflator index into the inflation index, the assumption here is that the ratio of prices in tokens coins to prices in proper coins was 1.06 in 1716, 1.24 in 1717, 1.5 in 1718 and 2 in 1719 (end-of-year figures).

## 8.6. The period 1732–1914

Gunnar Myrdal's (1933) annual cost of living index extends back to 1830 and is still used by Statistics Sweden.[34] However, Myrdal's index must be regarded as somewhat dated. A number of supplements can be made to this index in the light of new price data that have been produced by various researchers.

A variety of consumer price indices for the 18th century are presented in Jörberg

33 The price of rye for Stockholm in Jansson, Andersson Palm, och Söderberg (1991) is based on the sales of Uppsala Akademi in Stockholm in proper coins. The latter series can be found in Hegardt (1975).

34 Statistiska centralbyrån (2005).

A Stockholm Market in 1750*, by an unknown artist.*
Source: Nordiska museet.

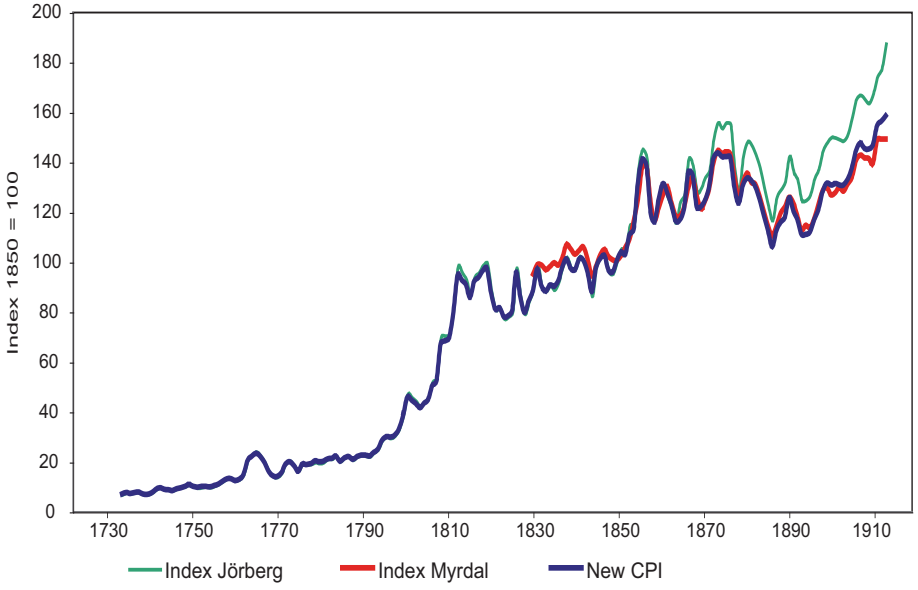
(1972) and Åmark (1921). For the period 1732–1914 the present CPI is based on data in Jörberg (1972) and Myrdal (1933), supplemented with data on salt published in Stefan Carlén (1997) and price indices of various industrial products presented by Lennart Schön (1988). Different weights apply to each of the periods 1732–82, 1782–1830, 1830–70 and 1870–1913 (see Table 8.3). The weights have been adjusted in accordance with earlier studies by Gunnar Myrdal and Lennart Jörberg, and to fit the patterns of consumption according to historical national accounts.[35]

Figure 8.1 compares the present Consumer Price Index with Jörberg's for 1732–1914 and Myrdal's for 1830–1914. The differences between the new CPI and Jörberg's index are negligible from 1732 up to about 1870. After that year, the new CPI does not increase as much as Jörberg's index. This is due to the differences in the composition of index weights. For the period 1870–1914, the new CPI includes goods such as potatoes, sugar, coffee, gas and coke, which are missing in Jörberg's index. For the period 1865–1914 lighting is not included in Jörberg's index, whereas the new index includes goods that reflect this cost (rape oil and tallow candles). The new index thus includes more industrial goods and imported goods, which tended to become relatively cheaper in the decades after 1870. Compared to Myrdal's index for the period 1830–1914, the differences with the new index are quite small.

35 Edvinsson (2005).

*Market Day in Linköping in 1891.*
Source: Östergötlands Länsmuseum.

**Figure 8.1.** *The present Consumer Price Index compared to Jörberg's and Myrdal's, 1732–1914 (1850 = 100).*




Sources: Table A8.1, Jörberg (1972) and Myrdal (1933).

**Table 8.3.** *CPI weights (in per cent) in the present study, 1732–1914.*

| | 1732–82 | 1782–1830 | 1830–70 | 1870–1913 |
|---|---|---|---|---|
| Rye | 21 | 21 | 14.4 | 9.8 |
| Barley | 7.5 | 7.5 | 7.2 | 4.2 |
| Wheat | 2.25 | 2.25 | 2.16 | 4.9 |
| Oats | 4.5 | 4.5 | 4.32 | 2.8 |
| Hard ryebread | | | 1.44 | 1.4 |
| Coffee | | | 0.72 | 0.7 |
| Sugar | | | 0.72 | 0.7 |
| Salt | 0.75 | 0.75 | 0.72 | 0.7 |
| Potatoes | | | 2.88 | 2.8 |
| Peas | 2.25 | 2.25 | 2.16 | 1.4 |
| Beef | 4.5 | 4.5 | 4.32 | 5.6 |
| Pork | 6.75 | 6.75 | 6.48 | 9.8 |
| Butter | 18.75 | 18.75 | 2.88 | 4.9 |
| Milk | | | 15.12 | 12.6 |
| Cheese | 1.5 | 1.5 | 1.44 | 2.1 |
| Eggs | 0.75 | 0.75 | 0.72 | 1.4 |
| Baltic herring | 2.25 | 2.25 | 2.16 | 2.1 |
| Dried fish | 2.25 | 2.25 | 2.16 | 2.1 |
| Birch wood | 3 | 3 | 3 | 2 |
| Pine wood | 3 | 3 | 3 | 2 |
| Charcoal | 1 | 1 | 1 | 1 |
| Gas | | | | 1 |
| Coke | | | | 1 |
| Tallow | 2.3 | 1 | 1 | 1 |
| Rape oil | | 0.65 | 0.8 | |
| Tallow candles | | 0.65 | 0.8 | 2.5 |
| Linen | 6 | 6 | 6.5 | 7 |
| Coarse cloth | 6 | 6 | 6.5 | 7 |
| Tanned cow hides | 1.2 | 1.2 | 1.4 | 1.5 |
| Pig iron | 0.5 | 0.5 | 1 | 1 |
| Bar iron | 0.5 | 0.5 | 1 | 1 |
| Bricks | 1 | 1 | 1.5 | 1.5 |
| Tar | 0.5 | 0.5 | 0.5 | 0.5 |
| Sum | 100 | 100 | 100 | 100 |

## 8.7. The period 1914–2008

For the period after 1914, the CPI is the same as the index presented by Statistics Sweden.

The first official cost-of-living index was calculated from July 1914 and onwards.[36] The main concern was to represent the conditions of the life of the less well-to-do and it was therefore not a general CPI. Regional coverage was fairly wide. The quotations did not reflect prices in purely rural districts with agricultural production, but rather in towns, municipalities and important industrial districts. From 1918 the cost-of-living index was calculated four times a year, on about the 1st of January, April, July and October and the prices referred to the 15th of the last month of each quarter, i.e. 15th of December, 15th of March, 15th of July and 15th of October. Taxes were also included but are easily eliminated to obtain an index without taxes. This index continued on a quarterly basis up to 1954, when it was replaced by the monthly CPI. From September 1916 monthly indices were also calculated, but only for foodstuffs and fuel and lighting.

In the period 1914–31, the quantities of the cost-of-living index were based on a budget enquiry in 1913–14[37] which happened to coincide with the price reference period (July 1914). During this period the cost-of-living index could therefore be considered to be of a Laspeyres type. In 1932 a revision was made; the new weights were based on the budget inquiry of 1923, while the price reference period was shifted to 1931.[38] The budget inquiry of 1923 was broader and also included some middle social layers. In 1939 a revision was made based on the budget enquiry of 1933. Since the weight reference period was not the same as the price reference period, the cost-of-living in the period 1932–43 was strictly speaking not a Laspeyres price index, but rather a Lowe price index.[39]

In 1943 a major revision was made to the cost-of-living index based on the findings of a Commission in 1943, which recommended a chain index of Edgeworth's type. The Edgeworth price index is a basket index (Lowe index) whose quantities are the arithmetic average of the quantities in two periods.[40] The revision of the household budget was to be made every December.[41]

One problem for the cost-of-living index arose during the World Wars. For example, during the First World War the deterioration in the quality of clothes was not taken into consideration, implying that the price increase was underestimated.[42]

When Sweden left the gold standard in September 1931, it was feared that this would lead to price increases. Because of its special character, the cost-of-living index was seen as a not entirely satisfactory measure of changes in retail prices. This explains

36 Bouvin (1933).
37 Bouvin (1933, p. 160).
38 Kungl. Socialstyrelsen (1961, p. 92).
39 See ILO and others, (2004, p. 2).
40 ILO and others, (2004, p. 268).
41 Kungl. Socialstyrelsen (1961, pp. 101–4).
42 Bouvin (1933, p. 158).

why the Riksbank constructed a monthly price index, called a consumption price index, in the period 1931–48 with the aim of obtaining an index that reflected price changes for the whole of private consumption, not just consumption by a specific type of household. Besides being monthly, this price index had the advantage that its weights were changed more frequently. The quantities used were in principle an average of the two periods compared. This was an advantage particularly during the Second World War, when several goods disappeared from the market. Seasonal fluctuations were eliminated for potatoes, eggs, fruit and vegetables by replacing the monthly price by the average of prices in the previous 12 months.[43]

In 1931–7 the Riksbank's consumption price index applied an arithmetic formula of the price index type, but from 1937 this was replaced by the geometric formula of a Törnqvist price index type. The Törnqvist price index is a weighted geometric average of price relatives using the arithmetic average of the expenditure shares in two periods.

In 1949, the index was taken over by the Social Welfare Board, its name was changed to the General CPI of the Social Welfare Board and there was a return to the arithmetic formula. The method of changing weights annually was also applied to the cost-of-living index on the recommendation of the Commission from 1943. The formula used by the Riksbank in 1931–7 was adopted for the cost-of-living index from 1943 onwards.[44]

The present official monthly CPI has been published by Statistics Sweden since June 1954. This index replaced the other indices. The fictive lower-income family was dropped and the index came to be a measure of price changes generally for the whole of private consumption. The CPI was linked to the cost-of-living index, not to the monthly Riksbank index, in spite of the fact that the Riksbank index was more similar to the construction of the CPI. The choice was made because the cost-of-living index had a more official character.[45]

Chaining was based on a long-term index, which estimated the change from December in the previous year to December in the present year, and a short-term index, which estimated the change from December in the previous year to the month in question in the present year. This followed the recommendation of the Commission in 1943.[46]

The long-term index ($L$) used the weights for the present year, and was of an Edgeworth type. It was calculated as follows:

$$L_{t-1,12}^{t,12} = \frac{\sum_i p_i^{t,12} q_i^t}{\sum_i p_i^{t-1,12} q_i^t} \qquad (2)$$

43 Kungl. Socialstyrelsen (1961, pp. 104–6), Sveriges Riksbank, (1949, pp. 21*–30*), and Sveriges Riksbank, (1949, pp. 25 and 84–5).

44 Kungl. Socialstyrelsen (1961, pp. 104–6).

45 Kungl. Socialstyrelsen (1961, p. 107).

46 Statistiska centralbyrån (2001, pp. 18–9).

The short term index ($K$) used the weights of the previous year, and was of a Laspeyres type. It was calculated as follows:

$$K_{t\text{-}1,12}^{t,m} = \frac{\sum_i p_i^{t,m} q_i^{t\text{-}1}}{\sum_i p_i^{t\text{-}1,12} q_i^{t\text{-}1}} \tag{3}$$

From January 2005 Statistics Sweden has changed its method once again. The computations are made in two steps, applying an annual chain index. The long-term chaining is no longer made from December to December, but from one whole year to another using the Walsh formula (where the price reference period is the previous year, i.e. 0 = t-1).[47] The Walsh price index is a basket index (Lowe index) whose quantities are the geometric average of the quantities in the two periods. However, to estimate a monthly index, the price level of one month is compared to the price level two years earlier using that year's quantities, i.e. in that case the Laspeyres formula is used. Hence, to calculate the price level of month $m$ in year $t$ in the price level of year $r$ the following formula would be used ($r > 2003$, since Statistics Sweden used another method up to 2004):

$$I_r^{t,m} = \frac{\sum_i p_i^{t,m} q_i^{t\text{-}2}}{\sum_i p_i^{t\text{-}2} q_i^{t\text{-}2}} \prod_{k=r+1}^{t-2} \left( \frac{\sum_i \left( p_{k,i} \sqrt{q_{k,i} q_{k\text{-}1,i}} \right)}{\sum_i \left( p_{k\text{-}1,i} \sqrt{q_{k,i} q_{k\text{-}1,i}} \right)} \right) \tag{4}$$

One problem with Statistics Sweden's officially produced CPI is that it is legally fixed and cannot be changed, even though errors are sometimes detected later. Therefore, a so-called shadow index is computed with corrections for these mistakes. In the period 1980–2000, six such mistakes were corrected in the shadow index.[48] For its historical CPI series, Statistics Sweden seems to use the shadow index rather than the legally fixed CPI.

Statistics Sweden also produces other consumer-type price indices that are not considered here.

## 8.8. A short overview

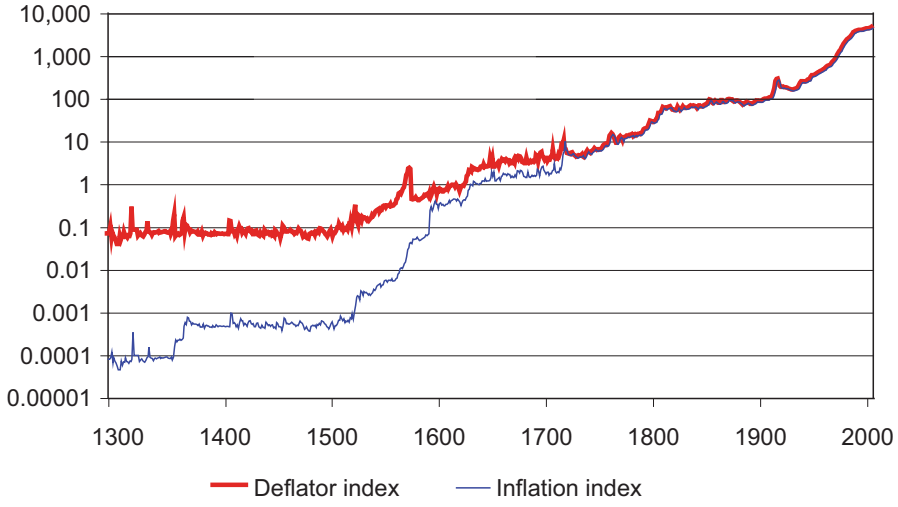
Figure 8.2 presents the deflator index and the inflation index for the period 1290–2008. The scale is logarithmic. Between 1290 and 2008 the price level increased by a factor of 55 million, or, on average, by 2.5 per cent per year, which can be compared to the Riksbank's present inflation target of two per cent per annum.

Figure 8.2 shows that there is a secular pattern of inflation demarcated by international events such as major wars.

47 Statistiska centralbyrån (2004) and Statistiska centralbyrån (2006, p. 61).

48 Statistiska centralbyrån (2001, p. 72).

**Figure 8.2** *The two CPIs, the deflator index and the inflation index, 1290–2008 (July 1914 = 100).*




Source: Table A8.1.

High inflation typified the 1350s and 1360s, and the 16th, 18th and 20th centuries. The average annual rate of inflation was 18 per cent in 1351–64, 6.3 per cent in 1518–1633, 3.5 per cent in 1715–1812 and 4.7 per cent in 1914–91. The high inflation in the 18th and 20th centuries was caused by the circulation of fiat monies. If the relative price of bullion does not change considerably, commodity money should be accompanied by price stability. Nevertheless, inflation under commodity money is well known. The highest inflation rate can be recorded for the 16th century, not the 20th, despite the presence of a commodity standard at the time (see Chapter 2).

Most of the Middle Ages, the 17th and 19th centuries, and the period from the early 1990s onwards were accompanied by stability of prices. The average annual rate of inflation was 0.1 per cent in 1290–1351, 0.04 per cent in 1364–1518, 0.8 per cent in 1633–1715, 0.5 per cent in 1812–1914 and 1.7 per cent in 1991–2008. While the price stability in earlier periods was connected with the prevalent commodity standards, the recent low inflation is combined with a fiat standard.

Interestingly, Ola Grytten, who presents a CPI for Norway back to 1516, finds a similar pattern of the secular movement of prices as in Sweden, from the 16th century to today.[49]

49 Grytten (2004, pp. 73–4).

The Dannemora Iron Mine in Uppland, *by Elias Martin (1739–1818).*

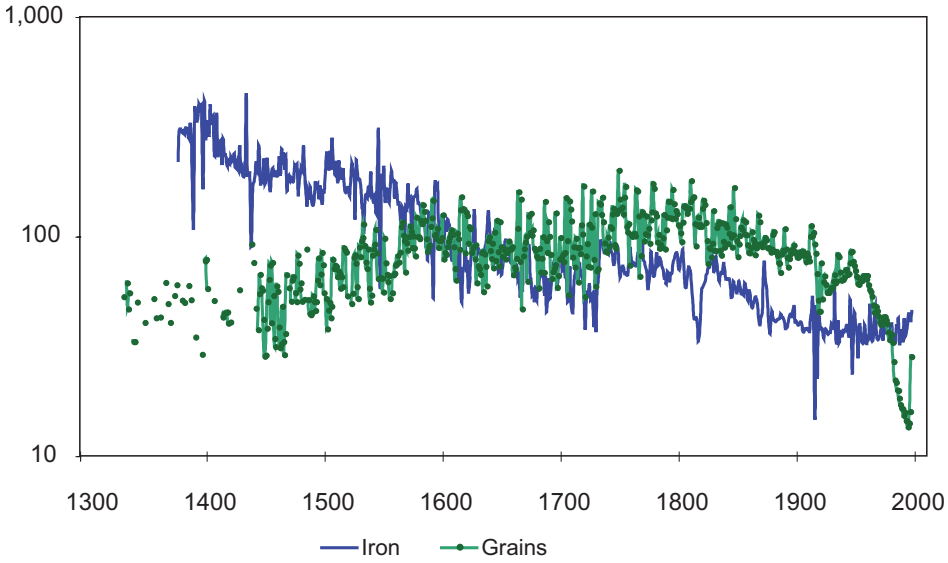
## 8.9. The CPI at work

It is time for some illustrations of the potential usefulness of the new CPI. Below we briefly present two applications, relating to iron and grain prices, and land prices, respectively. A further example concerning the real wage is given in Chapter 9. Deflating the price of an item by the CPI could be interpreted as a calculation of that item's real price, since such a series shows how much the item could buy in terms of goods and services constituting the CPI.

### *8.9.1. Iron and grain prices*

Figure 8.3 presents the evolution of the price of iron in Stockholm, deflated by the CPI deflator index, in the very long term. The medieval prices refer to osmond iron, but from 1540 onwards they pertain to bar iron (the two series have been linked at

**Figure 8.3:** *Prices of iron and grains in Sweden deflated by the CPI deflator index, 1291–2007 (index 1580–99 = 100).*




Source: See the main text.

that year). Bar iron was a more refined product which cost about twice as much per weight unit as osmond iron.

From the latter 14th century up to the First World War, the real price of iron was reduced by a factor of ten. It is striking that this decline in the real price of iron did not accelerate in the early modern era. Instead, the reduction of the deflated price proceeded at a fairly constant rate up to the early 18th century, when the real price rose. Presumably, technological progress and economies of scale was the main factors behind the long-term decline in the relative price of iron.

However, the upward shift in the deflated price curve around 1720 is probably due to the Swedish authorities' deliberate attempts to hold back output and limit the supply of exported iron in the hope that this would raise the price in the major market, England. As a result, exports were largely constant for half a century up to about 1780, despite a growing demand for iron in the world market.

The real price of grains, on the other hand, roughly follows an inverted U-shaped curve. The real price of grains rose during the late Middle Ages and the 16th century, stagnated during the 17th century, climbed again and peaked during the latter decades of the 18th century. These trends conform to the trends in population, with the 16th and 18th centuries as growth periods. In the first half of the 19th century, however, something decisive happened. The relative price of grain began to drop. For the first time, there were long periods when per capita harvests rose.

These price relations capture the fundamental production problems of pre-indus-

trial society. Agricultural per capita growth came late, and this large but relatively immobile sector dominated the economy for centuries. Once agriculture began to industrialize, however, the changes were dramatic and rapid. During the second half of the 20th century, the drop in the real price of grains was much larger than for iron. The fall in the relative price of grains has continued until very recently. Signs of a reversal occur at the very end of the series, though this is an upsurge from a historically extremely low level of the relative price of grain.

### 8.9.2. Land prices

Even though land was one of the most important commodities in the pre-industrial economy, land prices in Sweden have not been studied extensively. An exception is the recent pioneering study by Bo Franzén (2006), presenting the evolution of land prices for part of the medieval era up to 1370.

Figure 8.4 presents results from a pilot study of land prices, deflated by the CPI deflator index. It is based on 605 land sales, primarily in the province of Uppland, from 1294 to 1651. The long-term decline in this relative price is notable. Previous research has observed that the relative price of land dropped after the Black Death. It is clear from these data that the decline continued throughout most of the 16th century, and that the relative price of land did not turn upwards until after about 1580. This may at first sight seem surprising, since population growth was probably substantial during the 16th century as a whole. The longevity of the decline may be explained by restrictions on the land market, forcing the seller to offer the land to his or her relatives before selling to anybody else. Land purchases had to be registered in the local court, which sometimes applied fixed prices per land that were considerably below prices in the unrestricted market.

## 8.10. Summary and conclusions

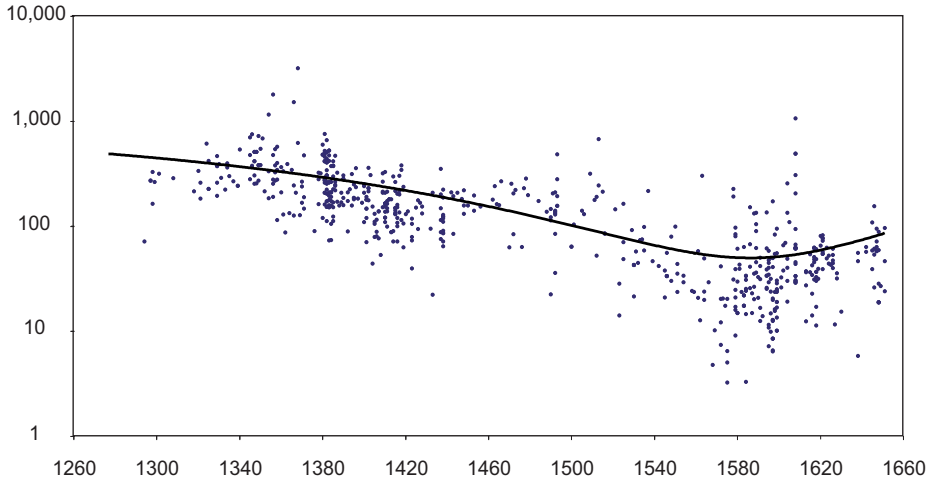
The purpose of this chapter is to present a CPI for Sweden for the period 1290–2008. The index is linked up with the present CPI published by Statistics Sweden.

The basic advantage of the CPI presented in this chapter is that it allows the linking of medieval price data to those of more recent periods. It makes it possible to estimate the inflation rate during various periods and to compare the price level in one year with the price level in an earlier year. This also opens up for broader international comparisons, making possible an extended analysis of Swedish prices in a European and global context.

Constructing an index that covers more than seven centuries poses conceptual as well as empirical problems. It raises many more questions than do modern type consumer price indices.

For example, the currency unit was changed on numerous occasions, and in some periods multiple currencies were used at a floating exchange rate relative to each

**Figure 8.4.** *Land prices per öresland in East Sweden, 1294–1651, deflated by the CPI (1500 = 100).*




Sources: Table A8.1, Svenskt diplomatariums huvudkartotek över medeltidsbreven, *Svenska riksarchivets pergamentsbref: från och med år 1351*, vol 1 and 2 (1866–1868); Uppländska domböcker (1925–1956), vol. 1–9, *Sjuhundra härads domböcker 1601–1651* (1984).

Note. The *öresland* was part of the medieval and early modern land measurement system in East Sweden, in which 1 *markland* = 8 *öresland* = *24 örtugland*. These units aimed at capturing the yield of a farming unit rather than measuring its area. Therefore, no exact translation can be made into modern measurements. It is clear, however, that one *öresland* was not a large landholding. Dovring (1947, p. 31) estimates the median size of the *markland* at about 14 hectares by the mid-16th century. The normal size of the *öresland* would then be slightly less than 2 hectares.

other. During so-called debasement cycles, the currency deteriorated and was later replaced by a stronger currency at a reduced value. There are different ways of constructing a price index under such circumstances.

The chapter presents two different CPIs: a deflator index and an inflation index.

The deflator index follows the main currency unit through time; mark for the period 1290–1624, daler kopparmynt 1624–1776, specie riksdaler 1776–89, riksdaler riksgälds 1789–1855, riksdaler riksmynt 1855–73, and krona for the period 1873 onwards. The deflator index is an index of prices expressed in the main Swedish currency unit: 1 SEK = 72 marks.

The inflation index is constructed to take into consideration times of very high inflation, when inflation money was circulated and was later replaced by a more stable currency. This occurred in six periods: 1351–4, 1361–4, 1521–4, 1561–6, 1590–3 and 1715–9. At the end of these inflation periods, the inflation coins could

be exchanged for the new coins, albeit at a much lower rate than was nominally assigned to the inflation coins. The inflation index takes into account that the inflation coins were devalued by two thirds in 1354, by 50 per cent in 1364, by 61.5 per cent in 1524, by 11/13 in 1576, by 75 per cent in 1593 and by 50 per cent in 1719, whereas the deflator index does not. When prices were expressed in proper coins, they have been converted into prices in inflation coins by using the exchange rate between these coins. This chapter argues that if the purpose is to measure the rate of inflation over longer time spans, a price index should be measured in the currency most in use, which usually is the weaker one. Under such assumptions the old, debased currency, and the new, better currency must be viewed as two different currencies (going under the same name), which our inflation index takes into account.

This study finds that in the period 1290–2008 the average annual rate of Swedish inflation was 2.5 per cent, only slightly above the Riksbank's present inflation target. There was also a clear secular movement in prices. While the 14th, 16th, 18th and 20th centuries saw high rates of inflation, the 15th, 17th and 19th centuries were characterised by relative price stability. Whether the 21st century will once again mark the return of price stability is an open question.

The chapter also presents some examples of how our CPI could be used. By deflating various relative prices by the CPI, some long-term economic trends can be analysed.

Our study finds that the relative price of iron declined significantly from the latter 14th century to the early 18th century. On the other hand, the relative price of grain either increased or stagnated before the industrial revolution. In Chapter 9 it is shown that real wage rates even declined between the 15th and the early 19th centuries. These price relations capture the fundamental production problems of pre-industrial society. The iron industry shows that there was a dynamic sector in the pre-industrial period that could achieve significant advances in productivity. However, before the industrial revolution this sector was too small to generate substantial increases in the living standards of a majority of the population. Agricultural per capita growth came first in the 19th century, and this large but relatively immobile sector dominated the pre-industrial economy.

# Appendix A8: Summary table

**Table A8.1.** *The two Consumer Price Indices, the deflator and inflation indices, for Sweden, 1290–2008 (July 1914 = 100).*

| Year | Deflator index | Inflation index | Year | Deflator index | Inflation index | Year | Deflator index | Inflation index |
|---|---|---|---|---|---|---|---|---|
| **1290** | 0.0644 | 0.000079 | **1335** | 0.0666 | 0.000082 | **1380** | 0.0570 | 0.000422 |
| **1291** | 0.0645 | 0.000080 | **1336** | 0.0687 | 0.000085 | **1381** | 0.0656 | 0.000485 |
| **1292** | 0.0708 | 0.000087 | **1337** | 0.0703 | 0.000087 | **1382** | 0.0671 | 0.000497 |
| **1293** | 0.0954 | 0.000118 | **1338** | 0.0730 | 0.000090 | **1383** | 0.0652 | 0.000482 |
| **1294** | 0.0523 | 0.000065 | **1339** | 0.0674 | 0.000083 | **1384** | 0.0648 | 0.000480 |
| **1295** | 0.0707 | 0.000087 | **1340** | 0.0703 | 0.000087 | **1385** | 0.0608 | 0.000450 |
| **1296** | 0.0584 | 0.000072 | **1341** | 0.0687 | 0.000085 | **1386** | 0.0605 | 0.000448 |
| **1297** | 0.0522 | 0.000064 | **1342** | 0.0700 | 0.000086 | **1387** | 0.0601 | 0.000445 |
| **1298** | 0.0445 | 0.000055 | **1343** | 0.0715 | 0.000088 | **1388** | 0.0653 | 0.000483 |
| **1299** | 0.0368 | 0.000045 | **1344** | 0.0729 | 0.000090 | **1389** | 0.0607 | 0.000449 |
| **1300** | 0.0368 | 0.000045 | **1345** | 0.0732 | 0.000090 | **1390** | 0.0605 | 0.000448 |
| **1301** | 0.0368 | 0.000045 | **1346** | 0.0681 | 0.000084 | **1391** | 0.0681 | 0.000504 |
| **1302** | 0.0584 | 0.000072 | **1347** | 0.0672 | 0.000083 | **1392** | 0.0650 | 0.000482 |
| **1303** | 0.0465 | 0.000057 | **1348** | 0.0669 | 0.000083 | **1393** | 0.0623 | 0.000461 |
| **1304** | 0.0560 | 0.000069 | **1349** | 0.0738 | 0.000091 | **1394** | 0.0651 | 0.000482 |
| **1305** | 0.0550 | 0.000068 | **1350** | 0.0624 | 0.000077 | **1395** | 0.0641 | 0.000475 |
| **1306** | 0.0702 | 0.000087 | **1351** | 0.0713 | 0.000088 | **1396** | 0.0640 | 0.000474 |
| **1307** | 0.0571 | 0.000071 | **1352** | 0.1272 | 0.000157 | **1397** | 0.0633 | 0.000469 |
| **1308** | 0.0561 | 0.000069 | **1353** | 0.1831 | 0.000226 | **1398** | 0.0651 | 0.000482 |
| **1309** | 0.0512 | 0.000063 | **1354** | 0.0555 | 0.000205 | **1399** | 0.0635 | 0.000470 |
| **1310** | 0.0579 | 0.000072 | **1355** | 0.0596 | 0.000221 | **1400** | 0.0623 | 0.000462 |
| **1311** | 0.0572 | 0.000071 | **1356** | 0.0596 | 0.000221 | **1401** | 0.0628 | 0.000465 |
| **1312** | 0.0644 | 0.000079 | **1357** | 0.0628 | 0.000233 | **1402** | 0.0637 | 0.000472 |
| **1313** | 0.2737 | 0.000338 | **1358** | 0.0596 | 0.000221 | **1403** | 0.0624 | 0.000462 |
| **1314** | 0.0797 | 0.000098 | **1359** | 0.0620 | 0.000229 | **1404** | 0.0621 | 0.000460 |
| **1315** | 0.0797 | 0.000098 | **1360** | 0.0678 | 0.000251 | **1405** | 0.1300 | 0.000962 |
| **1316** | 0.0797 | 0.000098 | **1361** | 0.1263 | 0.000467 | **1406** | 0.1274 | 0.000943 |
| **1317** | 0.0797 | 0.000098 | **1362** | 0.1548 | 0.000573 | **1407** | 0.0741 | 0.000549 |
| **1318** | 0.0797 | 0.000098 | **1363** | 0.0699 | 0.000518 | **1408** | 0.0771 | 0.000571 |
| **1319** | 0.0575 | 0.000071 | **1364** | 0.1026 | 0.000760 | **1409** | 0.0721 | 0.000534 |
| **1320** | 0.0626 | 0.000077 | **1365** | 0.0997 | 0.000738 | **1410** | 0.0623 | 0.000462 |
| **1321** | 0.0659 | 0.000081 | **1366** | 0.0845 | 0.000626 | **1411** | 0.0690 | 0.000511 |
| **1322** | 0.0593 | 0.000073 | **1367** | 0.0819 | 0.000607 | **1412** | 0.0567 | 0.000420 |
| **1323** | 0.0569 | 0.000070 | **1368** | 0.0687 | 0.000509 | **1413** | 0.0777 | 0.000575 |
| **1324** | 0.0553 | 0.000068 | **1369** | 0.0766 | 0.000567 | **1414** | 0.0953 | 0.000705 |
| **1325** | 0.0610 | 0.000075 | **1370** | 0.0716 | 0.000530 | **1415** | 0.0867 | 0.000642 |
| **1326** | 0.0695 | 0.000086 | **1371** | 0.0721 | 0.000534 | **1416** | 0.0856 | 0.000634 |
| **1327** | 0.0753 | 0.000093 | **1372** | 0.0719 | 0.000532 | **1417** | 0.0680 | 0.000503 |
| **1328** | 0.1230 | 0.000152 | **1373** | 0.0708 | 0.000524 | **1418** | 0.0746 | 0.000553 |
| **1329** | 0.0710 | 0.000088 | **1374** | 0.0653 | 0.000483 | **1419** | 0.0707 | 0.000524 |
| **1330** | 0.0692 | 0.000085 | **1375** | 0.0712 | 0.000527 | **1420** | 0.0627 | 0.000464 |
| **1331** | 0.0676 | 0.000083 | **1376** | 0.0608 | 0.000450 | **1421** | 0.0741 | 0.000549 |
| **1332** | 0.0602 | 0.000074 | **1377** | 0.0610 | 0.000452 | **1422** | 0.0837 | 0.000619 |
| **1333** | 0.0676 | 0.000083 | **1378** | 0.0612 | 0.000453 | **1423** | 0.0865 | 0.000641 |
| **1334** | 0.0684 | 0.000084 | **1379** | 0.0710 | 0.000526 | **1424** | 0.0725 | 0.000537 |

**Table A8.1 (cont.).** *The two Consumer Price Indices, the deflator and inflation indices, for Sweden, 1290–2008 (July 1914 = 100).*

| Year | Deflator index | Inflation index | Year | Deflator index | Inflation index | Year | Deflator index | Inflation index |
|---|---|---|---|---|---|---|---|---|
| **1425** | 0.0700 | 0.000518 | **1471** | 0.0783 | 0.000580 | **1517** | 0.1004 | 0.000744 |
| **1426** | 0.0727 | 0.000538 | **1472** | 0.0750 | 0.000555 | **1518** | 0.0953 | 0.000706 |
| **1427** | 0.0621 | 0.000460 | **1473** | 0.0644 | 0.000477 | **1519** | 0.1228 | 0.000909 |
| **1428** | 0.0621 | 0.000460 | **1474** | 0.0542 | 0.000402 | **1520** | 0.0931 | 0.000690 |
| **1429** | 0.0741 | 0.000549 | **1475** | 0.0561 | 0.000415 | **1521** | 0.1371 | 0.001015 |
| **1430** | 0.0757 | 0.000561 | **1476** | 0.0619 | 0.000459 | **1522** | 0.1922 | 0.001423 |
| **1431** | 0.0619 | 0.000458 | **1477** | 0.0533 | 0.000394 | **1523** | 0.3017 | 0.002234 |
| **1432** | 0.0600 | 0.000444 | **1478** | 0.0499 | 0.000370 | **1524** | 0.1259 | 0.002421 |
| **1433** | 0.0573 | 0.000424 | **1479** | 0.0482 | 0.000357 | **1525** | 0.1215 | 0.002336 |
| **1434** | 0.0667 | 0.000494 | **1480** | 0.0636 | 0.000471 | **1526** | 0.1015 | 0.001951 |
| **1435** | 0.0591 | 0.000437 | **1481** | 0.0649 | 0.000480 | **1527** | 0.1646 | 0.003166 |
| **1436** | 0.0593 | 0.000439 | **1482** | 0.0669 | 0.000496 | **1528** | 0.1546 | 0.002973 |
| **1437** | 0.0567 | 0.000420 | **1483** | 0.0649 | 0.000481 | **1529** | 0.1305 | 0.002510 |
| **1438** | 0.0797 | 0.000590 | **1484** | 0.0677 | 0.000501 | **1530** | 0.1597 | 0.003072 |
| **1439** | 0.0736 | 0.000545 | **1485** | 0.0596 | 0.000441 | **1531** | 0.1491 | 0.002867 |
| **1440** | 0.0661 | 0.000489 | **1486** | 0.0702 | 0.000520 | **1532** | 0.1526 | 0.002934 |
| **1441** | 0.0686 | 0.000508 | **1487** | 0.0675 | 0.000500 | **1533** | 0.1442 | 0.002773 |
| **1442** | 0.0632 | 0.000468 | **1488** | 0.0747 | 0.000553 | **1534** | 0.1328 | 0.002555 |
| **1443** | 0.0673 | 0.000498 | **1489** | 0.0685 | 0.000507 | **1535** | 0.1390 | 0.002673 |
| **1444** | 0.0687 | 0.000509 | **1490** | 0.0844 | 0.000625 | **1536** | 0.1289 | 0.002478 |
| **1445** | 0.0587 | 0.000435 | **1491** | 0.0833 | 0.000616 | **1537** | 0.1402 | 0.002696 |
| **1446** | 0.0607 | 0.000450 | **1492** | 0.0807 | 0.000597 | **1538** | 0.1485 | 0.002855 |
| **1447** | 0.0563 | 0.000417 | **1493** | 0.0731 | 0.000541 | **1539** | 0.1789 | 0.003440 |
| **1448** | 0.0780 | 0.000577 | **1494** | 0.0707 | 0.000524 | **1540** | 0.1693 | 0.003255 |
| **1449** | 0.0731 | 0.000541 | **1495** | 0.0627 | 0.000464 | **1541** | 0.1806 | 0.003474 |
| **1450** | 0.0614 | 0.000455 | **1496** | 0.0590 | 0.000437 | **1542** | 0.2115 | 0.004068 |
| **1451** | 0.0615 | 0.000455 | **1497** | 0.0553 | 0.000410 | **1543** | 0.2223 | 0.004276 |
| **1452** | 0.0605 | 0.000448 | **1498** | 0.0622 | 0.000461 | **1544** | 0.2316 | 0.004454 |
| **1453** | 0.0508 | 0.000376 | **1499** | 0.0727 | 0.000538 | **1545** | 0.2450 | 0.004712 |
| **1454** | 0.0643 | 0.000476 | **1500** | 0.0802 | 0.000593 | **1546** | 0.2042 | 0.003927 |
| **1455** | 0.0987 | 0.000731 | **1501** | 0.0648 | 0.000480 | **1547** | 0.2262 | 0.004349 |
| **1456** | 0.0923 | 0.000683 | **1502** | 0.0546 | 0.000404 | **1548** | 0.2306 | 0.004434 |
| **1457** | 0.0728 | 0.000539 | **1503** | 0.0657 | 0.000487 | **1549** | 0.2827 | 0.005436 |
| **1458** | 0.0749 | 0.000554 | **1504** | 0.0657 | 0.000486 | **1550** | 0.2942 | 0.005657 |
| **1459** | 0.0709 | 0.000525 | **1505** | 0.0728 | 0.000539 | **1551** | 0.2892 | 0.005562 |
| **1460** | 0.0722 | 0.000535 | **1506** | 0.0873 | 0.000646 | **1552** | 0.2635 | 0.005067 |
| **1461** | 0.0751 | 0.000556 | **1507** | 0.0875 | 0.000648 | **1553** | 0.2927 | 0.005629 |
| **1462** | 0.0795 | 0.000589 | **1508** | 0.1102 | 0.000816 | **1554** | 0.2913 | 0.005603 |
| **1463** | 0.0738 | 0.000546 | **1509** | 0.0969 | 0.000718 | **1555** | 0.2873 | 0.005525 |
| **1464** | 0.0703 | 0.000520 | **1510** | 0.0866 | 0.000641 | **1556** | 0.3165 | 0.006086 |
| **1465** | 0.0696 | 0.000516 | **1511** | 0.0960 | 0.000711 | **1557** | 0.2826 | 0.005435 |
| **1466** | 0.0639 | 0.000473 | **1512** | 0.0781 | 0.000578 | **1558** | 0.2829 | 0.005440 |
| **1467** | 0.0666 | 0.000493 | **1513** | 0.0841 | 0.000623 | **1559** | 0.2887 | 0.005552 |
| **1468** | 0.0666 | 0.000493 | **1514** | 0.0808 | 0.000598 | **1560** | 0.3170 | 0.006096 |
| **1469** | 0.0758 | 0.000561 | **1515** | 0.0873 | 0.000647 | **1561** | 0.3285 | 0.006318 |
| **1470** | 0.0847 | 0.000627 | **1516** | 0.0800 | 0.000592 | **1562** | 0.4035 | 0.007759 |

**Table A8.1 (cont.).** *The two Consumer Price Indices, the deflator and inflation indices, for Sweden, 1290–2008 (July 1914 = 100).*

| Year | Deflator index | Inflation index | Year | Deflator index | Inflation index | Year | Deflator index | Inflation index |
|---|---|---|---|---|---|---|---|---|
| **1563** | 0.4326 | 0.008318 | **1609** | 0.7138 | 0.3569 | **1655** | 2.555 | 1.277 |
| **1564** | 0.5541 | 0.01066 | **1610** | 0.8212 | 0.4106 | **1656** | 2.702 | 1.351 |
| **1565** | 0.5765 | 0.01109 | **1611** | 0.7326 | 0.3663 | **1657** | 2.880 | 1.440 |
| **1566** | 0.5484 | 0.01055 | **1612** | 0.8189 | 0.4094 | **1658** | 2.423 | 1.211 |
| **1567** | 0.6269 | 0.01206 | **1613** | 0.8410 | 0.4205 | **1659** | 3.025 | 1.512 |
| **1568** | 0.7167 | 0.01378 | **1614** | 0.8950 | 0.4475 | **1660** | 3.068 | 1.534 |
| **1569** | 0.7803 | 0.01501 | **1615** | 0.8882 | 0.4441 | **1661** | 3.562 | 1.781 |
| **1570** | 1.0237 | 0.01969 | **1616** | 0.8830 | 0.4415 | **1662** | 3.359 | 1.680 |
| **1571** | 1.5058 | 0.02896 | **1617** | 0.8033 | 0.4017 | **1663** | 3.405 | 1.703 |
| **1572** | 1.6848 | 0.03240 | **1618** | 0.9029 | 0.4514 | **1664** | 3.175 | 1.588 |
| **1573** | 2.1575 | 0.04149 | **1619** | 0.8223 | 0.4112 | **1665** | 3.473 | 1.736 |
| **1574** | 2.2457 | 0.04319 | **1620** | 0.7584 | 0.3792 | **1666** | 3.362 | 1.681 |
| **1575** | 2.1036 | 0.04045 | **1621** | 0.6264 | 0.3132 | **1667** | 3.387 | 1.693 |
| **1576** | 0.4141 | 0.05177 | **1622** | 0.7185 | 0.3593 | **1668** | 2.877 | 1.439 |
| **1577** | 0.4021 | 0.05026 | **1623** | 0.8199 | 0.4099 | **1669** | 3.074 | 1.537 |
| **1578** | 0.4142 | 0.05177 | **1624** | 0.8536 | 0.4268 | **1670** | 2.843 | 1.422 |
| **1579** | 0.4169 | 0.05211 | **1625** | 0.8475 | 0.4237 | **1671** | 2.834 | 1.417 |
| **1580** | 0.4583 | 0.05729 | **1626** | 0.9672 | 0.4836 | **1672** | 3.298 | 1.649 |
| **1581** | 0.4132 | 0.05165 | **1627** | 1.044 | 0.5220 | **1673** | 2.929 | 1.465 |
| **1582** | 0.3843 | 0.04803 | **1628** | 1.428 | 0.7139 | **1674** | 4.127 | 2.063 |
| **1583** | 0.3904 | 0.04881 | **1629** | 1.520 | 0.7600 | **1675** | 4.013 | 2.007 |
| **1584** | 0.4034 | 0.05043 | **1630** | 1.984 | 0.9918 | **1676** | 3.636 | 1.818 |
| **1585** | 0.4211 | 0.05264 | **1631** | 1.941 | 0.9703 | **1677** | 4.234 | 2.117 |
| **1586** | 0.4421 | 0.05526 | **1632** | 1.839 | 0.9197 | **1678** | 4.093 | 2.047 |
| **1587** | 0.4597 | 0.05746 | **1633** | 2.309 | 1.155 | **1679** | 3.731 | 1.865 |
| **1588** | 0.5159 | 0.06449 | **1634** | 2.220 | 1.110 | **1680** | 3.058 | 1.529 |
| **1589** | 0.5003 | 0.06253 | **1635** | 2.042 | 1.021 | **1681** | 2.960 | 1.480 |
| **1590** | 0.5219 | 0.06523 | **1636** | 2.079 | 1.039 | **1682** | 2.850 | 1.425 |
| **1591** | 0.5448 | 0.06810 | **1637** | 1.996 | 0.998 | **1683** | 2.865 | 1.432 |
| **1592** | 0.4895 | 0.2448 | **1638** | 1.956 | 0.978 | **1684** | 3.857 | 1.928 |
| **1593** | 0.5978 | 0.2989 | **1639** | 2.076 | 1.038 | **1685** | 2.982 | 1.491 |
| **1594** | 0.4716 | 0.2358 | **1640** | 2.048 | 1.024 | **1686** | 2.859 | 1.429 |
| **1595** | 0.5266 | 0.2633 | **1641** | 2.386 | 1.193 | **1687** | 3.003 | 1.502 |
| **1596** | 0.6918 | 0.3459 | **1642** | 2.398 | 1.199 | **1688** | 3.215 | 1.607 |
| **1597** | 0.8003 | 0.4001 | **1643** | 2.340 | 1.170 | **1689** | 3.058 | 1.529 |
| **1598** | 0.6755 | 0.3378 | **1644** | 2.690 | 1.345 | **1690** | 3.129 | 1.564 |
| **1599** | 0.6759 | 0.3379 | **1645** | 2.328 | 1.164 | **1691** | 3.003 | 1.502 |
| **1600** | 0.5360 | 0.2680 | **1646** | 2.380 | 1.190 | **1692** | 3.193 | 1.597 |
| **1601** | 0.6980 | 0.3490 | **1647** | 2.358 | 1.179 | **1693** | 4.425 | 2.212 |
| **1602** | 0.7235 | 0.3618 | **1648** | 2.414 | 1.207 | **1694** | 4.155 | 2.077 |
| **1603** | 0.6457 | 0.3229 | **1649** | 2.822 | 1.411 | **1695** | 3.111 | 1.555 |
| **1604** | 0.6779 | 0.3390 | **1650** | 3.894 | 1.947 | **1696** | 4.244 | 2.122 |
| **1605** | 0.6231 | 0.3115 | **1651** | 3.040 | 1.520 | **1697** | 5.036 | 2.518 |
| **1606** | 0.6231 | 0.3115 | **1652** | 3.854 | 1.927 | **1698** | 5.266 | 2.633 |
| **1607** | 0.6761 | 0.3381 | **1653** | 2.395 | 1.198 | **1699** | 4.244 | 2.122 |
| **1608** | 0.6674 | 0.3337 | **1654** | 2.386 | 1.193 | **1700** | 3.894 | 1.947 |

**Table A8.1 (cont.).** *The two Consumer Price Indices, the deflator and inflation indices, for Sweden, 1290–2008 (July 1914 = 100).*

| Year | Deflator index | Inflation index | Year | Both indices | Year | Both indices | Year | Both indices |
|---|---|---|---|---|---|---|---|---|
| **1701** | 3.454 | 1.727 | **1747** | 6.007 | **1793** | 15.43 | **1839** | 61.43 |
| **1702** | 3.805 | 1.902 | **1748** | 6.453 | **1794** | 17.72 | **1840** | 61.02 |
| **1703** | 3.765 | 1.882 | **1749** | 6.022 | **1795** | 18.63 | **1841** | 63.81 |
| **1704** | 3.252 | 1.626 | **1750** | 5.764 | **1796** | 18.51 | **1842** | 63.40 |
| **1705** | 3.556 | 1.778 | **1751** | 6.070 | **1797** | 19.04 | **1843** | 60.35 |
| **1706** | 3.504 | 1.752 | **1752** | 6.067 | **1798** | 20.63 | **1844** | 55.46 |
| **1707** | 4.130 | 2.065 | **1753** | 5.923 | **1799** | 23.93 | **1845** | 61.63 |
| **1708** | 4.327 | 2.163 | **1754** | 6.202 | **1800** | 28.66 | **1846** | 63.87 |
| **1709** | 6.098 | 3.049 | **1755** | 6.627 | **1801** | 27.87 | **1847** | 64.63 |
| **1710** | 3.976 | 1.988 | **1756** | 7.364 | **1802** | 27.06 | **1848** | 60.93 |
| **1711** | 3.651 | 1.825 | **1757** | 7.949 | **1803** | 25.98 | **1849** | 60.41 |
| **1712** | 3.863 | 1.931 | **1758** | 7.967 | **1804** | 27.10 | **1850** | 63.43 |
| **1713** | 3.715 | 1.858 | **1759** | 7.511 | **1805** | 28.01 | **1851** | 65.58 |
| **1714** | 4.680 | 2.340 | **1760** | 7.824 | **1806** | 31.70 | **1852** | 64.99 |
| **1715** | 4.348 | 2.174 | **1761** | 9.079 | **1807** | 32.82 | **1853** | 70.05 |
| **1716** | 5.266 | 2.791 | **1762** | 12.65 | **1808** | 42.37 | **1854** | 71.50 |
| **1717** | 7.913 | 4.906 | **1763** | 13.71 | **1809** | 43.00 | **1855** | 83.40 |
| **1718** | 7.790 | 5.843 | **1764** | 14.49 | **1810** | 43.82 | **1856** | 89.23 |
| **1719** | 9.983 | 9.983 | **1765** | 13.58 | **1811** | 50.29 | **1857** | 87.34 |
| **1720** | 6.172 | 6.172 | **1766** | 12.05 | **1812** | 59.73 | **1858** | 75.22 |
| **1721** | 6.038 | 6.038 | **1767** | 9.80 | **1813** | 58.36 | **1859** | 73.23 |
| **1722** | 4.964 | 4.964 | **1768** | 8.61 | **1814** | 57.13 | **1860** | 79.24 |
| **1723** | 4.830 | 4.830 | **1769** | 8.50 | **1815** | 54.06 | **1861** | 82.92 |
| **1724** | 4.703 | 4.703 | **1770** | 9.48 | **1816** | 58.12 | **1862** | 80.56 |
| **1725** | 4.673 | 4.673 | **1771** | 11.66 | **1817** | 59.04 | **1863** | 77.43 |
| **1726** | 5.079 | 5.079 | **1772** | 12.24 | **1818** | 60.78 | **1864** | 73.41 |
| **1727** | 5.140 | 5.140 | **1773** | 11.28 | **1819** | 61.33 | **1865** | 73.81 |
| **1728** | 4.606 | 4.606 | **1774** | 9.92 | **1820** | 55.13 | **1866** | 76.62 |
| **1729** | 4.327 | 4.327 | **1775** | 11.62 | **1821** | 51.05 | **1867** | 85.84 |
| **1730** | 4.272 | 4.272 | **1776** | 11.61 | **1822** | 51.42 | **1868** | 85.10 |
| **1731** | 4.054 | 4.054 | **1777** | 11.85 | **1823** | 49.06 | **1869** | 76.91 |
| **1732** | 4.084 | 4.084 | **1778** | 12.48 | **1824** | 49.30 | **1870** | 77.17 |
| **1733** | 4.401 | 4.401 | **1779** | 12.30 | **1825** | 50.83 | **1871** | 78.68 |
| **1734** | 4.242 | 4.242 | **1780** | 12.39 | **1826** | 60.37 | **1872** | 82.17 |
| **1735** | 4.414 | 4.414 | **1781** | 13.05 | **1827** | 54.04 | **1873** | 89.44 |
| **1736** | 4.604 | 4.604 | **1782** | 13.09 | **1828** | 50.22 | **1874** | 90.78 |
| **1737** | 4.148 | 4.148 | **1783** | 13.67 | **1829** | 53.24 | **1875** | 89.84 |
| **1738** | 3.985 | 3.985 | **1784** | 12.43 | **1830** | 55.88 | **1876** | 89.80 |
| **1739** | 4.389 | 4.389 | **1785** | 13.29 | **1831** | 61.32 | **1877** | 89.60 |
| **1740** | 5.149 | 5.149 | **1786** | 13.60 | **1832** | 56.94 | **1878** | 81.71 |
| **1741** | 5.716 | 5.716 | **1787** | 12.83 | **1833** | 55.65 | **1879** | 77.94 |
| **1742** | 5.312 | 5.312 | **1788** | 13.58 | **1834** | 57.20 | **1880** | 82.62 |
| **1743** | 5.136 | 5.136 | **1789** | 13.95 | **1835** | 56.81 | **1881** | 84.34 |
| **1744** | 4.912 | 4.912 | **1790** | 13.91 | **1836** | 58.34 | **1882** | 83.73 |
| **1745** | 5.432 | 5.432 | **1791** | 13.72 | **1837** | 61.69 | **1883** | 82.03 |
| **1746** | 5.669 | 5.669 | **1792** | 14.63 | **1838** | 63.82 | **1884** | 78.99 |

**Table A8.1 (cont.).** *The two Consumer Price Indices, the deflator and inflation indices, for Sweden, 1290–2008 (July 1914 = 100).*

| Year | Both indices | Year | Both indices | Year | Both indices | Year | Both indices | Year | Both indices |
|---|---|---|---|---|---|---|---|---|---|
| **1885** | 74.88 | **1910** | 91.69 | **1935** | 155 | **1960** | 407 | **1985** | 2246 |
| **1886** | 71.05 | **1911** | 92.80 | **1936** | 157 | **1961** | 416 | **1986** | 2341 |
| **1887** | 66.91 | **1912** | 97.72 | **1937** | 162 | **1962** | 436 | **1987** | 2440 |
| **1888** | 71.00 | **1913** | 98.80 | **1938** | 165 | **1963** | 449 | **1988** | 2582 |
| **1889** | 73.15 | **1914** | 100.1 | **1939** | 170 | **1964** | 463 | **1989** | 2748 |
| **1890** | 74.40 | **1915** | 115 | **1940** | 193 | **1965** | 487 | **1990** | 3036 |
| **1891** | 79.27 | **1916** | 130 | **1941** | 219 | **1966** | 519 | **1991** | 3319 |
| **1892** | 75.95 | **1917** | 164 | **1942** | 234 | **1967** | 540 | **1992** | 3395 |
| **1893** | 73.85 | **1918** | 241 | **1943** | 235 | **1968** | 551 | **1993** | 3553 |
| **1894** | 70.01 | **1919** | 266 | **1944** | 234 | **1969** | 566 | **1994** | 3631 |
| **1895** | 70.07 | **1920** | 271 | **1945** | 233 | **1970** | 605 | **1995** | 3723 |
| **1896** | 70.63 | **1921** | 221 | **1946** | 234 | **1971** | 650 | **1996** | 3740 |
| **1897** | 73.80 | **1922** | 184 | **1947** | 241 | **1972** | 689 | **1997** | 3760 |
| **1898** | 76.27 | **1923** | 174 | **1948** | 255 | **1973** | 735 | **1998** | 3754 |
| **1899** | 80.85 | **1924** | 174 | **1949** | 256 | **1974** | 808 | **1999** | 3772 |
| **1900** | 83.05 | **1925** | 177 | **1950** | 260 | **1975** | 887 | **2000** | 3809 |
| **1901** | 82.58 | **1926** | 171 | **1951** | 304 | **1976** | 979 | **2001** | 3902 |
| **1902** | 82.94 | **1927** | 169 | **1952** | 326 | **1977** | 1090 | **2002** | 3986 |
| **1903** | 82.59 | **1928** | 170 | **1953** | 328 | **1978** | 1200 | **2003** | 4063 |
| **1904** | 82.62 | **1929** | 168 | **1954** | 331 | **1979** | 1286 | **2004** | 4078 |
| **1905** | 83.98 | **1930** | 162 | **1955** | 339 | **1980** | 1461 | **2005** | 4097 |
| **1906** | 86.91 | **1931** | 157 | **1956** | 356 | **1981** | 1638 | **2006** | 4153 |
| **1907** | 91.32 | **1932** | 155 | **1957** | 372 | **1982** | 1778 | **2007** | 4243 |
| **1908** | 93.15 | **1933** | 151 | **1958** | 388 | **1983** | 1937 | **2008** | 4390 |
| **1909** | 91.81 | **1934** | 152 | **1959** | 391 | **1984** | 2092 | **2009** | (4378) |

Sources: See the main text.

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# 9.
# Long-term trends in real wages of labourers

**Johan Söderberg**

## 9.1. Introduction

This chapter presents a very long-term view of real wages of unskilled labourers in Sweden, particularly in Stockholm, from medieval times up to the present. Emphasis is on the pre-industrial era up to about 1860.

The wages series is based on the building accounts of Stockholm City, supplemented with some institutional and parish archives.[1] The accounts of the Town Council of Stockholm contain detailed descriptions of the building works initiated by the Council and the daily wages of various building workers. Here we focus on unskilled labourers, since this is the only category for which long series of daily wage rates are available.[2] Parish accounts (e.g., Storkyrkoförsamlingen and the German Church) also provide information on wages. Wages were paid in cash and for most of the period examined there were no substantial additional benefits in kind (though the City occasionally did pay for the gloves used by labourers, and gave them some beer). In the late medieval era, though, beer and food could be a substantial part of wages (see Section 9.2 below).

For the period 1365–1864, wages refer to daily summer rates of male unskilled labourers in Stockholm (the 1365 quotation actually refers to the town of Nyköping, about 100 km south of Stockholm).[3] From 1864 onwards, this series is linked to the series of wages for industrial and mining workers in Sweden presented by Svante

1 Söderberg (1987a); Jansson, Palm and Söderberg (1991); Söderberg, Jonsson and Persson (1991).

2 For wages of other groups of labourers in Stockholm (e.g., carpenters, masons, and female labourers) for the 17th and early 18th centuries, see Jansson, Palm and Söderberg (1991, pp. 18–21, pp. 96–108).

3 Daily wage rates of unskilled labourers in Stockholm 1860–64 are drawn from Höjer (1967, p. 423).

Prado in Chapter 10 below.[4] Hence, the series presented is not homogeneous. Nevertheless, it should give a rough general overview of real wage trends over a very long period. As pointed out by Prado in the subsequent chapter, statistical agencies have not been eager to use the term 'unskilled' during the 20th century. As a result, the construction of reliable wage series for unskilled non-agricultural workers from the 1860s onwards will require further research.

Real wages are often used as an indicator of material living standards. It should be kept in mind, though, that real wage rates do not say anything about unemployment. Real incomes may therefore evolve differently from real wages. Furthermore, the real wage rates of male labourers used here do not automatically mirror family or household incomes, to which women and children may have contributed as well. Also, the length of the working day and the intensity of work may vary in a way that is not reflected in daily wage rates. However, we rarely have information on unemployment, work intensity, and household incomes in the past. After all, real wage calculations often seem to be the single best proxy available for trends and fluctuations in purchasing power among various categories of labourers, at least when it comes to producing long-term series.

The deflator CPI presented in Chapter 8 above is used here for the calculation of real wages. The weights of goods used in the construction of the CPI were also presented there, and are given in simplified form in Table 9.1 below. A few words should be added regarding the choice of these weights.

**Table 9.1.** *Weights of main components in the deflator CPI (per cent)*

| Component | Period | | | | |
|---|---|---|---|---|---|
| | 1539–1731 | 1732–82 | 1782–1830 | 1830–70 | 1870–1913 |
| Foodstuffs | 75.0 | 75.0 | 75.0 | 72.0 | 70.0 |
| Fuel, lighting, building materials | 7.5 | 9.3 | 9.3 | 9.6 | 10.5 |
| Clothing | 10.0 | 13.2 | 13.2 | 14.4 | 15.5 |
| Other | 7.5 | 2.5 | 2.5 | 4.0 | 4.0 |
| Total | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

As seen from Table 9.1, foodstuffs are the dominant item in the deflator index for the period up to 1913, with weights ranging from 75 to 70 per cent. These weights are based on data on the composition of food at two Stockholm institutions, the Danviken asylum and the Orphanage, at selected points in time from 1571 and 1781.[5] They are somewhat lower than the weights employed by Jörberg in previous

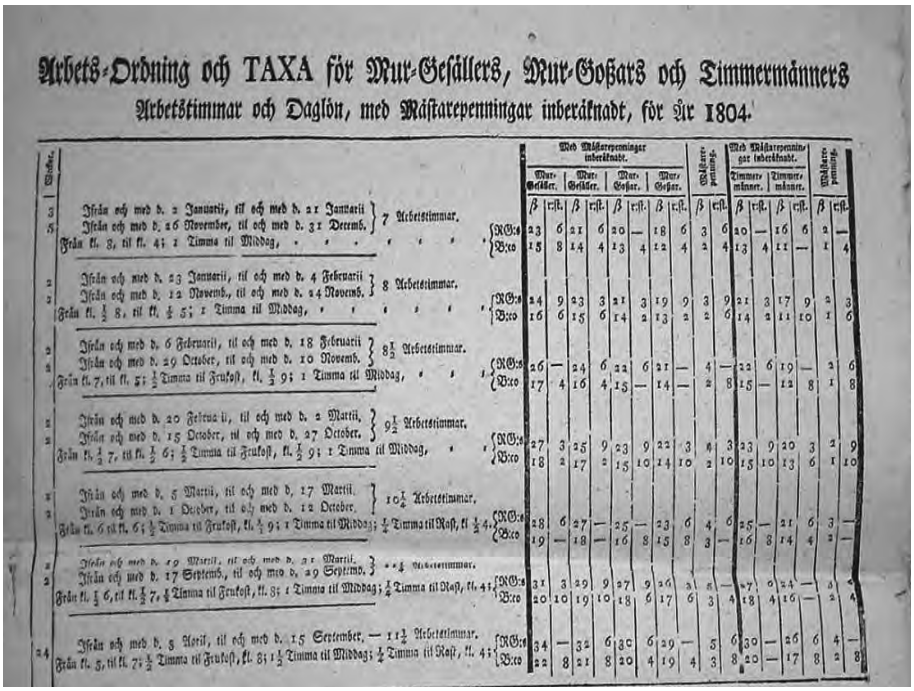
4 For the period 1865–1930, a series of earnings of unskilled municipal workers in Stockholm is published in Bagge et al. (1935, Vol. II, p. 55). This series does not appear sufficiently reliable to be used here, since the rate of increase over the period as a whole in unrealistically high.

5 Jansson, Palm and Söderberg (1991, p. 5); Utterström (1978, p. 143, pp. 216–7).

The Ebonists, *by Elias Martin (1739–1818).*
Source: Nationalmuseum.

Swedish research.[6] They are fairly close to weights used in modern international research. For Britain, Robert Allen assumes a weight of 73.5 per cent for foodstuffs (including beer and tobacco) in his construction of a price index employed to cap-

6 Jörberg (Vol. I, 1972, p. 119, p. 182, p. 349) used weights for foodstuffs ranging between 83.3 per cent (for the period 1732–1804) and 81.4 per cent (for the period 1865–1914).



Arbets-Ordning och TAXA för Mur-Gesällers, Mur-Goßars och Timmermänners
Arbetstimmar och Daglön, med Mästarepenningar inberäknadt, för År 1804.

*Regulation of working hours and wages for journeymen and apprentices in the building sector ('mur-gesäller' and 'mur-gossar') and carpenters ('timmermän') in Göteborg in 1804. The length of the working day varied over the year, from 7 hours from 26 November to 21st January (from 8 a.m. to 4 p.m. with a 1-hour break) to 11¾ hours from 8 April to 15 September (from 5 a.m. to 7 p.m. with a 2¼-hour break). Moreover, the daily wage varied with the number of hours per day. Journeymen earned around 15 per cent more than apprentices.*

Source: Göteborgs stadsarkiv, Oordnade inneliggande handlingar E II j:3

ture real wage developments during the Industrial Revolution (1770–1869).[7] This is slightly less that the weights put forward in earlier research by Feinstein (1998), who assumes a weight of 79 per cent for food and drink in 1788/92, declining somewhat to 76 per cent in 1828/32 and further to 73 per cent in 1858/62.[8] The differences between various modern researchers in their assumptions about the share of food in the cost of living thus appear to be modest, as there is general agreement that food was the dominant component.

*

7 Allen (2007, p. 16). For Antwerp in the late 16th century, Scholliers (1960) constructs an index with a food component of 75 per cent, which is identical to the weight used in the present study for that period.

8 Feinstein (1998, p. 635).

Figure 9.1 below reports real wages of labourers from 1365 up to 2004. The main trends in real wages in Stockholm after 1500 can be divided into four phases:

1. The first phase is characterized by a decline during most of the 16th century.
2. The second phase is a recovery during the 17th century, continuing up to about 1730.
3. A new phase of depression of real wages occurred from about 1730 up to 1800.
4. After about 1800, there is a strong upsurge in real wages.

These phases are further discussed below.

## 9.2. The medieval era and the 16th century

Data on late medieval wages in Sweden are very sparse. In modern research there has been no attempt to compare Swedish wages for the medieval era with those of later periods.[9] In order to make such a comparison possible, some assumptions have to be made regarding medieval wage rates.

First, late medieval daily wage rates are of two kinds. Most of them refer to actual wages paid according to the accounts. In a few cases, however, regulations of maximum wage rates were issued by the Stockholm City authorities. Normally, the rates given in such regulations should be expected to be lower than actual wages paid, since their purpose would be to counteract increases in market wages. For the years 1476, 1478, and 1496, the daily rates in Figure 9.1 refer to regulations issued by the Stockholm City authorities.[10] They should be interpreted as probable minimum wages. Even as such, they suggest a relatively high level of real wages during the 15th century, continuing in the early years of the 16th century.

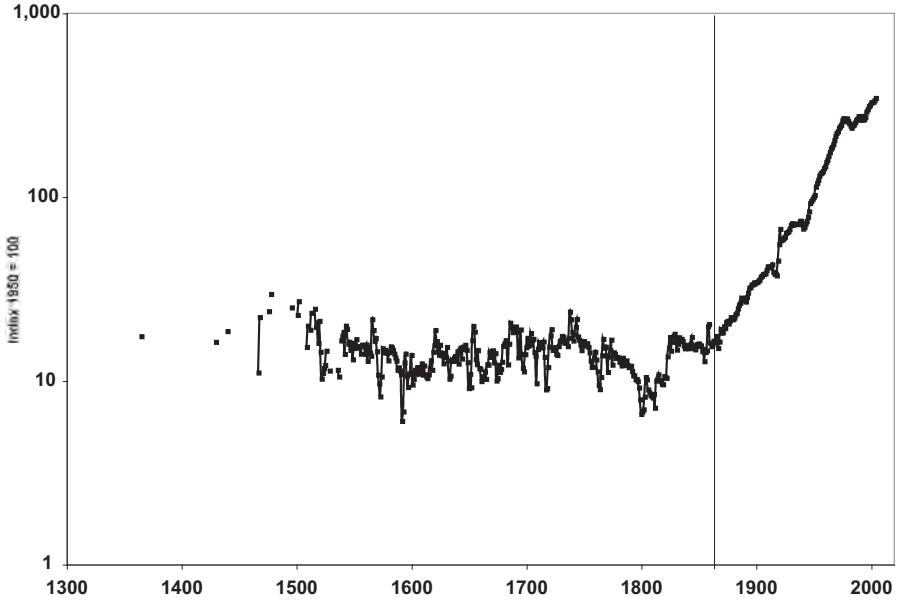
Second, some wage rates include food and beer, whereas others do not, while yet others do not give any information in this respect. For the years 1476, 1478, and 1496, the regulated daily summer cash wage rate was 0.5 öre. In addition, the labourer received food and beer. Here, the value of food and beer is estimated at 0.5 öre for these years. This is based on several pieces of information. Assuming that food comprised half the wage rate seems reasonable in the light of conditions in the copper-producing district at Kopparberget in the province of Dalarna. There, the daily wage rate for a labourer without food in 1499 was set at twice the wage rate including food.[11] There are also examples from Stockholm of wage rates of labourers who were given no food being twice as high as when food was included in the daily wage. This relationship is found in 1517, for male as well as female labourers, and in

9 Note, though, the early attempt at real wage analysis by Sommarin (1908, pp. 42–51, p. 75). He argued that real wages of Swedish labourers were unusually favourable during the 15th century, especially its latter half. However, the major part of the prices he included in the discussion was of a normative character, expressed in various royal regulations.

10 *Stockholms stads tänkeböcker 1474–1483* (1917, pp. 179, 467); *Stockholms stads tänkeböcker 1492–1500* (1930, p. 271).

11 Sommarin (1908, pp. 47–8).

**Figure 9.1.** *Real wages of unskilled labourers in Stockholm, 1365–1864, and industrial workers in Sweden 1865–2004 (index 1950 = 100).*




Source: Table A9.1.

Note: A vertical line marks the change in 1865 from unskilled labourers in Stockholm to industrial workers in Sweden.

1525–26.[12] It may also be noted that the cost of a soldier's daily food was set at 0.5 öre at Stockholm in 1508.[13]

During the late Middle Ages, beer could sometimes be a substantial part of the daily wage. This was the case at least in 1467, when beer made up 1/6 of the wage for some labourers and 1/8 of the wage for some others.[14] This is suggestive of a fairly high living standard, since much of the energy content of the raw material (barley) is lost in the brewing process. Labourers living at the physical subsistence level would be expected to consume cereals in other forms, e.g. as bread or porridge. Beer grew in popularity in Sweden during the late Middle Ages and became a central item of consumption on festive occasions. At least seven litres of beer per person was, for example, consumed at the annual May feast at Stockholm City Hall in the 1460s.[15] This of course also indicates that material living conditions exceeded the minimum level.

Although the number of observations before 1500 is small, a statistical test (*t* test)

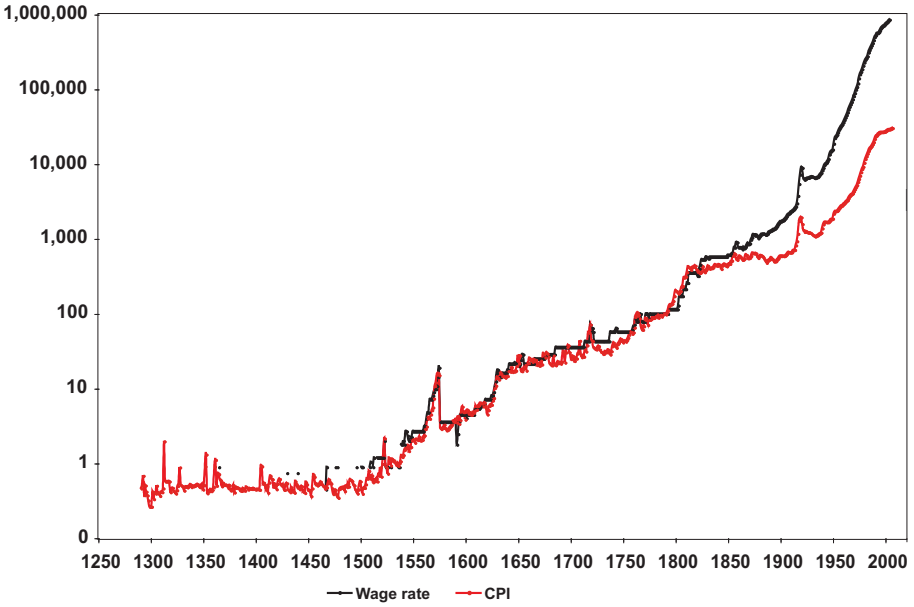
12 1517: *Handlingar rörande Helga lekamens gille II–IV* (1923, p. 59, pp. 72–3, p. 75). 1525–1526: *Handlingar rörande Helga lekamens gille II–IV* (1923, p. 135, p. 137).

13 *Stockholms stads skottebok 1501–1510* (1915, p. 274).

14 *Stockholms stads skottebok 1460–1468* (1926, p. 287).

15 Dahlbäck (1987, p.171).

**Figure 9.2.** *Nominal wage rates of unskilled labourers in Stockholm and deflator CPI, 1291–2004 (index 1780/89 = 100).*




Source: Table A9.1.

Note: Missing values in the deflator CPI have been interpolated.

reveals a significant difference in means between real wages before that year and those registered for the period 1500–1800.[16]

Late medieval labourers thus found themselves in a rather favourable situation, in Stockholm as well as in other parts of northern and western Europe, where population decline after the Black Death raised the price of labour.[17] In Stockholm, however, the high level of real wages did not last much beyond 1500. Real wages were quite volatile in the 1510s and '20s. This is a turbulent period in Swedish history, characterized by war and civil unrest. The high volatility suggests a low level of welfare where basic living conditions were unstable. There are also many qualitative statements on the poverty of the country in the early 16th century.[18]

16 Assuming equal or unequal variances, the *t* value is -7.57 and -5.61, respectively. Both are significant at a very high level.

17 For an overview of conditions in England see Clark (2007a, p. 41); more detailed analysis in Clark (2005) and Clark (2007b).

18 See, e.g., Letter from the inhabitants of the province of Hälsingland, 19 February 1507 (SDhk 35724); Letter to Svante Nilsson 28 June 1508 on poverty in the province of Småland; Letters to Svante Nilsson 22 February 1509 (SDhk 36448) and 12 December 1508 (SDhk 36356) on poverty in northern Sweden and Finland. On the severe famine of 1509 see Olsson (1947). A letter to Svante Nilsson dated 1 September 1510 describes the lack of food in the mining district of Norberg (SDhk 36804). See also Letter from the Mayor and Council of Uppsala to Svante Nilsson, 14 July 1511 (SDhk 37033), reporting that the town, due to poverty, is unable to keep the prisoners assigned to it and that the peasants threaten to kill them if they stay much longer (see also SDhk 36759, 22 June, 1510).

The 16th century was characterized by strong population growth in Sweden as well as generally in northern and north-western Europe. Growing population pressure led to the expansion of cultivated land, and marginal land was increasingly used for grain production.[19] Despite land reclamation, it seems that the total output of grains in Sweden did not keep pace with population growth. The decline in per capita grain production seems to have been the major force behind the substantial rise in the relative price of grains. Grain prices in Sweden rose more steeply than prices of animal foodstuffs, which in turn rose less than prices of textiles and building materials. This conforms to trends elsewhere in western Europe.[20]

After about 1540, the trend in real wages in Stockholm is clearly downward. By 1600, real wages were about 40 per cent lower than in 1540. This may seem a remarkably strong fall but it resembles trends found in several other places in Europe, e.g., in southern England and Valencia.[21]

The real wages of agricultural labourers in Sweden during the 16th century have not been systematically explored. It is clear, though, that these wages declined at least around mid-century, as nominal daily wage rates were practically unchanged, whereas food prices were rising. It should be remembered, though, that agricultural labourers in Sweden made up a small proportion of the total labour force at this time; the great increase in landless labourers did not take place until the 19th century.[22]

The real wages of unskilled labourers in Stockholm fell dramatically during the extreme inflation around 1573 and 1592. During the latter inflation period, there are indications in the sources of unusually severe conditions for these labourers. At the Horn brick-yard, quantities of herring and smelt were distributed to the workers in 1592 'in order that they would be serviceable for work'. This suggests that real incomes had fallen below the physiological minimum at which meaningful work could be carried out. Already in October 1591, the Stockholm City accounts register that extra cash payments were given to the day labourers 'since they had a poor daily wage'.[23]

After the inflationary periods, however, real wages tended to return to their former levels. Thus, extreme inflation had no lasting influence on real wages. Figure 9.2 illustrates that, as a rule, nominal wages in the pre-industrial era closely followed the changes in the general price level. Thus, the view often put forward in international literature, that nominal wages were frequently rather inflexible for long periods, does not fully fit the situation in Stockholm, where inflation was an ongoing phenomenon. There is no counterpart here, for example, to the stability of nominal wages observed in southern England from 1412 up to 1545, when daily wage rates of

19 Kriedte (1983); Abel (1967, p. 117).

20 Myrdal and Söderberg (2002, pp. 96–108); Bowden (1967); Braudel and Spooner (1967, pp. 425–7, 482–3).

21 Söderberg (1987a, p. 353).

22 Söderberg (1987a, p. 354).

23 Söderberg (1987a, p. 352).

unskilled building labourers were unchanged at 4 pence a day.[24] Sharp drops in wage rates relative to prices, as occurred around 1592, were rare in Stockholm.

## 9.3. The period c. 1600–1730

The most surprising feature of the long-term evolution of real wages is perhaps that the wars and the militarization of the Swedish economy during the Great Power Era (ending in 1721) did not prevent a growth in real wages. This is in agreement, however, with upward real wage trends in several other places in Europe during the 17th century. The rise in real wages can be linked to stagnating or declining relative food prices and tendencies to depression in the agrarian sector.[25]

In the Stockholm case, it should be noted that the population increased rapidly in the 17th century, from about 10,000 in the early years of the century to nearly 60,000 around 1690. Demand for labour, e.g., for building and shipbuilding, seems to have been high as Stockholm became the capital of a centralized state.[26]

This expansion helps to explain the upward trend in real wages. It is part of a general European tendency for big towns and cities, often with a large administrative or military sector, to expand during the period 1600–1750. Besides Stockholm, several other capitals, e.g., Madrid, Paris, and Copenhagen, exhibited dynamic tendencies during this phase. On the other hand, many industrial towns regressed during this period.[27]

It may be of some interest to note that the length of the working day for carpenters and masons was regulated in 1675. The Stockholm magistrate decided that work should start at 5 a.m. and continue until 7 p.m. during the summer season (covering the light half of the year). The working day was thus set to comprise 14 hours. This decision was taken in response to complaints that workers did not arrive at work until 6 a.m. and left at 6 p.m. During the winter season (the dark half of the year) work was to be carried out from sunrise to sunset.[28] If this regulation was adhered to, there must have been very little possibility of earning extra income by performing work over and above the summer-season working day.

## 9.4. The period c. 1730–1800

The trend towards stagnating or falling food prices ended during the first part of the 18th century. Rising grain prices was a general European tendency from about 1730 to 1800. As grain prices were still a major element of the cost of living of labourers and nominal wages were rather inflexible, the outcome was a depression of real wages

24 Brown and Hopkins (1981, p. 11).
25 See, e.g., Hobsbawm (1965, p. 28); Slicher van Bath (1963, pp. 209–10); Felloni (1977, p. 28); Brown and Hopkins (1981, p. 82).
26 Jansson, Palm and Söderberg (1991, pp. 30–1).
27 Vries (1984).
28 Pursche (1979, pp. 100, 150 ff, 304).

Labourers in Stockholm in 1767*, by Johan Sevenbom (1721–84).*
Source: Stockholm City Museum.

similar to the one in the 16th century. A deep trough in real wages occurred during the Revolutionary and Napoleonic wars, due to sharply rising food prices. Despite substantial technological and institutional changes, around 1800 most urban as well as rural labourers actually seem to have been worse off in terms of material living standards than at any other time during the preceding five centuries.

As in the 16th century, it was grain prices in particular that rose strongly, in Sweden as well as in Europe in general. The relative price change was driven by population growth. A new period of land reclamation started during the 18th century. The surplus from agrarian production was distributed more unequally than before. In general, farmers who produced a surplus for sale on the market should have gained from the relative price shift in favour of grains. Agricultural land prices and rents should be expected to have turned upwards. This was in fact the case in Sweden. In particular, prices of small landholdings surged upwards, stimulating the division of farms. As a result, income differentials between rich and poor widened. The stratum of landless labourers grew strongly after 1750.[29]

Figure 9.3 compares real wages of unskilled labourers in Stockholm with real wages of male agricultural labourers in rural Sweden from 1732 up to 1914 (the latter series deflated with the CPI used elsewhere in this chapter).

29 Herlitz (1974). Similar tendencies are seen in France, for example; Söderberg, Jonsson and Persson (1991, pp. 78–80).

The real wage decline 1730–1800 was more pronounced in Stockholm than in rural Sweden. One reason for this may be that Stockholm real wages suffered not only from the price rise of grains and other foodstuffs, but also from de-industrialization. The most important industrial branch in the capital was textile manufacturing, which declined during the second half of the 18th century and the first part of the 19th. Most of the silk industry, for example, ceased to exist. Low profits forced many Stockholm artisans into bankruptcy during the latter part of the 18th century, and their total number fell. Unemployment in the capital probably increased, and part of the labour force was driven into informal sector occupations. These informal occupations included illegal or quasi-legal activities such as the production of handicraft items without belonging to a guild, or the selling of alcohol or various goods in the streets.[30] The economic problems affected demographic trends. The population of Stockholm hardly changed in the latter half of the 18th century and the early 19th, and the marriage rate fell from 13.3 per 1,000 in 1751–60 to only 8.2 in 1801–10.[31]

From Figure 9.3 we also see that the fluctuations in real wages in Stockholm exceeded those in rural Sweden. During years of high prices, the Stockholm curve tended to fall below that for rural Sweden, whereas the opposite was often true for low-price years. This is an effect of greater flexibility in nominal wage rates in Stockholm compared to rural Sweden.

It should be kept in mind that these real wage trends are not typical of social groups who enjoyed substantial payment in kind. One large such group was male and female servants in urban as well as in rural Sweden. Food and lodging was the major part of their pay. The real wage decline for them must have been less steep during this period (and, correspondingly, the rise in their real wages during the 19th century should have been less pronounced than for labourers with no payment in kind). Some civil and military functionaries, particularly the clergy and officers of the county regiments, had their pay in kind from tithes and rents. They probably gained from the grain price rise. Urban functionaries, on the other hand, were often money-salaried. They became increasingly disadvantaged compared with their colleagues in rural regions.[32] Here, as elsewhere, we observe a redistribution of income from urban to rural regions during the latter part of the 18th century.

As seen in Figure 9.3, the erosion of real wages in Stockholm was pronounced in the period 1730–1800. Could it be realistic to assume such a dramatic downturn not only in real wage rates but also in real incomes and living standards? Probably not. The declining real wage rates of male labourers may to some extent have been compensated by increased labour market participation by women and children.

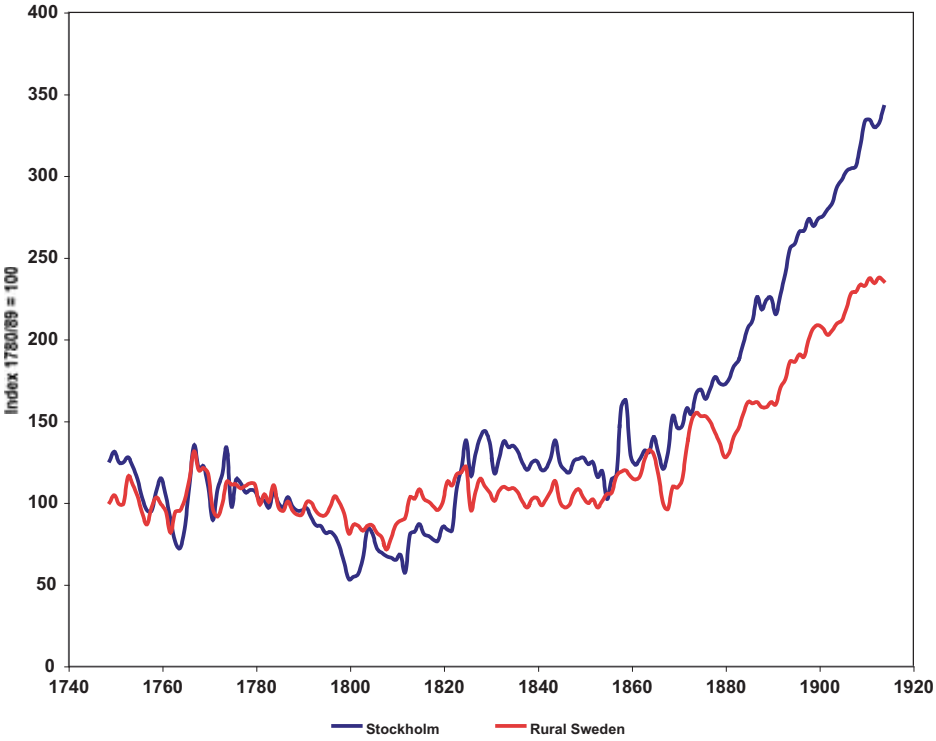
During the 18th and early 19th centuries, institutional changes were undertaken in Stockholm in order to facilitate the running of small businesses in certain branches

30 Söderberg, Jonsson and Persson (1991, pp. 46–64).

31 *Statistisk årsbok för Stockholms stad* 38 (1905, p. 66).

32 Artéus (1982, Chapter 5).

**Figure 9.3.** *Real wage rates of unskilled labourers in Stockholm and of male agricultural labourers in Sweden, 1732–1914, index 1780/89 = 100.*




Sources: Stockholm: see Figure 9.1; rural Sweden: Jörberg (1972), Vol. I, pp. 710 onwards.

by women and widows. The authorities were well aware that many married men were unable to provide for their families, due to insufficient income, illness, or heavy drinking. In order to avoid increased poor relief costs, the authorities stimulated the opening of certain businesses to women. While most trades remained closed to women, quite a number of women were allowed to earn an income in various occupations: as hawkers (making and selling certain kinds of food), innkeepers, rowing mamsels, or bakers. They could also work as vendors of tobacco, certain textile goods or used clothes, furniture and household utensils.[33] This expansion of female trades should to some degree have counteracted the decline of male incomes in lower social strata. Yet, this new interest in female employment could not prevent the loss of many jobs for women as textile manufactories closed.

In international research, the concept of 'the industrious revolution' has been used to delineate a new type of household behaviour, involving an increased supply of market-oriented and money-earning activities and a simultaneous increase in

33 Bladh (1991, pp. 50–56).

demand for many kinds of goods offered in the market. This revolution, driven by consumer aspirations, took place roughly between 1650 and 1850 in western Europe. Even though real wage rates of labourers fell during most of the 18th century, annual household incomes could increase as a result of working longer hours during the year, a higher work intensity, greater specialization in household production, and increased labour market participation by women and children.[34]

In the Stockholm case, there were several ways in which household incomes could be further supplemented by children's work. For example, the newspaper *Dagligt Allehanda* was started in Stockholm in 1767 as an advertising medium (in itself a typical phenomenon of the rising consumer aspirations and market expansion connected with 'the industrious revolution'). This newspaper was distributed by a combination of subscriptions and street sales by newspaper boys; contemporaries referred to the latter method as 'the English way' of distribution.[35]

There is as yet no thorough study of Swedish conditions from the perspective of 'the industrious revolution' but there are several indications that such an interpretation could be realistic. The growing role of married women in the Stockholm economy fits this pattern. In Sweden as well as in England, the growth of second-hand markets in clothes and other goods was probably also important in making consumption cheap enough to include the lower classes.[36] Consumers in Sweden, as elsewhere in western Europe, were attracted by new and exotic goods such as tobacco, sugar, and silk.

While the economy of Stockholm stagnated in the period 1760–1850, several towns in other parts of Sweden expanded. The growing incomes of peasants stimulated handicrafts and small industries such as book-binders' shops, where hymnbooks, calendars and almanacs were made.[37] New types of consumption were spreading to rural areas. In parts of northern Sweden during the late 18th century, the peasants criticized young people and servants for being affected by urban habits such as wearing watches, silk waistcoats, velvet trousers, and high hats with buckles and silk ribbons. This problem was said to be most serious along the trade routes to Stockholm.[38] The traditional dark, uniform dress habits among the peasantry were giving way to more varied styles. 'People are more inclined towards *multiform* than *uniform*', one author from rural northern Sweden observed around 1770.[39] In Småland in southern Sweden, contemporaries observed that dress fashion was now changing from year to year. Men as well as women, not only married women but also girl servants, now dressed like the urban population. They followed the latest fashion, including silk items imported

34 Vries (2008).
35 Sylwan (1896, pp. 496–504); Sylwan (1896, p. 430 n 2).
36 On England see Lemire (1988).
37 Söderlund (1949).
38 Svensson (1969, p. 82).
39 Nordenström (1923, p. 60).

Skeppsbron in 1860*, in the old town of Stockholm, by Carl Johan Billmark (1804–70).*
Source: http://sv.wikipedia.org/wiki/Fil:Skeppsbron_1860_Carl_Johan_Billmark.jpg

by the Swedish East India Company, and other colourful fabrics.[40] In response to increased demand, cottage production of textiles grew in many rural areas and seems to have been better adapted to local demands than were the products of manufactories in the capital.

De-industrialization in Stockholm thus went hand in hand with industrial (or proto-industrial) growth in rural areas. Like the changes in the previous period, this is also part of a broader European pattern, or what de Vries labels a new urbanization period from 1750 to 1800/1850. These regional shifts can also be interpreted against the background of the new consumer aspirations that were driving the industrious revolution. Much of the urban growth now took place in relatively small cities, stimulated by relative price shifts to the advantage of agrarian producers.[41]

## 9.5. The period after 1800

The dominant feature of Figure 9.1 is of course the steep increase in real wages after 1800. Real wages rose after the Napoleonic wars, as grain prices declined, but this growth did not continue in the second quarter of the 19th century. The first sustained rise in the purchasing power of labour did not materialize until after about

40 Gaslander (1982, pp. 66–8).
41 Vries (1984).

1870, when industrialization gained ground. At about that time, real wages of unskilled labourers in Stockholm began to depart from those of agricultural labourers in rural Sweden, as is evident from Figure 9.3.

Already by 1900, real wages were substantially higher than ever before. A new industrial structure was established in Stockholm. Mechanical engineering and typographic industry, relying on relatively high wages, became key branches. Low-wage branches, such as the textile and match industries, could not survive in the capital and had to relocate to regions where wages were lower.

In 1895, the working day of Stockholm building labourers was still as long as 12 hours in the summer half of the year (April to September). By 1900, the working day had been shortened to 10 hours and the 48-hour week was introduced in 1920.[42] In other words, an unprecedented wage rise went hand in hand with a substantial shortening of working hours. This further underscores the improvement of labourers' conditions connected with industrialization.

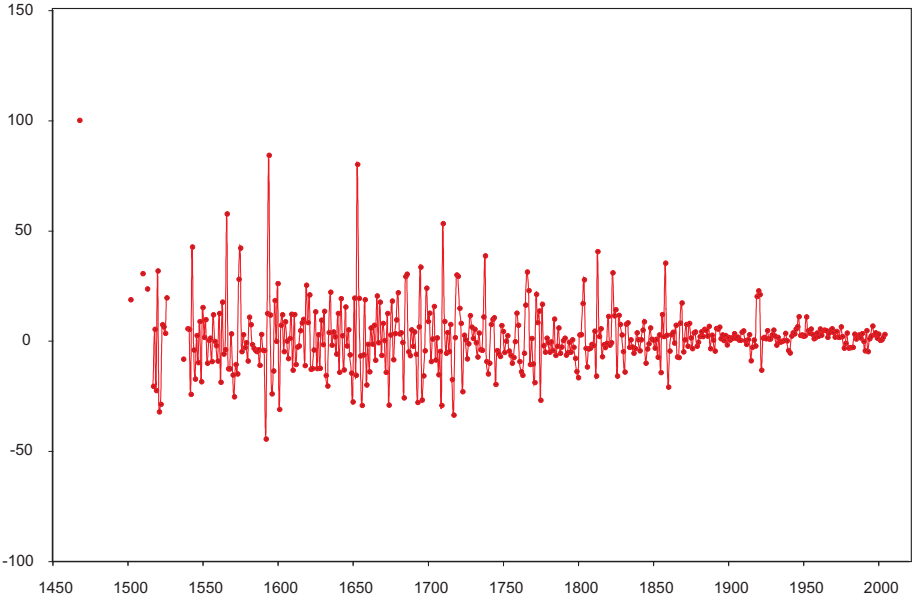
## 9.6. Volatility in real wages and prices

International research has emphasized that fluctuations in real wages (or in prices of basic necessities) can be seen as a welfare indicator. Large swings from one year to another had serious welfare implications. In times of falling prices, this could give rise to unforeseen increases in purchasing power, as nominal wages were inflexible. But in years of crisis, surging prices increased the risk of malnutrition and excess mortality. Unstable prices were a fundamental problem of pre-industrial economies due to the large fluctuations they caused in living conditions. Stable prices enhanced welfare by facilitating more regular provisioning with basic foodstuffs.[43] The Italian economic historian, Carlo Cipolla, interprets the standard medieval economic policy of price regulation against the background of unstable prices and their repercussions on living standards.[44]

For this reason, it is important to assess not only the level of real wages but also the magnitude of the fluctuations around the trend. From Figure 9.1 it is immediately obvious that the real wages of Stockholm labourers became more stable in the long run. The short-term fluctuations around the trend were clearly greater before the mid-18th century than afterwards. In other words, volatility was reduced. Figure 9.4 and Table 9.2 provide a clearer picture of how volatility has changed.

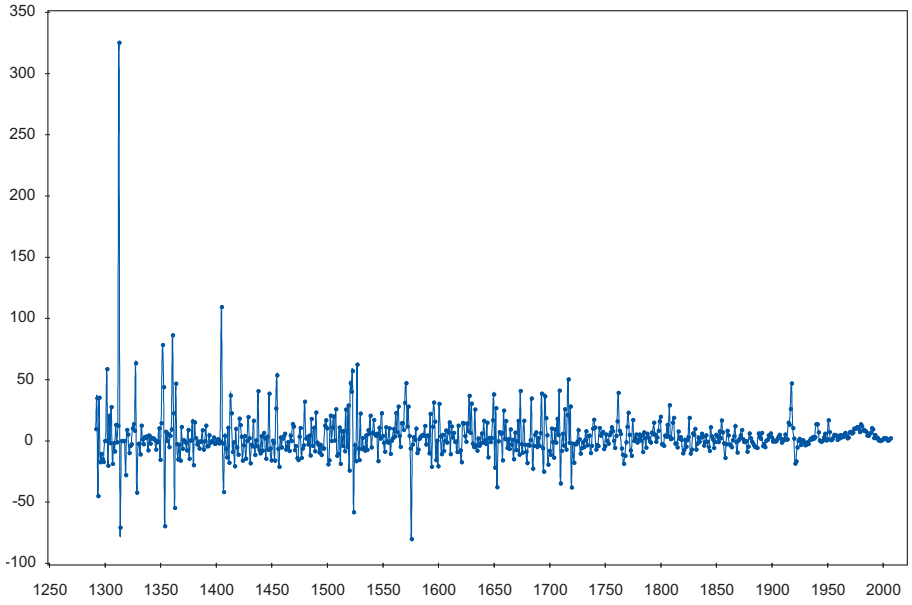
42 Bagge et al. (1935, Vol I, pp. 14–5).
43 Persson (1999, p. 23, p. 31).
44 Cipolla (1967, pp. 404–7).

**Figure 9.4.** *Volatility of real wages of labourers in Stockholm/Sweden 1468–2004, measured as the percentage year-on-year change in real wages.*




Source: Table A9.1.

**Figure 9.5.** *Volatility of the deflator CPI, 1291–2004, measured as the percentage year-on-year change in the CPI.*




Note: Missing values in the deflator CPI have been interpolated.
Source: Table A9.1.

**Table 9.2.** *Volatility in real wages and in the deflator CPI, 1291–2004, measured as the standard deviation of the percentage year-on-year change.*

| Period | Volatility of real wages | Volatility of deflator CPI |
|---|---|---|
| 1291–1399 | | 38.1 |
| 1400–99 | | 17.8 |
| 1500–99 | 20.0 | 19.2 |
| 1600–99 | 16.4 | 14.7 |
| 1700–99 | 13.3 | 12.6 |
| 1800–99 | 9.5 | 6.9 |
| 1900–2004 | 4.7 | 7.0 |

Source: Table A9.1.

Due to the scarcity of medieval wage data, real wage volatility cannot be calculated before the 16th century. Price data are more continuous, however. This makes it possible to give a picture of price volatility for earlier periods. Figure 9.5 and Table 9.2 suggest that price volatility, as measured by the deflator CPI, was quite high during the period 1291–1399. However, the calculation of price volatility for this early period should be viewed with caution since data are sparse and the extremely high price in 1313 (which should perhaps be dated to the harvest year 1315) has a strong impact on the result. It should be added, however, that the period 1315–17 is well-known for harvest failures in northern Europe, probably the worst during the century. Crops were damaged by cold and wet weather, and the grain shortage led to extremely high prices.[45]

Data availability is much better from the early 15th century onwards. The fairly high level of volatility in the 15th century, and even more so in the 16th century, is probably realistic. The years of monetary crisis, described in Chapter 8 above, contributed to the high volatility in the 16th century. After that, volatility decreased for

45 Kershaw (1973, pp. 6–10); Jordan (1996, pp. 15–6, 50–2). The price of wheat and barley in England, in grams of silver per litre, was higher in 1316 and 1317 than in any other year between the start of the series in 1209 and the years 1623 and 1637, respectively. See the large price data file compiled by Gregory Clark, England_1209-1914_(Clark).xls, available from Global Price and Income History Group, http://gpih.ucdavis.edu/. At Lübeck, the very high price of rye in 1315 was noted by the chronicler Detmar; Lucas (1930, p. 353). Danish chroniclers also wrote about the high prices this year following the destruction of crops by rain; *Historiske kildeskrifter og bearbejdelser af dansk historie især fra det 16. aarhundrede, Vol. 1* (1873, p. 589). The Swedish price record from 1313 stems from the 15th-century chronicler Ericus Olai, who used a now lost source; Ahnlund (1953, p. 161). It is possible that this quotation should be dated to the harvest year of 1315 instead, since it seems unlikely that Sweden escaped this harvest failure. Jordan (1996, p. 194 note 63) refers to Swedish chronicles mentioning unusual thunder and terrible displays of lightning in 1315. The rainy weather may be connected with an eruption of the volcano Kaharoa in New Zealand, which lasted about five years; Nairn et al (2004).

prices as well as real wages. The parallel trend is not surprising since short-run fluctuations in real wages were primarily due to changing prices of the goods included in the CPI, especially the price of grains, not to fluctuating nominal wages.

The reduction in the volatility of prices and real wages suggests more regular provisioning, leading to more stable living conditions after the 16th century. This reduction continued throughout the pre-industrial era, no doubt due in part to the expansion of trade in the Baltic area in the 17th century, enabling Sweden to import grains from Livonia and other regions in times of high prices or harvest failures. It is also likely that Swedish harvests became more stable during the 19th century, producing a substantial decline in price volatility.

During the industrial period, prices as well as real wages became even more stable in the short run, despite temporary upturns during the World Wars. In particular, the First World War had a strong impact on price volatility. For this reason, overall price volatility during the period 1900–2004 was of the same magnitude as during the 19th century.

## 9.7. Concluding discussion

The real wage trends during the period up to about 1800 seem to agree with an economic model of the type presented by Thomas Robert Malthus more than two hundred years ago. According to Malthus, no long-term improvement in living standards was possible because population growth would tend to exceed the increase in food production. If the population declined (e.g., due to epidemics, famine, or war), the price of labour would rise. This would lead to an improvement for the labourers, but only temporarily, since renewed population growth would soon press real wages down again. Land reclamation could not solve the problem since the cultivation of less productive marginal lands would lead to rising food prices. Malthus assumed that agricultural productivity could not rise in the longer run. The actual pattern in Sweden, as well as in many other parts of Europe, fits this model fairly well. We have seen that strong population growth during most of the 16th and 18th centuries pushed real wages down, whereas real wages improved during the 17th century when population pressure was weaker.

No sustained growth in real wages occurred in the pre-industrial era. The years around 1800 were characterized by lower real wages than in any other period (though single years with even lower wages can be found in connection with the harvest failures of the late 1590s). Real wages improved from the early 19th century onwards. Yet it was not until industrialization had gained momentum around 1870 that the highest levels in the pre-industrial era were surpassed. With industrialization, the Malthusian mechanism was no longer effective, as population as well as real wages surged upwards.

During the pre-industrial era up to 1800, an unskilled labourer could buy approximately 1 kg of butter for his daily wage. In 2004, the average male industrial worker

could buy 25 times as much for his pre-tax daily wage. Despite some setbacks during the two world wars and a tendency towards weaker growth after the late 1970s, real wage development in the last two centuries is one of strong and almost uninterrupted growth.

Volatility in real wages and prices has been used here as a welfare indicator, based on the assumption that large swings in these variables were harmful to labourers. The evolution of volatility tells a somewhat different story than does the mere movement of real wages. Prices as well as real wages became more stable in the long run, as the short-term fluctuations were already diminishing in the 17th century, followed by further reductions during the subsequent century. This levelling tendency is probably due to the expansion of trade in grains, resulting in a more regular supply. So even if Stockholm labourers did not enjoy any sustained rise in real wages before the advent of industrialization, at least they benefited from more stable prices and wages.

**Table A9.1.** *Daily nominal wage (in öre 1365-1624, öre kopparmynt 1625-1776, skilling 1777-1788, and skilling riksgälds 1789-1850), daily wage in gram silver, and real wage 1365-1850 (1950=100).*

| Year | Nominal wage | Gram silver | Real wage | Year | Nominal wage | Gram silver | Real wage | Year | Nominal wage | Gram silver | Real wage |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1365** | 1 | 4.0 | 18 | **1552** | 3 | 2.7 | 17 | **1594** | 4 (16[i]) | 2.8 | 13 |
| **1430** | 0.83 | 2.2 | 16 | **1553** | 3 | 2.7 | 15 | **1595** | 5 | 3.6 | 14 |
| **1440** | 0.83 | 2.2 | 19 | **1554** | 3 | 2.4 | 15 | **1596** | 5 | 3.6 | 11 |
| **1467** | 1 | 2.6 | 22 | **1555** | 3 | 2.7 | 15 | **1597** | 5 | 3.6 | 9 |
| **1468** | 1 | 2.4 | 22 | **1556** | 3 | 2.7 | 14 | **1598** | 5 | 3.6 | 11 |
| **1476** | 1 | 2.2 | 24 | **1557** | 3 | 2.7 | 16 | **1599** | 5 | 3.6 | 11 |
| **1478** | 1 | 2.4 | 30 | **1558** | 3 | 2.6 | 16 | **1600** | 5 | 3.6 | 14 |
| **1496** | 1 | 2.3 | 25 | **1559** | 3 | 2.6 | 15 | **1601** | 4.5 | 3.1 | 10 |
| **1497** | 1 | 2.3 | 27 | **1560** | 3 | 2.6 | 14 | **1602** | 5 | 3.6 | 10 |
| **1501** | 1 | 1.8 | 23 | **1561** | 3.5 | 2.8 | 16 | **1603** | 5 | 3.6 | 11 |
| **1502** | 1 | 1.8 | 27 | **1562** | 3.5 | 2.8 | 13 | **1604** | 5 | 3.5 | 11 |
| **1509** | 1 | 1.7 | 15 | **1563** | 4.42 | 3.1 | 15 | **1605** | 5 | 3.6 | 12 |
| **1510** | 1.17 | 2.0 | 20 | **1564** | 5.33 | 3.4 | 14 | **1606** | 5 | 3.6 | 12 |
| **1512** | 1 | 1.7 | 19 | **1565** | 5.33 | 2.8 | 14 | **1607** | 5 | 3.6 | 11 |
| **1513** | 1.33 | 2.1 | 23 | **1566** | 8 | 4.1 | 22 | **1608** | 5 | 3.0 | 11 |
| **1516** | 1.33 | 2.5 | 25 | **1567** | 8 | 3.9 | 19 | **1609** | 6 | 3.7 | 12 |
| **1517** | 1.33 | 2.2 | 20 | **1568** | 8 | 3.4 | 17 | **1610** | 6 | 3.7 | 11 |
| **1518** | 1.33 | 1.9 | 21 | **1569** | 9 | 3.2 | 17 | **1611** | 6 | 3.2 | 12 |
| **1519** | 1.33 | 1.9 | 16 | **1570** | 10 | 3.2 | 14 | **1612** | 6 | 3.2 | 11 |
| **1520** | 1.33 | 2.0 | 21 | **1571** | 11 | 2.7 | 11 | **1613** | 6 | 2.7 | 11 |
| **1521** | 1.33 | 1.4 | 14 | **1572** | 11 | 1.8 | 10 | **1614** | 6.25 | 3.2 | 10 |
| **1522** | 1.33 | 0.8 | 10 | **1573** | 12 | 1.5 | 8 | **1615** | 6.5 | 3.2 | 11 |
| **1523** | 2.25[i] | 1.0 | 11 | **1574** | 16 | 1.6 | 11 | **1616** | 7 | 3.4 | 12 |
| **1524** | 1 | 1.2 | 12 | **1575** | 21.33 | 2.4 | 15 | **1617** | 7 | 3.5 | 13 |
| **1525** | 1 | 1.4 | 12 | **1576** | 4 | 3.2 | 14 | **1618** | 7 | 3.4 | 11 |
| **1526** | 1 | 1.3 | 15 | **1577** | 4 | 3.0 | 15 | **1619** | 8 | 3.9 | 14 |
| **1529** | 1 | 1.1 | 11 | **1578** | 4 | 2.9 | 14 | **1620** | 8 | 3.9 | 16 |
| **1536** | 1 | 1.0 | 11 | **1579** | 4 | 3.0 | 14 | **1621** | 8 | 3.9 | 19 |
| **1537** | 1 | 1.1 | 11 | **1580** | 4 | 3.0 | 13 | **1622** | 8 | 3.9 | 16 |
| **1539** | 2 | 2.0 | 17 | **1581** | 4 | 3.0 | 14 | **1623** | 8 | 3.9 | 14 |
| **1540** | 2 | 1.7 | 17 | **1582** | 4 | 3.0 | 15 | **1624** | 8 | 3.9 | 14 |
| **1541** | 2.25 | 2.2 | 18 | **1583** | 4 | 3.0 | 15 | **1625** | 9 | 4.3 | 16 |
| **1542** | 2 | 2.1 | 14 | **1584** | 4 | 3.0 | 15 | **1626** | 9 | 4.1 | 14 |
| **1543** | 3 | 3.2 | 20 | **1585** | 4 | 3.0 | 14 | **1627** | 10 | 4.6 | 14 |
| **1544** | 3 | 2.7 | 19 | **1586** | 4 | 2.8 | 13 | **1628** | 12 | 4.0 | 12 |
| **1545** | 2.63 | 2.1 | 16 | **1587** | 4 | 2.8 | 13 | **1629** | 14 | 3.1 | 14 |
| **1546** | 2.25 | 1.8 | 16 | **1588** | 4 | 2.8 | 11 | **1630** | 18 | 3.7 | 13 |
| **1547** | 2.25 | 1.7 | 15 | **1589** | 4 | 2.8 | 12 | **1631** | 20 | 3.9 | 15 |
| **1548** | 2.5 | 2.0 | 16 | **1590** | 4 | 2.8 | 11 | **1632** | 16 | 3.4 | 13 |
| **1549** | 2.5 | 1.9 | 13 | **1591** | 4 | 2.7 | 11 | **1633** | 16 | 3.5 | 10 |
| **1550** | 3 | 2.5 | 15 | **1592** | 2 (8[i]) | 1.6 | 6 | **1634** | 16 | 3.9 | 11 |
| **1551** | 3 | 2.7 | 15 | **1593** | 2.75 (11[i]) | 2.0 | 7 | **1635** | 18 | 4.2 | 13 |

**Table A9.1 (cont.).** *Daily nominal wage (in öre 1365-1624, öre kopparmynt 1625-1776, skilling 1777-1788, and skilling riksgälds 1789-1850), daily wage in gram silver, and real wage 1365-1850 (1950=100).*

| Year | Nominal wage | Gram silver | Real wage | Year | Nominal wage | Gram silver | Real wage | Year | Nominal wage | Gram silver | Real wage |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1636** | 18 | 4.4 | 13 | **1679** | 32 | 3.7 | 13 | **1722** | 64 | 5.4 | 19 |
| **1637** | 18 | 4.3 | 13 | **1680** | 32 | 3.7 | 15 | **1723** | 48 | 4.2 | 15 |
| **1638** | 18 | 4.4 | 14 | **1681** | 32 | 4.1 | 16 | **1724** | 48 | 4.3 | 15 |
| **1639** | 18 | 3.9 | 13 | **1682** | 32 | 4.0 | 17 | **1725** | 48 | 4.5 | 15 |
| **1640** | 20 | 4.2 | 14 | **1683** | 32 | 4.0 | 17 | **1726** | 48 | 4.5 | 14 |
| **1641** | 20 | 4.2 | 12 | **1684** | 32 | 4.0 | 12 | **1727** | 48 | 4.3 | 14 |
| **1642** | 24 | 5.1 | 15 | **1685** | 32 | 4.0 | 16 | **1728** | 48 | 4.3 | 15 |
| **1643** | 24 | 5.1 | 15 | **1686** | 40 | 5.2 | 21 | **1729** | 48 | 4.3 | 16 |
| **1644** | 24 | 5.0 | 13 | **1687** | 40 | 5.1 | 20 | **1730** | 48 | 4.3 | 17 |
| **1645** | 24 | 4.7 | 15 | **1688** | 40 | 5.1 | 18 | **1731** | 48 | 4.3 | 18 |
| **1646** | 24 | 4.8 | 15 | **1689** | 40 | 5.1 | 19 | **1732** | 48 | 4.3 | 17 |
| **1647** | 25 | 5.3 | 16 | **1690** | 40 | 5.1 | 19 | **1733** | 48 | 4.3 | 16 |
| **1648** | 24 | 4.9 | 15 | **1691** | 40 | 5.1 | 20 | **1734** | 48 | 4.2 | 17 |
| **1649** | 24 | 4.7 | 13 | **1692** | 40 | 5.1 | 19 | **1735** | 48 | 4.2 | 16 |
| **1650** | 24 | 4.7 | 9 | **1693** | 40 | 5.1 | 13 | **1736** | 48 | 4.1 | 15 |
| **1651** | 22.4 | 4.4 | 11 | **1694** | 40 | 5.1 | 14 | **1737** | 48 | 4.2 | 17 |
| **1652** | 24 | 4.7 | 9 | **1695** | 40 | 5.1 | 19 | **1738** | 64 | 5.5 | 24 |
| **1653** | 26.88 | 5.3 | 17 | **1696** | 40 | 4.7 | 14 | **1739** | 64 | 5.5 | 22 |
| **1654** | 32 | 6.3 | 20 | **1697** | 40 | 4.6 | 12 | **1740** | 64 | 5.4 | 18 |
| **1655** | 32 | 6.2 | 19 | **1698** | 40 | 4.8 | 11 | **1741** | 64 | 5.4 | 17 |
| **1656** | 24 | 4.6 | 13 | **1699** | 40 | 5.1 | 14 | **1742** | 64 | 5.3 | 18 |
| **1657** | 24 | 4.5 | 12 | **1700** | 40 | 5.0 | 15 | **1743** | 68 | 5.5 | 20 |
| **1658** | 24 | 4.5 | 15 | **1701** | 40 | 5.1 | 17 | **1744** | 72 | 5.6 | 22 |
| **1659** | 24 | 4.3 | 12 | **1702** | 40 | 5.2 | 16 | **1745** | 64 | 5.0 | 17 |
| **1660** | 24 | 4.3 | 12 | **1703** | 40 | 4.8 | 16 | **1746** | 64 | 5.1 | 17 |
| **1661** | 24 | 4.2 | 10 | **1704** | 40 | 4.8 | 18 | **1747** | 64 | 4.6 | 16 |
| **1662** | 24 | 4.2 | 11 | **1705** | 40 | 4.8 | 17 | **1748** | 64 | 4.4 | 15 |
| **1663** | 24 | 4.1 | 10 | **1706** | 40 | 4.8 | 17 | **1749** | 64 | 4.4 | 16 |
| **1664** | 24 | 3.8 | 11 | **1707** | 40 | 4.8 | 14 | **1750** | 64 | 4.5 | 16 |
| **1665** | 24 | 3.6 | 10 | **1708** | 40 | 4.8 | 14 | **1751** | 64 | 4.9 | 16 |
| **1666** | 28 | 4.2 | 12 | **1709** | 40 | 4.8 | 10 | **1752** | 64 | 4.9 | 16 |
| **1667** | 28 | 4.2 | 12 | **1710** | 40 | 4.8 | 15 | **1753** | 64 | 5.1 | 16 |
| **1668** | 28 | 4.2 | 14 | **1711** | 40 | 4.9 | 16 | **1754** | 64 | 5.0 | 15 |
| **1669** | 28 | 4.2 | 13 | **1712** | 40 | 4.8 | 15 | **1755** | 64 | 5.0 | 14 |
| **1670** | 28 | 4.2 | 15 | **1713** | 40 | 4.8 | 16 | **1756** | 64 | 4.8 | 13 |
| **1671** | 28 | 4.2 | 15 | **1714** | 48 | 5.9 | 15 | **1757** | 64 | 4.6 | 12 |
| **1672** | 28 | 4.2 | 13 | **1715** | 48 | 6.1 | 16 | **1758** | 64 | 3.9 | 12 |
| **1673** | 28 | 4.2 | 14 | **1716** | 48 | 5.5 | 13 | **1759** | 68 | 3.8 | 13 |
| **1674** | 28 | 4.1 | 10 | **1717** | 48 | 4.0 | 9 | **1760** | 76 | 3.8 | 14 |
| **1675** | 28 | 3.8 | 10 | **1718** | 48 | 2.5 | 9 | **1761** | 80 | 3.6 | 13 |
| **1676** | 30 | 3.8 | 12 | **1719** | 80 | 6.2 | 12 | **1762** | 96 | 3.6 | 11 |
| **1677** | 32 | 3.9 | 11 | **1720** | 64 | 5.1 | 15 | **1763** | 88 | 3.2 | 9 |
| **1678** | 32 | 3.8 | 12 | **1721** | 72 | 6.2 | 18 | **1764** | 88 | 3.1 | 9 |

**Table A9.1 (cont.).** *Daily nominal wage (in öre 1365-1624, öre kopparmynt 1625-1776, skilling 1777-1788, and skilling riksgälds 1789-1850), daily wage in gram silver, and real wage 1365-1850 (1950=100).*

| Year | Nominal wage | Gram silver | Real wage | Year | Nominal wage | Gram silver | Real wage | Year | Gram silver | Real wage |
|---|---|---|---|---|---|---|---|---|---|---|
| **1765** | 96 | 3.5 | 10 | **1808** | 20 | 7.1 | 8 | **1851** | 7.6 | 15 |
| **1766** | 112 | 4.7 | 14 | **1809** | 20 | 5.5 | 8 | **1852** | 7.6 | 16 |
| **1767** | 112 | 6.0 | 17 | **1810** | 20 | 4.4 | 8 | **1853** | 7.6 | 14 |
| **1768** | 88 | 5.6 | 15 | **1811** | 24 | 3.7 | 8 | **1854** | 8.0 | 15 |
| **1769** | 88 | 4.7 | 15 | **1812** | 24 | 4.5 | 7 | **1855** | 8.0 | 13 |
| **1770** | 88 | 4.1 | 14 | **1813** | 33 | 6.2 | 10 | **1856** | 9.6 | 14 |
| **1771** | 88 | 4.2 | 11 | **1814** | 33 | 5.9 | 10 | **1857** | 9.6 | 15 |
| **1772** | 112 | 5.0 | 14 | **1815** | 33 | 5.3 | 11 | **1858** | 11.2 | 20 |
| **1773** | 112 | 4.4 | 15 | **1816** | 33 | 4.8 | 10 | **1859** | 11.2 | 20 |
| **1774** | 112 | 4.6 | 17 | **1817** | 33 | 5.1 | 10 | **1860** | 9.6 | 16 |
| **1775** | 96 | 4.3 | 12 | **1818** | 33 | 5.1 | 10 | **1861** | 9.6 | 15 |
| **1776** | 112 | 5.0 | 14 | **1819** | 33 | 4.5 | 10 | **1862** | 9.6 | 16 |
| **1777** | 9.33[ii] (112[iii]) | 5.0 | 14 | **1820** | 33 | 4.2 | 11 | **1863** | 9.6 | 17 |
| **1778** | 9.33 | 5.0 | 13 | **1821** | 30 | 4.1 | 10 | **1864** | 9.0 | 16 |
| **1779** | 9.33 | 5.0 | 13 | **1822** | 30 | 4.1 | 10 | **1865** | 9.7 | 18 |
| **1780** | 9.33 | 5.0 | 13 | **1823** | 37.5 | 5.1 | 14 | **1866** | 9.3 | 16 |
| **1781** | 9.33 | 5.0 | 13 | **1824** | 42 | 5.5 | 15 | **1867** | 9.7 | 15 |
| **1782** | 9.33 | 5.0 | 13 | **1825** | 49.5 | 6.7 | 17 | **1868** | 10.4 | 16 |
| **1783** | 9.33 | 5.0 | 12 | **1826** | 49.5 | 6.5 | 15 | **1869** | 11.0 | 19 |
| **1784** | 9.33 | 5.0 | 13 | **1827** | 49.5 | 6.1 | 16 | **1870** | 10.5 | 18 |
| **1785** | 9.33 | 5.0 | 12 | **1828** | 49.5 | 6.6 | 17 | **1871** | 10.8 | 18 |
| **1786** | 9.33 | 5.0 | 12 | **1829** | 54 | 7.4 | 18 | **1872** | 12.2 | 20 |
| **1787** | 9.33 | 5.0 | 13 | **1830** | 54 | 7.0 | 17 | **1873** | 13.0 | 19 |
| **1788** | 9.33 | 5.0 | 12 | **1831** | 51 | 6.1 | 15 | **1874** | 14.5 | 21 |
| **1789** | 9.33 | 4.9 | 12 | **1832** | 51 | 5.9 | 16 | **1875** | 15.0 | 21 |
| **1790** | 9.33 | 4.6 | 12 | **1833** | 54 | 6.3 | 17 | **1876** | 15.5 | 20 |
| **1791** | 9.33 | 4.5 | 12 | **1834** | 54 | 6.7 | 17 | **1877** | 15.5 | 21 |
| **1792** | 9.33 | 4.5 | 11 | **1835** | 54 | 7.2 | 17 | **1878** | 15.4 | 22 |
| **1793** | 9.33 | 4.5 | 11 | **1836** | 54 | 7.2 | 16 | **1879** | 14.7 | 22 |
| **1794** | 10.67 | 4.7 | 11 | **1837** | 54 | 7.2 | 16 | **1880** | 15.2 | 22 |
| **1795** | 10.67 | 5.1 | 10 | **1838** | 54 | 7.2 | 15 | **1881** | 16.1 | 22 |
| **1796** | 10.67 | 5.2 | 10 | **1839** | 54 | 7.2 | 16 | **1882** | 16.6 | 23 |
| **1797** | 10.67 | 5.2 | 10 | **1840** | 54 | 7.2 | 16 | **1883** | 17.0 | 23 |
| **1798** | 10.67 | 4.7 | 9 | **1841** | 54 | 7.2 | 15 | **1884** | 17.2 | 25 |
| **1799** | 10.67 | 4.0 | 8 | **1842** | 54 | 7.2 | 15 | **1885** | 17.8 | 26 |
| **1800** | 10.67 | 4.0 | 7 | **1843** | 54 | 7.2 | 16 | **1886** | 18.6 | 27 |
| **1801** | 10.67 | 3.8 | 7 | **1844** | 54 | 7.2 | 17 | **1887** | 18.9 | 28 |
| **1802** | 10.67 | 3.8 | 7 | **1845** | 54 | 7.2 | 16 | **1888** | 20.2 | 27 |
| **1803** | 12 | 4.3 | 8 | **1846** | 54 | 7.2 | 15 | **1889** | 21.5 | 28 |
| **1804** | 16 | 5.7 | 10 | **1847** | 54 | 7.2 | 15 | **1890** | 19.7 | 28 |
| **1805** | 16 | 5.7 | 10 | **1848** | 54 | 7.2 | 16 | **1891** | 21.2 | 27 |
| **1806** | 16 | 5.7 | 9 | **1849** | 54 | 7.2 | 16 | **1892** | 24.3 | 29 |
| **1807** | 16 | 5.7 | 9 | **1850** | 57 | 7.6 | 16 | **1893** | 27.9 | 30 |

**Table A9.1 (cont.).** *Daily nominal wage (in öre 1365-1624, öre kopparmynt 1625-1776, skilling 1777-1788, and skilling riksgälds 1789-1850), daily wage in gram silver, and real wage 1365-1850 (1950=100).*

| Year | Gram silver | Real wage | Year | Real wage | Year | Real wage |
|---|---|---|---|---|---|---|
| **1894** | 34.6 | 32 | **1915** | 39 | **1936** | 71 |
| **1895** | 34.0 | 32 | **1916** | 38 | **1937** | 72 |
| **1896** | 34.1 | 33 | **1917** | 38 | **1938** | 74 |
| **1897** | 40.0 | 33 | **1918** | 37 | **1939** | 74 |
| **1898** | 43.4 | 34 | **1919** | 45 | **1940** | 71 |
| **1899** | 44.4 | 34 | **1920** | 55 | **1941** | 67 |
| **1900** | 45.0 | 34 | **1921** | 67 | **1942** | 69 |
| **1901** | 46.8 | 35 | **1922** | 58 | **1943** | 72 |
| **1902** | 53.9 | 35 | **1923** | 59 | **1944** | 74 |
| **1903** | 53.0 | 36 | **1924** | 60 | **1945** | 78 |
| **1904** | 51.4 | 37 | **1925** | 61 | **1946** | 83 |
| **1905** | 50.3 | 37 | **1926** | 64 | **1947** | 93 |
| **1906** | 47.7 | 38 | **1927** | 64 | **1948** | 95 |
| **1907** | 51.6 | 38 | **1928** | 65 | **1949** | 98 |
| **1908** | 65.4 | 38 | **1929** | 67 | **1950** | 100 |
| **1909** | 69.0 | 40 | **1930** | 70 | | |
| **1910** | 69.4 | 42 | **1931** | 72 | | |
| **1911** | 70.7 | 42 | **1932** | 71 | | |
| **1912** | 64.4 | 41 | **1933** | 72 | | |
| **1913** | 66.7 | 42 | **1934** | 72 | | |
| **1914** | 74.7 | 43 | **1935** | 71 | | |

[i] In klipping coins.

[ii] In skilling.

[iii] In öre kopparmynt. 1 daler kopparmynt (in 1625-1777) = 32 öre kopparmynt.

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# 10.
# Nominal and real wages of manufacturing workers, 1860–2007

**Svante Prado**

## 10.1. Introduction

The nominal wage represents the marginal return to a unit of labour input.[1] The rise or fall in nominal wages is one of the most central aspects of an economy in which competitive labour markets determine the price of manpower. In addition, the movement of nominal wages, deflated by a cost-of-living index, indicates progress or decline in living standards, the most important by-product of economic growth.[2] Throughout most of the pre-modern era, and also in many of today's less developed countries, the ratio between wages and prices has failed to remain on a long-term upward track, preventing workers from gaining sustainable increases in the purchasing power of goods and services. It is only during the era of modern economic growth that expectations of perpetual rises in real wages have been fulfilled. From our vantage point, workers have gained enormously since the onset of sustainable increases in income per capita in the mid-19th century. Since 1860, real wages of male manufacturing workers have on average increased 2.25 per cent annually, implying that purchasing power thus measured has increased by a factor of 26. Workers have gained access to an almost infinite variety of goods and services. Of course, they have also enjoyed shorter working hours per week, longer holidays and decreased years of work over the lifetime, as well as improved working conditions and greater security

1 The author would like to acknowledge Daniel Waldenström, Christer Lundh, Jan Bohlin, Oskar Broberg, Rodney Edvinsson, Lars Svensson, Jonatan Svanlund, Johan Söderberg, Stefan Öberg, Martin Fritz and Erik Bengtsson for helpful suggestions. Any remaining errors rest with the author.

2 There are various objections to using the growth of real hourly earnings as a measure of changing living standards. To address issues of material living standards, annual household earnings, or annual disposable incomes, would be a better indicator of material well-being. Furthermore, these real hourly earnings exclude payroll taxes, the significance of which increased notably in the latter half of the twentieth century.

in the face of unemployment and sickness. Still, the importance of real wages as a manifestation of the material benefits of economic growth serves to justify the close attention social scientists devote to the measurement of nominal wages.[3]

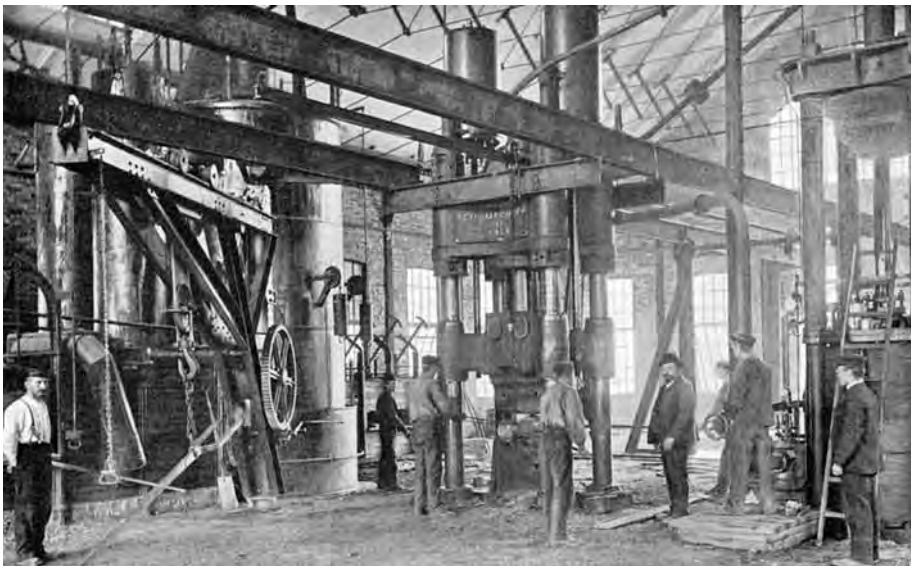
The purpose of this chapter is to document series of nominal and real wages of male and female manufacturing workers in 1860–2007.[4] An attempt is made to construct nine wage series for groups of industries and an overall average series for manufacturing as a whole, spanning the era in its entirety and circumventing the constraint imposed by inter-temporal inconsistency in the classification of industry. The first half of the chapter deals with the nature, sources and definitions of the historical wage sources available, with particular attention to the different wage sources before and after 1913. The second half contains a discussion of the results, with respect to growth rates of male real wages and the evolutions of the female-to-male wage gap and inter-industry wage differentials.

## 10.2. Quality of labour

Needless to say, employers have altered minimum hiring standards many a time since 1860. This project shares with all historical wage studies the intention of establishing wage series with as high a degree of inter-temporal consistency as possible in the qualifications demanded of the workers. Commonly, attempts to document long-term series for wages seek to trace the evolution of wages for an unchanged professional characteristic, like unskilled, manual or plain labourer. The idea is that it is possible to trace the nominal price of a particular kind of labour service, the essential feature of which, despite the many far-reaching implications of technological development, has remained fairly unchanged over time. It is also sometimes suggested that this kind of labour service commands no industry-specific formal skill or requires little or no on-the-job training. Therefore unskilled workers are subjected to

3 Scholliers (1989) is an excellent introduction to the significant role which the measurement and interpretation of real wages have played in the historiography of economic history. In brief, whereas an older tradition used real wages as an indicator of the evolution of living standard, most importantly in the discussions of the British industrial revolution, modern approaches also use nominal and real wages to address issues of, for instance, divergence and convergence between sectors, regions and countries and various aspects of income distributions.

4 Research on the long-term evolution of wages by sectors in Sweden is relatively scarce. An early example is Bagge, Lundberg and Svennilson (1933, 1935), who constructed 7 industry-specific wage series based on archival research and wage series of agriculture and municipal workers spanning 1860–1913. Other works include Jungenfelt (1959, 1966), who constructed annual wage series covering the period 1870–1950 and all major sectors of the economy; Jörberg's (1972) magisterial volumes of prices, which contain wage series for day workers in agriculture based on market price scales in 1732–1914; Björklund and Stenlund (1995), who presented annual wages for 6 manufacturing industries in 1870–1950; Svensson (1995), who explored the female-to-male wage gap in 1913–90 on the basis of wage data from the official statistics for 11 manufacturing industries; and Ljungberg (2004), who has compiled series of earnings of graduate and college engineers in 1867–2002 to study educational pay-off.



*The Kohlswa ironworks in 1900.*
Source: http://commons.wikimedia.org/wiki/File:Kohlswa_jernverk.jpg.

similar forces of demand and supply in the labour market which do not derive from industry-specific developments of new technologies.[5]

Before the proportion of manufacturing industries reached significant importance in the economy, typical workers labelled unskilled were mostly found in the construction sector, for instance helpers in the building trade or unskilled road and canal construction workers.[6] In the initial stages of industrialisation it is perhaps doubtful whether unskilled workers were a common category of labour since most manufacturing industries were small-scaled and relied on handicraft-based technologies; they were what Kenneth Sokoloff tellingly referred to as artisanal shops.[7] For instance, in the Swedish mechanical engineering industry at the beginning of the 20th century, only 13 per cent were helpers and 83 per cent were workers with a specific profession (the rest were supervisors and apprentices).[8] Other industries, for instance the sawmill industry and iron and steel works,[9] employed a mass of helpers and transport

5 Williamson (1995).
6 The most classic example of long-term series of construction workers is that of Phelps Brown and Hopkins (1955, 1956). A more recent one is Allen (2001). For Sweden, see Johan Söderberg's contribution in Chapter 9 of this volume.
7 Sokoloff (1984).
8 Lundh Nilsson (2007, p. 96).
9 Monthlies, Utterström and Söderlund (1959) provide insights into the type of labour that iron works needed; for the labour service performed at the sawmill industry, see Gustafsson (1965) and Cornell (1982).

workers, but unskilled workers probably did no become preponderant in manufacturing industries before the mass production technologies in the 20th century.[10] The Social Board's official wage statistics, which came into being in 1913, do not mention a specific occupational category like common labour or unskilled labour. They simply distinguish between workers on the one hand and technical personnel (engineers, chemists, and supervisors), administrative staff and shop assistants on the other. Thus the label worker is very heterogeneous. Statistical agencies in the 20th century have in general not responded to economic historians' infatuation with the prefix unskilled.[11] It is a great paradox that whereas the rise of mass production technologies in the 20th century turned the manufacturing industry into a large employer of the typical unskilled worker, the label unskilled fell out of favour among statistical agencies. When the 20th century drew to a close, and the forces of technical development and capital accumulation served to contract the labour force in manufacturing industries, the share of unskilled workers started to decline. Perhaps the market service sectors, some of which are characterised by a multiplicity of quite monotonous labour services, have instead become the most important employer of unskilled workers.

## 10.3. Historical wage sources

Today's researchers with a keen eye on the historical dimensions of wages depend crucially on past generations' concern with the detailed documentation and compilation of wage records. Various possible wage sources are at our disposal, which makes the enterprise to patch some or all of them together, to capture as long a time span of history as possible, particularly challenging. Sweden is known for its rich source of statistical material from earlier times, for instance a census from 1749 and annual publications of industrial statistics from the mid-19th century. With wage statistics one is however inclined to take a less benign view on the supply of useful source material, in particular for the 19th century. For instance, we have nothing that at all closely resembles the Norwegian *Wedervang's Arkiv*, which supplies a wealth of wage quotations back to the mid-18th century.[12] We also lack the type of government surveys which were conducted in the US post-bellum years, the so-called Weeks and Aldrich reports,[13] or the wage material which A. L. Bowley and G.H. Wood used to compile their pioneering index of average earnings in the UK during the 19th centu-

10 Goldin and Katz (1998) argue along a somewhat different line. Their model, supported by historical evidence from the early 20th century, predicts that the increase in the relative demand for skilled labour was associated with the technological shifts from factories to continuous-process and batch methods, and from steam and water power to electricity. The use of modern technology reduced the need for unskilled workers and increased the proportion of white-collar workers.

11 David and Sollar (1977).

12 Grytten (2007).

13 Margo (2006).

*The AGA factory in Lidingö, outside Stockholm, in 1915.*
Source: http://commons.wikimedia.org/wiki/File:AGA_Fabrik_1910.jpg

ry.[14] The scarceness of wage data may be one explanation for the faint interest which Swedish economic historians have taken in the evolution of wages during the era of industrialisation before the First World War.[15]

In relation to the US and the UK, the overwhelmingly agrarian nature of the Swedish economy in the latter half of the 19th century may explain the low priority Swedish authorities gave to the systematic collection and presentation of wages in sectors other than agriculture. Action was taken only when the first major labour conflicts occurred around the turn of the century, posing a threat to the social order. A series of investigations into working conditions and wage remunerations in manufacturing industries paved the way for the establishment of the Social Board's official wage statistics in 1913. Our knowledge of wage movements before the First World

14 Feinstein (1990).

15 In contrast, the list of works on the historical evolution of real wages for American manufacturing workers is lengthy. Three well-known books are Douglas (1930); de Long (1960) and Rees (1961). In the British case, the most cited works have focused on the development of wages during the industrial revolution and the 19th century, for instance Hobsbawm (1957), Hartwell (1961), Lindert and Williamson (1983) and Feinstein (1998).

War relies instead on the large-scale project *Wages in Sweden*, which presents the results of a major research programme intended to trace the evolution of nominal and real wages.[16] The presentation of the sources and methods used to construct the present series of Swedish wages thus falls into two parts. The first covers 1860–1913 and deals with *Wages in Sweden*, and the second covers 1913–2007, coinciding with the publication of official wage statistics.

### 10.3.1. Wages in Sweden, 1860–1913

It may be useful to distinguish between wage rates and earnings, although the boundary between them is frequently blurred. Many historical studies, including the present one, are forced to depend on a mixture of these two types of measure. Wage rate is the stipulated return for a given time unit of labour input, usually hourly or daily for blue-collar workers and monthly for white-collar workers. It excludes payment for overtime work, premiums, bonuses and other forms of payment by result, as well as payment in kind. Studies intending to establish the movement of wage rates and capture a lengthy time span rely ultimately on firm records that show the stipulated wage rate, or on wage rates established by labour unions. Earnings is a more inclusive measure which incorporates the effects of changes in the composition of the labour force between industries and of changes within each industry by age, sex, skill and region. It also allows for the effect of payments for overtime work, and for premiums, bonuses and other forms of payment by result as well as any rise in hourly rates paid to compensate for a reduction in standard hours worked. Dividing the wage bill by the number of working hours gives a measure of average hourly earnings.

In the 1920s, Gösta Bagge, at the Institute for Social Sciences at Stockholm University, launched a large-scale project with the explicit intention of tracing the evolution of wages, cost of living and national income for Sweden between 1860 and 1930.[17] Two of the final five volumes which were published in the 1930s deal with wages, the first in the manufacturing and mining sectors and the second in the municipal service sectors and the agriculture and forestry sectors.

Weak unionisation in Swedish manufacturing industries pre-1900 precluded the authors of *Wages in Sweden* from using union wage rates. Instead they relied on wage rates paid to individual workers based on information from about 100 firms whose payrolls had been preserved. The method used to construct wage series for 1860–1913 can be described as a four-stage procedure:[18] First, collect payrolls from firms whose wage records had survived. Second, select workers from a few representative occupations in each firm. One of the selection criteria was that the worker's employment exceeded 11 months, thus excluding temporary workers. A worker's wage was recorded for no more than 5–10 years, thereby eliminating the influence of age on

16 Bagge, Lundberg and Svennilson (1933, 1935).

17 Carlsson (1982) gives all the fascinating details about the whole project.

18 Bagge, Lundberg and Svenningson (1933, pp. 15–46).

wage movements. Payment in kind, although a more important component in the latter half of the 19th century than it is today, was generally omitted.[19] The most important benefit was access to free housing. The authors discussed the matter at length yet approached it ambiguously. In most instances the value of free housing was not incorporated into earnings. In other cases, when some workers received a cash allowance for rent while others had free housing, the value of free housing was included. Third, compute wage averages for each firm. Fourth, combine the different firm-specific wage series to form industry-specific series, with weights based on the quality of the series, the size of the firm and the relative importance of the industry.

The method described above is sometimes called kinetic since it tracks the *movement* of wages better than it establishes the average wage *level* of all workers in a particular industry, a methodology which is attributed to A. L. Bowley.[20] Cross-sections were therefore used to compare the wage levels of the selected workers in relation to the average level of all workers in a particular concern. These cross-sections were made for 1865, 1885 and 1905 and it was found that in most cases the wage level of the selected workers was on average five per cent higher than the average of all workers. In addition, the authors considered the problems of heterogeneity with respect to age, gender and professional qualifications. Today we stand to benefit greatly from that careful consideration because it made possible the documentation of homogeneous professional characteristics. For most of the industries there are separate series for skilled, in a few cases also semi-skilled, and unskilled workers. Furthermore, the industry-specific wage series exclude the potential influence of changes in the composition of the labour force. The disadvantages concern, for instance, the low coverage and the equivocal approach to benefits in kind. It is also doubtful whether these wage levels can be used to address issues of standards of living since they do not reflect the levels of income which workers had at their disposal.

The wage data for manufacturing represent the most comprehensive part of the project. The authors documented 7 industry-specific wage series in the main section of the volume, while the appendix contains the original wage data from the firm records. Besides these 7 manufacturing industries there are wage series for sugar industries and railway workers. In relation to the 9 industries included in the present chapter, *Wages in Sweden* does not provide wage series for the quarrying industry and the chemical industry. Based on the wage material presented in their monographs section, I have attempted to establish wage series for these industries, though undeniably these two series rest on a more tenuous empirical foundation. For female workers there are two industry-specific wage series, textiles and food, but no aggregate series.

19 The value of food allowance made up a minor value relative to the cash wage in most industries. The major exception to this rule is the payment system of the iron works where the values of benefits in kind and free housing were significant and therefore included in the estimate of hourly and annual earnings (Bagge, Lundberg and Svennilson 1933, pp. 85–90).

20 Bowley (1895).

**Table 10.1.** *Wage series for 1860–1913 from* Wages in Sweden *used in the present study*

| | Wage | First observation |
|---|---|---|
| | **Male workers** | |
| Mining | annual | 1860 |
| Metal | hourly | 1860 |
| Engineering | hourly | 1860 |
| Quarrying | hourly, daily | 1868 |
| Wood | hourly | 1870 |
| Paper | hourly | 1860 |
| Food | hourly | 1861 |
| Textile | hourly | 1865 |
| Chemical | hourly, daily, annual | 1871 |
| | **Female workers** | |
| Food | hourly | 1888 |
| Textile | hourly | 1865 |

**Table 10.2.** *Average annual growth rates (per cent) of nominal wages in the manufacturing industry, 1868–1913*

| | Wage | Sawmills included | Sawmills excluded |
|---|---|---|---|
| New series | hourly | 1.6 | 2.0 |
| Bagge, Lundberg and Svennilson | hourly | 2.2 | |
| Bagge, Lundberg and Svennilson | annual | 1.9 | |

Sources: Bagge, Lundberg and Svennilson (1933 table 26); new series: Appendix, table A10.1.

What do we know about the reliability of the wage evidence presented in *Wages in Sweden*? Admittedly, not all that much. Bo Gustafsson has shown that there are problems with the wage series of sawmill workers in 1890–1913. Based on an investigation into the movement of wages for sawmill workers in Norrland 1896–1913, he argued that the sawmill series in *Wages in Sweden* shows too little progress and that the wage levels are too high. He has also raised concerns about the omission of temporary workers.[21] Others have criticised the methodology and the wage data for workers in the match industry.[22] The present author has cast some doubt on the weighting scheme applied in *Wages in Sweden*.[23] The lack of transparency in the description of how the different wage series were combined into an aggregate measure makes it difficult to replicate the result. Lennart Schön has raised the level of gross output for several industries, including sawmills, within the context of Swedish Historical National Accounts.[24] We therefore have reasons to suspect that weighting

21 Gustafsson (1965).
22 Berglund (1982).
23 Prado (2008a).
24 Schön (1988).

with respect to these higher levels of gross output, and thereby employment, will modify the series of average wages for manufacturing workers in *Wages in Sweden*. Weighting the industry-specific series to allow for the large number of workers employed in the sawmill industry lowers the estimated growth rate of the new series of wages for manufacturing as a whole before 1890 compared to the aggregate series in *Wages in Sweden*, as Table 10.2 shows.[25] The reason is the sluggish growth of sawmill workers' wages, which rose steeply in the wake of booming conditions in world markets for sawmill products in the first half of the 1870s but collapsed when the boom turned to bust in the second half of that decade. In fact, sawmill workers' wages did not resume a sustained upward course like that of manufacturing until the beginning of the 1890s. Thus, the aggregate series of manufacturing wages offered here shows slower progress than the corresponding series in *Wages in Sweden*.

### 10.3.2. The official wage statistics, 1913–2007

Apart from the wage statistics for day-workers in agriculture that were reported in the Swedish Agricultural Statistics, the first official attempt to document wage conditions covered the manufacturing sector. This was because the first far-reaching labour conflicts in Sweden occurred among industrial workers. The authorities felt a pressing need for more information on labour and wage conditions in several manufacturing industries. Therefore, in 1899–1909 the Board of Trade (*Kommerskollegium*) undertook a number of special investigations into the following industries: bakeries, tobacco industry, mechanical engineering and book printing. The methodology of these investigations conformed to a resolution passed by the International Statistical Institute requiring wage statistics to be based on individual wage data. To meet that requirement, each wage survey was directed at a single industry in a particular year, which limited the possible number of industries and years to be investigated.[26] However, the inflationary conditions in the aftermath of the First World War, when money wages first rose dramatically and then plummeted in the ensuing deflation, required that wage statistics be published annually. Otherwise they would be outdated and of limited use by the time they saw the light of day.[27]

To render an annual publication possible, several modifications, in practice simplifications, were necessary. As with most official wage statistics, the method used by the Social Board from 1913 onwards was designed to provide a measure of average hourly earnings, thus fundamentally different from the attempt made in *Wages in*

25 The computed growth rate in Prado (2008a p. 57) is slightly different from the growth rate reported in Table 10.2 because the constituent series are not identical and have different weights. However, the difference between a series with sawmills included and one with them excluded remains.

26 A recent doctoral dissertation, Lundh Nilsson (2007), is based on the investigation of wages in the mechanical engineering industry.

27 SOU (1931).

*Sweden* to provide a more specific and homogeneous measure of wages. The Social Board collected data by requesting firms to provide information on wages and other closely related issues in surveys. It extracted from a single firm the total sum paid out as wages during one year and divided this sum by the number of working hours, days or workers (the average number of workers on a number of pay-days, for instance once a week). Thus, in their final shape, the official wage statistics concealed firm-specific wage information. In this way the Social Board tackled the reluctance of many employers to submit detailed information about wages.

There are three types of hourly wage, labelled *a*, *b* and *c*. Categories *a* and *b* represent payment for regular working hours, where *a* stands for time wages and *b* piece wages; piece wages are generally higher. Label *c* is the total wage sum paid out divided by the number of working hours. The wage sum includes all kinds of payment, whether piece wages, time wages, benefits in kind, holiday pay or overtime. In their own publications, the Social Board and Statistics Sweden use the *c*-wage to illustrate movements of hourly earnings over time. It is the most satisfactory available measure of average hourly earnings and is used in the present study. However, it is not accessible throughout the period; after 1992 Statistics Sweden provides only wage data that exclude overtime pay, which lowers their reported wage levels by around twenty per cent.

Bagge, Lundberg and Svennilson levelled damning criticism at the way the official wage statistics were constructed.[28] A series of earnings so constructed makes no distinction between factors which change the composition of the work force, apart from holding constant for the impact of females, males and the under-age, for which the official wage statistics provided separate information. The inherent problem with this method, as the authors correctly pointed out, is that a change in the computed average may be caused by a number of factors other than changing wage rates. For instance, if the proportions of skilled and unskilled workers change in favour of skilled workers, the increase in the average wage mirrors not only changing wage rates but also the compositional effect of higher wages for skilled workers. Likewise, if the average age of the working population in a specific firm increases, so will the measure of average earnings. Further problems include the proportions of full- and part-time workers. A substantial proportion of temporary workers will drive a wedge between the measures of average annual and hourly earnings. In many cases the actual number of employed workers is higher than the average number of workers given by the statistics, which leads to too high an estimate of annual income per worker. This is especially problematic in industries with pronounced seasonal characteristics or those employing casual labour. The method does not, however, cause any problems with the number of hours, which means that in the official statistics hourly wages are more useful than annual.

Even though Bagge, Lundberg and Svennilson painted the method of the official statistics in rather derogatory colours, they acknowledged the statistics' usefulness for

28 Bagge, Lundberg and Svennilson (1933, pp. 243–7).

indicating wage movements post-1913. In their final index, the official post-1913 series is linked to their pre-1913 series to provide a wage series covering the entire era 1860–1930. They also admitted that the official statistics covered a much broader segment of the manufacturing sector. In 1930, it encompassed 67 per cent of the industries, and while that share admittedly was smaller in 1913, it rose in the course of the 20th century to include the lion's share of all firms.

The years before 1921 represent the most serious lacuna in the official statistics. It is sometimes wrongly asserted that the Social Board began to publish wage statistics annually in 1913, whereas in fact it did not do so until 1919. In 1918 the Social Board requested firms to report wages not only for that year but also for 1913–17. This wage material is less complete, and less reliable, than for post-1919 years, and there are no wage data for 1914 and 1915. Besides, no information on average hourly wages was given between 1913 and 1920. Later on, the Social Board estimated hourly wage series for male and female workers for manufacturing as a whole on the basis of information on working hours, but the gap in our knowledge as to the evolution of hourly wages in different industries still exists. There are two ways out of this dilemma, neither of them very satisfactory. One is to extrapolate backwards from 1920 to 1913 by drawing on the series of daily wages. However, the substantial reduction of working hours in the two years preceding the Hours of Labour Act in 1920 makes daily wages a bad indicator of hourly wages. The rate at which reductions took place varied widely by type of activity and location, making it difficult to ascertain the movement of hourly wages for different industries. And there are still gaps in 1914 and 1915. The other way out involves filling the gap with the Social Board's aggregate hourly wage series, a solution which gives the misleading impression that all industries grew in tandem. The preferred solution here is to leave out all industry-specific wage series 1913–21.

The labels for the nine different manufacturing industries are conditioned by a classification scheme called SNI 92,[29] which was put into practice in 1993.[30] Some of the major changes which SNI 92 brought about cannot be dealt with satisfactorily; for instance, wood industries do not include furniture after 1993. Similar breaks have occurred in 1952 and 1971. Frequent changes in classification schemes pose a challenge to the very idea of establishing long-term wage series for different industries. In the coming section an attempt is therefore made to deal with inter-temporal inconsistencies.

## 10.4. Aggregation

Constructing wage series spanning the most recent one-and-a-half centuries encounters major difficulties and many potential pitfalls. Few industries have been classified

29 Svensk näringslivsindelning.

30 SNI 92 became SNI 2002 but that involved only minor modifications.

*A mass meeting in Stockholm during the general strike in 1909.*
Source: http://sv.wikipedia.org/wiki/Fil:Storstrejk.jpg.

in the same manner throughout the entire era. Industries like metal and engineering, whose product varieties defy efforts to capture their nature by labels, are difficult per se, whereas other difficulties arise mostly because of breaks in classifications. Another closely related problem is the effects of economic growth and technical development on the evolution of skill requirements (human capital), the tasks workers are set to carry out and labour's working conditions more generally. All this has of course changed a lot since 1860. The only thing a worker in the wood industry in 2007 has in common with his peer 150 years earlier is probably the material (wood) that is being processed.

To deal with inter-temporal inconsistencies in the definition of industries and the different sources and methodologies used before and after 1913, indices of average hourly earnings for nine industries are compiled with no attention paid to the actual wage levels in different industries. Still, the construction of an aggregate measure requires allowance for these wage levels because an important part of the movement in average hourly earnings may be due to the changing proportions of low and high wage occupations. Modern economic growth often entails the expansion of dynamic industries whose wage levels exceed those of industries sliding into decline. The approach used in the present study is therefore designed to provide an estimate of levels of average hourly earnings in nine industries, with indices of hourly earnings in

each industry scaled proportionally to the actual hourly wages in a reference year, as in (1), where the wage levels for each industry in 1950, $W_{i,1950}$, are multiplied by all the years in each industry's wage index.

$$\text{Estimated wage levels} = index_{i,t}^{w} * W_{i,1950} \quad (1)$$

The wage levels thus constructed comply with the official wage statistics between 1913 and 1992. They also track *Wages in Sweden*'s pre-1913 estimated wage levels very well; the difference is on average less than one per cent in 1880–1913. Before 1880 the gap expands because the new series grows more slowly. From 1992 onwards the wage levels of the new series are, however, higher than Statistics Sweden's because the latter exclude overtime pay. Whereas interpretations of actual wage levels extending further back in history admittedly call for great caution, these series of wage levels at least allow the computation of inter-industry and gender pay ratios on the one hand, and permit the computation of proper index numbers on the other.

The next step is to come up with the corresponding numbers of workers for the nine industries for which hourly wage levels have been estimated. That requires data for employment which tally with the classification of the nine wage series. This requirement is only party met; for instance, the Swedish Industrial Statistics started using SNI 69 in 1969, while the official wage statistics did not apply it until 1972. A more severe shortcoming concerns the ways in which employment figures have been obtained for different sub-periods. The Swedish Industrial Statistics pre-1913 suffer from insufficient coverage and cannot therefore be used as a source of employment. Alternative employment series are used instead.[31] Another major change in the way employment was recorded occurred in 1989, and employment weights had to be derived elsewhere. AKU,[32] which is based on household surveys about people's current employment, was used as an indicator of employment trends between 1986 and 1992; from then on employment figures from RAMS[33] were used. From the perspective of the present study, the different sources suffer from inter-temporal variations in reported levels of number of workers, which render necessary a solution similar to (1). Thus, indices of employment were compiled and scaled proportionally to the actual number of workers in 1950. That gives industry-specific series of estimated employment for the entire era. The employment series are only intended to measure the changing proportions of employment between different industries. They are not designed to provide a measure of the actual number of people employed. In the appendix, they appear as employment shares, not as absolute numbers.

31 The unpublished, industry-specific employment series underlying the aggregate series of employment in manufacturing in Prado (2008a p. 194) have been used. To make these new employment series comparable to the Swedish Industrial Statistics' post-1913 series, they incorporate Schön's (1988) estimated number of handicraft workers.

32 *Arbetskraftsundersökning* (labour force surveys).

33 *Registerbaserad arbetsmarknadsstatistik* (register-based labour market statistics).

$$\text{An index of average hourly earnings} = \frac{\sum_{i=1}^{n} W_{i,t} N_{i,t}}{\sum_{i=1}^{n} N_{i,t}} \Bigg/ \frac{\sum_{i=1}^{n} W_{i,r} N_{i,r}}{\sum_{i=1}^{n} N_{i,r}} \qquad (2)$$

Equipped with series of wage and employment levels annually, a series of weighted means can be straightforwardly computed, in the form of either levels or an index, as in (2), where *r* stands for reference year. This series of wages incorporates the effects of inter-industry growth rates and shifts in employment structure but does not satisfy the properties of an index number because the choice of reference year does not affect the estimated annual growth rate. It cannot tell us whether structural transformation contributed to the rise in average earnings. To do that, the series needs to be decomposed into two proper index numbers, one showing intra-occupational wage movements, a Laspeyres index (3), and the other inter-occupational structural shifts, a Paasche index (4).[34]

$$\text{Laspeyres index numbers} = \frac{\sum_{i=1}^{n} W_{i,t} N_{i,b}}{\sum_{i=1}^{n} W_{i,b} N_{i,b}} \qquad (3)$$

$$\text{Paasche index numbers} = \frac{\sum_{i=1}^{n} W_{i,t} N_{i,t}}{\sum_{i=1}^{n} W_{i,t} N_{i,b}} \times \frac{\sum_{i=1}^{n} N_{i,b}}{\sum_{i=1}^{n} N_{i,t}} \qquad (4)$$

Now the chosen base year (*b*) will affect the movement of the series. A Laspeyres index number measures the way wages would have changed if the sectoral structure had remained the same as in the base year. Two Laspeyres index numbers can be computed, one with the first and the other with the last year as base year, to gain at least a brief understanding of the extent to which the structure influenced the average annual growth rate. The computation of these two index figures reveals that the choice of early or late base year has a negligible affect on the estimated annual growth rate: the difference is 0.02 percentage points. Further evidence of the insignificance of inter-occupational structural shifts for the estimated growth rates is that the Paasche index remains essentially flat.

In fact, over such a long period the insignificance of weighting is an expected result. The effect of the intra-industry growth rates dwarfs the potential impact of the employment structure on the movement of the series of weighted means. Differ-

34 Dividing (2) by (3) gives (4).

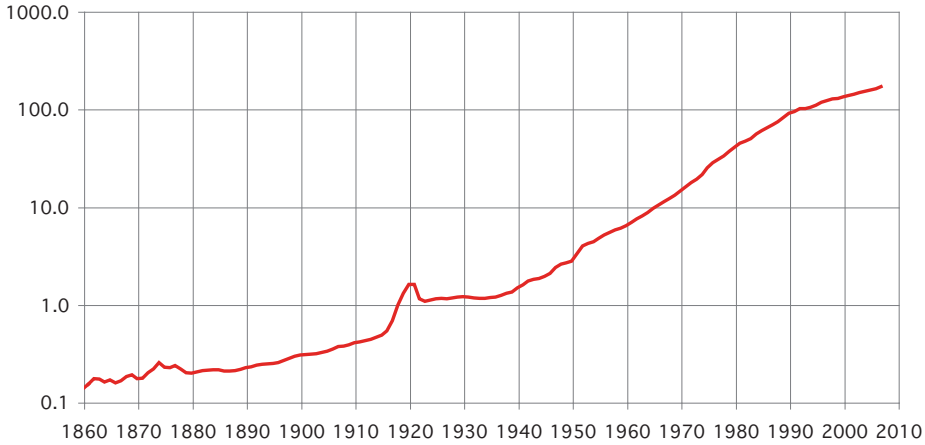
ent weighting schemes will only exert an influence on a series of means if the constituent components grow at significantly varying rates, and/or there are very large inter-industry wage gaps. Intra-industry growth rates do sometimes diverge over short time spans, as testified by the previously discussed example of the sawmill industry in 1870–90, but in the long run it is not entirely likely that wages in any industry will either race ahead perpetually or notoriously lag behind. Competitive forces and movements of labour tend to keep the band within which rates of wage growth range quite narrow. In addition, the influence of labour unions through centralized bargaining contributes to even out the variability in inter-industry growth rates of wages. The weights employed affect the estimated growth rate of the aggregate for the more volatile pre-1913 era, when there were frequent shifts in intra-industry growth rates. The importance of weighting diminishes gradually in the interwar years, and disappears altogether after the Second World War, when wage progress was notably uniform. Furthermore, the chosen weights have an impact on the movement of the series comprising both female and male wages, because female wages outgrew male in the 20th century at the same time as the share of female workers increased.

## 10.5. Long-term evidence of nominal and real wages

The series of hourly wages for male manufacturing workers offers the most consistent evidence of the evolution of nominal wages for the era in its entirety. The long-term, quite steep, upward movement of nominal wages depicted in Figure 10.1 is an expected result because, first, the investigated period coincides with the onset of modern economic growth in Sweden, and second, nominal wages do not take price increases for consumables into account. Nominal wages increased on average by 5.3 per cent annually but the rate fluctuated significantly. The first era of industrialization until 1913 was accompanied by steady increases in nominal wages. The most remarkable surge in nominal wages took place towards the end and in the aftermath of the First World War, between 1917 and 1921, when wages rose 134 per cent. Wages then fell substantially in the ensuing deflation but remained quite stable in the rest of the 1920s and the 1930s. A steady and long-term rise followed from the 1950s until the depression at the beginning of the 1990s. After the crises, nominal wages have increased moderately.

However, the movement of nominal wages may give a misleading impression of the evolution of workers' final means for purchasing goods and services. At times, reliable measurement of price changes is a far more crucial element in achieving a correct assessment of movements in real wages, especially when fluctuations in prices were very much greater than those in nominal wages. Bringing in the measure of cost-of-living which Rodney Edvinsson and Johan Söderberg offer in Chapter 8 permits a preliminary assessment of the speed at which improvements in living standards have taken place from 1860 to today. The most striking feature of Figure 10.2

**Figure 10.1.** *Nominal hourly earnings (kronor) of male manufacturing workers, 1860–2007*



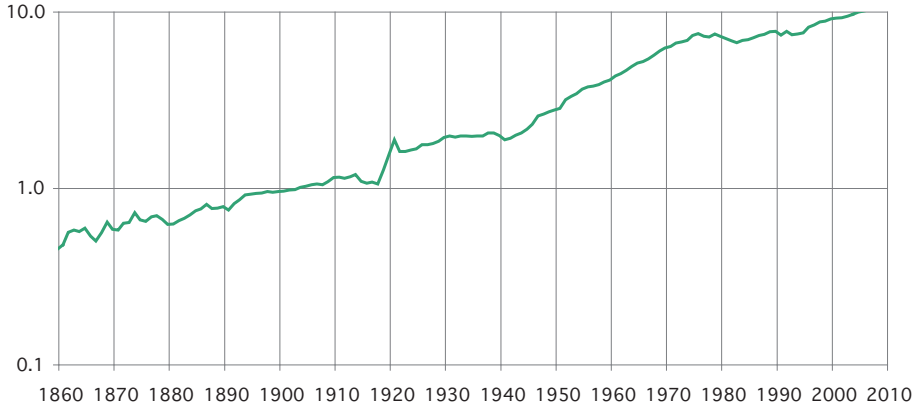

Note: Logarithmic scale
Source: Appendix, Table A10.1.

is the incessant force with which economic growth has propelled the growth of real wages since 1860. Although a few setbacks, brief in time yet serious in terms of losing foregone gains in consumption, did interrupt the general upward movement of workers' purchasing power, the general tendency is undisputable. Most economists and economic historians would probably agree that the growth of labour productivity is the most important determinant of the growth of real wages, even though intermittent changes in the share of value added accruing to labour at times drive a wedge between the movements of labour productivity and real wages. Still, there are those who have argued that the reverse may be the case, that exogenous growth in real wages may trigger the growth of labour productivity.[35]

Turning now to the sub-periods, the average rate of progress varied widely, as indicated by the computed growth rates in Table 10.3, where the time spans follow Angus Maddison's widely used classification of the last one-and-a-half centuries. As will be clear below, somewhat different turning points in fact give a better fit with the evolution of Swedish real wages.[36] The first wave of industrialization from 1860 to about the mid-1890s brought with it steady if erratic progress of real wages. A significant part of the series' volatility comes from the sawmill industry, which weighs heavily. The rapid expansion of this industry peaked in 1874 and the subsequent drop to the trough in 1891 cut the wage level by half. Between 1870 and 1912 the series' average annual growth rate was 0.4 per cent, which was 72 per cent less than the rate for

35 Wright (2006) and David and Wright (2003).
36 Maddison (1991).

**Figure 10.2.** *Real hourly earnings of male manufacturing workers, 1860–2007*




Note: Real hourly earnings in kronor of 1950. Logarithmic scale
Sources: nominal earnings: Appendix, Table A10.2; cost-of-living: Chapter 8, Table 8.4 in this volume.

manufacturing as a whole. Although volatility decreased after the 1890s, the average annual growth rate actually decelerated somewhat, which is surprising given that the growth of labour productivity was appreciably faster after the mid-1890s.[37] Here is a possible macro-economic clue to workers' dissatisfaction with the wage benefits they reaped in relation to profits, manifested most significantly in the general strike in 1909.

**Table 10.3.** *Average annual growth rates (per cent) of real wages for male workers in manufacturing*

| Label | Years | Growth rate (per cent) |
|---|---|---|
| The whole era | 1860–2007 | 2.3 |
| Industrialisation | 1860–1913 | 1.6 |
| Interwar years | 1913–1950 | 2.1 |
| Golden age | 1950–1973 | 3.8 |
| Globalisation | 1973–2007 | 1.1 |

Source: Appendix, Table A10.1.

Unlike the series of nominal wages, which gives the impression of unbroken improvements in the lot of workers during the First World War, the real wage measurement highlights the initial, detrimental war conditions. Real wages dropped about 11 per cent from 1914 to 1918 because shortages of imported food led to price increases

37 Prado (2008a p. 167).

that greatly exceeded the increases in nominal wages. However, real wages then soared in the following three years, from 1918 to 1921. Workers gained annual real wage increases of more than twenty per cent and the total increase was no less than 77 per cent. Even though the subsequent severe deflation cut real wages by 14 per cent, contemporaries witnessed an unprecedented rise in real wages. These anomalous increases in average hourly earnings are partly explained by the marked reductions in working hours in 1918–20; in 1920, the working week was restricted to 48 hours in manufacturing, commerce and transport.[38] Annual wages did not increase by nearly as much as hourly wages.[39]

The interwar era, plagued by recurrent labour disputes and high rates of unemployment, brought comparatively modest real wage increases, mostly because of stagnation in the 1930s. The fearsome crisis at the beginning of the 1930s, the Great Depression, did not in fact leave a conspicuously negative mark in the wage record but the 1930s as a whole looks particularly pale given the Swedish growth record in that decade: the annual per capita GDP growth rate was more than 3 per cent in 1930 to 1939 and the growth of labour productivity in manufacturing industry was vigorous.[40] By inference, labour's share of value added in the manufacturing industry decreased.[41]

The 1938 Saltsjöbad agreement between the employers association, SAF, and the labour union, LO, establishing a set of rules governing central wage negotiations and restrictions circumscribing the adverse effects of strikes, was the culmination of a series of attempts to solve the problems of recurrent labour disputes. It ushered in an era of relative peace and consensus between the representatives of capital and labour, which lasted until the end of the 1960s.[42] As with the beginning of the First World War, real wage reductions occurred initially in the Second World War because price increases for consumables exceeded nominal wage increases. There is a striking parallel here between the two World Wars; the opening (three) years reduced real wages by about 8 per cent and in both cases reductions were caused by price increases for goods and services.

However, the era which followed the Second World War brought large and permanent gains in living standards. Because of rapid increases in labour productivity and an institutional set-up designed to promote consensus between the combatants in labour markets, workers in most developed countries enjoyed a long-lasting period of peace and prosperity.[43] The traditional dating of this golden era is 1950 to 1973. Until at least the end of the 1960s there were few labour disputes and the latter half

38 Isidorsson (2000).
39 Bagge, Lundberg and Svennilson (1933 pp. 260–1 ).
40 Edvinsson (2005).
41 Schön (2004).
42 Lundh (2004).
43 Eichengreen (1996).

of that decade also saw the emergence of the so-called Swedish model.[44] The Swedish real wage series indicate, however, that the golden era actually started in 1942 and lasted until 1976, signifying 35 years of uninterrupted real wage increases, unprecedented in modern times. The average annual growth rate was no less than 4.1 per cent, 1.8 percentage points above the growth rate recorded for the period 1860–2007 as a whole. The long series of years during which real wages grew rapidly and sustainably has perhaps tended to perpetuate the notion that this achievement is the standard against which other growth records should be judged. That is questionable. The long-term evidence of real wages suggests instead that the era after the Second World War was exceptional, which makes it unsuitable as a benchmark.

Since then, the growth of real wages has been relatively sluggish, on average 1.2 per cent per annum. Above all, progress in this period has been more episodic; with brief episodes of rapid acceleration, deceleration and even temporary declines. Between 1976 and 1983 real wages actually decreased by 11 per cent, which contrasts sharply with the more optimistic nominal wage picture in Figure 10.1, which does not allow for the inflationary conditions in the wake of the oil crises and the three consecutive devaluations of the currency. In sharp contrast with the interwar period, when both nominal and real wages grew at a sedate pace, the crises at the end of the 1970s involved nominal wage increases that greatly exceeded the growth of real wages. Contemporaries predicted just a brief deceleration in the growth of real wages and a rebound in economic growth in the next few years. Economic policy was therefore designed to safeguard employment with massive industrial subsidization to prevent substantive destruction of human and material capital and the labour unions continued to demand high nominal wage increases in response to soaring inflation.[45] The expectations of a brief slump came to naught, however, and the conflict between labour unions and the employers' association heightened. By historical standards, the crises in the late 1970s and early 1980s seem to have entailed the most protracted and deepest wage recession in the entire era.

The next severe setback, at the beginning of the 1990s, was comparatively brief, reducing real wages by 4.4 per cent between 1990 and 1993. Since 1994 we have enjoyed 13 years of unbroken real wage gains, historically rivalled only by the golden period 1942–76. The rate of inflation was brought down, which meant that modest nominal wage increases translated into respectable increases in real wages; between 1994 and 2007 real wages grew by 2.4 per cent per annum. Yet, to break the record after the Second World War, we need a further 23 years of uninterrupted real wage growth, an accomplishment that seems increasingly remote in the light of the current economic crisis.

44 Lundberg (1985); Lindbeck (1997).

45 Bohlin (1999).

## 10.6. The evolution of the wage structure

The present investigation permits a cursory scan of two measures of wage dispersion: the gender pay ratio and inter-industry wage differentials. The female to male wage ratio for blue-collar workers in manufacturing at large is a crude measure of the inequality of pay. The interpretation of the ratio's size requires caution. The measure does not reveal whether the observed payment gaps were in fact generated by differences in educational attainments and job-related qualifications. However, those who are prepared to waive all reservations concerning the multitude of possible interpretations may find some interest in what the long-term gender pay ratio suggests. An outstanding feature of this ratio is that female wages have outgrown male wages since 1865, although female catching up has been episodic rather than continuous. Figure 10.3 shows that convergence was manifest in three, easily identifiable periods, the first of which took place immediately after the First World War, the second between 1943 and 1949 and the third, and most pronounced, between 1961 and 1978. This evidence of sharp contractions of the male to female wage gap in manufacturing in three marked episodes during the 20th century accords well with what Lars Svensson, on the basis of the official wage statistics, found in his investigation.[46] Apart from these episodes of rapid developments of female relative wages, the gap between male and female wages has been quite stable. Before 1913, the female-to-male pay ratio was on average 50 in the textile industry; thus, a female worker had to toil twice as long as a male worker to earn the same annual wage. In 2007, the male wage advantage had narrowed to on average 8 per cent. This marked contraction of the gender wage gap is one of the most pervasive aspects of the evolution of labour markets in the 20th century, in Sweden as well as in other developed countries.[47] Another noteworthy aspect is the increase in the female participation rate in the manufacturing industry, from 16 per cent in 1913 to 29 per cent at the end of the 1980s. Since then, the rate has fallen back to 25 percent.[48]

The three occurrences of gender wage gap contractions in the 20th century, particularly the last one, have attracted close attention. An earlier camp interpreted the narrowing of the gender pay gap after the Second World War as a response to policy changes promoting equal opportunities for male and female workers.[49] Most of these policies, for instance the abolition of separate wage tariffs for male and female workers and agreements designed to promote workers at the lower end of the market, were implemented in the 1960s and 1970s. Lars Svensson questions the idea that these strategies to favour wage compression were solely responsible for the female wage catch up in the 1960s and 1970s. Two factors cast doubt on the policy change

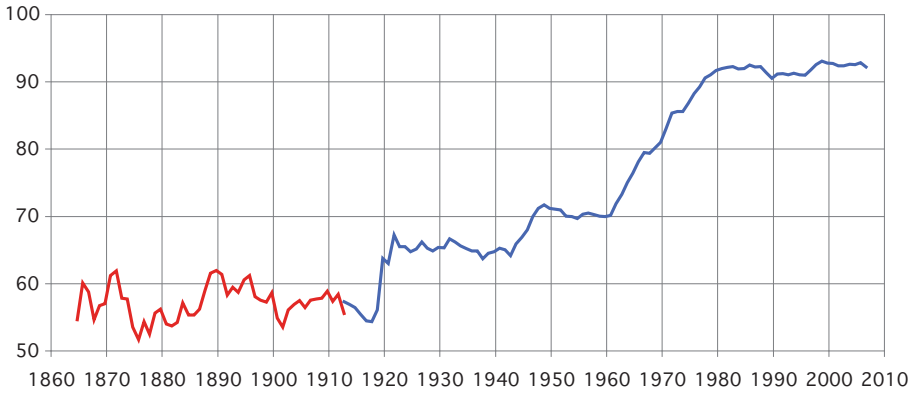
46 Svensson (1995, 1996).

47 Blau and Kahn (2000).

48 Most women are employed in sectors other than manufacturing. Before 1960 the proportion of women in gainful employment engaged in manufacturing was 30 per cent; today it is down to 10 per cent (Svensson 2003).

49 Hibbs (1990), Löfström and Gustafsson (1991) and Gustafsson and Lantz (1985).

**Figure 10.3.** *The female-to-male wage ratio in manufacturing, 1865–2007*



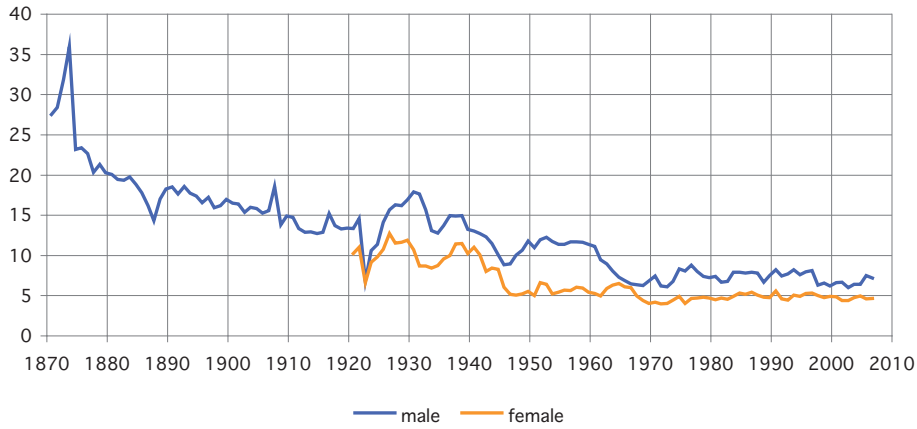

Note: The pre-1913 series is based solely on wage ratios in the textile industry.
Sources: Appendix, Tables A10.1 and A10.2.

hypothesis: first, the tendency towards wage compression started before the change in wage policy; second, market and demographic forces, in terms of a relative scarcity of married women willing to enter the labour markets, and surplus demand for female labour services in connection with technological developments and rationalization, were very favourable for the development of female relative wages. Svensson shows that the increase in demand for female labour was particularly strong in the metal, engineering and electro-mechanical industries. The most striking example is the automotive industry, where the female to male wage ratio increased by 32 percentage points between 1960 and 1965, and female employment increased by 750 per cent. Similar unbalanced growth characteristics – varying rates of female relative wage gains within different industries – served to contract the gender pay gap in the two earlier episodes of convergence, in 1919–22 and from 1943 to 1949. Thus the effects of inter-industrial employment structures do not seem to have played an important part in the race between female and male wages in the manufacturing industry.[50]

The other measure of wage dispersion which the present investigation enables us to explore is the variation of wage levels by industry. These inter-industry wage gaps are sometimes referred to as a surprisingly sustainable feature of economic development that calls for an explanation. One would perhaps expect the gaps to disappear altogether as a result of equilibrating market forces but they disobey this simple logic and thus have engaged numerous minds in economics and economic history.[51] The

50 Svensson (1995).
51 Cullen (1956), Johansen (1958), Krueger and Summers (1987) and Allen (1995). For Sweden, see Svensson (2004) and Hibbs and Locking (1996, 2000).

**Figure 10.4.** *The evolution of inter-industry wage dispersion, 1871–2007 (coefficient of variation)*




Sources: Appendix, Tables A10.1 and A10.2

long-term Swedish evidence indicates that the 20th century witnessed a pronounced compression of these wage differentials. In the course of the nearly one-and-a-half centuries this chapter encompasses, these differentials have diminished but have not completely disappeared. Figure 10.4 shows the evolution of the coefficient of variation for male wages since 1871, and for female wages since 1921. Disregarding for a moment the anomalous peak in the mid-1870, attributable to the anomalous behaviour of wages for male sawmill workers, the ratio was roughly halved between the pre-1913 era of industrialization and the end of the 1960s, after which it has remained quite stable. Inter-industry wage dispersions were generally smaller among female workers for the period as a whole but since the tendency towards wage compression among male workers was more pronounced and there was a slight tendency towards increased dispersion among female workers in the 1970s and 1980s, the two measures nearly converged around the turn of the century. Three eras of major wage compression permanently reduced the magnitude of the coefficient of variation, each of them by about forty per cent. The first coincides broadly with the first pre-1913 wave of industrialization; the second started at the beginning of the 1930s and lasted until the end of the 1940s; and the third spanned the golden period after the Second World War, from the end of the 1950s to the beginning of the 1970s.[52] The deflation at the beginning of the 1920s also compressed the wage structure temporarily but wage dispersion quickly rebounded during the rest of the 1920s. The reason for the sudden wage compres-

52 Lundh (2002 p. 203) documents the coefficient of variation for a similar classification of industries from the official wage statistics between 1930 and 1970. His documentation also shows that the wage structure became more compressed in the 1930s, 1940s and 1960s.

The Little Brewery, 1890*, by Anders Zorn (1860–1920).*
Source: Nationalmuseum.

sion during the deflation was that industries with relatively high wage levels experienced a more precipitous drop in wages than did low-wage industries. The same mechanism compressed the wage structure at the beginning of the 1930s and during the Second World War.

The size order of the hourly wage levels among the nine industries underwent some changes, particularly before 1913. Wages in mining remained at the top throughout the period, usually followed by engineering and paper. At the other end of the scale, the wood industry seems to have performed consistently badly, the 1870s notwithstanding. Other low wage industries were food (apart from the pre-1913 period), textiles and quarrying. The female story is similar. The highest wages were paid to female workers in the engineering industry until the mid-1960s, when female wages in mining rose from the lowest to the highest position in just a few years. During the rest of the period, mining remained at the top of the table, while engineering wages declined relatively. Low wages were paid to female workers in the textile, food, wood and quarrying industries. In general, high-wage industries were oriented towards the world market.

It is tempting to view this movement towards greater wage compression as a response to the rise of labour unions and to government involvement in the labour market through regulation and legislation designed to promote wage equality. In particular, the concurrence of wage compression on the one hand and centralized bargaining and wage solidarity on the other in the 1960s hints at a possible connec-

tion, running from policy to performance.[53] The interlude of prominent equalization of inter-industry wage gaps in the 1960s made the Swedish wage structure in manufacturing very compressed in an international perspective, especially in relation to the US.[54] In Sweden, most of the industry wage differentials can be explained by industry differences in labour quality and working conditions, while in the US, the industry variable is a more important wage determinant. Swedish wage differentials by occupation have been almost erased. The difference between the two countries suggests that labour unions play an important part.[55] And, as Claudia Goldin concludes, and which contrasts with her study object, the American labour market, European labour markets have been fundamentally transformed by institutional wage settings, employment security laws, mandated work councils and centralized bargaining.[56] The remarkably uniform pace of wage progress among the nine industries since at least the 1970s – itemized in Table 10.4, which shows the annual growth rates of female and male wages by industry in 1970–2007 – is difficult to imagine without the establishment of collective agreements and pervasive unionization in the manufacturing industry. In Sweden, the first wave of labour unions occurred in the 1880s. The establishment of new labour unions continued through the 1890s and 1900s until the general strike in 1909, which marked a turning point in labour union memberships. The share of workers associated with a labour union recovered in the 1920s and rose steadily from then on until the 1950s, when close to 80 per cent of blue-collar workers belonged to a labour union.[57]

**Table 10.4.** *Average annual growth rates (per cent) of nominal hourly earnings by industry, 1970–2007*

| | Male | Female |
|---|---|---|
| Mining | 6.7 | 6.8 |
| Metal | 6.8 | 6.9 |
| Engineering | 6.7 | 7.0 |
| Quarrying | 6.8 | 7.0 |
| Wood | 6.7 | 7.0 |
| Paper | 6.8 | 7.0 |
| Food | 6.8 | 6.9 |
| Textile | 6.9 | 6.9 |
| Chemical | 7.1 | 7.1 |

Sources: Appendix, Tables A10.1 and A10.2.

53 Hedin and Holmlund (1995) and Hibbs and Locking (2000).
54 Kreuger and Summers (1987).
55 Edin and Zetterberg (1992).
56 Goldin (2000 p. 550).
57 Lundh (2002 pp. 100–1).


*A modern printing works.*
Source: Riksbanken.se

Still, as others have pointed out many times, the perceived wisdom that policy and labour market institutions always exert a strong influence on the way history unfolds often turns out to be unfounded. Instead, authors often conclude that the voice and actions of unionized labour and the legislation which often follows in their wake simply reinforce long-term forces that have already been set in motion.[58] Sustainable gains in real wages started in the 1860s, before labour unions appeared on the stage and the levelling tendency of inter-industry wage differentials predated the policy of wage solidarity.

## 10.7. Conclusions

This chapter presents series of earnings for female and male manufacturing workers from 1860 to 2007, for 9 separate industries and for manufacturing as a whole. Wage data from the pre-1913 period, when there is a paucity of official wage statistics, are taken from Bagge, Lundberg and Svennilson's major contribution, *Wages in Sweden*, whose first volume (1933) contains industry-specific wage series based on thus far novel and extensive archival research. They attempted to establish wage rates for homogeneous professional classifications, paying due consideration to the effects of age, qualifications and gender. In spite of all the decades that have elapsed since its publication, *Wages in Sweden* still sums up what we know about wage movements in the manufacturing sector before 1913. After 1913 the Social Board, first, and Statistics Sweden, later, provide average hourly earnings by industry. The coverage is significantly improved in relation to *Wages in Sweden* but the measure of average hourly earnings by industry in the official statistics makes no distinction between worker's formal and professional qualifications.

The allocation of industries into nine groups is based on Statistics Sweden's latest classification scheme, SNI 1992/2002, making it possible to carry the series forward henceforth. The approach used to construct a weighted average of manufacturing is designed to provide an estimate of levels of average hourly earnings in nine industries, with indices of hourly earnings in each industry scaled proportionally to the actual hourly wages in a reference year (1950). The same methodology was used to establish series of employment. The decomposition of the series of average wages into Laspeyres and Paasche index numbers shows that inter-occupational employment shifts did not contribute significantly to the growth of average earnings.

Male nominal wages in the manufacturing sector increased at an annual average rate of 5.3 per cent from 1860 to 2007. Because nominal wages fail to account for price increases for the goods which make up workers' consumption bundle, they lead

58 For instance, Roine and Waldenström (2009) show that the wealth share of the top decile started declining long before the welfare state and a set of redistributive policies could possibly have affected income distribution. Scheve and Stasavage (2009) likewise demonstrate that the decline of top income shares occurred before centralized wage bargaining was introduced in a sample of OECD countries.

us astray as to the real gains in purchasing power. The real wage, which is the preferred measure, has grown more moderately, 2.25 per cent annually. The era after the Second World War stands out for the series of 35 years of unbroken real wage progress, averaging 4.1 per cent annually, unprecedented in modern times. The most astonishing leap forward took place, however, in the aftermath of the First World War, 1919–21, when average hourly earnings soared by about 20 per cent annually, due above all to cuts in working hours. The most prolonged and severe real wage crisis occurred in 1977 to 1983, cutting earlier real wage gains by 11 per cent.

This long-term wage study permits a preliminary look at the evolution of two measures of wage dispersion: the gender pay ratio and inter-industry wage differentials. Female wage convergence was profound in three well-defined periods, raising the female to male wage ratio from about 50 to 90. The most recent and important of these episodes ran from 1961 to 1978. Since then, the ratio has been rather stable. A combination of policy, intended to promote wage compression via regulation, and the supply of and demand for female labour services, closed most of the remaining gender wage gap in the 1960s and 1970s. The movement of the coefficient of variation indicates that the wage structure has become more compressed since the pre-1913 initial surge of industrialization. The measure was roughly halved between the pre-1913 era of industrialization and the end of the 1960s, after which it has remained quite stable. While it is true that wage compression began before unionization and legislation could possibly have had a significant impact on the wage structure, collective agreements between labour unions and the employer's association surely set the stage for the levelling tendency during the 20th century.

# Appendix A10.1

## *Classification of industry*

The following account gives the sources underlying the nominal wage series and employment weights. Words in italics mark entries in any of the following volumes:

**Wages:**
1913–28: Sociala meddelanden, Socialstyrelsen
1929–51: Statistisk årsbok, Socialstyrelsen
1952–60: Statens offentliga statistik, Löner, Socialstyrelsen
1961–93: Statens offentliga statistik, Löner, Statistiska centralbyrån
1994–2007: Statistiska meddelanden, Statistiska centralbyrån

**Employment:**
1913–58: Statens offentliga statistik, Industri, Kommerskollegium
1959–86: Statens offentliga statistik, Industri, Statistiska centralbyrån
1987–92: Arbetskraftsundersökning, Statistiska centralbyrån
1993–2007: Registerbaserad arbetsmarknadsstatistik, Statistiska centralbyrån

**Mining**
*Wages*
1860–1913: Bagge, Lundberg and Svennilson (1933 p. 104, Table 8), male annual wages at mines in central Sweden
1913–51: *Gruvor och anrikningsverk*
1952–71: *Malmgruvor*
1972–93: $SNI_{69}$ 2
1994–2007: $SNI_{92}$ 10–14

*Employment*
1860–1912: Prado (2008b)
1913–67: *Järnmalmsgruvor och anrikningsverk; Andra malmgruvor och anrikningsverk*
1968–85: $SNI_{69}$ 2
1986–2007: $SNI_{92}$ 10–14

**Metal**
*Wages*
1860–1913: Bagge, Lundberg and Svennilson (1933 p. 74–5, Table 6), male hourly wages at iron works
1913–51: *Järn- stål och kopparverk; Järn- och stålmanufaktur; Metalmanufaktur; Guld- och silverfabriker*

1952–71: *Järn- och metallverk; Järn- och stålmanufaktur; Annan metallindustri*
1972–93: $SNI_{69}$ 37; $SNI_{69}$ 381
1994–2007: $SNI_{92}$ 27–28

*Employment*
1860–1912: Prado (2008b) less handicraft workers from Schön (1988 Table 14)
1913–39: *Verk för framställning av järn och stål; Verk för framställning av andra metaller; Järn- och stålmannufaktur; Metallmanufaktur; Guld- och silverfabriker; Annan järn- och metallindustri*
1940–68: *Järn- och stålverk; Andra metallverk; Järn- och stålmanufaktur; Guld- silver- och nysilverfabriker*
1969–85: $SNI_{69}$ 37; $SNI_{69}$ 381
1986–2007: $SNI_{92}$ 27–28

**Engineering**
*Wages*
1860–1913: Bagge, Lundberg and Svennilson (1933 p. 115, Table 10), male hourly wages at metal manufacturing and engineering works.
1913–51: *Mekaniska verkstäder; Skeppsvarv och båtbyggerier; Instrument och urfabriker; Fabriker för elektriska maskiner*
1952–71: *Mekaniska verkstäder; Bil- och karosserifabriker; Reparationsverkstäder; Skeppsvarv; Elektroteknisk industri*
1972–93: $SNI_{69}$ 38 with $SNI_{69}$ 381 excluded
1994–2007: $SNI_{92}$ 29–35
Note: The wage series for 1860–1913 contains a certain amount of industries that actually belong to Metal.

*Employment*
1860–1912: Prado (2008b) less handicraft workers from Schön (1988 Table 14)
1913–39: *Mekaniska verkstäder; Skeppsvarv och båtbyggeri, Instrument- och urfabriker; Fabriker för elektriska apparater; Fabriker för elektriska apparater och ledningar*
1940–67: *Andra Mekaniska verkstäder och gjuterier; Skeppsvarv och båtbyggeri, Instrument- och urfabriker; Transportmedelsfabriker (utom skeppsvarv); Elektroteknisk industri*
1968–85: $SNI_{69}$ 38, with $SNI_{69}$ 381 excluded
1986–2007: $SNI_{92}$ 29–35

**Quarrying, clay and glass industry**
*Wages*
1868–1913: Bagge, Lundberg and Svennilson (1933, monograph section), based on wage series for glass workers, workers at china factories, brick makers, workers at cement factories and hewers. For a more detailed description, see Prado (2008a p. 59).

1913–51: *Jord- och stenindustri*
1952–71: *Jord- och stenindustri; Kolgruvor*
1972–93: $SNI_{69}$ 36
1993–2007: $SNI_{92}$ 26

*Employment*
1868–1912: Prado (2008b) less handicraft workers from Schön (1988 Table 14)
1913–51: *Jord- och stenindustri*
1952–68: *Jord- och stenindustri; Kolgruvor*
1969–85: $SNI_{69}$ 36
1986–2007: $SNI_{92}$ 26

**Wood industry**
*Wages*
1870–1913: Bagge, Lundborg and Svennilson (1933 p. 143, Table 12), arithmetic mean of the series of hourly earnings of sawers and plank pilers
1913–71: *Träindustri*
1972–93: $SNI_{69}$ 33
1994–2007: $SNI_{92}$ 20
Note: The wage series for 1870–1913 and 1994–2007 do not include the furniture industry

*Employment*
1870–1912: Prado (2008b) less handicraft workers from Schön (1988 Table 14)
1913–51: *Träindustri*
1952–68: *Träindustri; Wallboardfabriker*
1969–85: $SNI_{69}$ 33; $SNI_{69}$ 34113
1986–2007: $SNI_{92}$ 20

**Pulp, paper and printing**
*Wages*
1860–1913: Bagge, Lundberg and Svennilson (1933 p. 172, Table 15), hourly earnings for male wood pulp workers and hourly earnings for skilled paper mill workers (p. 187, Table 16).
1913–51: *Pappers- och grafisk industri*
1952–71: *Massafabriker och pappersbruk; Pappersvaru- och grafisk industri*
1972–93: $SNI_{69}$ 34
1994–2007: $SNI_{92}$ 21–22
Note: The wage series for 1860–1913 does not include the book printing industry.

*Employment*
1860–1912: Prado (2008b) less handicraft workers from Schön (1988 Table 14)

1913–51: *Pappers- och grafisk industri*
1952–68: *Massa- och pappersindustri; Grafisk industri*
1969–85: $SNI_{69}$ 34, with $SNI_{69}$ 34113 excluded
1986–2007: $SNI_{92}$ 21–22

**Food, beverages and tobacco**
*Wages*
1861–1913: Bagge, Lundberg and Svennilson (1933 p. 196, Table 18), male and female hourly wages
1913–51: *Livsmedelsindustri*
1952–71: *Livsmedelsindustri; Dryckesvaru- och tobaksindustri*
1972–93: $SNI_{69}$ 31
1994–2007: $SNI_{92}$ 15–16
Note: The wage series for 1861–1913 does not include the tobacco industry

*Employment*
1861–1912: Prado (2008b) less handicraft workers from Schön (1988 Table 14)
1913–51: *Livsmedelsindustri*
1952–68: *Livsmedelsindustri; Dryckesvaru- och tobaksindustri*
1969–85: $SNI_{69}$ 31
1986–2007: $SNI_{92}$ 15–16

**Textiles, leather and hair**
*Wages*
1865–13: Bagge, Lundberg and Svennilson (1933 p. 220, Table 20), male and female hourly wages
1913–71: *Textil- och beklädnadsindustri; Läder- och hårindustri*
1972–93: $SNI_{69}$ 32
1994–2007: $SNI_{92}$ 17–19
Note: The wage series for male and female wages in 1865–1913 does not include the leather and hair industry.

*Employment*
1865–1912: Prado (2008b) less handicraft workers from Schön (1988 Table 14)
1913–68: *Textil- och beklädnadsindustri; Läder- och hårindustri*
1969–85: $SNI_{69}$ 32
1986–2007: $SNI_{92}$ 17–19

**Chemical**
*Wages*
1871–1913: Bagge, Lundberg and Svennilson (1933 monographic secton) arithmetic mean of the series of wages for workers at soap factories, nitroglycerine factories,

superphosphate factories, match factories and candle moulders at stearine factories. For a more detailed description, see Prado (2008a p. 61–2).
1913–71: *Kemisk-teknisk industri; Gummivaruindustri*
1972–93: $SNI_{69}$ 35
1993–2007: $SNI_{92}$ 23–25

*Employment*
1871–1912: Prado (2008b)
1913–68: *Kemisk-teknisk industri, Gummivaruindustri, Gummirepationsverkstäder*
1969–85: $SNI_{69}$ 35
1986–2007: $SNI_{92}$ 23–25

## Appendix A10.2.

**Table A10.1.** *Male hourly earnings, 1860-2007, kronor*

| | Mining | Metal | Engineering | Quarrying | Wood | Paper | Food | Textile | Chemical | Weighted average |
|---|---|---|---|---|---|---|---|---|---|---|
| 1860 | 0.20 | 0.08 | 0.12 | | | 0.11 | | | | |
| 1861 | 0.21 | 0.09 | 0.12 | | | 0.11 | 0.16 | | | |
| 1862 | 0.22 | 0.13 | 0.12 | | | 0.11 | 0.16 | | | |
| 1863 | 0.21 | 0.12 | 0.13 | | | 0.12 | 0.16 | | | |
| 1864 | 0.22 | 0.10 | 0.12 | | | 0.12 | 0.16 | | | |
| 1865 | 0.22 | 0.11 | 0.13 | | | 0.12 | 0.17 | 0.13 | | |
| 1866 | 0.22 | 0.09 | 0.13 | | | 0.12 | 0.17 | 0.13 | | |
| 1867 | 0.22 | 0.10 | 0.14 | | | 0.12 | 0.17 | 0.13 | | |
| 1868 | 0.23 | 0.13 | 0.14 | 0.15 | | 0.12 | 0.17 | 0.13 | | |
| 1869 | 0.23 | 0.15 | 0.16 | 0.14 | | 0.12 | 0.17 | 0.13 | | |
| 1870 | 0.23 | 0.10 | 0.17 | 0.15 | 0.29 | 0.12 | 0.17 | 0.13 | | |
| 1871 | 0.24 | 0.12 | 0.17 | 0.16 | 0.27 | 0.12 | 0.17 | 0.13 | 0.16 | 0.17 |
| 1872 | 0.27 | 0.15 | 0.19 | 0.17 | 0.30 | 0.14 | 0.19 | 0.13 | 0.19 | 0.20 |
| 1873 | 0.33 | 0.15 | 0.20 | 0.18 | 0.33 | 0.16 | 0.21 | 0.14 | 0.23 | 0.22 |
| 1874 | 0.35 | 0.18 | 0.21 | 0.20 | 0.44 | 0.18 | 0.22 | 0.16 | 0.25 | 0.25 |
| 1875 | 0.34 | 0.18 | 0.21 | 0.22 | 0.28 | 0.19 | 0.22 | 0.17 | 0.27 | 0.22 |
| 1876 | 0.32 | 0.17 | 0.20 | 0.22 | 0.29 | 0.19 | 0.20 | 0.18 | 0.27 | 0.22 |
| 1877 | 0.32 | 0.18 | 0.19 | 0.22 | 0.32 | 0.19 | 0.23 | 0.18 | 0.27 | 0.23 |
| 1878 | 0.30 | 0.17 | 0.18 | 0.20 | 0.27 | 0.19 | 0.22 | 0.18 | 0.25 | 0.22 |
| 1879 | 0.28 | 0.15 | 0.17 | 0.16 | 0.23 | 0.18 | 0.22 | 0.17 | 0.24 | 0.20 |
| 1880 | 0.29 | 0.16 | 0.19 | 0.19 | 0.20 | 0.18 | 0.22 | 0.17 | 0.25 | 0.19 |
| 1881 | 0.30 | 0.14 | 0.21 | 0.20 | 0.22 | 0.18 | 0.22 | 0.18 | 0.25 | 0.20 |
| 1882 | 0.31 | 0.16 | 0.21 | 0.20 | 0.23 | 0.18 | 0.22 | 0.19 | 0.26 | 0.21 |

**Table A10.1 (cont.).** *Male hourly earnings, 1860-2007, kronor*

| | Mining | Metal | Engineering | Quarrying | Wood | Paper | Food | Textile | Chemical | Weighted average |
|---|---|---|---|---|---|---|---|---|---|---|
| 1883 | 0.32 | 0.17 | 0.21 | 0.20 | 0.23 | 0.19 | 0.21 | 0.19 | 0.26 | 0.21 |
| 1884 | 0.32 | 0.17 | 0.21 | 0.20 | 0.22 | 0.19 | 0.22 | 0.18 | 0.26 | 0.21 |
| 1885 | 0.31 | 0.17 | 0.21 | 0.20 | 0.22 | 0.19 | 0.22 | 0.19 | 0.26 | 0.21 |
| 1886 | 0.29 | 0.17 | 0.20 | 0.20 | 0.22 | 0.18 | 0.22 | 0.19 | 0.26 | 0.21 |
| 1887 | 0.28 | 0.17 | 0.20 | 0.20 | 0.21 | 0.18 | 0.22 | 0.19 | 0.26 | 0.20 |
| 1888 | 0.26 | 0.17 | 0.21 | 0.20 | 0.22 | 0.19 | 0.22 | 0.19 | 0.26 | 0.21 |
| 1889 | 0.29 | 0.16 | 0.23 | 0.22 | 0.23 | 0.19 | 0.23 | 0.19 | 0.28 | 0.21 |
| 1890 | 0.31 | 0.18 | 0.23 | 0.22 | 0.22 | 0.20 | 0.25 | 0.20 | 0.30 | 0.22 |
| 1891 | 0.31 | 0.17 | 0.24 | 0.23 | 0.22 | 0.22 | 0.26 | 0.20 | 0.30 | 0.23 |
| 1892 | 0.32 | 0.19 | 0.23 | 0.23 | 0.23 | 0.22 | 0.27 | 0.21 | 0.31 | 0.24 |
| 1893 | 0.32 | 0.18 | 0.24 | 0.23 | 0.23 | 0.22 | 0.28 | 0.21 | 0.31 | 0.24 |
| 1894 | 0.32 | 0.18 | 0.24 | 0.24 | 0.23 | 0.22 | 0.28 | 0.22 | 0.31 | 0.24 |
| 1895 | 0.32 | 0.18 | 0.25 | 0.24 | 0.23 | 0.23 | 0.28 | 0.22 | 0.32 | 0.25 |
| 1896 | 0.33 | 0.18 | 0.27 | 0.25 | 0.24 | 0.24 | 0.29 | 0.22 | 0.30 | 0.25 |
| 1897 | 0.35 | 0.19 | 0.27 | 0.25 | 0.25 | 0.26 | 0.32 | 0.23 | 0.32 | 0.26 |
| 1898 | 0.37 | 0.21 | 0.30 | 0.26 | 0.26 | 0.27 | 0.33 | 0.25 | 0.33 | 0.28 |
| 1899 | 0.39 | 0.22 | 0.31 | 0.28 | 0.27 | 0.28 | 0.34 | 0.26 | 0.34 | 0.29 |
| 1900 | 0.41 | 0.23 | 0.33 | 0.28 | 0.28 | 0.29 | 0.35 | 0.26 | 0.35 | 0.30 |
| 1901 | 0.42 | 0.24 | 0.32 | 0.29 | 0.27 | 0.29 | 0.35 | 0.28 | 0.35 | 0.30 |
| 1902 | 0.42 | 0.25 | 0.33 | 0.28 | 0.27 | 0.29 | 0.36 | 0.29 | 0.36 | 0.31 |
| 1903 | 0.41 | 0.25 | 0.33 | 0.29 | 0.28 | 0.30 | 0.37 | 0.28 | 0.36 | 0.31 |
| 1904 | 0.43 | 0.26 | 0.36 | 0.29 | 0.29 | 0.31 | 0.37 | 0.28 | 0.36 | 0.32 |
| 1905 | 0.43 | 0.27 | 0.38 | 0.30 | 0.30 | 0.32 | 0.39 | 0.30 | 0.37 | 0.33 |
| 1906 | 0.45 | 0.29 | 0.39 | 0.32 | 0.30 | 0.33 | 0.41 | 0.32 | 0.40 | 0.34 |
| 1907 | 0.48 | 0.29 | 0.41 | 0.34 | 0.32 | 0.36 | 0.42 | 0.33 | 0.43 | 0.36 |
| 1908 | 0.51 | 0.29 | 0.42 | 0.35 | 0.32 | 0.32 | 0.45 | 0.34 | 0.44 | 0.37 |
| 1909 | 0.41 | 0.31 | 0.43 | 0.34 | 0.32 | 0.38 | 0.47 | 0.35 | 0.44 | 0.38 |
| 1910 | 0.53 | 0.37 | 0.44 | 0.36 | 0.34 | 0.38 | 0.48 | 0.35 | 0.43 | 0.40 |
| 1911 | 0.55 | 0.37 | 0.45 | 0.37 | 0.35 | 0.39 | 0.47 | 0.37 | 0.44 | 0.41 |
| 1912 | 0.55 | 0.39 | 0.47 | 0.38 | 0.36 | 0.40 | 0.49 | 0.40 | 0.45 | 0.42 |
| 1913 | 0.57 | 0.39 | 0.46 | 0.42 | 0.37 | 0.43 | 0.49 | 0.41 | 0.46 | 0.43 |
| 1914 | | | | | | | | | | 0.45 |
| 1915 | | | | | | | | | | 0.48 |
| 1916 | | | | | | | | | | 0.53 |
| 1917 | | | | | | | | | | 0.67 |
| 1918 | | | | | | | | | | 0.96 |
| 1919 | | | | | | | | | | 1.28 |
| 1920 | | | | | | | | | | 1.58 |
| 1921 | 2.06 | 1.42 | 1.68 | 1.44 | 1.34 | 1.55 | 1.79 | 1.48 | 1.66 | 1.57 |
| 1922 | 1.43 | 1.06 | 1.25 | 0.94 | 0.95 | 1.08 | 1.39 | 1.10 | 1.16 | 1.13 |
| 1923 | 1.17 | 1.02 | 1.13 | 0.97 | 0.98 | 1.08 | 1.18 | 1.06 | 1.07 | 1.06 |
| 1924 | 1.36 | 1.04 | 1.17 | 0.99 | 0.98 | 1.07 | 1.23 | 1.07 | 1.11 | 1.09 |
| 1925 | 1.41 | 1.07 | 1.19 | 1.03 | 0.99 | 1.11 | 1.31 | 1.08 | 1.14 | 1.12 |

**Table A10.1 (cont.).** *Male hourly earnings, 1860-2007, kronor*

| | Mining | Metal | Engineering | Quarrying | Wood | Paper | Food | Textile | Chemical | Weighted average |
|---|---|---|---|---|---|---|---|---|---|---|
| 1926 | 1.52 | 1.08 | 1.20 | 1.04 | 0.98 | 1.15 | 1.37 | 1.06 | 1.13 | 1.14 |
| 1927 | 1.58 | 1.09 | 1.21 | 0.94 | 1.01 | 1.15 | 1.34 | 1.07 | 1.13 | 1.13 |
| 1928 | 1.63 | 1.11 | 1.23 | 0.95 | 1.02 | 1.19 | 1.35 | 1.08 | 1.14 | 1.15 |
| 1929 | 1.65 | 1.13 | 1.26 | 0.97 | 1.05 | 1.20 | 1.38 | 1.07 | 1.17 | 1.17 |
| 1930 | 1.71 | 1.15 | 1.27 | 0.98 | 1.04 | 1.23 | 1.38 | 1.09 | 1.20 | 1.19 |
| 1931 | 1.73 | 1.13 | 1.27 | 0.97 | 1.00 | 1.24 | 1.37 | 1.09 | 1.20 | 1.17 |
| 1932 | 1.65 | 1.09 | 1.23 | 0.94 | 0.96 | 1.19 | 1.37 | 1.06 | 1.20 | 1.14 |
| 1933 | 1.54 | 1.09 | 1.22 | 0.94 | 0.95 | 1.16 | 1.36 | 1.07 | 1.20 | 1.13 |
| 1934 | 1.42 | 1.11 | 1.23 | 0.97 | 0.94 | 1.19 | 1.33 | 1.06 | 1.19 | 1.14 |
| 1935 | 1.44 | 1.14 | 1.24 | 0.98 | 0.97 | 1.21 | 1.34 | 1.06 | 1.20 | 1.15 |
| 1936 | 1.50 | 1.15 | 1.27 | 1.00 | 0.96 | 1.24 | 1.35 | 1.07 | 1.23 | 1.17 |
| 1937 | 1.63 | 1.19 | 1.30 | 1.02 | 1.00 | 1.30 | 1.38 | 1.12 | 1.27 | 1.21 |
| 1938 | 1.72 | 1.27 | 1.39 | 1.09 | 1.06 | 1.37 | 1.43 | 1.14 | 1.33 | 1.28 |
| 1939 | 1.79 | 1.32 | 1.43 | 1.12 | 1.10 | 1.41 | 1.45 | 1.18 | 1.36 | 1.32 |
| 1940 | 1.84 | 1.44 | 1.57 | 1.23 | 1.18 | 1.52 | 1.55 | 1.31 | 1.49 | 1.45 |
| 1941 | 1.96 | 1.57 | 1.69 | 1.31 | 1.27 | 1.63 | 1.63 | 1.40 | 1.61 | 1.56 |
| 1942 | 2.16 | 1.71 | 1.85 | 1.46 | 1.40 | 1.76 | 1.75 | 1.55 | 1.72 | 1.70 |
| 1943 | 2.26 | 1.79 | 1.91 | 1.57 | 1.47 | 1.82 | 1.83 | 1.62 | 1.78 | 1.77 |
| 1944 | 2.28 | 1.84 | 1.96 | 1.63 | 1.51 | 1.87 | 1.85 | 1.70 | 1.83 | 1.82 |
| 1945 | 2.33 | 1.92 | 2.05 | 1.73 | 1.63 | 1.95 | 1.92 | 1.79 | 1.93 | 1.91 |
| 1946 | 2.47 | 2.03 | 2.15 | 1.88 | 1.81 | 2.10 | 2.04 | 1.95 | 2.07 | 2.04 |
| 1947 | 2.85 | 2.34 | 2.45 | 2.18 | 2.07 | 2.40 | 2.31 | 2.25 | 2.39 | 2.34 |
| 1948 | 3.20 | 2.55 | 2.65 | 2.34 | 2.25 | 2.59 | 2.50 | 2.46 | 2.59 | 2.54 |
| 1949 | 3.34 | 2.66 | 2.76 | 2.42 | 2.31 | 2.62 | 2.49 | 2.57 | 2.67 | 2.62 |
| 1950 | 3.57 | 2.78 | 2.88 | 2.51 | 2.40 | 2.70 | 2.57 | 2.63 | 2.78 | 2.73 |
| 1951 | 4.18 | 3.37 | 3.46 | 3.04 | 2.95 | 3.24 | 3.05 | 3.10 | 3.15 | 3.27 |
| 1952 | 5.03 | 4.05 | 4.14 | 3.59 | 3.42 | 3.97 | 3.57 | 3.59 | 3.83 | 3.91 |
| 1953 | 5.30 | 4.27 | 4.44 | 3.76 | 3.59 | 4.11 | 3.75 | 3.75 | 4.03 | 4.13 |
| 1954 | 5.50 | 4.41 | 4.60 | 4.00 | 3.84 | 4.36 | 3.85 | 3.89 | 4.28 | 4.31 |
| 1955 | 5.92 | 4.77 | 4.93 | 4.34 | 4.17 | 4.79 | 4.23 | 4.19 | 4.61 | 4.68 |
| 1956 | 6.36 | 5.19 | 5.35 | 4.66 | 4.48 | 5.20 | 4.52 | 4.55 | 5.01 | 5.06 |
| 1957 | 6.80 | 5.51 | 5.64 | 4.96 | 4.75 | 5.48 | 4.76 | 4.80 | 5.28 | 5.35 |
| 1958 | 7.20 | 5.84 | 6.01 | 5.27 | 5.05 | 5.75 | 5.05 | 5.08 | 5.53 | 5.68 |
| 1959 | 7.55 | 6.12 | 6.25 | 5.52 | 5.32 | 6.00 | 5.33 | 5.30 | 5.73 | 5.93 |
| 1960 | 8.03 | 6.51 | 6.60 | 5.99 | 5.67 | 6.46 | 5.71 | 5.64 | 6.10 | 6.32 |
| 1961 | 8.62 | 7.05 | 7.10 | 6.45 | 6.11 | 6.97 | 6.19 | 6.14 | 6.56 | 6.83 |
| 1962 | 9.04 | 7.31 | 7.68 | 7.07 | 6.66 | 7.47 | 6.92 | 6.76 | 7.06 | 7.35 |
| 1963 | 9.58 | 8.09 | 8.23 | 7.59 | 7.19 | 8.02 | 7.51 | 7.25 | 7.53 | 7.93 |
| 1964 | 10.17 | 8.72 | 8.86 | 8.31 | 7.83 | 8.77 | 8.16 | 7.91 | 8.19 | 8.58 |
| 1965 | 10.95 | 9.60 | 9.73 | 9.19 | 8.67 | 9.74 | 8.97 | 8.70 | 9.08 | 9.46 |
| 1966 | 11.78 | 10.37 | 10.53 | 10.04 | 9.38 | 10.56 | 9.94 | 9.46 | 9.82 | 10.26 |
| 1967 | 12.46 | 11.01 | 11.41 | 10.77 | 10.20 | 11.51 | 10.76 | 10.13 | 10.59 | 11.06 |
| 1968 | 13.23 | 11.98 | 12.10 | 11.51 | 10.85 | 12.55 | 11.46 | 11.01 | 11.25 | 11.85 |

**Table A10.1 (cont.).** *Male hourly earnings, 1860-2007, kronor*

| | Mining | Metal | Engineering | Quarrying | Wood | Paper | Food | Textile | Chemical | Weighted average |
|---|---|---|---|---|---|---|---|---|---|---|
| 1969 | 14.32 | 12.99 | 13.06 | 12.58 | 11.85 | 13.76 | 12.43 | 11.95 | 12.28 | 12.86 |
| 1970 | 16.26 | 14.47 | 14.50 | 13.94 | 13.20 | 15.23 | 13.80 | 13.14 | 13.75 | 14.30 |
| 1971 | 18.21 | 15.97 | 15.90 | 15.13 | 14.31 | 16.44 | 15.14 | 14.44 | 15.03 | 15.67 |
| 1972 | 19.56 | 17.92 | 17.10 | 17.16 | 16.12 | 18.65 | 17.31 | 16.40 | 16.62 | 17.33 |
| 1973 | 21.09 | 19.57 | 18.62 | 18.43 | 17.57 | 20.13 | 18.60 | 17.79 | 17.86 | 18.82 |
| 1974 | 23.96 | 21.96 | 20.61 | 20.59 | 19.90 | 23.08 | 20.58 | 19.91 | 20.11 | 21.04 |
| 1975 | 29.35 | 25.87 | 23.96 | 24.08 | 23.02 | 27.30 | 24.27 | 23.13 | 23.61 | 24.64 |
| 1976 | 32.85 | 29.13 | 26.83 | 27.34 | 25.76 | 31.14 | 27.88 | 26.30 | 27.18 | 27.81 |
| 1977 | 36.45 | 31.16 | 29.11 | 29.63 | 27.84 | 33.49 | 29.77 | 28.15 | 29.37 | 30.02 |
| 1978 | 39.09 | 33.78 | 31.54 | 32.50 | 30.89 | 36.60 | 33.04 | 30.84 | 32.29 | 32.70 |
| 1979 | 41.46 | 38.05 | 34.85 | 36.03 | 33.87 | 41.41 | 36.68 | 34.45 | 35.94 | 36.39 |
| 1980 | 45.60 | 41.77 | 38.27 | 40.51 | 37.21 | 45.72 | 40.44 | 38.31 | 40.09 | 40.12 |
| 1981 | 50.27 | 44.87 | 41.95 | 43.83 | 40.63 | 49.79 | 44.46 | 41.54 | 43.71 | 43.74 |
| 1982 | 51.49 | 47.74 | 44.29 | 46.37 | 42.72 | 51.98 | 46.56 | 43.75 | 46.40 | 46.15 |
| 1983 | 54.28 | 50.32 | 46.88 | 49.01 | 45.28 | 55.54 | 49.59 | 46.20 | 49.44 | 48.90 |
| 1984 | 63.23 | 56.30 | 52.00 | 55.16 | 50.32 | 62.64 | 54.14 | 51.85 | 55.56 | 54.51 |
| 1985 | 67.12 | 61.34 | 56.25 | 59.96 | 54.53 | 68.66 | 58.80 | 55.36 | 60.00 | 59.11 |
| 1986 | 72.47 | 65.84 | 60.23 | 64.50 | 58.24 | 72.80 | 62.77 | 59.80 | 64.29 | 63.25 |
| 1987 | 77.18 | 71.81 | 63.80 | 68.68 | 62.78 | 78.51 | 67.23 | 64.06 | 69.21 | 67.77 |
| 1988 | 83.66 | 75.33 | 69.01 | 74.81 | 67.62 | 84.40 | 72.95 | 69.24 | 75.20 | 72.87 |
| 1989 | 89.17 | 83.57 | 76.08 | 81.71 | 75.27 | 91.15 | 80.71 | 76.44 | 83.18 | 80.36 |
| 1990 | 100.89 | 92.49 | 83.52 | 92.02 | 83.79 | 101.88 | 87.67 | 83.39 | 91.92 | 88.82 |
| 1991 | 108.76 | 96.29 | 87.93 | 94.61 | 87.05 | 106.54 | 90.84 | 86.80 | 95.98 | 92.84 |
| 1992 | 117.45 | 102.56 | 95.36 | 100.25 | 94.45 | 110.00 | 97.70 | 94.24 | 104.63 | 99.57 |
| 1993 | 117.39 | 102.93 | 94.50 | 100.26 | 94.47 | 110.82 | 97.83 | 93.32 | 103.79 | 99.52 |
| 1994 | 121.75 | 105.66 | 97.43 | 103.18 | 97.57 | 115.51 | 101.37 | 94.34 | 107.69 | 102.68 |
| 1995 | 124.85 | 111.61 | 102.16 | 105.85 | 102.11 | 120.43 | 105.52 | 100.16 | 109.88 | 107.22 |
| 1996 | 135.83 | 118.36 | 111.75 | 113.89 | 110.10 | 129.62 | 112.99 | 105.61 | 117.19 | 115.69 |
| 1997 | 140.39 | 124.53 | 115.32 | 117.76 | 113.67 | 133.91 | 115.62 | 108.70 | 122.90 | 119.88 |
| 1998 | 138.48 | 129.11 | 120.40 | 124.54 | 117.28 | 137.53 | 119.82 | 116.82 | 126.11 | 124.32 |
| 1999 | 141.94 | 132.42 | 122.02 | 126.47 | 119.56 | 138.90 | 121.30 | 118.07 | 131.75 | 126.57 |
| 2000 | 147.66 | 135.74 | 127.82 | 128.89 | 123.16 | 144.83 | 128.47 | 126.56 | 136.58 | 131.75 |
| 2001 | 152.31 | 143.02 | 129.72 | 135.07 | 128.81 | 150.52 | 129.95 | 129.81 | 142.52 | 135.72 |
| 2002 | 158.03 | 145.31 | 133.59 | 137.61 | 132.90 | 154.19 | 136.50 | 131.18 | 146.75 | 139.48 |
| 2003 | 160.77 | 150.16 | 139.69 | 143.78 | 137.22 | 158.95 | 140.08 | 138.18 | 151.72 | 144.78 |
| 2004 | 168.40 | 154.09 | 144.25 | 148.50 | 142.03 | 166.70 | 145.14 | 142.93 | 156.19 | 149.65 |
| 2005 | 172.69 | 157.89 | 150.10 | 146.69 | 146.24 | 170.99 | 149.22 | 148.80 | 160.24 | 154.32 |
| 2006 | 184.49 | 162.54 | 154.50 | 150.92 | 150.08 | 176.96 | 154.78 | 150.55 | 166.58 | 159.18 |
| 2007 | 192.95 | 171.07 | 161.13 | 160.73 | 157.17 | 183.51 | 161.08 | 157.67 | 171.53 | 166.17 |

**Table A10.2.** *Female hourly earnings 1865–2007, kronor*

| | Mining | Metal | Engineering | Quarrying | Wood | Paper | Food | Textile | Chemical | Weighted average |
|---|---|---|---|---|---|---|---|---|---|---|
| 1865 | | | | | | | | 0.07 | | |
| 1866 | | | | | | | | 0.08 | | |
| 1867 | | | | | | | | 0.08 | | |
| 1868 | | | | | | | | 0.07 | | |
| 1869 | | | | | | | | 0.07 | | |
| 1870 | | | | | | | | 0.07 | | |
| 1871 | | | | | | | | 0.08 | | |
| 1872 | | | | | | | | 0.08 | | |
| 1873 | | | | | | | | 0.08 | | |
| 1874 | | | | | | | | 0.09 | | |
| 1875 | | | | | | | | 0.09 | | |
| 1876 | | | | | | | | 0.09 | | |
| 1877 | | | | | | | | 0.10 | | |
| 1878 | | | | | | | | 0.09 | | |
| 1879 | | | | | | | | 0.09 | | |
| 1880 | | | | | | | | 0.09 | | |
| 1881 | | | | | | | | 0.10 | | |
| 1882 | | | | | | | | 0.10 | | |
| 1883 | | | | | | | | 0.10 | | |
| 1884 | | | | | | | | 0.11 | | |
| 1885 | | | | | | | | 0.11 | | |
| 1886 | | | | | | | | 0.11 | | |
| 1887 | | | | | | | | 0.11 | | |
| 1888 | | | | | | | 0.09 | 0.11 | | |
| 1889 | | | | | | | 0.09 | 0.12 | | |
| 1890 | | | | | | | 0.12 | 0.12 | | |
| 1891 | | | | | | | 0.13 | 0.12 | | |
| 1892 | | | | | | | 0.13 | 0.12 | | |
| 1893 | | | | | | | 0.13 | 0.12 | | |
| 1894 | | | | | | | 0.13 | 0.13 | | |
| 1895 | | | | | | | 0.14 | 0.13 | | |
| 1896 | | | | | | | 0.15 | 0.14 | | |
| 1897 | | | | | | | 0.15 | 0.14 | | |
| 1898 | | | | | | | 0.16 | 0.15 | | |
| 1899 | | | | | | | 0.15 | 0.15 | | |
| 1900 | | | | | | | 0.16 | 0.15 | | |
| 1901 | | | | | | | 0.16 | 0.15 | | |
| 1902 | | | | | | | 0.17 | 0.15 | | |
| 1903 | | | | | | | 0.17 | 0.16 | | |
| 1904 | | | | | | | 0.18 | 0.16 | | |
| 1905 | | | | | | | 0.18 | 0.17 | | |
| 1906 | | | | | | | 0.20 | 0.18 | | |

**Table A10.2 (cont.).** *Female hourly earnings 1865–2007, kronor*

| | Mining | Metal | Engineering | Quarrying | Wood | Paper | Food | Textile | Chemical | Weighted average |
|---|---|---|---|---|---|---|---|---|---|---|
| 1907 | | | | | | | 0.21 | 0.19 | | |
| 1908 | | | | | | | 0.23 | 0.19 | | |
| 1909 | | | | | | | 0.26 | 0.20 | | |
| 1910 | | | | | | | 0.27 | 0.21 | | |
| 1911 | | | | | | | 0.26 | 0.21 | | |
| 1912 | | | | | | | 0.27 | 0.23 | | |
| 1913 | | | | | | | 0.28 | 0.23 | | |
| 1914 | | | | | | | | | | |
| 1915 | | | | | | | | | | |
| 1916 | | | | | | | | | | |
| 1917 | | | | | | | | | | |
| 1918 | | | | | | | | | | |
| 1919 | | | | | | | | | | |
| 1920 | | | | | | | | | | |
| 1921 | | 0.91 | 1.07 | 0.83 | 0.83 | 0.99 | 1.10 | 0.91 | 1.00 | 0.98 |
| 1922 | | 0.70 | 0.77 | 0.57 | 0.77 | 0.75 | 0.87 | 0.71 | 0.76 | 0.75 |
| 1923 | | 0.66 | 0.70 | 0.59 | 0.65 | 0.69 | 0.75 | 0.68 | 0.69 | 0.69 |
| 1924 | | 0.69 | 0.72 | 0.55 | 0.69 | 0.70 | 0.79 | 0.68 | 0.69 | 0.71 |
| 1925 | | 0.72 | 0.81 | 0.60 | 0.68 | 0.69 | 0.83 | 0.69 | 0.71 | 0.72 |
| 1926 | | 0.72 | 0.87 | 0.63 | 0.69 | 0.74 | 0.85 | 0.68 | 0.72 | 0.73 |
| 1927 | | 0.72 | 0.90 | 0.59 | 0.72 | 0.70 | 0.86 | 0.69 | 0.72 | 0.74 |
| 1928 | | 0.73 | 0.91 | 0.61 | 0.74 | 0.72 | 0.84 | 0.70 | 0.73 | 0.74 |
| 1929 | | 0.73 | 0.93 | 0.66 | 0.69 | 0.74 | 0.86 | 0.70 | 0.73 | 0.75 |
| 1930 | | 0.74 | 0.96 | 0.67 | 0.69 | 0.74 | 0.86 | 0.72 | 0.77 | 0.76 |
| 1931 | | 0.74 | 0.93 | 0.67 | 0.71 | 0.76 | 0.85 | 0.71 | 0.77 | 0.76 |
| 1932 | | 0.73 | 0.85 | 0.65 | 0.73 | 0.75 | 0.85 | 0.72 | 0.77 | 0.75 |
| 1933 | | 0.72 | 0.84 | 0.65 | 0.78 | 0.74 | 0.85 | 0.70 | 0.77 | 0.74 |
| 1934 | | 0.73 | 0.86 | 0.65 | 0.75 | 0.76 | 0.83 | 0.70 | 0.76 | 0.74 |
| 1935 | | 0.75 | 0.86 | 0.64 | 0.74 | 0.76 | 0.84 | 0.71 | 0.76 | 0.75 |
| 1936 | | 0.75 | 0.87 | 0.64 | 0.69 | 0.77 | 0.84 | 0.71 | 0.77 | 0.75 |
| 1937 | | 0.76 | 0.89 | 0.64 | 0.70 | 0.80 | 0.86 | 0.74 | 0.78 | 0.78 |
| 1938 | | 0.82 | 0.98 | 0.68 | 0.70 | 0.83 | 0.88 | 0.76 | 0.83 | 0.81 |
| 1939 | | 0.84 | 1.02 | 0.69 | 0.75 | 0.88 | 0.91 | 0.80 | 0.83 | 0.84 |
| 1940 | | 0.92 | 1.09 | 0.75 | 0.88 | 0.95 | 1.00 | 0.89 | 0.91 | 0.93 |
| 1941 | | 1.00 | 1.19 | 0.80 | 0.90 | 1.04 | 1.07 | 0.96 | 1.01 | 1.01 |
| 1942 | | 1.08 | 1.28 | 0.89 | 0.99 | 1.13 | 1.15 | 1.05 | 1.09 | 1.10 |
| 1943 | | 1.13 | 1.22 | 0.96 | 1.00 | 1.18 | 1.20 | 1.09 | 1.11 | 1.13 |
| 1944 | | 1.18 | 1.35 | 1.02 | 1.06 | 1.22 | 1.22 | 1.16 | 1.15 | 1.19 |
| 1945 | | 1.26 | 1.43 | 1.08 | 1.12 | 1.30 | 1.27 | 1.25 | 1.23 | 1.27 |
| 1946 | | 1.35 | 1.48 | 1.20 | 1.30 | 1.43 | 1.40 | 1.37 | 1.33 | 1.38 |
| 1947 | | 1.57 | 1.73 | 1.47 | 1.53 | 1.69 | 1.64 | 1.61 | 1.57 | 1.63 |
| 1948 | | 1.74 | 1.89 | 1.61 | 1.70 | 1.88 | 1.78 | 1.79 | 1.73 | 1.80 |
| 1949 | | 1.81 | 1.98 | 1.66 | 1.75 | 1.91 | 1.86 | 1.86 | 1.82 | 1.87 |

**Table A10.2 (cont.).** *Female hourly earnings 1865–2007, kronor*

| | Mining | Metal | Engineering | Quarrying | Wood | Paper | Food | Textile | Chemical | Weighted average |
|---|---|---|---|---|---|---|---|---|---|---|
| 1950 | | 1.90 | 2.07 | 1.70 | 1.82 | 1.96 | 1.87 | 1.92 | 1.91 | 1.93 |
| 1951 | | 2.30 | 2.49 | 2.07 | 2.21 | 2.29 | 2.29 | 2.29 | 2.24 | 2.31 |
| 1952 | 2.52 | 2.80 | 3.05 | 2.49 | 2.57 | 2.91 | 2.71 | 2.67 | 2.68 | 2.77 |
| 1953 | 2.59 | 2.92 | 3.21 | 2.59 | 2.72 | 3.01 | 2.85 | 2.79 | 2.81 | 2.88 |
| 1954 | 2.67 | 3.01 | 3.31 | 2.82 | 2.84 | 3.11 | 2.96 | 2.91 | 2.99 | 3.00 |
| 1955 | 2.87 | 3.25 | 3.53 | 2.94 | 3.18 | 3.42 | 3.23 | 3.13 | 3.25 | 3.25 |
| 1956 | 3.14 | 3.56 | 3.88 | 3.20 | 3.45 | 3.71 | 3.50 | 3.40 | 3.54 | 3.55 |
| 1957 | 3.22 | 3.79 | 4.11 | 3.39 | 3.68 | 3.92 | 3.69 | 3.62 | 3.75 | 3.76 |
| 1958 | 3.33 | 4.02 | 4.38 | 3.55 | 3.85 | 4.13 | 3.90 | 3.82 | 3.94 | 3.98 |
| 1959 | 3.39 | 4.21 | 4.54 | 3.68 | 4.12 | 4.28 | 4.11 | 3.96 | 4.08 | 4.14 |
| 1960 | 3.84 | 4.50 | 4.80 | 3.97 | 4.41 | 4.53 | 4.43 | 4.21 | 4.35 | 4.41 |
| 1961 | 4.32 | 4.87 | 5.15 | 4.28 | 4.73 | 4.88 | 4.82 | 4.56 | 4.69 | 4.78 |
| 1962 | 4.80 | 5.40 | 5.63 | 4.77 | 5.26 | 5.32 | 5.39 | 5.02 | 5.12 | 5.27 |
| 1963 | 5.30 | 5.97 | 6.32 | 5.21 | 5.82 | 5.83 | 5.91 | 5.46 | 5.50 | 5.79 |
| 1964 | 5.97 | 6.64 | 7.05 | 5.75 | 6.35 | 6.53 | 6.49 | 6.01 | 6.04 | 6.41 |
| 1965 | 7.03 | 7.58 | 7.96 | 6.50 | 7.16 | 7.27 | 7.18 | 6.66 | 6.82 | 7.21 |
| 1966 | 8.38 | 8.39 | 8.77 | 7.34 | 7.90 | 8.02 | 8.02 | 7.31 | 7.59 | 7.99 |
| 1967 | 9.89 | 9.19 | 9.56 | 8.04 | 8.76 | 8.94 | 8.81 | 7.98 | 8.40 | 8.77 |
| 1968 | 10.46 | 9.65 | 10.12 | 8.82 | 9.28 | 9.66 | 9.33 | 8.69 | 8.99 | 9.38 |
| 1969 | 11.43 | 10.42 | 10.89 | 9.78 | 10.26 | 10.74 | 10.26 | 9.55 | 9.90 | 10.29 |
| 1970 | 13.55 | 11.73 | 12.14 | 11.11 | 11.48 | 11.89 | 11.49 | 10.62 | 11.25 | 11.55 |
| 1971 | 15.35 | 13.27 | 13.68 | 12.50 | 12.87 | 13.15 | 12.82 | 11.82 | 12.60 | 12.97 |
| 1972 | 17.14 | 15.43 | 15.09 | 14.49 | 14.45 | 15.17 | 14.83 | 13.49 | 14.40 | 14.75 |
| 1973 | 18.39 | 16.86 | 16.44 | 15.83 | 15.87 | 16.51 | 15.94 | 14.76 | 15.47 | 16.06 |
| 1974 | 20.78 | 18.80 | 18.20 | 17.66 | 17.81 | 18.98 | 17.61 | 16.39 | 17.42 | 17.96 |
| 1975 | 25.17 | 22.48 | 21.55 | 21.10 | 20.79 | 22.72 | 20.82 | 19.37 | 20.45 | 21.34 |
| 1976 | 28.17 | 25.58 | 24.82 | 24.36 | 23.74 | 25.27 | 24.22 | 22.46 | 23.55 | 24.48 |
| 1977 | 31.55 | 27.86 | 26.93 | 26.43 | 25.76 | 28.47 | 26.08 | 24.57 | 25.45 | 26.73 |
| 1978 | 33.90 | 30.57 | 29.63 | 29.42 | 28.84 | 31.76 | 29.10 | 27.19 | 27.97 | 29.55 |
| 1979 | 35.88 | 34.30 | 33.29 | 32.24 | 32.07 | 35.33 | 32.47 | 30.34 | 31.14 | 33.05 |
| 1980 | 41.08 | 37.85 | 36.82 | 36.36 | 35.40 | 39.46 | 36.11 | 33.81 | 34.73 | 36.71 |
| 1981 | 44.78 | 40.75 | 40.62 | 40.00 | 38.57 | 42.82 | 39.57 | 36.96 | 37.87 | 40.14 |
| 1982 | 46.25 | 43.02 | 43.02 | 41.78 | 40.48 | 45.29 | 41.90 | 38.73 | 40.20 | 42.42 |
| 1983 | 49.29 | 45.53 | 45.67 | 44.37 | 43.11 | 47.91 | 44.34 | 41.09 | 42.83 | 45.00 |
| 1984 | 57.73 | 50.44 | 50.75 | 50.56 | 47.38 | 53.52 | 48.42 | 45.31 | 48.13 | 49.98 |
| 1985 | 60.59 | 55.27 | 54.75 | 54.77 | 51.59 | 58.59 | 52.57 | 48.74 | 51.98 | 54.24 |
| 1986 | 66.80 | 59.45 | 58.90 | 59.55 | 55.00 | 62.64 | 56.67 | 52.76 | 56.03 | 58.35 |
| 1987 | 70.42 | 65.18 | 62.22 | 63.25 | 59.24 | 66.93 | 60.62 | 55.93 | 60.06 | 62.34 |
| 1988 | 73.10 | 67.42 | 67.33 | 68.64 | 63.52 | 72.01 | 65.62 | 60.46 | 64.96 | 67.07 |
| 1989 | 77.82 | 74.49 | 73.05 | 74.19 | 70.09 | 78.27 | 72.18 | 65.90 | 71.21 | 73.25 |
| 1990 | 87.54 | 81.49 | 79.40 | 82.73 | 77.00 | 86.49 | 78.27 | 73.61 | 78.22 | 80.21 |
| 1991 | 92.21 | 84.88 | 84.45 | 85.95 | 80.26 | 91.50 | 81.46 | 74.82 | 81.74 | 84.43 |
| 1992 | 101.83 | 90.14 | 92.15 | 92.33 | 86.98 | 94.79 | 90.13 | 82.01 | 84.70 | 90.61 |

**Table A10.2 (cont.).** *Female hourly earnings 1865–2007, kronor*

| | Mining | Metal | Engineering | Quarrying | Wood | Paper | Food | Textile | Chemical | Weighted average |
|---|---|---|---|---|---|---|---|---|---|---|
| 1993 | 99.82 | 91.54 | 91.00 | 91.41 | 88.16 | 94.23 | 88.75 | 80.47 | 88.14 | 90.39 |
| 1994 | 102.92 | 93.31 | 94.09 | 95.78 | 91.90 | 96.57 | 93.93 | 81.06 | 91.93 | 93.48 |
| 1995 | 108.61 | 97.90 | 99.33 | 98.84 | 94.05 | 99.93 | 96.50 | 84.98 | 94.20 | 97.39 |
| 1996 | 116.24 | 104.40 | 107.62 | 104.33 | 107.23 | 107.56 | 104.45 | 90.65 | 100.16 | 105.03 |
| 1997 | 121.08 | 109.47 | 112.67 | 110.35 | 110.60 | 113.43 | 106.44 | 94.68 | 105.19 | 109.75 |
| 1998 | 116.70 | 115.08 | 117.21 | 114.19 | 113.65 | 120.65 | 110.87 | 101.29 | 108.96 | 114.76 |
| 1999 | 119.78 | 117.82 | 120.60 | 117.43 | 114.58 | 120.92 | 110.50 | 103.94 | 116.52 | 117.49 |
| 2000 | 122.85 | 121.11 | 125.72 | 119.47 | 117.98 | 125.63 | 115.43 | 106.95 | 120.12 | 121.93 |
| 2001 | 128.53 | 130.25 | 126.41 | 123.31 | 123.14 | 130.58 | 119.13 | 111.52 | 125.09 | 125.58 |
| 2002 | 138.23 | 130.42 | 127.65 | 125.95 | 126.19 | 134.15 | 125.53 | 114.53 | 130.20 | 128.57 |
| 2003 | 138.70 | 136.82 | 134.36 | 129.44 | 129.01 | 138.13 | 127.63 | 119.82 | 134.01 | 133.47 |
| 2004 | 153.01 | 141.94 | 138.47 | 132.08 | 134.64 | 144.57 | 133.05 | 122.95 | 137.86 | 138.27 |
| 2005 | 159.51 | 145.51 | 143.60 | 137.60 | 140.39 | 149.21 | 135.51 | 125.35 | 140.94 | 142.47 |
| 2006 | 176.89 | 149.14 | 149.40 | 141.44 | 142.85 | 152.34 | 141.92 | 130.05 | 145.86 | 147.46 |
| 2007 | 186.94 | 154.52 | 154.14 | 146.73 | 148.95 | 159.11 | 147.21 | 134.62 | 151.31 | 152.85 |

**Table A10.3** *Male employment weights, 1871–2007*

| | Mining | Metal | Engineering | Quarrying | Wood | Paper | Food | Textile | Chemical |
|---|---|---|---|---|---|---|---|---|---|
| 1871 | 0.04 | 0.25 | 0.07 | 0.07 | 0.18 | 0.03 | 0.19 | 0.05 | 0.11 |
| 1872 | 0.05 | 0.25 | 0.07 | 0.08 | 0.18 | 0.04 | 0.18 | 0.05 | 0.10 |
| 1873 | 0.05 | 0.24 | 0.08 | 0.08 | 0.18 | 0.04 | 0.17 | 0.05 | 0.10 |
| 1874 | 0.06 | 0.24 | 0.09 | 0.08 | 0.17 | 0.05 | 0.17 | 0.05 | 0.10 |
| 1875 | 0.05 | 0.24 | 0.09 | 0.08 | 0.17 | 0.05 | 0.17 | 0.05 | 0.10 |
| 1876 | 0.04 | 0.25 | 0.08 | 0.09 | 0.18 | 0.05 | 0.16 | 0.05 | 0.10 |
| 1877 | 0.04 | 0.24 | 0.08 | 0.10 | 0.19 | 0.05 | 0.16 | 0.05 | 0.10 |
| 1878 | 0.03 | 0.24 | 0.07 | 0.10 | 0.19 | 0.04 | 0.17 | 0.05 | 0.10 |
| 1879 | 0.03 | 0.24 | 0.07 | 0.10 | 0.20 | 0.04 | 0.17 | 0.05 | 0.10 |
| 1880 | 0.04 | 0.25 | 0.07 | 0.11 | 0.18 | 0.05 | 0.16 | 0.05 | 0.10 |
| 1881 | 0.04 | 0.25 | 0.08 | 0.09 | 0.18 | 0.05 | 0.16 | 0.05 | 0.10 |
| 1882 | 0.04 | 0.25 | 0.09 | 0.09 | 0.17 | 0.05 | 0.16 | 0.04 | 0.10 |
| 1883 | 0.04 | 0.25 | 0.10 | 0.09 | 0.16 | 0.05 | 0.16 | 0.04 | 0.10 |
| 1884 | 0.04 | 0.25 | 0.09 | 0.10 | 0.17 | 0.05 | 0.16 | 0.04 | 0.10 |
| 1885 | 0.04 | 0.24 | 0.09 | 0.10 | 0.17 | 0.05 | 0.16 | 0.05 | 0.10 |
| 1886 | 0.04 | 0.25 | 0.09 | 0.10 | 0.16 | 0.06 | 0.16 | 0.05 | 0.09 |
| 1887 | 0.04 | 0.24 | 0.08 | 0.10 | 0.17 | 0.06 | 0.16 | 0.05 | 0.09 |
| 1888 | 0.04 | 0.25 | 0.09 | 0.10 | 0.16 | 0.07 | 0.15 | 0.05 | 0.09 |
| 1889 | 0.03 | 0.25 | 0.10 | 0.11 | 0.16 | 0.07 | 0.14 | 0.05 | 0.08 |
| 1890 | 0.03 | 0.26 | 0.10 | 0.11 | 0.15 | 0.07 | 0.14 | 0.05 | 0.08 |
| 1891 | 0.03 | 0.24 | 0.10 | 0.14 | 0.15 | 0.08 | 0.14 | 0.05 | 0.08 |
| 1892 | 0.04 | 0.20 | 0.11 | 0.14 | 0.15 | 0.07 | 0.16 | 0.05 | 0.08 |

**Table A10.3 (cont.).** *Male employment weights, 1871–2007*

| | Mining | Metal | Engineering | Quarrying | Wood | Paper | Food | Textile | Chemical |
|---|---|---|---|---|---|---|---|---|---|
| 1893 | 0.04 | 0.16 | 0.11 | 0.15 | 0.15 | 0.08 | 0.17 | 0.05 | 0.08 |
| 1894 | 0.04 | 0.16 | 0.11 | 0.15 | 0.15 | 0.08 | 0.16 | 0.06 | 0.08 |
| 1895 | 0.04 | 0.16 | 0.12 | 0.16 | 0.15 | 0.09 | 0.16 | 0.06 | 0.08 |
| 1896 | 0.04 | 0.15 | 0.13 | 0.17 | 0.15 | 0.09 | 0.15 | 0.06 | 0.07 |
| 1897 | 0.04 | 0.14 | 0.14 | 0.17 | 0.15 | 0.09 | 0.14 | 0.06 | 0.07 |
| 1898 | 0.04 | 0.14 | 0.14 | 0.18 | 0.14 | 0.09 | 0.14 | 0.06 | 0.07 |
| 1899 | 0.03 | 0.15 | 0.15 | 0.18 | 0.14 | 0.09 | 0.13 | 0.06 | 0.06 |
| 1900 | 0.04 | 0.14 | 0.15 | 0.18 | 0.14 | 0.09 | 0.13 | 0.06 | 0.06 |
| 1901 | 0.04 | 0.14 | 0.14 | 0.18 | 0.14 | 0.10 | 0.14 | 0.06 | 0.06 |
| 1902 | 0.04 | 0.14 | 0.14 | 0.19 | 0.13 | 0.10 | 0.14 | 0.06 | 0.06 |
| 1903 | 0.04 | 0.14 | 0.14 | 0.19 | 0.14 | 0.10 | 0.13 | 0.06 | 0.05 |
| 1904 | 0.04 | 0.14 | 0.15 | 0.19 | 0.13 | 0.11 | 0.13 | 0.07 | 0.05 |
| 1905 | 0.04 | 0.15 | 0.15 | 0.20 | 0.12 | 0.11 | 0.13 | 0.07 | 0.05 |
| 1906 | 0.04 | 0.14 | 0.15 | 0.19 | 0.12 | 0.11 | 0.13 | 0.07 | 0.05 |
| 1907 | 0.03 | 0.15 | 0.16 | 0.18 | 0.12 | 0.12 | 0.12 | 0.06 | 0.05 |
| 1908 | 0.04 | 0.14 | 0.17 | 0.18 | 0.11 | 0.13 | 0.12 | 0.06 | 0.05 |
| 1909 | 0.03 | 0.14 | 0.15 | 0.18 | 0.11 | 0.13 | 0.13 | 0.07 | 0.05 |
| 1910 | 0.03 | 0.14 | 0.15 | 0.18 | 0.12 | 0.13 | 0.13 | 0.07 | 0.05 |
| 1911 | 0.04 | 0.14 | 0.16 | 0.18 | 0.12 | 0.13 | 0.12 | 0.07 | 0.05 |
| 1912 | 0.03 | 0.14 | 0.16 | 0.18 | 0.11 | 0.13 | 0.12 | 0.07 | 0.06 |
| 1913 | 0.04 | 0.14 | 0.16 | 0.18 | 0.11 | 0.13 | 0.12 | 0.07 | 0.06 |
| 1914 | 0.03 | 0.14 | 0.17 | 0.18 | 0.11 | 0.13 | 0.12 | 0.07 | 0.06 |
| 1915 | 0.04 | 0.14 | 0.18 | 0.15 | 0.11 | 0.13 | 0.12 | 0.07 | 0.06 |
| 1916 | 0.04 | 0.14 | 0.20 | 0.13 | 0.12 | 0.13 | 0.12 | 0.07 | 0.06 |
| 1917 | 0.04 | 0.14 | 0.21 | 0.14 | 0.11 | 0.13 | 0.11 | 0.06 | 0.06 |
| 1918 | 0.04 | 0.14 | 0.22 | 0.15 | 0.11 | 0.13 | 0.10 | 0.06 | 0.07 |
| 1919 | 0.03 | 0.13 | 0.21 | 0.15 | 0.11 | 0.14 | 0.10 | 0.06 | 0.07 |
| 1920 | 0.03 | 0.13 | 0.20 | 0.14 | 0.11 | 0.15 | 0.11 | 0.07 | 0.06 |
| 1921 | 0.03 | 0.12 | 0.18 | 0.14 | 0.10 | 0.16 | 0.14 | 0.07 | 0.06 |
| 1922 | 0.03 | 0.12 | 0.13 | 0.14 | 0.12 | 0.18 | 0.14 | 0.08 | 0.06 |
| 1923 | 0.02 | 0.13 | 0.16 | 0.15 | 0.12 | 0.17 | 0.10 | 0.09 | 0.06 |
| 1924 | 0.02 | 0.13 | 0.17 | 0.15 | 0.11 | 0.16 | 0.12 | 0.08 | 0.06 |
| 1925 | 0.02 | 0.13 | 0.18 | 0.16 | 0.11 | 0.16 | 0.11 | 0.08 | 0.06 |
| 1926 | 0.02 | 0.13 | 0.18 | 0.15 | 0.11 | 0.16 | 0.11 | 0.08 | 0.05 |
| 1927 | 0.02 | 0.13 | 0.19 | 0.15 | 0.11 | 0.17 | 0.09 | 0.08 | 0.05 |
| 1928 | 0.02 | 0.13 | 0.19 | 0.14 | 0.11 | 0.17 | 0.11 | 0.08 | 0.05 |
| 1929 | 0.02 | 0.13 | 0.20 | 0.15 | 0.11 | 0.17 | 0.10 | 0.08 | 0.05 |
| 1930 | 0.02 | 0.13 | 0.20 | 0.15 | 0.10 | 0.16 | 0.10 | 0.08 | 0.05 |
| 1931 | 0.02 | 0.14 | 0.20 | 0.14 | 0.11 | 0.16 | 0.10 | 0.09 | 0.05 |
| 1932 | 0.02 | 0.15 | 0.19 | 0.13 | 0.11 | 0.16 | 0.10 | 0.09 | 0.05 |
| 1933 | 0.01 | 0.16 | 0.19 | 0.12 | 0.10 | 0.16 | 0.10 | 0.10 | 0.05 |
| 1934 | 0.02 | 0.16 | 0.20 | 0.11 | 0.11 | 0.15 | 0.10 | 0.10 | 0.05 |
| 1935 | 0.02 | 0.17 | 0.21 | 0.11 | 0.11 | 0.14 | 0.10 | 0.09 | 0.05 |
| 1936 | 0.02 | 0.17 | 0.22 | 0.12 | 0.10 | 0.14 | 0.09 | 0.09 | 0.05 |

**Table A10.3 (cont.).** *Male employment weights, 1871–2007*

| | Mining | Metal | Engin-eering | Quarry-ing | Wood | Paper | Food | Textile | Chemi-cal |
|---|---|---|---|---|---|---|---|---|---|
| 1937 | 0.02 | 0.18 | 0.23 | 0.12 | 0.10 | 0.13 | 0.09 | 0.09 | 0.05 |
| 1938 | 0.02 | 0.17 | 0.24 | 0.12 | 0.10 | 0.13 | 0.09 | 0.09 | 0.05 |
| 1939 | 0.02 | 0.17 | 0.24 | 0.11 | 0.10 | 0.13 | 0.09 | 0.09 | 0.05 |
| 1940 | 0.02 | 0.15 | 0.28 | 0.09 | 0.09 | 0.12 | 0.10 | 0.10 | 0.06 |
| 1941 | 0.02 | 0.15 | 0.29 | 0.10 | 0.09 | 0.11 | 0.09 | 0.09 | 0.06 |
| 1942 | 0.02 | 0.15 | 0.29 | 0.12 | 0.08 | 0.11 | 0.09 | 0.08 | 0.06 |
| 1943 | 0.02 | 0.14 | 0.30 | 0.13 | 0.09 | 0.10 | 0.09 | 0.08 | 0.06 |
| 1944 | 0.02 | 0.14 | 0.30 | 0.12 | 0.09 | 0.10 | 0.09 | 0.08 | 0.06 |
| 1945 | 0.01 | 0.14 | 0.29 | 0.12 | 0.09 | 0.11 | 0.09 | 0.08 | 0.06 |
| 1946 | 0.01 | 0.14 | 0.31 | 0.11 | 0.09 | 0.12 | 0.08 | 0.09 | 0.06 |
| 1947 | 0.01 | 0.14 | 0.31 | 0.10 | 0.09 | 0.12 | 0.08 | 0.09 | 0.06 |
| 1948 | 0.01 | 0.14 | 0.32 | 0.10 | 0.08 | 0.12 | 0.08 | 0.09 | 0.06 |
| 1949 | 0.01 | 0.14 | 0.33 | 0.09 | 0.08 | 0.12 | 0.08 | 0.09 | 0.06 |
| 1950 | 0.01 | 0.14 | 0.33 | 0.09 | 0.08 | 0.12 | 0.08 | 0.09 | 0.06 |
| 1951 | 0.01 | 0.14 | 0.33 | 0.08 | 0.08 | 0.12 | 0.09 | 0.09 | 0.06 |
| 1952 | 0.02 | 0.15 | 0.33 | 0.09 | 0.07 | 0.11 | 0.08 | 0.09 | 0.06 |
| 1953 | 0.02 | 0.16 | 0.32 | 0.09 | 0.07 | 0.11 | 0.08 | 0.09 | 0.06 |
| 1954 | 0.02 | 0.15 | 0.32 | 0.09 | 0.08 | 0.11 | 0.08 | 0.09 | 0.06 |
| 1955 | 0.02 | 0.16 | 0.34 | 0.09 | 0.04 | 0.12 | 0.09 | 0.08 | 0.06 |
| 1956 | 0.02 | 0.15 | 0.33 | 0.08 | 0.08 | 0.12 | 0.08 | 0.08 | 0.06 |
| 1957 | 0.02 | 0.16 | 0.34 | 0.08 | 0.07 | 0.12 | 0.08 | 0.07 | 0.06 |
| 1958 | 0.02 | 0.16 | 0.34 | 0.08 | 0.07 | 0.12 | 0.08 | 0.07 | 0.06 |
| 1959 | 0.02 | 0.16 | 0.34 | 0.08 | 0.07 | 0.12 | 0.08 | 0.07 | 0.06 |
| 1960 | 0.02 | 0.17 | 0.34 | 0.08 | 0.07 | 0.12 | 0.08 | 0.06 | 0.06 |
| 1961 | 0.02 | 0.17 | 0.35 | 0.08 | 0.07 | 0.12 | 0.07 | 0.06 | 0.06 |
| 1962 | 0.02 | 0.17 | 0.36 | 0.08 | 0.07 | 0.12 | 0.07 | 0.06 | 0.06 |
| 1963 | 0.01 | 0.16 | 0.37 | 0.08 | 0.07 | 0.12 | 0.07 | 0.06 | 0.06 |
| 1964 | 0.01 | 0.17 | 0.37 | 0.08 | 0.07 | 0.11 | 0.07 | 0.06 | 0.06 |
| 1965 | 0.01 | 0.17 | 0.37 | 0.08 | 0.07 | 0.11 | 0.07 | 0.06 | 0.06 |
| 1966 | 0.01 | 0.17 | 0.37 | 0.08 | 0.07 | 0.11 | 0.07 | 0.05 | 0.06 |
| 1967 | 0.01 | 0.17 | 0.37 | 0.08 | 0.08 | 0.11 | 0.07 | 0.05 | 0.06 |
| 1968 | 0.01 | 0.19 | 0.37 | 0.07 | 0.08 | 0.10 | 0.07 | 0.05 | 0.06 |
| 1969 | 0.01 | 0.20 | 0.37 | 0.07 | 0.07 | 0.10 | 0.07 | 0.04 | 0.06 |
| 1970 | 0.01 | 0.20 | 0.38 | 0.06 | 0.07 | 0.10 | 0.07 | 0.04 | 0.07 |
| 1971 | 0.01 | 0.20 | 0.39 | 0.06 | 0.07 | 0.10 | 0.07 | 0.04 | 0.07 |
| 1972 | 0.01 | 0.20 | 0.39 | 0.06 | 0.07 | 0.10 | 0.07 | 0.04 | 0.07 |
| 1973 | 0.01 | 0.20 | 0.40 | 0.05 | 0.07 | 0.10 | 0.07 | 0.04 | 0.07 |
| 1974 | 0.01 | 0.20 | 0.41 | 0.05 | 0.07 | 0.09 | 0.06 | 0.03 | 0.07 |
| 1975 | 0.01 | 0.20 | 0.42 | 0.05 | 0.07 | 0.09 | 0.07 | 0.03 | 0.07 |
| 1976 | 0.01 | 0.20 | 0.42 | 0.05 | 0.07 | 0.10 | 0.07 | 0.03 | 0.07 |
| 1977 | 0.01 | 0.20 | 0.41 | 0.05 | 0.07 | 0.10 | 0.07 | 0.03 | 0.07 |
| 1978 | 0.01 | 0.19 | 0.42 | 0.05 | 0.07 | 0.10 | 0.07 | 0.03 | 0.07 |
| 1979 | 0.01 | 0.19 | 0.42 | 0.05 | 0.07 | 0.10 | 0.07 | 0.02 | 0.07 |
| 1980 | 0.01 | 0.19 | 0.41 | 0.05 | 0.07 | 0.10 | 0.07 | 0.02 | 0.07 |

**Table A10.3 (cont.).** *Male employment weights, 1871–2007*

| | Mining | Metal | Engineering | Quarrying | Wood | Paper | Food | Textile | Chemical |
|---|---|---|---|---|---|---|---|---|---|
| 1981 | 0.01 | 0.19 | 0.41 | 0.04 | 0.06 | 0.10 | 0.08 | 0.02 | 0.07 |
| 1982 | 0.01 | 0.19 | 0.42 | 0.04 | 0.06 | 0.10 | 0.08 | 0.02 | 0.07 |
| 1983 | 0.01 | 0.19 | 0.42 | 0.04 | 0.06 | 0.10 | 0.08 | 0.02 | 0.08 |
| 1984 | 0.01 | 0.19 | 0.42 | 0.04 | 0.06 | 0.10 | 0.08 | 0.02 | 0.08 |
| 1985 | 0.01 | 0.18 | 0.43 | 0.04 | 0.06 | 0.10 | 0.08 | 0.02 | 0.08 |
| 1986 | 0.01 | 0.18 | 0.43 | 0.04 | 0.06 | 0.10 | 0.08 | 0.02 | 0.08 |
| 1987 | 0.01 | 0.18 | 0.43 | 0.04 | 0.06 | 0.10 | 0.08 | 0.02 | 0.08 |
| 1988 | 0.01 | 0.18 | 0.43 | 0.04 | 0.06 | 0.11 | 0.07 | 0.02 | 0.08 |
| 1989 | 0.01 | 0.18 | 0.42 | 0.04 | 0.06 | 0.11 | 0.08 | 0.01 | 0.08 |
| 1990 | 0.01 | 0.18 | 0.41 | 0.05 | 0.06 | 0.11 | 0.08 | 0.01 | 0.08 |
| 1991 | 0.01 | 0.18 | 0.42 | 0.04 | 0.06 | 0.12 | 0.08 | 0.01 | 0.07 |
| 1992 | 0.01 | 0.17 | 0.43 | 0.03 | 0.06 | 0.12 | 0.08 | 0.02 | 0.07 |
| 1993 | 0.01 | 0.17 | 0.41 | 0.03 | 0.06 | 0.12 | 0.09 | 0.02 | 0.08 |
| 1994 | 0.02 | 0.17 | 0.41 | 0.03 | 0.06 | 0.12 | 0.09 | 0.02 | 0.08 |
| 1995 | 0.02 | 0.18 | 0.42 | 0.03 | 0.06 | 0.11 | 0.08 | 0.01 | 0.08 |
| 1996 | 0.02 | 0.18 | 0.43 | 0.03 | 0.06 | 0.11 | 0.08 | 0.01 | 0.08 |
| 1997 | 0.01 | 0.18 | 0.43 | 0.03 | 0.06 | 0.11 | 0.08 | 0.01 | 0.08 |
| 1998 | 0.01 | 0.18 | 0.44 | 0.03 | 0.06 | 0.10 | 0.08 | 0.01 | 0.08 |
| 1999 | 0.01 | 0.18 | 0.43 | 0.03 | 0.06 | 0.10 | 0.08 | 0.01 | 0.08 |
| 2000 | 0.01 | 0.18 | 0.43 | 0.03 | 0.06 | 0.10 | 0.08 | 0.01 | 0.08 |
| 2001 | 0.01 | 0.18 | 0.43 | 0.03 | 0.06 | 0.10 | 0.08 | 0.01 | 0.09 |
| 2002 | 0.01 | 0.18 | 0.43 | 0.03 | 0.06 | 0.10 | 0.08 | 0.01 | 0.09 |
| 2003 | 0.01 | 0.18 | 0.43 | 0.03 | 0.06 | 0.10 | 0.08 | 0.01 | 0.09 |
| 2004 | 0.01 | 0.19 | 0.43 | 0.03 | 0.07 | 0.10 | 0.08 | 0.01 | 0.09 |
| 2005 | 0.01 | 0.19 | 0.43 | 0.03 | 0.07 | 0.10 | 0.08 | 0.01 | 0.08 |
| 2006 | 0.01 | 0.19 | 0.43 | 0.03 | 0.07 | 0.09 | 0.08 | 0.01 | 0.08 |
| 2007 | 0.01 | 0.19 | 0.43 | 0.03 | 0.07 | 0.10 | 0.08 | 0.01 | 0.08 |

**Table A10.4** *Female employment weights, 1921–2007*

| | Mining | Metal | Engineering | Quarrying | Wood | Paper | Food | Textile | Chemical |
|---|---|---|---|---|---|---|---|---|---|
| 1921 | | 0.04 | 0.04 | 0.04 | 0.01 | 0.12 | 0.24 | 0.39 | 0.11 |
| 1922 | | 0.04 | 0.03 | 0.04 | 0.01 | 0.12 | 0.21 | 0.44 | 0.11 |
| 1923 | | 0.05 | 0.04 | 0.04 | 0.01 | 0.12 | 0.21 | 0.44 | 0.11 |
| 1924 | | 0.05 | 0.04 | 0.03 | 0.01 | 0.12 | 0.20 | 0.44 | 0.11 |
| 1925 | | 0.05 | 0.05 | 0.03 | 0.01 | 0.12 | 0.18 | 0.44 | 0.11 |
| 1926 | | 0.05 | 0.05 | 0.03 | 0.01 | 0.13 | 0.18 | 0.44 | 0.11 |
| 1927 | | 0.05 | 0.05 | 0.03 | 0.01 | 0.13 | 0.17 | 0.44 | 0.12 |
| 1928 | | 0.05 | 0.06 | 0.03 | 0.01 | 0.13 | 0.16 | 0.45 | 0.12 |
| 1929 | | 0.06 | 0.06 | 0.03 | 0.01 | 0.12 | 0.16 | 0.44 | 0.12 |
| 1930 | | 0.05 | 0.06 | 0.03 | 0.01 | 0.12 | 0.16 | 0.45 | 0.11 |
| 1931 | | 0.05 | 0.06 | 0.03 | 0.01 | 0.12 | 0.16 | 0.47 | 0.11 |

**Table A10.4 (cont.)** *Female employment weights, 1921–2007*

| | Mining | Metal | Engineering | Quarrying | Wood | Paper | Food | Textile | Chemical |
|---|---|---|---|---|---|---|---|---|---|
| 1932 | | 0.05 | 0.05 | 0.03 | 0.01 | 0.12 | 0.16 | 0.47 | 0.11 |
| 1933 | | 0.05 | 0.05 | 0.03 | 0.01 | 0.12 | 0.15 | 0.48 | 0.11 |
| 1934 | | 0.05 | 0.06 | 0.03 | 0.01 | 0.12 | 0.15 | 0.50 | 0.10 |
| 1935 | | 0.06 | 0.07 | 0.03 | 0.01 | 0.12 | 0.14 | 0.49 | 0.09 |
| 1936 | | 0.05 | 0.07 | 0.03 | 0.01 | 0.12 | 0.14 | 0.50 | 0.09 |
| 1937 | | 0.05 | 0.08 | 0.03 | 0.01 | 0.11 | 0.14 | 0.48 | 0.09 |
| 1938 | | 0.05 | 0.09 | 0.03 | 0.01 | 0.11 | 0.14 | 0.48 | 0.09 |
| 1939 | | 0.06 | 0.09 | 0.03 | 0.01 | 0.11 | 0.13 | 0.48 | 0.09 |
| 1940 | | 0.07 | 0.10 | 0.03 | 0.01 | 0.10 | 0.12 | 0.47 | 0.11 |
| 1941 | | 0.08 | 0.11 | 0.03 | 0.01 | 0.11 | 0.12 | 0.45 | 0.10 |
| 1942 | | 0.08 | 0.12 | 0.05 | 0.01 | 0.11 | 0.12 | 0.42 | 0.09 |
| 1943 | | 0.08 | 0.13 | 0.05 | 0.01 | 0.11 | 0.11 | 0.42 | 0.09 |
| 1944 | | 0.08 | 0.13 | 0.05 | 0.01 | 0.12 | 0.11 | 0.43 | 0.09 |
| 1945 | | 0.08 | 0.12 | 0.05 | 0.01 | 0.12 | 0.11 | 0.42 | 0.08 |
| 1946 | | 0.08 | 0.12 | 0.05 | 0.01 | 0.12 | 0.11 | 0.42 | 0.08 |
| 1947 | | 0.08 | 0.13 | 0.04 | 0.01 | 0.12 | 0.11 | 0.43 | 0.08 |
| 1948 | | 0.08 | 0.13 | 0.04 | 0.01 | 0.11 | 0.11 | 0.45 | 0.08 |
| 1949 | | 0.08 | 0.13 | 0.03 | 0.01 | 0.12 | 0.11 | 0.45 | 0.07 |
| 1950 | | 0.08 | 0.12 | 0.03 | 0.01 | 0.12 | 0.10 | 0.45 | 0.08 |
| 1951 | | 0.09 | 0.13 | 0.03 | 0.01 | 0.11 | 0.11 | 0.44 | 0.08 |
| 1952 | 0.002 | 0.09 | 0.15 | 0.04 | 0.01 | 0.12 | 0.12 | 0.40 | 0.08 |
| 1953 | 0.002 | 0.08 | 0.13 | 0.03 | 0.01 | 0.12 | 0.12 | 0.42 | 0.08 |
| 1954 | 0.002 | 0.09 | 0.14 | 0.04 | 0.01 | 0.12 | 0.12 | 0.40 | 0.08 |
| 1955 | 0.002 | 0.10 | 0.15 | 0.04 | 0.01 | 0.12 | 0.11 | 0.39 | 0.08 |
| 1956 | 0.002 | 0.10 | 0.15 | 0.03 | 0.01 | 0.12 | 0.13 | 0.38 | 0.08 |
| 1957 | 0.002 | 0.10 | 0.15 | 0.03 | 0.01 | 0.12 | 0.12 | 0.37 | 0.08 |
| 1958 | 0.002 | 0.09 | 0.16 | 0.03 | 0.01 | 0.13 | 0.13 | 0.36 | 0.08 |
| 1959 | 0.002 | 0.10 | 0.16 | 0.03 | 0.01 | 0.13 | 0.13 | 0.36 | 0.08 |
| 1960 | 0.003 | 0.11 | 0.16 | 0.03 | 0.01 | 0.13 | 0.13 | 0.34 | 0.08 |
| 1961 | 0.003 | 0.11 | 0.18 | 0.03 | 0.01 | 0.12 | 0.13 | 0.33 | 0.08 |
| 1962 | 0.003 | 0.11 | 0.19 | 0.03 | 0.01 | 0.12 | 0.13 | 0.32 | 0.08 |
| 1963 | 0.003 | 0.11 | 0.20 | 0.03 | 0.01 | 0.12 | 0.13 | 0.31 | 0.08 |
| 1964 | 0.002 | 0.11 | 0.20 | 0.03 | 0.02 | 0.12 | 0.13 | 0.30 | 0.08 |
| 1965 | 0.002 | 0.12 | 0.21 | 0.04 | 0.02 | 0.12 | 0.13 | 0.28 | 0.08 |
| 1966 | 0.003 | 0.12 | 0.22 | 0.04 | 0.02 | 0.12 | 0.13 | 0.25 | 0.09 |
| 1967 | 0.002 | 0.13 | 0.22 | 0.04 | 0.02 | 0.12 | 0.13 | 0.25 | 0.09 |
| 1968 | 0.002 | 0.12 | 0.22 | 0.03 | 0.03 | 0.12 | 0.14 | 0.24 | 0.09 |
| 1969 | 0.002 | 0.13 | 0.24 | 0.03 | 0.02 | 0.12 | 0.14 | 0.22 | 0.10 |
| 1970 | 0.002 | 0.14 | 0.27 | 0.03 | 0.02 | 0.12 | 0.13 | 0.19 | 0.10 |
| 1971 | 0.003 | 0.14 | 0.29 | 0.03 | 0.03 | 0.12 | 0.13 | 0.17 | 0.10 |
| 1972 | 0.003 | 0.14 | 0.28 | 0.03 | 0.03 | 0.12 | 0.13 | 0.17 | 0.10 |
| 1973 | 0.003 | 0.15 | 0.29 | 0.03 | 0.03 | 0.12 | 0.12 | 0.16 | 0.10 |
| 1974 | 0.003 | 0.16 | 0.31 | 0.03 | 0.03 | 0.11 | 0.12 | 0.14 | 0.10 |
| 1975 | 0.004 | 0.16 | 0.33 | 0.03 | 0.03 | 0.11 | 0.11 | 0.13 | 0.10 |

**Table A10.4 (cont.)** *Female employment weights, 1921–2007*

| | Mining | Metal | Engin-eering | Quarry-ing | Wood | Paper | Food | Textile | Chemi-cal |
|---|---|---|---|---|---|---|---|---|---|
| 1976 | 0.004 | 0.16 | 0.33 | 0.03 | 0.03 | 0.12 | 0.12 | 0.12 | 0.10 |
| 1977 | 0.004 | 0.16 | 0.33 | 0.03 | 0.03 | 0.12 | 0.12 | 0.11 | 0.09 |
| 1978 | 0.004 | 0.16 | 0.33 | 0.03 | 0.03 | 0.12 | 0.12 | 0.10 | 0.09 |
| 1979 | 0.004 | 0.16 | 0.33 | 0.03 | 0.03 | 0.12 | 0.12 | 0.10 | 0.10 |
| 1980 | 0.004 | 0.16 | 0.33 | 0.03 | 0.03 | 0.13 | 0.12 | 0.09 | 0.10 |
| 1981 | 0.004 | 0.16 | 0.34 | 0.03 | 0.03 | 0.13 | 0.12 | 0.09 | 0.10 |
| 1982 | 0.005 | 0.16 | 0.33 | 0.03 | 0.03 | 0.13 | 0.12 | 0.09 | 0.10 |
| 1983 | 0.004 | 0.16 | 0.34 | 0.03 | 0.03 | 0.13 | 0.12 | 0.09 | 0.10 |
| 1984 | 0.004 | 0.16 | 0.34 | 0.02 | 0.03 | 0.13 | 0.12 | 0.08 | 0.10 |
| 1985 | 0.004 | 0.15 | 0.36 | 0.02 | 0.03 | 0.13 | 0.12 | 0.08 | 0.10 |
| 1986 | 0.004 | 0.15 | 0.36 | 0.02 | 0.03 | 0.13 | 0.12 | 0.08 | 0.10 |
| 1987 | 0.004 | 0.15 | 0.36 | 0.02 | 0.03 | 0.13 | 0.12 | 0.08 | 0.10 |
| 1988 | 0.008 | 0.14 | 0.37 | 0.02 | 0.03 | 0.14 | 0.12 | 0.07 | 0.10 |
| 1989 | 0.008 | 0.13 | 0.36 | 0.02 | 0.03 | 0.15 | 0.12 | 0.07 | 0.10 |
| 1990 | 0.006 | 0.13 | 0.35 | 0.02 | 0.03 | 0.16 | 0.14 | 0.06 | 0.10 |
| 1991 | 0.005 | 0.13 | 0.35 | 0.02 | 0.03 | 0.17 | 0.14 | 0.06 | 0.10 |
| 1992 | 0.004 | 0.13 | 0.34 | 0.02 | 0.03 | 0.18 | 0.14 | 0.05 | 0.11 |
| 1993 | 0.005 | 0.11 | 0.33 | 0.02 | 0.03 | 0.19 | 0.14 | 0.05 | 0.12 |
| 1994 | 0.005 | 0.11 | 0.33 | 0.02 | 0.03 | 0.18 | 0.14 | 0.06 | 0.12 |
| 1995 | 0.006 | 0.11 | 0.34 | 0.02 | 0.03 | 0.18 | 0.14 | 0.05 | 0.12 |
| 1996 | 0.006 | 0.11 | 0.35 | 0.02 | 0.03 | 0.18 | 0.14 | 0.05 | 0.13 |
| 1997 | 0.005 | 0.11 | 0.35 | 0.02 | 0.03 | 0.17 | 0.13 | 0.05 | 0.13 |
| 1998 | 0.005 | 0.11 | 0.36 | 0.02 | 0.03 | 0.17 | 0.13 | 0.04 | 0.13 |
| 1999 | 0.005 | 0.11 | 0.36 | 0.02 | 0.03 | 0.17 | 0.14 | 0.04 | 0.12 |
| 2000 | 0.004 | 0.11 | 0.36 | 0.02 | 0.03 | 0.16 | 0.13 | 0.04 | 0.14 |
| 2001 | 0.004 | 0.11 | 0.36 | 0.02 | 0.03 | 0.16 | 0.14 | 0.04 | 0.14 |
| 2002 | 0.005 | 0.10 | 0.36 | 0.02 | 0.03 | 0.16 | 0.14 | 0.03 | 0.15 |
| 2003 | 0.005 | 0.10 | 0.36 | 0.02 | 0.03 | 0.16 | 0.14 | 0.03 | 0.15 |
| 2004 | 0.005 | 0.11 | 0.35 | 0.02 | 0.03 | 0.16 | 0.14 | 0.03 | 0.15 |
| 2005 | 0.006 | 0.11 | 0.35 | 0.02 | 0.03 | 0.16 | 0.14 | 0.03 | 0.15 |
| 2006 | 0.006 | 0.11 | 0.35 | 0.02 | 0.04 | 0.16 | 0.14 | 0.03 | 0.15 |
| 2007 | 0.006 | 0.11 | 0.35 | 0.02 | 0.04 | 0.16 | 0.14 | 0.03 | 0.15 |

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