Volume Title: A Retrospective on the Classical Gold Standard, 1821-1931

Volume Author/Editor: Michael D. Bordo and Anna J. Schwartz, editors

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-06590-1

Volume URL: http://www.nber.org/books/bord84-1

Publication Date: 1984

Chapter Title: Swedish Experience under the Classical Gold Standard, 1873-1914

Chapter Author: Lars Jonung

Chapter URL: http://www.nber.org/chapters/c11133

Chapter pages in book: (p. 361 - 404)

8 Swedish Experience under the Classical Gold Standard, 1873–1914

Lars Jonung

8.1 Introduction

Sweden adopted gold as the basis for its monetary system in 1873. The Swedish currency, the krona, remained tied to gold at a fixed rate for about forty years until the outbreak of World War I. The prewar gold standard represents the longest lasting monetary regime in Swedish history from the establishment of the Riksbank in the second half of the seventeenth century to the present. Actually, World War I did not mark the demise of the gold standard in Sweden. During the war the krona was intermittently below, above, and at par with the prewar gold rate. In 1922 Sweden was the first country in Europe to return de facto to gold at the prewar parity and in 1924 de jure. The interwar gold standard lapsed in September 1931 when Sweden followed Great Britain's departure from gold.

Swedish experience stands out in four respects. First, the country's economic growth, if not the highest, certainly was one of the highest of any country in Europe during the classical gold standard era from the 1870s to the outbreak of World War I. In the second half of the nineteenth century, Sweden began a process of industrialization financed

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The author is greatly indebted to Ingemar Dahlstrand at the Lund computer center who has skillfully and patiently worked with the data base to produce the figures and tables. The author benefited from generous comments by Arthur Bloomfield, Michael Bordo, Thorvaldur Gylfason, Lennart Jörberg, Charles Kindleberger, Frank Kirwan, and Peter Lindert. He would also like to thank seminar participants at the Institute for International Economic Studies, University of Stockholm and at the Department of Economic History at the University of Lund. A great debt is owed to Frank Kirwan who has skillfully improved the author's English. Financial support from the Bank of Sweden Tercentenary Fund is gratefully acknowledged. This paper builds upon data and results from an ongoing study of Swedish monetary history.

by considerable capital imports which transformed a basically agrarian country into an industrialized society. Second, this rapid economic development was accompanied and supported by a swift expansion of the Swedish monetary system. Commercial banking spread, measured by the number of banks, number of branch offices, and volume of deposits.

Third, Denmark, Norway, and Sweden formed a monetary union in the 1870s based on a common gold currency, the Scandinavian krona. Eventually Scandinavian bank notes were accepted at par by the three central banks. In this way the Scandinavian countries maintained a close monetary association during the gold standard era. Finally, comprehensive monthly data covering the Riksbank and the complete commercial banking system are available from the early 1870s. The data make possible a detailed examination of Swedish monetary experience during the prewar gold standard era.

8.2 Issues to be Examined

The Swedish gold standard (1873–1914) has not previously been examined from a monetary standpoint applying received economic theory.[1] The purpose of this study is to fill the gap.[2]

The Swedish monetary system and the behavior of money, velocity, prices, and real income during the pre-1914 gold standard era are briefly described in section 8.3. This account also serves as background for an examination of the factors behind gold holding by the nonbank public, the commercial banking system, and the Riksbank (section 8.4). The domestic distribution of gold is intimately related to the role of gold and the role of the Riksbank in the money-supply process. That process is the framework for a discussion of the following questions in section 8.5: (1) Did the Riksbank follow "the rules of the game", i.e., did it respond to a gold outflow (inflow) by reducing (expanding) its domestic lending, or did the bank sterilize gold flows by offsetting operations? (2) Did the Riksbank use gold or other currencies like the British pound and the German mark for settling international transactions? (3) What role did short-term and long-term capital flows play in Sweden during the gold standard era?

Another important issue concerns the way the domestic economy adjusted to international and domestic disturbances. Two major theories are of special interest in this context: first, the price-specie-flow mechanism according to which arbitrage in gold—gold flows—maintained balance-of-payments equilibrium and long-run common-international-price-level behavior, and second, the monetary approach to the balance of payments according to which arbitrage in traded goods—commodity rather than gold flows—played a central role in the adjustment mechanism.

The law of one price—a corollary of the monetary approach—serves to

establish close international covariation of prices both in the short and in the long run. According to the monetary approach, the Swedish money supply was determined by the demand for money expressed by surpluses or deficits in the balance of payments. Swedish evidence on these issues is considered in section 8.6. Finally, the results of the study are summarized in section 8.7. An appendix contrasts the views of Wicksell and Cassel on pre–World War I price experience.

8.3 The Swedish Economy during the Pre-1914 Gold Standard Era

8.3.1 The Monetary System

The Riksbank, founded in 1656, holds the central position in Swedish monetary history. Shortly after the establishment of the bank, due to an overexpansion of its note issue, it was taken over by Parliament, the Riksdag, which has since owned and controlled it. As a consequence, the bank was a source of subsidized financing for various favored activities of the Parliament during most of the eighteenth and nineteenth centuries. The bank has supplied the Swedish public with bank notes since its establishment, so at an early stage of Swedish monetary history the public became accustomed to paper currency.

Following bankruptcies in the 1810s of a number of private commercial-bank undertakings, the Riksbank became the sole bank in existence in Sweden in the 1820s. A royal proclamation in 1824 authorized the establishment of privately owned and operated banks organized as joint partnerships with unlimited liability. The partners had to assume full financial responsibility for the conduct of the bank—"one for all and all for one." A charter issued by the Crown was required to start a new bank. The charter clearly stated that the new bank should not "expect to receive any support from public funds." Experience with bank runs and failures of private banks led the government to shun financial involvement with any new private banks.

The law of 1824 became the legal foundation of the Swedish commercial banking system. The first commercial bank, chartered in 1830, immediately began to issue non-interest-bearing certificates of deposit of low denominations, payable on demand to the bearer, i.e., private bank notes. The notes competed with Riksbank notes even though the law apparently prohibited private note issues. No legal steps against the private notes, however, were taken. Instead additional private commercial banks were chartered and established. Due to usury laws the private banks relied primarily on note issues and kept deposit activities to a minimum. The usury laws were repealed in the 1860s and private banks thereafter could compete freely for funds. At the same time, new legislation authorized the establishment of joint-stock banks (*aktiebanker*) that

were not allowed to issue notes. That right was reserved for banks with unlimited liability, the *enskilda* banks.

After these legislative changes in the 1860s, the Swedish commercial banking system underwent rapid growth. The *enskilda* banks, the joint-stock banks, and the Riksbank competed in the market for deposits, and the *enskilda* banks and the Riksbank competed in the market for notes. The private banks were successful in both markets, particularly in the market for notes, in spite of strong political pressures to limit use of the notes, manifested in various attempts by the Riksbank to reduce the competitiveness of the private notes and to strengthen the position of the Riksbank, the bank of the Riksdag.[3]

Sweden enjoyed a highly developed and efficient banking system prior to World War I. The system's expansion occurred primarily during Sweden's adherence to the prewar gold standard (see table 8.1). The number of commercial banks almost trebled in the period 1871–1913. New branch offices were established by the note-issuing banks as a way of increasing the circulation of their notes, so the number of commercial-bank offices increased from 141 to 630. The number of accounts and the size of deposits per capita exhibited a striking increase. The ratio of notes to the money stock, an indicator of the development of the banking system, fell from roughly 40 percent in 1871 to about 10 percent at the outbreak of World War I. In an international comparison of banking and economic growth, Sandberg (1978, p. 680) concluded that no other country, except possibly Switzerland, "could match the Swedish system" in terms of efficiency and growth during that period. The growth of the commercial banking system was also accompanied by a rapid expansion of the savings bank system.

The Riksbank, basically a commercial bank during the entire nineteenth century, developed gradually into a central bank, partially due to its inefficiency in the former role. After a long political debate and various government investigations, the Riksbank obtained a monopoly

Table 8.1 **Growth of Commercial Banking in Sweden, 1871–1913**

	Number of Commercial Banks (1)	Number of Commercial-bank Offices (2)	Number of Accounts Per Capita (3)	Volume of Deposits Per Capita (in kronor) (4)	Ratio of Notes to the Money Stock (percent) (5)
1871	28	141	0.01	20	42.2
1880	44	205	0.03	53	21.1
1890	43	190	0.03	72	19.6
1900	67	269	0.09	144	13.8
1913	75	630	0.25	296	9.9

Source: Jonung 1980.

over the note issue in 1897. Private notes were prohibited and eventually taken out of circulation in 1903. Simultaneously, the commercial banks were given the right to rediscount bills with the Riksbank. The facility had previously not been automatically available to them as the Riksbank viewed the commercial banks as competitors. Instead some large commercial banks had earlier in the nineteenth century served as central banks to smaller private banks.

The Swedish monetary system during the gold standard era was a stable one. Neither the Riksbank nor the private banks experienced bank runs, thanks to several factors. Public trust in the solvency of the *enskilda* banks was fostered by the unlimited liability of the owners of the banks. The period 1880–1913 under the international gold standard was one of international political and economic stability, which induced stability in the monetary sector of the small open Swedish economy.

The Swedish monetary system was closely connected to the international financial system during the pre-1914 gold standard because of the country's large export and import sectors. The flow of capital to and from Sweden was unrestricted. In the 1850s the Swedish government began large-scale borrowing abroad of long-term capital, primarily from Great Britain and France. Prior to World War I, about 80 percent of long-term government debt was raised abroad (Flodström 1912, pp. 812–15). Several commercial banks were engaged in international financing. Other financial institutions also borrowed abroad, although a domestic capital market gradually developed. In brief, Sweden enjoyed a highly efficient monetary system during the classical gold standard era, primarily due to a legal framework that fostered competition in financial markets.[4]

8.3.2 Money, Velocity, Prices and Real Income

This section, based on the quantity equation in its income version, briefly describes the behavior of money, velocity, prices, and real income in Sweden during the classical gold standard era. Table 8.2 presents magnitudes of the four components of the quantity equation in selected years 1871–1913, and table 8.3, average annual rates of change of the components for the period 1871–1913 and various subperiods.

The money stock (M2) increased secularly during the gold standard era by an average annual growth rate of 6 percent. It exhibited, however, substantial secular and cyclical fluctuations during this period. Relatively high growth rates were registered in the 1870s and during 1890–1913, while the rate was low during the 1880s, which was a decade of deflation. Velocity, measured by the ratio of nominal income to the money stock, consistently experienced a secular decline. The ratio fell from 6.8 in 1871 to about a third of this level in 1913 (see Jonung 1983 for a detailed analysis of this decline).

The price level had a slight positive growth rate over the full period,

Table 8.2 **Money Stock (M), Income Velocity of Money (V), the Price Level (P), and Real Income (y): Selected Years, 1871–1913**

	M (million kronor) (1)	V (ratio) (2)	P (1913 = 100) (3)	y (million 1913-kronor) (4)
1871	147.9	6.77	84.0	1192
1880	308.5	4.32	90.0	1482
1890	430.3	3.51	83.0	1821
1900	856.7	2.64	88.0	2569
1913	1854.8	2.23	100.0	4128

Sources: Col. (1), Jonung 1975, annual averages of end-of-month data for sum of the public's holdings of Riksbank and private bank notes and demand and time deposits; col. (2), Johansson 1967, table 55 divided by Jonung 1975; col. (3), Johansson 1967, table 55 divided by table 56; col. (4), Johansson 1967, table 56.

Table 8.3 **Rates of Growth of Money Stock ($\dot{M}$), Income Velocity of Money ($\dot{V}$), Prices ($\dot{P}$), and Real Income ($\dot{y}$): Selected Periods, 1871–1913**

Period	$\dot{M}$ (1)	$\dot{V}$ (2)	$\dot{P}$ (3)	$\dot{y}$ (4)
	(average annual percentage rates of change)			
1871–1913	6.0	−2.6	0.4	3.0
1871–1879	7.4	−4.7	0.1	2.6
1880–1889	3.5	−2.5	−1.2	2.1
1890–1899	6.5	−2.7	0.5	3.2
1900–1913	5.9	−1.3	1.0	3.6
Secular deflation:				
1874–1896	3.0	−1.9	−1.1	2.2
Secular inflation:				
1897–1913	7.2	−2.3	1.4	3.5

Source: Jonung 1976.

Note: Growth rates are continuously compounded.

with the rate of decline during the secular deflation of 1874–96 more than offset by the rate of rise during the secular inflation of 1897–1913. These secular movements closely coincide with long-term international price movements (see the Appendix on the views of Wicksell and Cassel on the determinants of changes in the secular price level).

Sweden experienced a rapid transformation from an agrarian economy to an industrialized country during the prewar gold standard era. Gross domestic product rose from a level of 1192 million kronor in 1871 to 4128 million kronor in 1913 measured in 1913 prices (see table 8.2), representing an average annual real growth rate of about 3 percent—among the

highest per capita growth rates in Europe during the period, if not the highest of any European country (Bairoch 1976).

Sweden was basically an agrarian country in the second half of the nineteenth century. About 80 percent of the total population was employed in agriculture in 1870. By the turn of the century the share of industry in gross domestic product surpassed that of the agricultural sector, although at the outbreak of World War I, 60 percent of the total population was still employed in agriculture (see Johansson 1967, table 58).

The process of growth and industrialization was primarily export-led. Lack of developed domestic markets and poor domestic communications hampered domestically oriented industries relative to export-oriented ones in the early stages of industrialization (Jörberg 1970, p. 81). However, beginning in the 1890s, domestic industries experienced rapid expansion, partly owing to large-scale building of railroads.

The main export items were timber products, paper and pulp, engineering products, and iron and steel. Swedish export of raw materials—representing 40–50 percent of Swedish exports during the prewar gold standard period—met a growing demand from countries beginning to industrialize, so terms of trade improved for Sweden under the gold standard (Jörberg 1970, p. 88).

Exports represented roughly 20 percent, imports a slightly higher share of gross domestic product. Great Britain was by far Sweden's most important export market, absorbing more than 50 percent of Swedish exports in the 1870s and about 30 percent prior to World War I. Most Swedish imports of goods originated in Great Britain and Germany—the British share fell from 30 percent in the 1870s to 24 percent prior to 1914, while the German share rose from 23 percent to 34 percent (*Historical Statistics of Sweden* 1972, tables 5.1, 5.2). Nearly all Sweden's foreign trade was European.

8.4 Use of Gold and the Legal Framework

8.4.1 Legal Framework

In the 1860s representatives from Denmark, Norway, and Sweden discussed the establishment of a monetary system based on gold that would replace the silver standard and encompass the three countries. In May 1873, a monetary union was formed by Sweden and Denmark. Norway joined in October 1875. The Scandinavian Monetary Union introduced a common currency unit, the Scandinavian krona, which equaled a 1/2480 kilo of gold. Consequently, the following gold-parity rates were established: one British pound = 18.16 kronor, 100 Reichsmark = 88.89 kronor, and later, one U.S. dollar = 3.73 kronor. Gold coins minted according to the Scandinavian monetary agreement were

legal tender in the three Scandinavian countries irrespective of where the coin had been minted originally. Common subsidiary silver and copper coins were also introduced and made legal tender within Scandinavia.

The founding of the Scandinavian Monetary Union per se did not result in significantly closer monetary cooperation than would have been the case if each country had adopted the gold standard by itself. A common currency system to a minor extent reduced transaction costs and had symbolic value attesting to Scandinavian cooperation. However, because of the union the three central banks accepted each other's notes at par as part of a clearing system they established. The Bank of Sweden informally accepted Danish and Norwegian notes at par in the 1870s. The Bank of Denmark and the Bank of Norway executed a formal agreement to this end in 1901. Consequently a considerable exchange of notes occurred among the three countries with notes partially replacing gold and other foreign reserves as international means of payment.[5] During the entire pre-1914 history of the Scandinavian Monetary Union, the parity rates remained the officially registered rates, while other exchange rates like that of the pound and the Reichsmark fluctuated above and below par.[6]

The convertibility of the notes of the Riksbank into gold was guaranteed by the Swedish constitution. Laws pertaining to the gold standard could only be changed by two identical decisions by Parliament with an election in between. The constitutional status of the gold standard is explained by Sweden's earlier turbulent monetary history during which at several times Riksbank notes became inconvertible. The constitutional guarantee turned out, however, to be an ineffective protection for the gold standard. When World War I broke out, the Riksbank decided unilaterally to make its notes inconvertible. This unconstitutional step—which was never challenged—ended the prewar gold standard in August 1914 (Heckscher 1926, pp. 13–14).

8.4.2 Use of Gold by the Public

The longest lasting metallic standard in the history of the Riksbank was the pre–World War I gold standard (Jonung 1976). Despite the roughly forty-year link between the krona and gold, there was never any significant domestic monetary use of gold by the Swedish nonbank public. According to contemporary commentators on the Swedish monetary system before World War I—Rosenberg (1878, p. 44), Davidson (1896, p. 25), Wicksell (1896, p. 38; 1904, p. 86), and Heckscher (1926, p. 11)—gold coins or gold in other forms were employed infrequently as a means of payment, in sharp contrast to prevailing conditions in the United Kingdom.

Although there is wide agreement that gold coins were rarely used by the Swedish public, few quantitative measures of the extent to which they

were held exist. According to Davidson (1896), a study by the Ministry of Finance estimated the public's possession of gold coins in 1885 at around 5.5 million kronor. The figure corresponds to about 8 percent of the total note issue of the Riksbank and the private banks, and to about a tenth of a percentage point of the Swedish money stock defined as the sum of the public's holdings of notes and commercial-bank demand and time deposits in that year. These figures suggest that the volume of gold held by the public for monetary use was insignificant relative to the money stock. Consequently, gold coins may safely be excluded from the definition of the Swedish money stock during the pre-1914 gold standard era.

Several factors contributed to the public's small holdings of gold coins compared to the volume of notes and deposits. The most important one was the policy of the monetary authorities of supplying the public with notes of denominations lower than those of gold coins. According to the arrangements of the Scandinavian Monetary Union, gold was initially minted in Sweden in two denominations: ten and twenty kronor. The coins were of such high denominations that they were seldom used to settle transactions involving small sums, as there existed more suitable means of payment of lower denominations, specifically bank notes as well as subsidiary coins of silver and copper. The Riksbank issued a one-krona note prior to 1875, but from then on the five-kronor note was the smallest note denomination supplied. The ten- and twenty-kronor gold coins were clearly inferior to the five- and ten-kronor notes for transaction purposes.[7]

Furthermore, long before the adoption of the gold standard, the Swedish public became well acquainted with the use of notes. Riksbank notes had been circulating in Sweden since the second half of the seventeenth century and the note-issuing commercial banks had been actively promoting their notes since the 1830s. Consequently, notes issued by the Riksbank and the private banks were more familiar to the public as means of payment than gold coins. Rosenberg (1878, p. 44) stated that "the Swedish public reluctantly uses the gold coins finally introduced." Apparently, the reluctance persisted throughout the gold standard period.

For several reasons, it was rational for the monetary authorities to pursue a policy of minimizing the public's holdings of gold. First, the management by the Riksbank of its gold stock was facilitated. To the extent that the public did not demand any gold, the possibility of sudden increases in the internal demand for gold remained small. Consequently, the bank's stock of gold could be maintained at a lower level than were gold in greater domestic use. Instead, the bank could concentrate on meeting fluctuations in the external demand for gold.

Second, small public holdings of gold allowed the bank to invest in interest-bearing assets rather than in gold, increasing its profit. Most likely such considerations had some influence on the policy of the bank

during the gold standard era, as the profit motive—adopting the term frequently used in the Swedish monetary debate during World War I—was of considerable importance in guiding the bank's affairs. Third, a policy to increase the domestic supply of gold coins would also have burdened the Swedish balance of payments in the nineteenth century, as Sweden was not a gold producer. Sweden as a rule had a deficit on current account prior to 1914, reflecting foreign-capital inflows to finance the domestic industrialization process. Thus, attempts to encourage the use of gold coins would possibly have encroached on the borrowing opportunities of other sectors of the Swedish economy.[8]

Commercial banks that issued notes also had two incentives to withdraw gold coins from circulation: first, they increased the circulation of their notes by eliminating a potential competitor, and second, they obtained an asset that satisfied the reserve requirements stipulated by law. The successful attempts by the note-issuing commercial banks to drive Riksbank notes out of circulation were based on the same motives.[9]

There is generally a strong complementarity between the use of an asset as a means of payment and as a store of value, that is, if an asset is demanded as a medium of exchange, that increases its employment as a store of value. However, in Sweden gold evidently did not serve either of these two functions, probably because gold was not adopted as a commonly used medium of exchange. The public had great confidence in the solvency of the private banking system, and the political situation remained stable, so there was little reason to use gold as a store of value.

In brief, the Swedish public's holdings of gold coins were extremely small during the classical gold standard era. The Swedish gold standard system was thus far from a "pure" gold-specie standard or gold-coin standard where gold coins circulated as currency in significant domestic monetary use.

8.4.3 Use of Gold by Commercial Banks

As a consequence of the replacement of the silver standard by a gold standard in 1873, the legislation pertaining to the reserve requirements of the note-issuing commercial banks, the *enskilda* banks, was changed accordingly in the banking law of 12 June 1874. The law of 1874 (article 26) regulated the maximum volume of notes that a private bank could issue, the *banksedelutgivningsrätt*, literally the right to issue notes. The volume was equal to the sum of a number of commercial-bank assets, including holdings of bonds and gold. The difference between the *banksedelutgivningsrätt* and the actual note issue in circulation was termed *obegagnad sedelutgivningsrätt*, literally the unused right to issue notes.

The unused right to issue notes, documented in the monthly bank reports for each *enskilda* bank, was substantial throughout the prewar gold standard period, constituting about 25 to 60 percent of the actual

Table 8.4 **Note Issues and Volume of Unused Right-to-Issue Notes (*obegagnad sedelutgivningsrätt*) of the Riksbank and Note-Issuing Commercial Banks (*enskilda* banks): Selected Years, 1875–1910**

	Notes in Circulation		Share of Riksbank Notes of Total Circulation (percent)	Unused Right to Issue Notes as Share of Circulation	
	Riksbank	*Enskilda* Banks		Riksbank	*Enskilda* Banks
	(million kronor)			(percent)	
	(1)	(2)	(3)	(4)	(5)
1875	37.7	60.3	38.5	17.2	25.1
1880	37.6	47.9	44.0[a]	39.6	53.7
1885	37.2	50.1	42.5	20.6	49.3
1890	42.8	59.6	41.8	56.5	32.7
1895	50.6	60.0	45.8	66.2	37.7
1900	63.6	79.4	44.5	105.7	36.6
1905	163.1	—	100.0[b]	—	—
1910	189.3	—	100.0	—	—

Source: Series, calculated by the author from the monthly bank reports, are annual averages of end-of-month figures.

[a]The increase in the market share of Riksbank notes between 1875 and 1880 was due to legislation that prohibited the issue of five-kronor notes by *enskilda* banks, leaving the Riksbank as the sole supplier of the denomination, the lowest available.

[b]Private bank notes were taken out of circulation in 1903 when the Riksbank obtained a monopoly over the note issue.

volume of private notes in circulation (see table 8.4). Consequently, banking laws concerning the maximum size of the private note issue did not effectively restrict the private supply of notes. Because the legal reserves behind private notes included bank assets that did not constitute base money, private banks could, within wide limits, increase their *banksedelutgivningsrätt* without obtaining base money, that is, gold and Riksbank notes.[10] Private note-issuing banks had thus little need to demand gold for legal reserve requirements against their circulation during the pre-1914 gold standard period.

The banking law of 1874 (article 28) made private bank notes redeemable in gold. Such notes, however, were redeemable on demand in legal tender gold coins only at the head office of the note-issuing bank. In a case where payment in gold was refused, the issuing bank was obliged to pay a 6 percent rate of interest to the note holder until gold redemption. In case of prolonged nonredemption, the *enskilda* bank was subject to loss of its government charter and thus extinction. As Sweden was sparsely populated and lacked a well-developed communications network, the stipulation that notes were only redeemable at the head office and not at branch offices was clearly a method of reducing potential

strains on *enskilda* banks in case of a loss of public confidence in the redeemability of their notes.

As a consequence of the adoption of the gold standard in 1873, private note-issuing banks started to purchase considerable quantities of gold during the decade, increasing their holdings of gold from virtually a zero level to 8.5 million kronor in 1876. The volume of commercial-bank-held gold remained constant around 7 to 8 million kronor until the mid-1890s, then rose to a peak of 9.4 million kronor in 1900 (see figure 8.1). Private note issues were gradually withdrawn from circulation during the period 1900–1903, and commercial banks coincidentally sold their gold to the Riksbank. As a result, by 1905 they held practically no gold.

The note issue of the private banks expanded from 48 million kronor in 1880 to 80 million kronor in 1900 (see table 8.4). Since their gold holdings remained practically constant in the 1880s and 1890s, the ratio of gold to notes of the *enskilda* banks declined from about 19 percent in 1879 to about 10 percent in 1900 (see figure8.2).

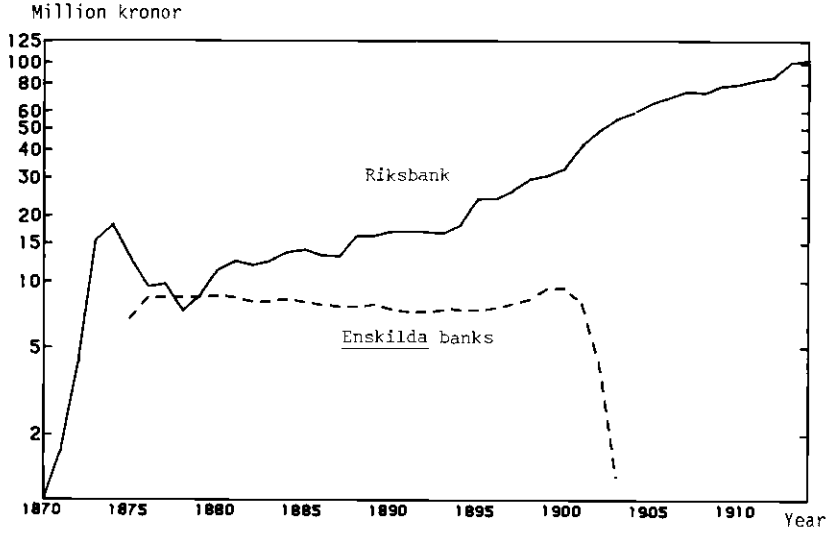

Fig. 8.1 Gold reserves of the Riksbank and of the note-issuing private commercial banks, 1870–1914. As commercial banks that did not have the right to issue notes held an insignificant amount of gold, these holdings are not included here. *Sources*: Riksbank 1870–74: *Sveriges Riksbank 1668–1924* 1931, 5:58, 60; for 1870, average of 30 June and 31 Dec.; for 1871, average of June–Dec. inclusive; for 1872–74, annual averages of end-of-month data. Riksbank and *enskilda* banks, 1875–1914: monthly bank reports, annual averages of end-of-month data. Before 1875, gold assets of the *enskilda* banks are not shown separately from silver assets.

The absence of reports that private banks could not redeem their notes into gold or that runs on the commercial banking system occurred because the public tried to convert deposits and notes into gold is confirmed by the constant level of the gold holdings of the *enskilda* banks (see figure 8.1). Bank runs would have caused significant fluctuations in the curve. As argued previously, the major reason for the fairly constant level of gold holdings by the private banks in the face of a rising note issue was the fact that the Swedish public never demanded gold for domestic monetary use—private and Riksbank notes were a superior means of payment.

Unlike the *enskilda* banks, the joint-stock banks—commercial banks that did not issue notes—were not subject to gold-reserve requirements. Their holdings of gold were consequently negligible. Note-issuing commercial banks were not obliged to hold gold against demand and time deposits. Thus, the commercial banking system held gold solely as cover

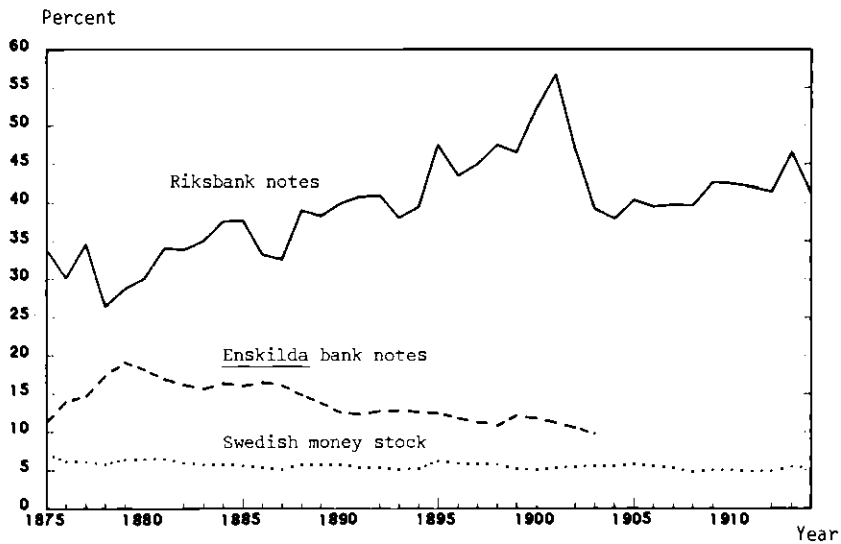

Fig. 8.2 Gold-reserve ratios of the Swedish monetary system, 1875–1914. Riksbank notes include public and commercial-bank holdings. Commercial-bank notes include holdings by the public, the Riksbank, and commercial banks that did not have the right to issue notes. Gold reserves of the Swedish monetary system include Riksbank, *enskilda*-bank, and joint-stock-bank holdings; the latter are not included here, however, since they were insignificant before 1914. After the elimination of private notes in 1903, commercial banks held practically no gold. *Sources*: For gold reserves of the Riksbank and the *enskilda* banks, see figure 8.1; for note issues, see table 8.4; and for money stock, see table 8.2, col. 1.

for bank-note issues and sold its gold to the Riksbank when private notes were eliminated at the turn of the century.

To sum up, legal gold-reserve requirements did not represent an effective restriction on the supply of notes and deposits by the commercial banking system during the gold standard era. Indeed, the holdings of gold relative to notes in circulation by the note-issuing banks declined during the 1880s and 1890s, while throughout the period the *enskilda* banks had the right to issue a far larger volume of notes than they actually did. The gold reserves of the *enskilda* banks were stable, reflecting the absence of monetary disturbances in the form of sudden domestic or international gold outflows.

8.4.4 Gold and the Reserve Requirements of the Riksbank

The rules regulating the relationship between the note issue of the Riksbank and its gold reserves were modified several times during the prewar gold standard period. The basic reason for the changes was a desire to accommodate the long-run growth of the note supply.

Prior to 1872 the note issue of the bank was based on its reserves of silver, gold, foreign assets[11] plus the *kontingent*, i.e., a fiduciary reserve of 30 million kronor. Silver was the dominant metallic asset. The sum of these assets represented the *sedelutgivningsrätt*, i.e., the maximum amount of notes that the Bank was allowed to supply (see table 8.5). As a consequence of the adoption of the gold standard in 1873, Riksbank notes were made redeemable in gold at the head office in Stockholm. Gold thus took the place previously held by silver (see figure 8.1). The fiduciary reserve was raised to 35 million kronor in 1879 when private five-kronor bank notes were prohibited, leaving the Riksbank as the sole supplier of the denomination. The reserve requirements were changed again in 1887. The fiduciary reserve was increased to 45 million kronor and covered by a secondary reserve requirement stipulating that the fiduciary reserve should correspond to the sum of easily salable bonds and bills. The Bank was also prohibited from holding less than 15 million kronor in gold for any prolonged period of time.

When private notes were abolished, the reserve requirements of the Riksbank were changed. In 1899, the fiduciary reserve was increased from 45 to 100 million kronor. The use of silver as a legal reserve asset was discontinued and a minimum level of 25 million kronor was stipulated for gold holdings. Due to a considerable expansion of the note issue, the rules were again altered in 1901. The end result was a complex system based on a combination of a fiduciary reserve and a reserve ratio, the latter strengthening the link between gold holdings and the note issue. In 1913 another revision of the rules expanded still further the right to issue notes.

The note issue of the Riksbank was thus determined by three types of reserves: (1) specie, i.e., gold and silver, (2) foreign assets as defined by the reserve rules, and (3) the fiduciary reserve. Table 8.5 shows that the fiduciary reserve was most important and gold second in importance relative to the note issues during the prewar gold standard period. Due to the size of the fiduciary reserve, the right to issue notes was considerably larger than the volume of Riksbank notes in actual circulation. The note supply was thus not effectively restricted by required reserve holdings, including those of gold. Gold and foreign assets were initially regarded as perfect substitutes by the reserve requirements. Consequently, the bank tried to maximize its holdings of interest-bearing foreign assets at the expense of gold. For this reason, rules pertaining to minimum holdings of

Table 8.5 **Legal Reserves for the Riksbank's Note Issue: Averages for Selected Periods of Unchanged Reserve Regulations, 1860–1912 (million kronor)**

	1860–68	1873–87	1887–98	1899–1912
	(coefficient of variation in parentheses)			
1. Gold	0.3 (.53)	12.3 (.22)	19.7 (.25)	63.3 (.30)
2. Silver	10.9 (.13)	5.8 (.53)	2.5 (.19)	—
3. Foreign assets	6.3 (.34)	7.6 (.42)	9.5 (.41)	21.6 (.31)
4. Fiduciary reserve (*kontingent*)	30.0 (.00)	32.7 (.08)	44.4 (.04)	119.8 (.18)
5. Right to issue notes (*sedelutgivningsrätt*)	47.4 (.07)	58.3 (.10)	76.2 (.11)	205.4 (.23)
6. Riksbank notes in circulation	29.6 (.16)	35.9 (.13)	47.4 (.16)	144.7 (.35)
7. Unused right to issue notes (*sedelreserv*)	4.5 (.83)	10.3 (.38)	28.8 (.14)	60.7 (.22)
8. Supplementary coverage (*supplementär täckning*)	—	—	55.3 (.13)	144.3 (.24)
9. Gold and silver as share of note issue	38%	50%	47%	44%

Sources: Lines 1–8, *Sveriges Riksbank, 1668–1924*, 1931, 5: pp. 58–71; 1860–68, end-of-year data; 1873–87 and 1887–98, annual averages of end-of-month data; 1899–1912, annual averages of weekly data; line 9, Source in figure 8.1 for gold and silver divided by line 6.

Notes: The selection of time periods in the table is based on dates of major changes in reserve regulations (see text and Brisman 1931). The years 1869–72, the transition from a silver to a gold standard, have been excluded. Line 3, foreign assets that were not held as legal reserves against notes are excluded. These assets, notably foreign bills and foreign bonds, were considerably larger than foreign assets shown in line 3. Lines 1–4 sum to line 5 (except for rounding differences)—the *sedelutgivningsrätt*, that is, the maximum volume of notes the Riksbank was allowed to circulate. Line 7, the *sedelreserv*, the unused right to issue notes, is the difference between line 5 and line 6, except for 1860–68 and 1873–87, when reserve requirements covered other short-term Riksbank liabilities, like demand deposits, and bank postal bills. Line 8, the supplementary coverage, shows the fiduciary reserve, i.e. the volume of notes the Riksbank was allowed to circulate without the backing of any assets held.

gold were introduced, and a ratio system between gold and the note supply was eventually established.

Figure 8.1 shows that the Riksbank's holdings of gold expanded rapidly in the early 1870s reaching a peak of about 20 million kronor in 1874. From then on until 1880 they declined. A slow but steady expansion occurred in the 1880s and 1890s. A period of very rapid long-run growth started at the turn of the century when private bank notes were taken out of circulation. By then all monetary gold in Sweden was concentrated in the Riksbank, where it was held for the management of Sweden's international transactions.

To sum up, the legal rules pertaining to gold and other assets did not restrict the note supply of the bank during the prewar gold standard period. The link between the gold holdings of the Riksbank and its note supply was loose due to the flexibility of the reserve rules. The sizable fiduciary reserves of the bank gave the Riksbank considerable short-run autonomy in reacting to temporary disturbances, and the authorities' propensity to change the reserve rules provided substantial long-run autonomy.

8.5 Gold and the Money-Supply Process

This section examines the role of gold in the Swedish money-supply process both in the long and the short run during the pre-1914 gold standard period. In addition, Swedish evidence on the key currency issue is presented.

8.5.1 Long-Run Movements in Gold and Money

The role of gold in the money-supply process is examined here using a framework pioneered and applied to U.S. monetary history by Friedman and Schwartz (1963) and Cagan (1965). The sources of secular and cyclical growth of the Swedish money stock, specifically the contributions of gold and foreign assets, can thereby be quantified.

Currency (C) is defined as the nonbank public's holdings of Riksbank notes, and deposits (D) as the sum of commercial bank notes and demand and time deposits. The money stock (M) = $C + D$. The monetary base (B) is set equal to Riksbank notes held by the public (C) and base money reserves (R) held by the commercial banking system, that is, Riksbank notes and gold held by the note-issuing private banks. The money stock is related to three aggregates: the monetary base, the currency ratio, and the reserve ratio.

$$M = \frac{1}{\frac{C}{M} + \frac{R}{D} - \frac{C}{M} \cdot \frac{R}{D}} B \text{ or} \tag{1}$$

$$M = m \cdot B, \tag{2}$$

where m is the monetary-base multiplier.

By expressing (1) in terms of rates of changes, the sources of secular growth of the Swedish money stock can be calculated. During the period 1871–1913 the Swedish money stock grew at an average annual rate of 6 percent, of which in absolute terms the monetary base contributed 4.5 percent, the currency ratio 0.6 percent, and the reserve ratio 1.1 percent (see Jonung 1975). The relative contribution of the monetary base was thus 75 percent while the base money multiplier accounted for the remaining 25 percent. Secular decline in the currency ratio and the reserve ratio produced the positive contributions of the asset ratios. The currency ratio fell from 14.0 percent in 1871 to 9.9 percent in 1913. The corresponding figures for the reserve ratio are 10.0 percent and 2.3 percent, respectively.

The monetary base accounted for the major share of the secular expansion of the Swedish money stock under the prewar gold standard. The effects of gold movements on the monetary base and thus on the money stock can be derived from a breakdown of the balance sheet of the Riksbank. The Riksbank was the major holder of gold in the Swedish economy. Riksbank notes constituted the most important component of the monetary base. Their share was around 75 to 80 percent in the 1880s and 1890s. After the elimination of private notes in 1903 and the sale of commercial-bank gold to the Riksbank, the note issue of the Riksbank was identical to the monetary base. Gold held by the commercial banks, the second major component of the monetary base, was practically constant in the period 1875–1900 according to figure 8.1 and is therefore ignored in the following computations.

Changes in the volume of Riksbank notes in circulation are equal to the sum of the changes in the following components of the balance sheet of the Riksbank: the volume of specie (G), primarily gold but also silver, net foreign assets (FA), and net domestic assets (DA), i.e., loans minus deposits at the Riksbank. When the note issue is set equal to the monetary base, expression (3) is obtained:

$$B = G + FA + DA. \tag{3}$$

The sum of specie and foreign assets (G) + (FA) is the foreign source component of the monetary base while domestic assets are the domestic source component.

Equation (3) is the basis for the calculations in table 8.6 displaying the contributions of specie, net foreign assets, and net domestic assets to the growth of the Riksbank note issue during the period 1871–1913 as well as during a number of subperiods. According to table 8.6, specie, i.e., primarily gold, accounted for 46 percent of the relative contribution, foreign assets for 52 percent, and the domestic source component includ-

Table 8.6 **Contributions to the Growth Rate of Riksbank Note Issue, 1871–1913**

Period	Annual Growth Rate of Riksbank Notes (percent) (1)	Absolute Contributions: Specie (2)	Absolute Contributions: Foreign Assets (percent) (3)	Absolute Contributions: Domestic Assets (4)	Relative Contributions: Specie (5)	Relative Contributions: Foreign Assets (6)	Relative Contributions: Domestic Assets (7)
1871–1913	4.8	2.2	2.5	0.1	46	52	2
1880–1890	1.4	0.6	−0.3	1.1	43	−21	79
1890–1900	4.6	4.4	4.0	3.8	96	87	−83
1900–1913	9.1	3.6	4.1	1.4	40	45	16

Source: Based on *Sveriges Riksbank, 1668–1924* 1931, 5: pp. 24–31.

Notes: Growth rates are continuously compounded. Cols. (2)–(4) growth rates are weighted by the average ratio of the individual components to the Riksbank note issue at the initial and terminal years of each subperiod. Cols. (5)–(7) express the rates in (2)–(4) as relative to 100. Specie includes gold and silver and other items such as coins and private bank notes. No correction was made for the latter since these items were fairly small. Foreign assets are the sum of net deposits at foreign banks, foreign bills, foreign bonds, and foreign notes. Domestic assets are the sum of domestic bonds, bills, and loans, minus deposits of the Riksbank (i.e., *giroräkning*, *upp- och avskrivningsräkning*, *depositionsräkning*, and *postremissväxlar*) minus capital items of the Riksbank.

ing capital items for 2 percent. Although both gross domestic assets and gross domestic liabilities increased during the gold standard period, the net volume made an insignificant contribution to the expansion of the note issue. Subperiods of the gold standard show differences in growth patterns, but specie holdings expanded throughout while foreign assets declined in the 1880s and domestic assets in the 1890s.

Consolidation of specie and the net foreign assets shows that the foreign source component of the monetary base accounted for practically all the secular growth of the note issue and thus of the monetary base. This statement implies that specie, including gold held by the commercial banks and foreign assets of the Riksbank, accounted, as noted above, for about 75 percent of the growth of the Swedish money stock during 1871–1913, the decline of the currency and reserve ratio accounting for the rest of the expansion.

The close association between the long-run growth of Riksbank notes and the secular increase in gold is also seen in figure 8.2 which displays the ratio of gold to the notes of the Riksbank. The ratio has an average value of around 40 percent for the entire gold standard period 1873–1914. The long-run ratio of gold to the Swedish money stock in the same figure exhibits a surprisingly constant level of around 5 percent. This constant level implies that an increase in the money stock was associated with an identical relative expansion of the monetary gold stock within Sweden, ignoring the issue of causality.

Sweden experienced substantial deficits on current account throughout the prewar gold standard period. Except in a few years, exports were smaller than imports. Since inflows of gold and foreign assets were the major factor behind the growth of the Swedish money stock during the period, long-term borrowing from abroad is of central importance in explaining the expansion of the money stock. The entries in table 8.6 support this conclusion. Deficits on the trade account would otherwise have caused a continuous outflow of specie and foreign assets from the Riksbank. The accumulation by the Riksbank of growing foreign reserves was based on the import of foreign capital.

Long-term borrowing was primarily arranged by the Swedish government during the gold standard period by issues of state debt in Germany, France, and the United Kingdom. The largest volume of capital imports occurred in the 1880s and between 1898 and 1911.[12] Swedish municipalities and mortgage banks also borrowed abroad. In addition, direct investments by foreigners and foreign firms contributed to the import of long-term capital. By 1908 Sweden's long-term debt roughly corresponded to 40 percent of the national income with the National Debt Office liable for close to 40 percent of the country's total foreign long-term indebtedness (Fleetwood 1947, pp. 39–42). In short, long-term capital imports during the gold standard period were the central factor accounting for the

secular increase in gold and foreign assets, and thus for the long-run growth of the Swedish money stock.

8.5.2 Short-Run Movements in Gold and the Policy of the Riksbank

On a year-to-year basis, the monetary base accounted for a major share of movements in the money stock under the gold standard although the contributions of the asset ratios were larger than in the long run (see Jonung 1975). The result implies that the Riksbank's role was central for short-run changes in gold, foreign assets, notes (which constituted most base money), and the money stock.

The Riksbank, while serving as the bank of the Parliament, during the nineteenth century was a mixture of a central bank and a commercial bank. Prior to the 1870s, regulations of Parliament determined the interest rates the bank charged. The rates were fixed at levels below market rates in order to subsidize favored borrowers. Changes in the discount rates were thus not a policy tool. Reserve regulations stipulated a rigid link between Riksbank notes in circulation and foreign assets of the bank. Since Sweden was on a silver standard prior to 1873, foreign reserves consisted mainly of silver, foreign bills, and deposits at a few foreign banks.

When confronting an outflow of metallic reserves and foreign assets, which occurred regularly in the 1850s and 1860s, the bank responded by reducing its loans outstanding. The bank thus reinforced an outside drain of its foreign reserves by decreasing the volume of domestic assets. This was a policy of "direct deflation," according to Brisman (1931, p. 88). Since commercial banks maintained silver and Riksbank notes as reserves, the policy of "direct deflation" caused a contraction throughout the Swedish monetary system.

The overriding goal of the Riksbank prior to the 1870s was maintenance of external stability. Parliament's instructions to the bank in the midnineteenth century actually stipulated that domestic lending was to be reduced in cases of decrease in metallic reserves and foreign assets. Domestic lending could be resumed when the currency drain had been arrested. The rule reflected the belief that Riksbank notes in circulation represented a potential threat to its metallic reserves, since the notes were convertible into specie. Brisman (1931, p. 87) notes that this rule was "one of the most remarkable in the history of international banking."

The policy of direct deflation was gradually modified and replaced in the 1860s and 1870s, owing in part to the influence of U.K. practice. A growing trade with the United Kingdom paved the way for changes in the instructions to the bank in the early 1860s, permitting it to hold funds in London, although the United Kingdom was not on silver.[13] Prior to this, Hamburg-Altona, a financial center for the silver standard, was the only place outside Sweden where the Riksbank had a banking connection. In

1866 the bank was granted the right to engage in financial transactions in foreign currencies with financial centers of its own choosing. The Riksbank steadily increased its holdings of nonmetallic foreign assets. It also started to purchase Swedish government bonds. These had high international liquidity and could be sold abroad to obtain foreign reserves.

When the gold standard was introduced in 1873, the reserve regulations were changed such that foreign bills and foreign bonds were excluded from the legally required reserves of the bank. The creation of selected foreign-reserve assets legally independent of the note issue conferred a considerable autonomy on the bank in framing its policy under the prewar gold standard.

In the 1870s the bank's goals were broadened to include maintenance of domestic as well as external stability. Facing a drain of foreign reserves in the depression of 1874, the bank responded by discounting foreign bills in London and Hamburg, selling bonds abroad, and placing the proceeds with foreign bankers, thus increasing legal reserve assets and the right to issue notes. Encountering an outflow of gold in 1875, the bank obtained loans from Rothschild and the London Joint Stock Bank. In 1877, although the bank borrowed in Hamburg, the following year it felt obliged to call in loans to a limited extent—the last time in the nineteenth century such action was taken. Eventually, the bank began to rely on changes in the discount rate.

From the 1880s until the outbreak of war, the Riksbank policy was to maintain constant specie holdings, employing a number of techniques to that end.

First, the bank used foreign assets, both those that were counted as satisfying reserve requirements and those that were not, to prevent and offset outflows of gold. Specifically, the bank maintained holdings at foreign banks and wrote checks on them to meet the demand for international means of payment. Second, the bank changed its discount rate to protect its foreign reserves. Figure 8.5 shows that the Swedish discount rate followed the Bank of England rate fairly closely. Third, the bank relied on foreign loans to meet an increased demand for foreign reserves. Fourth, the bank paid little attention to movements in its unused right to issue notes (*sedelreserven*). Reductions in this volume were more or less ignored and/or met by alterations in reserve regulations (see section 8.4.4). Fifth, the bank apparently actively discouraged outflows of gold from Sweden. According to Heckscher (1926, p. 4), this policy explains why the pound rate remained above the upper gold point of 18.27 kronor (with the gold-parity rate at 18.16 kronor) on average for several years, without significant net outflows of gold from Sweden. Finally, the Riksbank established agreements with the Bank of Denmark and Bank of Norway in the early 1880s eliminating gold as an international means of payment within the Scandinavian Monetary Union. Using these tech-

niques of monetary control, the Riksbank managed to stabilize in the short run its holdings of gold.

That foreign-exchange operations were important in the pre-1914 policy of the bank may be seen in the annual change of gold and net foreign assets of the Riksbank, 1876–1913 (see figure 8.3). The two assets were of roughly equal average size during this period, 35.4 and 30.3 million kronor respectively, so the two series in figure 8.3 may be compared directly. The figure shows that annual movements in net foreign assets were as a rule larger than those in gold. This was the case for twenty-nine out of thirty-eight observations over the period 1876–1913. The coefficient of variation of the annual first differences is 1.5 for gold reserves but 4.4 for net foreign assets. The corresponding figure for the note issue of the Riksbank and the Swedish money stock are 1.8 and 1.0, respectively. These figures indicate considerable variability in foreign assets compared to gold, the note issue, and the money stock.

Nurkse (1944) and Bloomfield (1959) investigated central-bank practices in following the "rules of the gold standard game." The rules are

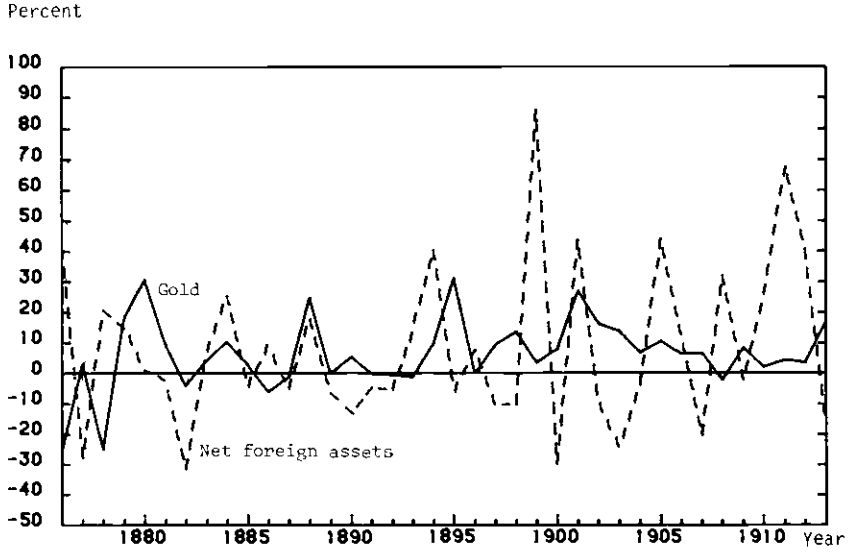

Fig. 8.3 Annual percentage changes in gold and net foreign assets of the Riksbank, 1876–1913. Foreign assets do not include foreign bonds held by the Riksbank, since they are not shown as a separate item in the source. For end-of-year data for foreign bonds, see *Sveriges Riksbank 1668–1924* 1931, 5: pp. 25–31. *Source*: For gold and net foreign assets (sum of foreign bills and Riksbank deposits, net, at foreign banks and bankers), see fig. 8.1. Annual averages were constructed from end-of-month data.

generally taken to mean that central banks reinforced gold flows, i.e., an increase (decrease) in gold and foreign assets should be met by an increase (decrease) in domestic assets. Bloomfield, comparing year-to-year changes in foreign reserves and in gross domestic assets for eleven pre-1914 central banks, found no support for a rules-of-the-game interpretation. Foreign and domestic assets changed in the opposite more often than in the same direction.

Table 8.7, comparing direction of movements in thirty-four changes of net foreign reserves and net domestic assets of the Riksbank for the

Table 8.7 **Annual Changes in Riksbank Net Foreign Reserves and Net Domestic Assets, 1880–1913**

	Change in Foreign Reserves (milllon kronor) (1)	Change in Domestic Assets (2)	Sign of Covar-iation (3)		Change in Foreign Reserves (milllon kronor) (1)	Change in Domestic Assets (2)	Sign of Covar-iation (3)
1880	2.8	4.6	+	1900	−8.5	5.9	−
81	.6	−1.7	0	01	20.3	−9.5	−
82	−6.6	5.3	−	02	3.0	26.9	+
83	1.5	−1.3	−	03	−1.4	39.3	−
84	4.9	−3.9	−	04	2.8	11.9	+
1885	−.4	1.3	0	1905	16.9	−10.8	−
86	.6	1.7	0	06	8.3	5.3	+
87	−1.1	1.5	+	07	−3.3	13.9	−
88	6.4	−4.7	−	08	8.3	−12.0	−
89	−1.4	2.1	−	09	5.0	−3.9	−
1890	−1.7	2.1	−	1910	11.9	−7.4	−
91	−.9	−.1	0	11	37.8	−28.0	−
92	−1.0	.6	0	12	37.3	−27.5	−
93	1.8	.7	0	13	−5.4	+13.8	−
94	8.6	−6.0	−				
1895	4.3	−0.2	0				
96	1.7	2.9	+				
97	−0.3	3.4	0				
98	1.3	3.1	+				
99	18.0	−14.5	−				

Source: See table 8.5; annual averages of end-of-month data.

Notes: In col. (3), + = change in same direction; − = change in opposite direction; 0 = negligible change (less than one million kronor) in either or both. The sum of the changes in net foreign reserves and net domestic assets equals the change in the Riksbank's note issue (see expression (3) in the text). Changes in capital items are thus included. Bloomfield 1959, p. 49 has a similar table comparing year-to-year changes in foreign assets (gold, foreign exchange, and silver) and in domestic income-earning assets (discounts, advances, and securities) covering eleven central banks. His results for Sweden 1900–1913 are identical to those in column (3) for seven out of fourteen observations. The difference is due to Bloomfield's use of gross domestic assets, ignoring changes in the domestic liabilities of the Riksbank and his use of end-of-year data.

period 1880–1913—similar to the exercise in Nurkse and Bloomfield—shows negative covariation (nineteen observations) to be considerably more frequent than a positive one (seven observations), the rest being zero signs. Table 8.7 is thus consistent with the view that the Riksbank sterilized and offset movements in foreign reserves.[14] The policy of "direct deflation" in the 1850s and 1860s, however, conformed to the rules of the game. Under that policy, the overriding goal of the bank was to maintain the convertibility of its notes—the objective of a central-bank policy observing the rules of the game.

In brief, the Riksbank carried out an "active" discretionary policy in the short run under the pre-1914 Swedish gold standard, relying on a large number of measures to adjust to and to counteract various disturbances. The Swedish gold standard was thus a managed gold standard. The techniques used by the Riksbank bear a great resemblance to Bloomfield's description of measures adopted by central banks. Bloomfield (1959, p. 52) concluded that the classical gold standard was "not so simple and 'automatic' a mechanism as it is often supposed to be." The evidence on the policy of the Riksbank lends support to his conclusion.

8.5.3 The Composition of Foreign Reserves and Transaction Volumes of Gold and Foreign Assets

Under the classical gold standard, international payments were mainly settled—not with gold—but with certain key currencies: the U.K. pound, the French franc and the German Reichsmark. These key currencies were thus part of private and official foreign-asset holdings of peripheral countries like Sweden. Three questions pertaining to Swedish holdings of key-currency reserves are examined here: (1) How large were the foreign assets of the Riksbank in relation to its specie reserves? (2) Which were the key currencies for Sweden under the gold standard? (3) How large were the transaction velocities of the components of the foreign reserves? (see Lindert 1969). The Swedish monetary data for a few years prior to World War I allow a detailed examination of the questions because they give the distribution by country of all foreign reserves of the Riksbank as well as the transaction volumes.

In the first half of the nineteenth century, the Riksbank's holdings of foreign reserves were entirely specie. Gradually, the bank acquired deposits at foreign banks and bankers (first shown in the statistics in 1844), foreign bills (first reported in 1845), and foreign bonds (first reported in 1872). The ratio of net foreign assets to total net foreign reserves of the Riksbank fluctuated around 50 percent during the gold standard period. It was 54 percent at the end of 1913, a high level compared to a ratio of 25 percent that Lindert (1969, pp. 10–11) calculated as the average for

Europe for official reserves, excluding the Bank of England, Bank of France, and the Reichsbank (see also table 8.8).

The composition of the foreign reserves of the Riksbank at the end of 1913 is displayed in table 8.8. This table shows that the gold stock was about 46 percent of total foreign reserves (silver holdings of 5.2 million kronor are excluded here). Most of the gold was minted gold, Scandinavian gold coins representing more than half the gold reserves. The key currencies in Europe under the gold standard, the pound, the Reichsmark, and to a minor extent the franc were also represented in the form of minted gold in the holdings of the Riksbank. Table 8.8 also shows that use of gold for settling international transactions was limited. The sum of debits and credits during 1913 was around 6 million kronor compared to a stock of 102 million kronor. It is safe to conclude that gold was not used by the Riksbank as an international means of payment. Gold instead remained in its vaults.

Transactions in foreign bonds, primarily of German origin, were more frequent, one reason being turnovers due to redemptions. Foreign bills and deposits at foreign banks constituted an important share of total reserves. The distribution of the total of the two assets, according to type of currency, shows that claims in Reichsmark were by far the largest item, followed by pound-sterling claims, and claims in Danish and Norwegian kroner (table 8.8). Assets denominated in francs and other currencies were insignificant. The volume of transactions in column (3) of table 8.8 indicates that foreign bills and deposits at foreign banks were most frequently used for international payments. Settlements in Reichsmark amounting to 1107 million kronor represented the bulk of transactions compared to settlements in pounds of 352 million kronor, and in Danish and Norwegian kroner of 326 million kronor.

Judging from table 8.8, the German currency was the most important key or reserve currency held by the Riksbank shortly before World War I.[15] The British pound and the Danish and Norwegian currencies were second in importance. The French franc, although a reserve currency, had no role in this context. The composition of Swedish exports and imports partially explains this result, since the largest share of Swedish imports originated in Germany. Thus, the Riksbank had to maintain considerable claims in Reichsmark to meet the demand for German currency from importers.

8.6 The Law of One Price and International-Market Integration

Much of recent discussion about the adjustment of an open economy to international disturbances has dealt with the monetary approach to the balance of payments. According to that theory, for a small open economy

Table 8.8 **Composition of Riksbank's Foreign Reserves, 1913**

Type of Asset (1)	Type of Currency (million kronor) (2)				Volume of Transactions (million kronor) (3)
1. Gold	Minted gold		91.4		
	Scandinavian	56.0			
	Sovereigns	20.5			
	Reichsmark	10.9			
	Francs	2.7			
	Other[a]	1.4			
	Unminted gold		10.7		
	Total gold		102.1		6.4[c]
2. Foreign bonds[b]			27.5		33.9[d]
3. Foreign bills			69.8		
4. Foreign banks (net) (lines 3 + 4)			24.8		
Norwegian and Danish kroner		10.2			326.3
Pound sterling		23.2			352.3
Reichsmark		57.4			1107.4
Francs		3.3			52.2
Other[e]		0.2			—
5. TOTAL foreign reserves (net)			224.2	TOTAL transactions volume	1879.9

Sources: *Riksbankens årsbok* 1913, 1918.

Notes: Col. (3) sums debits and credits to obtain the volume of transactions. Gold parity rates (*Riksbankens årsbok* 1918, pp. 74–75) were used to calculate the krona value of the composition and the transactions volume of foreign banks and foreign-bill assets (cols. 2 and 3).

[a]"Other" includes 0.8 million Finnish marks and 0.2 million rubles.

[b]The item "foreign and Swedish government bonds" (*in- och utländska statspapper*) was 27,489,511 million kronor end-of-December 1913. The item "foreign bonds" (*obligationer: utländska*) was identical in the balance sheet of the Riksbank (*Riksbankens årsbok* 1913, table 29). Thus, it is safe to assume that the Riksbank held no Swedish government bonds at that time. Consequently, line 2 pertains to foreign bonds. The composition of foreign-bond holdings is not shown in the 1913 report. The 1911 report, however, shows that 52 percent were German bonds, 37 percent were U.K., and 11 percent were French bonds with a total book value of 16.6 million kronor at the end of 1911. The composition of Riksbank bond holdings was probably similar in 1913.

[c]Transactions in gold included sales (export) of 0.9 million kronor of Scandinavian gold coins, a purchase (import) of 3.9 million kronor of unminted gold, and sales (export) of 1.4 million kronor of minted foreign gold coins.

[d]Transactions in foreign bonds also included Swedish nongovernment bonds. The latter represented a small share (12 percent) of the bond portfolio of the Riksbank at the end of 1913.

[e]"Other" includes assets in dollars, rubles, Austrian crowns, Finnish marks, and Dutch florins. The volume of transactions in these currencies was so small, it is ignored (col. 3).

adhering to fixed exchange rates, prices and interest rates are internationally determined on world markets. Arbitrage in traded goods is given a central role in establishing identical behavior of prices across countries with due allowance for costs of transportation, tariffs, and other restrictions on trade. The model, applied to Sweden during the pre-1914 gold standard era, indicates that the policy of the Riksbank had no effect on prices, interest rates, and the growth of the Swedish money stock—only on the composition of the monetary base. In particular, gold flows in or out of Sweden did not influence prices and incomes but established equilibrium between the demand for and supply of money.

This interpretation of the workings of the pre-1914 gold standard is forcefully argued by McCloskey and Zecher (1976, and chap. 2, this volume). They suggest, to the extent that a common-price-level behavior across countries adhering to gold is found, that the monetary approach is confirmed. They contrast the monetary approach with the price-specie-flow mechanism of Hume, according to which differences in inflation rates between countries cause deficits and surpluses on trade accounts, including gold flows that reestablish a common long-run behavior of prices.

This section applies the McCloskey-Zecher analysis to the Swedish gold standard record. Domestic and foreign individual and aggregate price behavior is compared, in particular, lead-lag relationships are examined. This issue is interesting to explore as one suspects that the Swedish economy, on the periphery of the world economy, adjusted with a lag to events in the center of the gold standard world—the United Kingdom.

Evidence concerning some individual prices is available for Sweden. Bengtsson and Jörberg (1975) compared the price of rye within Sweden and between Sweden and Amsterdam and Copenhagen during the eighteenth and nineteenth centuries. First, they established that regional price differences declined within Sweden between 1735 and 1914 for a large number of commodities. They concluded that agricultural markets were well integrated as early as the eighteenth century in spite of bad communications and obstructive government regulations. Second, they applied spectral analysis to movements in the price of rye during two periods of preindustrial Sweden: 1732–98 and 1799–1869. For 1732–98, a high correlation was evident between the price of rye in Stockholm, Gothenburg, Amsterdam, and Copenhagen. The spectra for 1799–1869 showed a still higher correlation with no lags in price movements in the four cities. A close correlation existed between larger fluctuations in interregional and international rye prices. The absence of lags in the nineteenth century was interpreted as signifying improved economic integration.

According to Bengtsson and Jörberg (1975, p. 105), "prices in Sweden were not determined regionally, but were influenced by interregional and international price movements." The period they investigated ended in 1869, that is, before the introduction of the gold standard in Sweden. To them it was "self-evident" that economic integration became more pronounced with the spread of railways and the rise of industrialization. Their results thus suggested that Swedish prices covaried strongly with foreign prices even prior to the gold standard era.

In a monumental study of Swedish price history, Jörberg (1972) compared movements in foreign and domestic prices and in market price scales (*markegångstaxor*). These price scales, determined at annual meetings in every county by representatives of the tax payers and by the authorities, were used to transform tax payments in kind into cash values. Jörberg examined the correlation of the price scales with "ordinary" domestic and foreign prices. A high correlation was interpreted as indicating that the market price scales reflected actual market prices well. The purpose of the tests was to explore the representativeness of the market price scales—not to study the law of one price. Jörberg's results, however, can be used for a study of the international integration of the Swedish economy.

Table 8.9 presents some of Jörberg's correlations of prices of wheat and rye during selected periods of the eighteenth and nineteenth centuries. The correlations support the view that prices within Sweden covaried to roughly the same extent as prices between Sweden and foreign countries like England, Germany, Norway, and Holland. It is worth noting that the price of wheat in England was highly correlated with the market price scale of wheat in Sweden as early as in the eighteenth century. The correlations are generally higher for the nineteenth century than for the eighteenth century. The covariation between Prussian grain prices and grain prices quoted on the Stockholm exchange for 1861–1913 is roughly of the same magnitude as the covariation between the latter set of prices and the market price scales of wheat and rye in Stockholm county for 1838–1913.

Jörberg concluded that the high correlations between the market price scales and other price data, Swedish as well as foreign, suggested that the market price scales were good measures of actual price fluctuations. A conclusion may also be drawn from table 8.9 concerning the law of one price: Swedish prices covaried closely with foreign prices during the classical gold standard period. Domestic Swedish and foreign markets were about as well integrated as regional markets within Sweden.

The behavior of Swedish and U.K. aggregate price indexes may throw light upon the issue of market integration. Figure 8.4 plots the U.K. wholesale price index (Sauerbeck's index), the wholesale price index for Sweden (Åmark 1921), and a cost-of-living index for Sweden (Myrdal

Table 8.9 **Correlations between Foreign Prices, Domestic Prices, and Market Price Scales: Selected Periods, 1732–1914**

Correlations Between (1)	Period (2)	Wheat (3)	Rye (4)	Other Commodities (5)
Interregional Markets				
Stockholm exchange commodity prices and market price scales, Stockholm county	1838–1913	.86	.83	—
Stockholm exchange commodity prices (Sept.–Febr.) and market price scales, Stockholm county	1880–1913	.81	.94	—
Price quotations from the town of Malmö and market price scales, Malmöhus county	1880–1914	.84	.93	—
International Markets				
English average prices and market price scales, averages for Sweden	1732–1759	.95		—
Prices for Prussian rye (Amsterdam exchange) and market price scales, averages for Sweden	1732–1789	.59	—	—
	1790–1808	.61	—	—
	1816–1874	.67	—	—
Market prices in Norway and market price scales, averages for Sweden	1836–1914	—	.72	—
Gazette prices in England and prices, Stockholm exchange	1860–1913	.74	—	—
Prussian grain prices and grain prices, Stockholm exchange	1861–1913	.89	.84	—
Export prices of butter, Finland, and market price scales, averages for Sweden	1882–1913	—	—	.94
Beef prices, Finland, and market price scales, averages for Sweden	1878–1913	—	—	.95

Source: Jörberg 1972, table 3.4.

Note: The Stockholm exchange traded primarily in commodities.

1933) for 1871–1913 with 1880 as the common base year. The covariation among the three series is substantial. The secular pattern is identical: long-run deflation during the 1880s and the early 1890s followed by secular inflation. The cyclical fluctuations seem similar too.

Table 8.10 gives correlation coefficients for leading, concurrent, and lagging observations of annual percentage changes in British and Swedish prices during the gold standard period, 1873–1913. The highest correlation is for simultaneous observations, while leads and lags give considerably lower correlations. Thus, Swedish markets display the same pattern

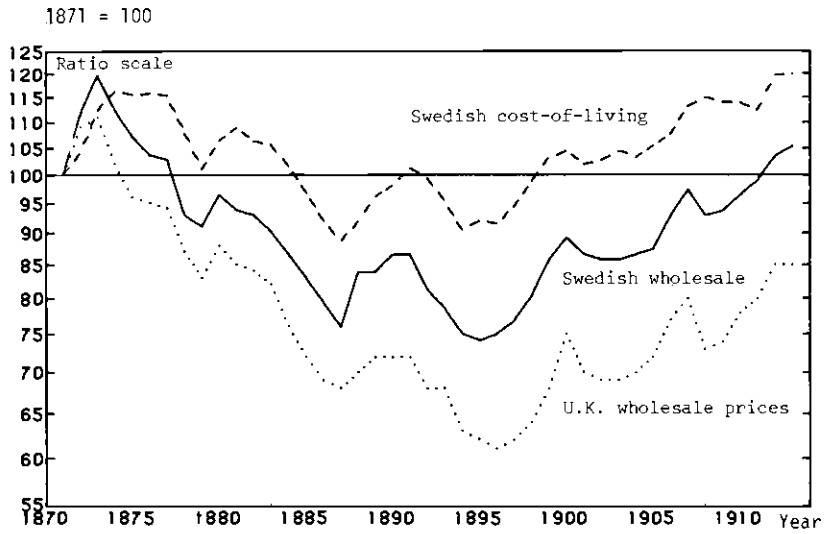

Fig. 8.4 Swedish and U.K. prices, 1871–1913. *Sources*: U.K. wholesale prices (Sauerbeck's general index): Åmark 1919, table 345. Swedish wholesale prices: Åmark 1921, a mixture of wholesale and consumer prices (*markegångstaxor*). Swedish cost-of-living index: Myrdal 1933, table A, similar to a consumer price index since it is based on market prices, prices in newspapers, and *markegångstaxor*.

as British markets. Table 8.10 also shows a higher correlation for wholesale prices in the two countries than for Swedish wholesale prices and Swedish consumer prices. The result probably reflects a larger share of traded goods in the wholesale price index than in the cost-of-living index. There is also a tendency for changes in Swedish and U.K. wholesale prices to lead changes in the cost-of-living if one may judge from the fairly high correlation coefficient for a one-year lead.

Sweden became a substantial long-term international borrower in the second half of the nineteenth century. For this reason, as long as Sweden adhered to a fixed exchange rate, the Swedish long-term bond rate was simply equal to the long-term rate of the international capital market. The U.K. discount rate was lower than the Swedish discount rate, reflecting the United Kingdom's role as a net lender in the center of world finance and Sweden's position as a net borrower (see figure 8.5). The covariation between Swedish and U.K. rates appears to be fairly close, at least from the 1880s onwards, but not as high as for prices (figure 8.4 and table 8.10). The highest correlation coefficient occurs when the British discount rate leads the Swedish rate by one year. This lead suggests that the Riksbank altered its rate in response to changes in the U.K. rate but with a lag.

The rates charged by Swedish commercial banks and the discount rate

Table 8.10 **Correlation Coefficients between Annual Percentage Changes in Prices and Interest Rates in England and Sweden under the Pre-1914 Gold Standard**

Variables	Period	Correlation Coefficients +2	+1	0	−1	−2
Price Indexes	1873–1913					
English and Swedish wholesale prices		−.019	.289	.842	.287	−.013
English wholesale prices and Swedish cost-of-living		.194	.381	.579	.039	−.048
Swedish wholesale and cost-of-living		.143	.584	.691	.071	−.147
Interest Rates	1880–1913					
British discount rate and Swedish discount rate		.018	.507	.288	−.288	−.186
Swedish discount rate and Swedish commercial bank rate		.002	.455	.842	.062	−.308

Sources: See figures 8.4 and 8.5.

Note: First listed variable leads the second listed variable 2 years; 1 year; both coincident; first listed variable lags the second variable 1 year; 2 years.

of the Riksbank covaried closely according to table 8.10 and figure 8.4. The pattern is most likely due to a common international influence on Swedish rates—and not to a domestic one running from the discount rate to commercial-bank rates or vice versa, at least not in the nineteenth century when the Riksbank also acted as a commercial bank and some big commercial banks served as central banks for smaller banks.

To sum up, Swedish individual prices as well as aggregate price indexes covaried closely with international price movements both in the short and in the long run under the pre-1914 gold standard. Differences in short-run inflation rates between Sweden and the United Kingdom are not evident under the gold standard, at least not on any significant scale. Swedish markets were thus well integrated with international markets. These results challenge any theory that rests upon short-run divergences between Swedish and foreign inflation rates and lend support to the monetary-approach interpretation of the Swedish gold standard, according to which prices and interest rates in Sweden were determined internationally.

8.7 Summary

The following conclusions emerge from the present study:

1. The Swedish gold standard was not a domestic gold standard based on large-scale circulation of gold coins within Sweden. The authorities

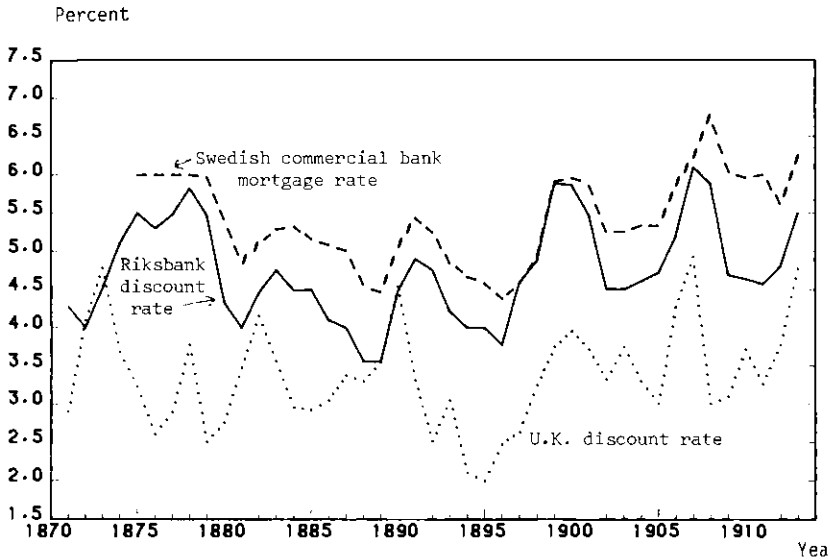

Fig. 8.5 Interest rates in Sweden and the United Kingdom, 1871–1913. *Sources*: Swedish discount rate: *Riksbankens årsbok* 1913, p. 73, apparently an annual average of daily rates. Mortgage rate on real estate (*utlåningsränta mot inteckning i fast egendom*) of Swedish commercial banks: monthly bank reports. Annual averages of end-of-month data averaged for three major commercial banks (*Stockholms Enskilda Bank*, *Skandinaviska Kreditaktiebolag*, and *Aktiebolag Stockholms Handelsbank*). U.K. discount rate: Åmark 1919, table 345.

minimized gold holdings of the Swedish public by supplying notes of lower denominations than gold-coin denominations. Legal reserve requirements of the commercial banking system and of the Riksbank were framed so that no rigid link between the gold reserves and the note issue was established. Consequently, considerable short-run as well as long-run autonomy was given the banking system's supply of notes. The incentive structure of the monetary system contributed to monetary stability.

2. The long-run growth of the Swedish money stock during the pre-1914 gold standard era was, however, strongly related to the growth of the gold and foreign-asset holdings of the Riksbank. That growth was financed by long-term borrowing on international capital markets.

3. In the short run, there was no rigid link between gold flows and the money stock. The Riksbank's policy of constant gold holdings minimized gold flows by foreign-exchange operations, borrowing abroad, and other monetary techniques. The Swedish pre-1914 gold standard was thus a managed gold standard.

4. Swedish prices covaried closely with international prices, both in the long run and in the short run, from 1880 to 1913. The covariation indicates that domestic markets were well integrated with international markets. Consequently, there is strong support for the law of one price and thus indirectly for the monetary approach to the balance of payments.

5. Sweden adhered to the gold standard during 1873–1914, a period of extremely rapid industrialization of its economy as well as of unusual domestic monetary and political stability. The free flow of capital into Sweden from financial centers like London, Paris, and Berlin was an engine for the transformation of its economy.

Monetary thought and monetary policy in Sweden *after* 1914 was greatly influenced by the experience under the classical gold standard system. The gold standard was commonly regarded as the normal state of affairs and World War I as a temporary disturbance. The parity rate of the krona became the norm for postwar monetary reconstruction in spite of far-reaching changes due to World War I and the inflation accompanying the war.

In 1922 Sweden was the first country in Europe to decide to return to the gold standard at the 1914 parity rate. Partly as a consequence of this step, a sharp deflation and great unemployment ensued. The policy reflected expectations that the gold standard, once reintroduced, would lead to stability, economic growth, and prosperity—as was the case prior to 1914. When these expectations did not materialize, economists and politicians became skeptical about the workings of the gold standard, a critical view that was absent during the pre-1914 gold standard period.

Appendix *Knut Wicksell and Gustav Cassel on Money, Gold, and Prices in the Long Run*

At the turn of the century, Knut Wicksell and Gustav Cassel each presented a theory to explain secular price-level movements during the nineteenth century. Using basically the same data set, they reached different conclusions. Their views are examined here in relation to the analysis of the Swedish-money-supply process in section 8.5.1 (see Jonung 1979a for a detailed analysis of their views).

Wicksell's theory (1898) was based on a distinction between two interest rates: the market rate charged by the banking system and the natural rate which equates the demand for and supply of capital. A discrepancy between these rates gave rise to cumulative movements in prices. When the natural rate is above the market rate, investors borrow from the banking system, commercial banks reduce their reserves, the

money stock and prices increase. When the natural rate is below the market rate, borrowing is arrested, reserves increase, and the money stock and prices decline.

Wicksell applied his theory to the behavior of prices and interest rates in the United Kingdom in the nineteenth century. According to him, the U.K. inflations of 1790–1815 and 1851–73 occurred because the natural rate was above the market rate, and the secular deflations of 1815–50 and 1873–96 occurred because the market rate was above the natural rate. Movements in the natural rate, due to technological innovations or wars, were thus the driving force behind secular movements in prices. He assumed that the banking system reacted passively to changes in the demand for credit even in the long run. Gold was assigned a secondary role in long-run processes.

Wicksell's theory does not lend itself to a direct test because the natural rate, the key variable in his theory, is not observable—a fact he was well aware of. His theory, however, has implications for the behavior of the monetary system. The cumulative process implies that the reserve-deposit ratio of the commercial banking system should be rising during secular deflations and falling during secular inflations. Alternatively, since Wicksell consolidated the balance sheets of the central bank and commercial banks, the ratio of gold to the monetary liabilities of the monetary system should be rising during secular deflations and falling during secular inflations.

An inspection of the Swedish evidence reveals that the reserve-deposit ratio of the Swedish commercial banking system was falling, not rising as suggested by the cumulative process, during the secular deflation of 1873–96. As figure 8.2 shows, the ratio of gold reserves to the Swedish money stock remained constant at about 5 percent during the pre-1914 gold standard period. This constancy is inconsistent with the cumulative process as a theory of long-run movements in prices. Cagan (1965) reached similar conclusions concerning Wicksell's theory on the basis of U.S. evidence. These results do not disprove the existence of a cumulative process as presented by Wicksell. Rather, they suggest that developments other than those discussed by Wicksell dominated actual developments.

Six years after Wicksell published his theory, Cassel (1904) provided an alternative one, suggesting that secular movements in prices in the nineteenth century were due to different growth rates of the demand for and supply of gold. His conclusion was based on the following four-step analysis. First, Cassel estimated the annual actual stock of gold in the world in the nineteenth century. Second, turning to the demand side, he argued that the increase in the world demand for gold between 1850 and 1900 was due to factors other than price-level changes because the price

level was the same in the two years. With the help of this assumption, he calculated the "normal" growth rate of the stock of gold to be 2.65 percent per year between 1850 and 1900. Had the supply of gold increased uniformly at that rate (the normal gold stock), the growth in the demand for and supply of gold would have been equal and the price level would have remained constant.

Third, Cassel estimated the ratio of the actual to the normal gold stock (the relative gold stock). Finally, plotting the relative gold stock against the U.K. price level on the base 1850, he concluded that the two curves followed each other closely in the long run. Cassel believed that he had demonstrated that (*a*) short-run movements in prices were not related to gold movements; (*b*) long-run differential growth rates in the demand for and supply of gold caused secular changes in the price level.

Cassel's views (1904) should properly be regarded as a precursor of global monetarism. The demand for and supply of gold are determined by two different sets of factors. The demand for gold is proportionate to the price level, i.e., it is a demand for real-gold balances, and it exhibits a stable long-run growth rate. The supply of gold is determined by the opening of new mines and changes in gold-processing technology. It is thus apt to undergo larger fluctuations in the long run than the demand for gold.

There is considerable evidence in favor of Cassel's view. Secular inflation in the 1850s and 1860s was due to gold discoveries in California and Australia. The inflation of 1896–1914 was associated with the opening of new gold mines in South Africa, Alaska, and Australia (see Rockoff, chap. 14, this volume). Furthermore, Cassel (1918) argued that the ratio of a country's holdings of gold to its money stock should be constant in the long run. Changes in gold should be followed by "corresponding" changes in the money stock, hence the ratio of gold to the money stock should have been constant, as it was during the pre-1914 gold standard period for Sweden (see figure 8.2). In summary, Cassel's theory appears more plausible than Wicksell's.

Wicksell, a critic of the gold standard, wanted to replace it with a monetary policy based on price stabilization. Cassel was initially a supporter of the gold standard. Following an intense debate on the merits and demerits of the gold standard during World War I and in the 1920s, Swedish economists became increasingly critical of the workings of the interwar monetary system based on gold. Eventually that exchange of ideas contributed to the adoption of Wicksell's norm of price stabilization as the guide to Riksbank policy when Sweden left the gold standard in September 1931 (for an account of the implementation of Wicksell's norm in the 1930s, see Jonung 1979b).

Notes

1. An important source of information on the policy of the Riksbank during the prewar gold standard is Brisman (1931). His work is part of the five-volume history of the Riksbank, *Sveriges Riksbank 1668–1924*. However, Brisman did not have access to the archives of the bank, which have not yet been the subject of a thorough economic study. Heckscher (1926) briefly considers the Swedish gold standard prior to 1914.

2. See Bordo (chap. 1, this volume) for a detailed presentation of the issues in debate concerning the gold standard.

3. The interaction between the legal framework and the growth of commercial banking in Sweden is analyzed in Jonung 1978. The growth of the Swedish banking system is described in Flux 1910 and Sandberg 1978.

4. A well-functioning monetary system was probably an important factor in Sweden's rapid economic growth prior to World War I. This point is stressed by Sandberg (1978).

5. *Riksbankens årsbok* 1913 gives statistics on both the exchange of notes and of subsidiary silver coins between Sweden on one hand and Denmark and Norway on the other. In 1913, 10 million kronor in Swedish notes were returned to Sweden by the latter, and 38 million kronor in Danish and Norwegian notes were sent from Sweden. The figures should be compared to a total average volume of 468.3 million kronor of Scandinavian (Danish, Norwegian, and Swedish) notes in circulation in 1913. The exchange of silver coins was much smaller; about one million kronor in each direction.

6. *Riksbankens årsbok* prior to 1914 showed the exchange rates of the pound and the Reichsmark but made no mention of the rates of the Danish and Norwegian currencies. The Scandinavian central banks apparently eliminated any deviations from the parity rates. Differences in monetary policies during World War I eventually caused the destruction of the union (see Heckscher 1926).

7. After 1881 five-kronor coins were minted. The twenty-kronor coin accounted for 71 million out of 85 million kronor in gold coins minted prior to World War I (see Wallroth 1918).

8. The authorities made no serious attempts to increase the domestic use of gold. The banking legislation of 1874 gave the government the right to withdraw at its discretion the five-kronor note issued by private banks, presumably to promote the circulation of gold. The gold standard was adopted in Sweden during the boom in the early 1870s. Large export surpluses during those years served to increase the circulation of gold (on this point see Montgomery 1934, pp. 50–51). The 1874 legislation was the basis for an attempt in the late 1870s to restrict the supply of private notes and increase the circulation of Riksbank notes—not of gold coins.

9. These attempts included bribes to tax authorities to accept private bank notes that were not legal tender and regular requests to borrowers to repay loans in cash, mainly Riksbank notes. The loans were paid out again next day in private bank notes (see Jonung 1978).

10. Riksbank notes were not counted as legal reserves although they were legal tender. However, from the viewpoint of the private *enskilda* bank, the notes represented base money since they could be exchanged for gold at the Riksbank at a fixed price.

11. Only selected kinds of foreign assets were counted as legal reserves.

12. Fleetwood (1947, p. 45) notes that "the Swedish emigration coincides with the period of the heaviest capital import. Together these two movements made possible the rapid increase in the standard of living in Sweden." Emigration from Sweden facilitated economic growth as Sweden otherwise would have had a "surplus" population, given its natural resources. According to Fleetwood (p. 46), a "surplus of labour and deficiency of capital" were eliminated by the simultaneous occurrence of emigration and capital imports.

13. Brisman (1931) notes that in 1865 the Board of Directors of the bank subscribed to

the *Economist* which promoted Bagehot's views concerning the responsibility of a central bank to use the discount rate to maintain domestic and external stability.

14. It is also consistent with the monetary approach to the balance of payments which suggests that the rules of the game were inconsistent with a gold standard system (see McCloskey and Zecher 1976).

15. The composition of the foreign reserves of the Riksbank had a major effect on the policy of the bank following the outbreak of war in August 1914. The bank wanted to avoid losses on its Reichsmark holdings due to a depreciating German currency by allowing the krona to depreciate with the Reichsmark. This policy was strongly criticized by economists, in particular by Cassel.

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Comment

Peter H. Lindert

Lars Jonung has written a successful paper about a successful nation. I would like to underline briefly some of the achievements of his paper and then turn to the still-underexploited opportunity to draw conclusions about the link between prewar Swedish success and the gold standard.

Jonung has skillfully described the prewar evolution of the Swedish monetary system into a smoothly functioning managed paper currency. Gold hardly circulated at all domestically. It gravitated toward the Riksbank both from within the country and from without, providing a growing metallic reserve. Growth in gold and foreign-exchange reserves accounted for three-fourths of the growth in the money supply, easily eclipsing the contributions of the deposit-currency ratio and the deposit-reserve ratio. Yet this reserve, as Jonung stresses, was largely redundant, since the nonbank public always trusted its paper money and its legislators always kept reserve requirements low enough to leave the Riksbank and commercial banks with considerable unrequired reserves. The domestic shunning of gold and the redundancy of gold and foreign-exchange reserves held by the banking system should be viewed as testimony to the efficiency of Sweden's monetary system. The nonuse of gold in transactions is what one would expect of a "successful gold

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standard"; if people are convinced that paper money is as good as gold, then expensive and barren gold dwindles away as a share of either holdings or transactions within Sweden just as it did in the prewar economy as a whole. The redundancy of reserves also bespeaks freedom from crisis in the same way that infrequent use of bank-deposit insurance is a sign that deposit insurance may be doing its job well. These conclusions are well supported by the material Jonung has presented.

In separate and somewhat disjointed sections of his paper, Jonung adds to our appreciation of the Swedish case by exploring the purchasing-power-parity hypothesis, the determinants of velocity, and the early gropings toward a theory of the price level by Wicksell and Cassel. The results here are firmly based, plausible, and noncontroversial. Purchasing-power parity gets the same partial and moderate support it receives elsewhere. The secular decline in velocity is mirrored in indicators of growing monetization. The appendix on Wicksell and Cassel is too brief to give major new insights, but it does remind us of Swedish patent rights in the area of monetary theory and the theory of purchasing-power parity.

These contributions set the stage for a rethinking of the central issue relating to Sweden's participation in the gold standard system: What difference did the gold standard make to Swedish economic growth and stability? The simple correlation is perfect: Before Sweden joined the gold standard, she was probably not growing any faster than Europe as a whole, yet upon joining she acquired the fastest growth rate in Europe, surging from a per capita income about two-thirds that of all Europe in 1873 to parity with the European average around 1900 to a 27 percent lead on the continent by 1913 (Bairoch 1976, p. 286). The purchasing power of that national product per capita rose even faster, since Sweden's external terms of trade improved greatly across the last quarter of the nineteenth century and were still better in 1913 than at the onset of her gold standard era.[1] This neat correlation looks like a fine scaffolding for Jonung's conclusion that

> Sweden adhered to the gold standard, 1873–1914, a period of extremely rapid industrialization of its economy as well as of unusual domestic monetary and political stability. The free flow of capital into Sweden from financial centers like London, Paris, and Berlin was an engine for the transformation of its economy. (P. 393)

Some readers may wish to infer that staying on gold raised and stabilized Sweden's national product. While this inference cannot be firmly rejected, I wish to counterpose it with my own null hypothesis: Sweden's participation in the international gold standard made no visible net contribution to the growth or stability of her national product, relative to a hypothetical world of flexible exchange rates for the krona.[2] One may

even doubt whether it mattered to Sweden that Britain and other major countries themselves adhered to the fixed-exchange-rate orthodoxy.

To support this null hypothesis, I shall first note how easy it seems to give proximate explanations for Sweden's rapid prewar growth without referring to any particular monetary institutions. By about the time she entered the gold standard and the redundant Scandinavian Monetary Union, Sweden was in the potentially favorable position that Lars Sandberg has aptly dubbed "the case of the impoverished sophisticate" (Sandberg 1979). Relative to her average income and capital stock, Sweden had remarkably high literacy, schooling, life expectancy, technological performance in some industries, and acceptance of modern financial institutions. Her rate of return on schooling may have been initially low for noneconomic reasons (mainly Lutheran insistence on universal literacy). In this respect, she bore a remarkable resemblance to the rest of Scandinavia, to North America, and to Meiji Japan at the start of their respective growth accelerations. Her development had been held back by high transport costs and by an initially unfavorable natural-resource endowment. Yet she had the human resources to exploit opportunities when they arose.

Opportunities arose after midcentury. Swedish oats, softwood, pulp, iron ore, and mechanical skills were given higher value by several developments in the world economy. World demand for softwood lumber and pulp expanded, helped by a decline in transport costs. That demand was shifted toward Sweden by the end of British preference for Canadian wood in the 1850s and the exhaustion of Norwegian timber. The Thomas-Gilchrist process in 1879 raised the steelmaking demand for basic Swedish iron ore. Each resource-related sector gave rise to machinery and engineering lines that were tapped with alacrity by a well-trained nation. Meanwhile, a stable government was maintained without heavy military investments.

This not-so-monetary story of prewar Swedish growth can be extended further to endogenize Sweden's attraction of foreign capital and her accumulation of gold and foreign-exchange reserves. A nation rich in human capital and newly valued natural resources relative to man-made nonhuman capital is likely to attract foreign lending. This attraction follows from the usual complementarity of man-made nonhuman capital with skills and nature. Such a nation, especially with a rising share of foreign trade in national product, is also likely to have a growing demand for international money balances in a way analogous to the minor role played by the human share of total wealth in Milton Friedman's restatement of the quantity theory of money. Perhaps the accumulation of gold and foreign exchange that Jonung rightly gives credit for 75 percent of Sweden's money growth is itself explained primarily by the opening of new trade opportunities for an already-skilled poor nation.

Thus far I have merely offered an alternative plausible story of Swedish growth without really showing that participation in the international gold standard made no contribution at all to Swedish stability or growth. International economists still lack a consensus model for giving international monetary regimes their proper due in growth accounting. We must be content with indirect clues and theoretical priors about the gold standard's contribution to Swedish stability and growth.

If we could find cases in which the Swedish economy was subjected to severe foreign or domestic shocks, we could see if either Swedish monetary policy or induced private financial movements saved her in a way that would not have been available without fixed exchange rates and gold convertibility. Theory would say that the gold standard, relative to flexible exchange rates, should have partly cushioned the domestic money stock and national product against domestic shocks and partly exacerbated their vulnerability to foreign-trade shocks.

The difficulty here is in finding any shocks inflicted on prewar Sweden. As Jonung has shown for the years from 1880 on, the Riksbank never lost foreign reserves in serious quantities. Thus, even though Jonung has helpfully shown us that the Riksbank tended to sterilize her external imbalances and smooth out the growth of the money supply, we should also note that she never had serious payments deficits that needed to be sterilized. As for the surpluses she tended to run on average, there has always been an asymmetry in fixed-exchange-rate systems that has made surpluses less disruptive to the domestic economy than deficits of equal magnitude as a percentage of the stock of reserves. The Riksbank, like the postwar Bundesbank, the Bank of Japan, and other central banks in chronic surplus, could go on for decades without being seriously inconvenienced by reserve accumulation.

In fact, the absence of signs of crisis pervades all the Swedish macroeconomic series available for this era. The money supply never dropped seriously. Annual GNP figures show occasional drops, but never large or consecutive ones. Modest nominal wage cuts occurred, but real wage cuts were never severe. In such a setting, it is hard to argue that the gold standard imposed any "discipline" whatsoever.

Extending the time period allows us to see how the Swedish monetary system responded to true pressure, and the response is instructive. Sweden, of course, like everybody else, suspended convertibility during the World Wars. In the Great Depression, when the going also got tough, Sweden promptly followed Britain's flight from the gold standard in order to cushion herself against world deflation, setting the stage for her reflationary monetary and fiscal policies. The money stock did not drop, and Sweden enjoyed one of the world's shallowest depressions of that decade, as Lars Jonung (1981, pp. 286–315) has ably noted elsewhere. Thus Sweden, like almost all other countries before and after 1914,

observed the gold standard orthodoxy when it made no difference to the domestic economy, but abandoned it as soon as it began to bind.

My defense of the null hypothesis remains incomplete. In particular, I have not been able to test Jonung's belief that adherence to the gold standard attracted more inflow of capital from the lending countries. In this belief he has the company not only of other scholars but of most prewar monetary officials. One could counter it with the observation that even borrowing nations with flexible exchange rates attracted prewar capital, sometimes with the expedient of shouldering the exchange risk and agreeing to repay in gold-backed currency. Yet a convincing test eludes us. Flexible exchange rates occurred often before 1914, but only in the wake of crises that the fixed-exchange-rate system could not handle adequately, such as the U.S. Civil War or fiscal profligacy. Any possible relationship between the exchange-rate regime and the supply of foreign funds will be clouded by this background of prior crisis.

The debate over the effects of the prewar gold standard on a prospering economy like Sweden thus remains open. As I read it, Jonung's capable summary of Swedish experience allows us to argue that Sweden stayed on the gold standard peacefully because she grew rapidly, and not vice versa.

Notes

1. The conventional terms of trade (P_x/P_m) moved as follows:

	1872	*1900*	*1913*
Merchandise (Johansson 1967, pp. 138–49)	92.1	105.0	100
Merchandise and services (Kindleberger 1955, p. 365)	87.0	107.0	100

2. In appraising the effect of this gold standard, different scholars will give different answers to the key underlying question: "A gold standard *relative to what?*" Possible counterfactual alternatives for countries on the gold standard include other commodity standards, barter, exchange controls, the Bretton Woods adjustable peg, dirty floats and clean floats. To make a comparison with an alternative widely used both before World War I and (especially) since 1971, I shall compare the gold standard with floats, both dirty and clean.

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