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Working Paper

Expansion of the money supply with a fixed exchange rate: free banking in Sweden under the silver and gold standards, 1834 - 1913

SSE/EFI Working Paper Series in Economics and Finance, No. 541

Provided in Cooperation with:

EFI - The Economic Research Institute, Stockholm School of Economics

Suggested Citation: Ögren, Anders (2003) : Expansion of the money supply with a fixed exchange rate: free banking in Sweden under the silver and gold standards, 1834 - 1913, SSE/EFI Working Paper Series in Economics and Finance, No. 541, Stockholm School of Economics, The Economic Research Institute (EFI), Stockholm

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Expansion of the Money Supply with a Fixed Exchange Rate:
“Free Banking” in Sweden under the Silver and Gold Standards,
1834 – 1913

Anders Ögren*

Keywords: *Classical Silver and Gold Standards; Endogenous Money; Fractional Reserves; Free banking; Money Supply*

ABSTRACT

This paper studies the role of bank notes issued by the private Enskilda banks in the expansion of the Swedish monetary stock under the classic specie standard maintained during the period 1834-1913. The use of balance sheets has made possible the estimation of more accurate and continuous series of the Swedish money stock and bank reserves. The conclusion of the paper is that the Enskilda banks contributed to Swedish economic expansion and integration, through the provision both of credit and of generally accepted means of payment, beyond what would have been possible for the central bank, constrained as the latter was by specie convertibility requirements. But, the Enskilda banks did not operate according to free banking theory. The re-establishment of the silver standard guaranteed by the central bank was crucial for this process, since it allowed the Enskilda banks to hold central bank notes instead of specie as reserves. The notes issued by the Enskilda banks were accepted as deposits in the banking system but not as reserves. The fact that more Enskilda than Riksbank notes circulated among the public was a result of the law of adverse monetary selection: Gresham’s Law.

JEL: E42; E51; N13; N23

For valuable comments I would like to thank Michael D. Bordo, Torbjörn Engdahl, Hilda Hellgren, Lars Jonung, Mats Larsson, Håkan Lindgren, Håkan Lobell, Göran B. Nilsson, Mike Rafferty, Duncan Ross, Lars G. Sandberg, Krim Talia and Stefan Wagenius. I am also grateful to Marc Flandreau for sending me data. All errors are my own responsibility. I am grateful for financial support from the Swedish Research Council.

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Introduction

In 1834 Sweden re-established the silver standard it had abandoned in 1809. This action marked the beginning of a fixed exchange rate regime that lasted for more than eighty years until the outbreak of World War I. During this entire period, the maintenance of the specie standard was the principal duty of the central bank. Despite being the poorest European country operating under a convertible standard, Sweden in 1873 followed Germany in converting from silver to gold. According to Eichengreen and Flandreau, the adherence of a country to any convertible specie standard was more important for economic growth than whether that standard was based on silver or on gold.¹ They would thus argue that it was the specie standard as such that was of fundamental importance for Swedish economic growth.

The nineteenth century witnessed great changes in the Swedish economy. Local, national and international markets were integrated during this epoch. These changes affected not only the money market, but also the very nature of the money in circulation.² Sweden's specie standard guaranteed international integration, but it sometimes impeded the provision of credit and acceptable means of payment in larger sections of the Country.

The extent of Swedish poverty during this period is well illustrated by the very limited and stagnant circulation of metallic coins, as well as a supply of specie metal insufficient to provide the Country with an adequate supply of generally accepted money and credit. Instead, the Swedish economy relied heavily on personal credits, IOUs and other types of informal money, accepted only on a personal or regional basis, thus hindering more widespread economic integration. During this era of rapid economic expansion, Sweden was able to preserve a specie standard while simultaneously replacing the money substitutes originally in circulation with money accepted throughout the Country.

In accord with the assumptions of free banking theory, previous studies of the private note issuing banks (the Enskilda banks) as a system have visualized them as if they were working in an economic vacuum. Incorporating the demands of the specie standard, as well as the actual condition of the economy and the credit market, has resulted in two new conclusions: 1) In some fundamental respects, the system of

¹ Eichengreen, B. & Flandreau, M. (1994) pp. 2-3, 6-8, Figure 1 & 2

Enskilda banks did not fit the theoretical concept of a free banking system, and, more important, 2) The Enskilda banks, in concert with the central bank (the Riksbank) and its issuance of notes backed by specie, were essential to Swedish monetization.

As demonstrated in this chapter, the demand for generally accepted means of payment was partly satisfied by a type of domestic specie exchange system that loosened the money supply restrictions imposed by the international specie standard. The key Swedish actors in this system were the Enskilda Banks and the Riksbank. The Riksbank, being the sole issuer of legal tender, supplied high powered notes in response to the international demand resulting from specie convertibility. The Enskilda banks issued what can be described as "medium powered notes" primarily backed by Riksbank notes. As was essential during a period of national market integration, the Enskilda bank notes came to be accepted nation wide. This domestic specie exchange system permitted an expansion of the Swedish money supply of what can be considered as currency beyond what might have been expected under an international specie convertibility regime.

The supplying of Sweden with credit and generally accepted means of payment can be simplified into a two step process: first, regional "unofficial" money in circulation was replaced by Enskilda bank notes and, second, these notes, together with circulating Riksbank notes, provided a sufficient quantity of currency accepted nationwide to allow the banking system, starting in the late 1860's, to balloon the money supply by the use of deposits.

Quantitative information on the Enskilda banks was obtained from their end of year balance sheets published during the period 1834-1906.³ With only a few exceptions, data was found for the entire period. It thus became possible to analyze developments over time. The balance sheets are unique in that they include vital information concerning the precise composition of reserves, as well as the extent to which the Enskilda banks utilized their legal ability to issue notes.⁴

² For a discussion of the effects of ongoing economic and financial integration on the role, as well as the form, of money (see Goodhart, C. (1995) pp. 2-5).

³ These were published in *Post & Inrikes Tidning* for the years 1834-1870 and *Sammandrag af Bankernas Uppgifter* 1871-1906. For the years 1836 -1842 and 1867, the figures have been supplemented with data from Brisman, S. (1924) pp. 246-247 and Sveriges Riksbank (1931) p. 177. The figures for 1866 refer to September 30, rather than December 31, of that year (see Ögren, A (2003a) Chapter 1).

⁴ The accuracy and reliability of the figures reported by the Enskilda banks might be questioned, but when differences were detected compared to other sources, the balance sheets reported less favorable (lower) ratio of reserves to notes issued. See BaU 1853/54, Brisman, S. (1924) pp. 246-247,

Bank Note Substitutes, Free Banking and Endogenous Money

By definition, the money supply consists of bank notes and coins in circulation. Bank notes, in turn, are defined as non-interest bearing credit instruments transferable among actors as payment. Note substitutes, however, are usually not defined as part of the money supply.

A problem immediately encountered is that this definition of the money stock seems to have little relevance to the Swedish nineteenth century experience. The most striking feature of the Swedish money market of the day was the shortage of specie, coins and other official means of payment.⁵ Indeed, contemporary observers considered this shortage to be a constraint on economic growth. Although their circulation was negligible, coins were regarded as real money by the authorities and by scholars. Notes were thought of as "representing" coins.⁶ Clearly, the lack of official forms of money forced the practical Swedish concept of money to be quite elastic.

Authorized assignments constituted the permissible value of checks drawn on the Riksbank. Such checks circulated as means of payment just like bank notes, and, since their value could exceed the drawer's deposits and credits with the Riksbank, they added further to the money supply.⁷ Promissary notes issued by companies or individuals were commonly used, and were widely accepted by the public, as means of payment. In the 1790's, the issuance of private promissary notes with engraved or printed denominations was banned. Until the 1820's, the deposit certificates of discount companies circulated as bank notes.⁸ In addition to various types of IOUs, bonds,

Finanskommittén 1858 and Sveriges Riksbank (1931) pp. 172-185. Brisman listed the Enskilda banks' holdings of legal tender for the years 1834-1856, but he did not provide the source (although it probably was the Financial Committee of 1858). Jonung relied on Brisman's data for the years it was available. For the years 1857-1870, he assumed that Enskilda bank holdings of Riksbank notes remained constant at ten million SEK (Jonung, L. (1989)).

⁵ Heckscher, E.F. (1965) pp. 294-296

⁶ Agardh, J.M. (1865) pp. 78, 146, BaU 1834/35 No8 p. 9, 1879 No8 pp. 2-3, Kock, K. (1931) p. 18, Nordström, J.J. (1853) p. 90, Rosenberg, C.M. (1878) p. 84, Wennberg, J.O. (1829) p. 7, Ögren, A. (1995) p. 14. The Riksbank's right to issue one SEK notes was rescinded in 1878 to pave the way for a more "civilized usage of coins" (BaU 1879 No8 p.3).

⁷ BaU 1850-1851 No 2, p. 18. Formally, authorized assignment could be over issued because the velocity of circulation could be taken into account. Informally, it was realized that a reduction of assignments in circulation would severely dampen economic activity. See also Engdahl, T. (2002).

⁸ Brisman (1924) pp. 47-51, 244, Lindgren, H. (2002), Sveriges Riksbank (1931) pp. 44-45. The ban on private notes with engraved or printed denominations was renewed in the nineteenth century. During the period 1810-16, the three existing discount companies circulated promissary notes with a value of up to 35 percent of the Riksbank notes in circulation.

despite their interest bearing nature, also circulated as a means of payment.⁹ Thus, informal money and credit in the form of notes substitutes were supplied in response to demand. Their quality (or lack thereof), however, restricted their circulation to a relatively narrow geographic region or personal network.

Despite the contextual definition of money embedded in orthodox economic theory, (i.e. money is whatever serves as a means of payment or exchange), economists usually use a static definition to determine which items are to be included in various measures of the money supply. Because of the state of the means of payment in circulation, as well as the circular definition of money, it is important that the various monetary concepts used in this chapter be strictly defined.

A central measure used in this chapter is the par value money circulating throughout the Country, that is to say, currency or M1. It consists of the public's holdings of Enskilda bank and Riksbank notes. This definition is justified by the finding in this chapter that Enskilda bank notes were not just a claim on central bank reserves. More importantly, they were acceptable for bank deposits, starting in 1869, even in the Riksbank. Thus, when in circulation, these notes were not only commercial bank liabilities, as were demand deposits, but they also constituted a prerequisite for the emergence of a deposit based banking system.¹⁰

A second measure used in the thesis is M2. It is defined as consisting of M1 plus the public's deposits in the commercial banks. The measure is not original and has to some extent been used in previous research.¹¹ Its practical importance, however, is questionable. Since the offices of commercial banks were both few and seldom open, bank notes were vastly more convenient for transactions than were deposits. If the deposits of the Swedish public are to be included, a more appropriate measure also would include deposits in savings banks, since these banks for the most part functioned as commercial banks.¹²

⁹ Post & Inrikes Tidning 7/7-1840. The use of domestic bonds as means of payments payment was discussed relative to the growing money stock.

¹⁰ The measure M1 is today usually defined as monetary liabilities of the central bank, i.e. its demand deposits, circulating notes and coins, plus the public's demand deposits in commercial banks.

¹¹ See Jonung, L. (1984) & (1989).

¹² See Lilja, K. (2000), Petersson, T. (2000) and Sjölander, A. (2000). Thus Swedish savings banks differed in that respect from the savings banks in many other countries, for instance UK and US.

Free Banking Theory

A true free banking system is based on the principal that banking should not be subjected to any legislation distinct from that which applies to any type of business. Thus there is no need for restrictions on note issue, barriers to entry or legislation regulating reserves. Naturally, no State sponsored central bank is required.¹³ Other than these basic principles, however, free banking theory varies among authors.¹⁴

The most common version of free banking is based on the experience of Scotland, at least as interpreted by Selgin, Smith and White.¹⁵ This model is of a system operating under a specie standard and with fractional reserves. It is thus quite similar to the Swedish institutional setting, and it is the version of free banking that is referred to in this chapter.¹⁶

The theory assumes a banking system operating with fractional reserves under a specie standard. Such a system is believed to be fully self-adjusting, with the supply of notes matching the demand. Any bank that over issues notes will lose reserves due to a public reluctance to hold their notes. The bank's reputation will suffer and the public will choose higher quality notes; i.e. those of banks with a higher reserve ratio. Thus, even in the absence of formal rules, a consensus concerning a sound reserve-to-notes ratio will emerge over time.¹⁷

In theory banks are assumed to operate with gold reserves, thus linking the theory of free banking to the monetary approach to the balance of payments as a model of the workings of the gold standard.¹⁸ Inter regional specie flows will establish monetary

¹³ Selgin, G.A. & White, L.H. (1994) pp. 1718-1719

¹⁴ The most pedagogical way of viewing the differences is through the basis of note issuance and the choice of a unit of account. Some advocates of commodity-based money backed up to one hundred percent, argue that smaller reserves are fraudulent. Yet others, argue that a free banking system can be provided without the use of commodity money or reserves, other than holdings of financial instruments, with an unit of account pegged to a basket of commodities. See Dowd, K. (1993) pp. 62-67, Rothbard, M.N. (1985) pp. 13-14, Sechrest, L.J. (1993) pp. 150-154.

¹⁵ Sechrest argues that both Smith and White have overvalued the freedom of the Scottish system. Usury laws, privileged chartered banks among other things limited the free banking of Scotland (Sechrest, L.J. (1993), p. 92).

¹⁶ Also for Sweden, the Scottish banking system served as an example. The Minister of finance C. D. Skogman, wrote that the Swedish system had the same ideals as the Scottish system. The reason the Scottish system was not fully adopted in Sweden, he wryly observed, was the difficulty of transforming Swedes into Scots (Skogman, C.D. (1846:2) pp. 53-54). See also Agardh, J.M. (1865) pp. 295-322, Nilsson, G.B. (1981) pp. 30-34, Nordström, J.J. (1853) pp. 193-205.

¹⁷ Sechrest, L.J. (1993) p. 14, Selgin, G.A. & White, L.H. (1994) p. 1720, White, L.H. (1985) pp. 119-121, White, L.H. (1989) pp. 21-22, 27-28, 23-36. Theoretically, the bank has a contractual obligation to the bearer of the bank note to exchange it on demand.

¹⁸ Regarding the MABP, see McCloskey, D.N. & Zecher, R.J. (1984) & McCloskey, D.N. & Zecher, R.J. (1985).

equilibrium. Over issuance of bank notes in a given region will result in a geographic outflow of reserves, an increase in public holdings of specie or both, thus lowering the banks' reserve ratio.¹⁹

Such a system could be expected to be problematic for an expanding economy, causing it to suffer from a shortage of specie and, consequently, of notes. According to free banking theory, the reserve ratio of the banks could change in response to public demand. That, however, would be contrary to the requirements of the specie standard. A conflict would thus arise between maintaining the reserve ratio in order to safe guard specie convertibility and satisfying the domestic demand for money.²⁰

Prior to the establishment of the Enskilda banks, this conflict was resolved through the utilization of note substitutes. These substitutes were totally independent of the specie standard. The challenge facing the financial system that emerged in connection with the Country's economic integration, was replacing these note substitutes with more reliable, nationally accepted, means of payment, without, however, endangering the convertibility that was the corner stone of the international monetary regime.

The theory of free banking posits an ideal, fully developed banking system functioning according to the law of adverse clearing. The holder of bank notes has the ability to choose notes of higher quality if his or her bank lets the quality of its notes deteriorate by reducing its level of reserves.

In 1989, Lars Jonung published an influential paper concerning the Enskilda banks: "The Economics of Private Money: The experience of private bank notes in Sweden, 1831-1902". Jonung's free banking perspective caused him to view the Enskilda banks as a private alternative to notes issue by the State via the Riksbank. Since the notes issued by the Enskilda banks displaced the Riksbank notes from circulation, Jonung concluded that the public preferred the former. The impact of the fixed exchange rate regime, the scarcity of trustworthy means of payment and the consequences of Gresham's Law were not considered by Jonung in his analysis of the struggle for market shares between the Enskilda banks and the Riksbank.

¹⁹ White, L. H. (1989) pp. 21-22, 27-28, 32-36. It is even argued that the international adjustment mechanism is not fully operational without a pure free banking system (White, L.H. (1985) pp. 119-121).

²⁰ Swedish 19th century economic debate fully recognized the difficulty of combining a fixed exchange rate with a growing demand for money and credit. See for instance Agardh, J.M. (1865) p. 154, Wennberg, J.O. (1829) p. 7.

Moreover, as in the case of Scotland, it is maintained that the Swedish experience of this alleged free banking system was one of inherent stability. Supposedly none of these banks experienced financial difficulty or came to require State assistance. These conclusions appear to be based directly on the theory, rather than on historical facts. Nonetheless, among writers in this field, they have been accepted as representing the Swedish experience of free banking.²¹

The Endogenous Approach to Money

This Swedish case seemed illustrative of an endogenous money creation mechanism. The basic assumption of such a theory is that money in fact is a debt instrument, that is a transfer of future purchasing power to the present. When one party is willing to incur debt, and the other to hold it, the consequence is the creation of money. Thus, money will be supplied in response to demand. If a third party accepts this debt as payment, then it has become a circulating means of payment. Institutional features affect the acceptability of the means payment among larger groups. Thus, the value of a means of payment, that is its quality, is determined by the ability to transfer it to other parties, not by the reserves held by the issuer.²²

The domestic volume of informal money and credit was demand driven. Consequently, there was a close relationship between the quantities of credit and means of payment. The quality of the latter also varied in accordance with their acceptability within various regions and to various groups of actors. Since the specie standard limited the supply of money and credit of the highest quality, money and credit of lower quality were supplied as substitutes.

The Riksbank and the Issuance of “High Powered Notes”

The principal credit and means of payment problem was to convince consumers that these could be transferred without risk of loss. One way of doing so was to guarantee that bank notes could be converted into specie. The Swedish central bank, the Riksbank, followed the dictates of the currency school; the economy was based on a specie standard, thus stressing the quantity theory of money and the specie flow mechanism.²³

²¹ See Schuler, K. (1992) pp. 31-32, 40, Selgin, G.A. (1988) p. 7. Where Selgin also views absence of regulations as a parameter in the Swedish case.

²² See Bell, S. (2001) Chick, V. (1992) and Wray, L.R. (1990).

²³ BaU 1840/41 No4 p. 27, Ögren, A. (1995) p. 12

The Riksbank was owned and administered by the Parliament (the Riksdag), not the Crown, and it had the exclusive right to issue legal tender notes. In addition to splitting the Parliament into factions, the granting of note issuing rights to the Enskilda banks became the metaphorical banking question in the struggle between Parliament and Crown. One of the official arguments against the Enskilda banks was that allowing them to issue notes would endanger international convertibility into specie. In 1850/51, the Parliament acted to create a new type of commercial bank without note issuing privileges, the Filial banks. These were instead dependent on credits from the Riksbank. It was hoped that they would facilitate the replacement of circulating Enskilda bank notes with Riksbank notes. When it became apparent that this hope was futile, the Parliament in 1860/61 withdrew its support for the Filial banks.²⁴

In 1869, the Riksbank began accepting Enskilda bank notes at par, as long as these notes could be redeemed for Riksbank notes in a city where the Riksbank maintained an office.²⁵ The Banking Law of 1897 granted the Riksbank a note issuing monopoly. The Enskilda banks were required to cease issuing notes by the end of 1903, and all of their notes were to be withdrawn from circulation by the end of 1906.²⁶

It was the fundamental duty of the Riksbank to maintain specie convertibility. At the same time, however, it was also expected to supply Sweden with an adequate supply of credit. This dual role of guardian of international convertibility and provider of credit made the level of Riksbank reserves a matter of the utmost importance.

Riksbank Reserves

According to the banking legislation of 1834, note issuance of the Riksbank was to be based on a fractional reserve system. Reserves were supposed to cover 40 % of issued notes, and only specie metals were valid as cover for note issue.

Regulatory changes introduced in 1845 permitted the Riksbank to include foreign holdings such as deposits in foreign banks and banking firms, and treasury bills among its reserves and to utilize them as backing for its note issue. The system of fractional reserves was changed to one of differential reserves, the issue of Riksbank notes being limited to reserves plus thirty million SEK. This change reduced the Riksbank's note

²⁴ Montgomery, A. (1934) p. 7. Regarding the political struggle, see Nilsson, G.B. (1981), (1989), (1994) and Chapter 2 in Ögren, A. (2003a).

²⁵ Ögren, A. (1995) pp. 12-15

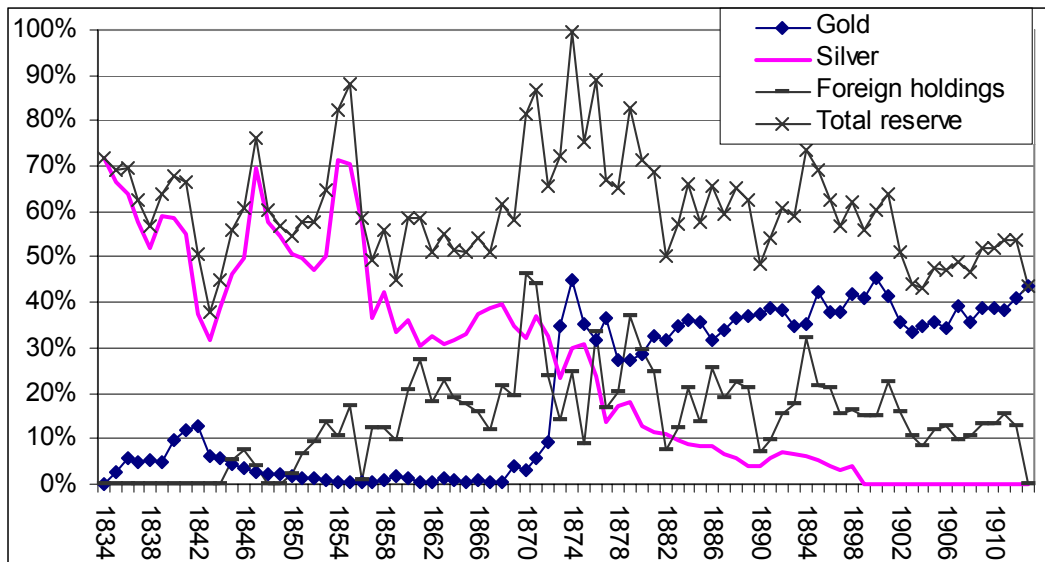
²⁶ Brisman, S. (1931) pp. 193-196, RdSkr 1898 No 66

issuance flexibility and, since they used Riksbank notes as part of their reserves, that of the Enskilda banks as well. The new regulations were motivated by a belief that falling reserves would cause a smaller shrinkage of the note issue with a differential, than with a fractional, reserve system.

In addition to outstanding notes, the Bank's reserves were supposed to cover its demand deposits, all types of written assignments and (until 1872) unutilized funds that were designated for loans and credits to specific social groups. Including these categories within the money stock ensured that the Riksbank's notes would be covered to an internationally sufficient degree. Starting in 1860, the Bank was permitted to hold up to ten percent of its reserves in gold. In preparation for adoption of the gold standard, all restrictions on the gold percentage were dropped in 1869.²⁷

In 1879, the maximum Riksbank note issue was increased to reserves plus thirty five million SEK. This change was made at the same time as the Enskilda banks were prohibited from issuing notes of less than ten SEK.²⁸ The clear intent was that the increased Riksbank note issue was to replace the low denomination Enskilda bank notes.

Figure 1: Backing of Riksbank Notes Issued, 1834 – 1913 (in percentages)



Source: Sveriges Riksbank (1931) pp. 54-71

²⁷ Brisman, S. (1931) pp. 75-78, 161-165, Davidsson, D. (1931) pp. 38-39, 44, Sveriges Riksbank (1931) pp. 54-71

²⁸ PrAK. 1879 Vol IV No 50, PrFK 1879 Vol. III No 35, RdSkr 1879 No 52.

Throughout the period 1834 – 1913, even though a differential reserve system was used, the specie reserves of the Riksbank covered approximately forty percent of the Bank's note issue. As early as 1845, the Riksbank began to intervene in the currency market by buying and selling foreign bills of exchange. The principal motivation for these actions was the shortage, and high import cost, of specie.²⁹ Consequently it was the foreign component of the Riksbank's reserves that fluctuated the most, while its specie reserves remained relatively stable.

Taking an international perspective, the Riksbank maintained a lower coverage of its notes than did the principal European countries. Its coverage, however, was similar to that Finland, another peripheral country.³⁰ The legal tender status of the Riksbank notes, making them acceptable for tax payments, as well as their specie backing made them a form of domestic "high powered" money. Thus the Riksbank notes also served as backing for the Enskilda bank notes. Since the Riksbank's obligation to preserve international specie convertibility limited its ability to supply credit and means of payment, this task was instead undertaken by the Enskilda banks.

Enskilda Banks and the Issuance of "Medium Powered Notes"

Two distinct features characterized the Enskilda banks: the right to issue notes and the unlimited liability of their share holders. The first Enskilda banks had been established in the early 1830's, but their numbers grew only slowly until after 1865, to a large extent as the result of restrictions on their establishment. Entry into banking was far from free.³¹ Their formal, legal acceptance as a distinct banking system came only with the Bank Law of 1864. Most importantly, this Law assured that all new bank charters that met standard criteria would be approved and that the renewal of existing bank charters would be virtually automatic. Still, the limits on note denominations and the taxes on note issuance that were imposed by the Parliament prevented the creation of a "full fledged" free banking system.³²

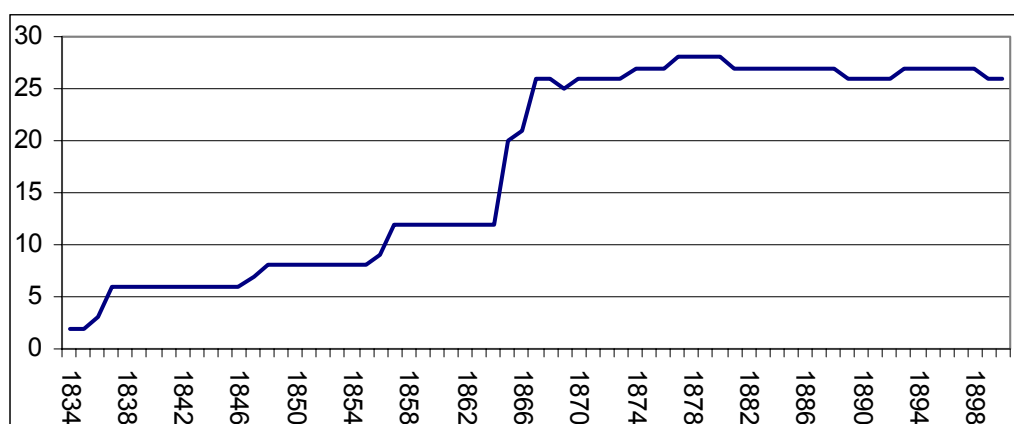
²⁹ BaU 1868 No2 pp. 2-3, Lobell, H. (1999) pp. 89-92

³⁰ Flandreau, M. (2000), Pipping, H.E. (1961) pp. 509, 512, Pipping, H.E. (1969) p. 432, Sveriges Riksbank (1931) pp. 45-49

³¹ Kock, K. (1931) pp. 103-104. The Crown twice, in 1841 and in 1849, rejected Skåne Enskilda Bank's request for an extension of the redemption time limit on its notes, in view of its pending charter renewal application.

³² SFS 1864:31 §§1, 26. The Parliamentary opposition to the Enskilda banks did not stand idly by as the notes of these banks in circulation rapidly expanded. In 1861, a tax of 0.2 percent, later increased to 0.3

Figure 2: The Number of Enskilda banks, 1834 – 1913



Sources: Post & Inrikes Tidning 1835-1871, Sammandrag af bankernas uppgifter 1871-1900, Sveriges Riksbank (1931) pp. 172-179.

The first Royal proclamation concerning the right to engage in banking had been issued in 1824, but the first Enskilda bank (Skåne Enskilda Bank) was not established until 1831. A puzzling question is why seven years elapsed between the proclamation and the first application for a charter.³³ The answer, quite simply, is that re-establishment of the specie standard was a prerequisite for the opening of private banks. The definitive Parliamentary decision to re-adopt the silver standard, thus setting the base value of the currency in terms of that metal, as well as to when notes would become exchangeable for silver coins, was taken in March of 1830. The first application for a bank charter then followed six months later in September of 1830.³⁴

The establishment of the silver standard was essential for the establishment of a note issuing banking system during the nineteenth century. It provided the public confidence that was absolutely vital, at least until the Enskilda banks had become firmly established. Thus, the notes issued by the Enskilda banks would not have achieved nearly the same level of acceptance had they not been backed by legal tender. Had the Riksbank notes not been secured by a fixed quantity of specie, the Enskilda banks would have had to

percent in 1887, 0.5 percent in 1892 and finally to 1.0 percent in 1893, was imposed on the issuance of such notes (RdSkr 1887 No49, 1892 No98, 1893 No45, SFS 1861:34 §15).

³³ According to Jonung, the explanation lay in a combination of the usury law's limitation on bank loan interest rates and the existence of an unrestricted, non-bank capital market. Given this situation, the banks found it difficult to compete effectively for funds (Jonung, L (1989) p. 7).

³⁴ Kock, K (1931) pp. 45-50. The fundamental importance of the specie standard for the ability to establish banks, was conveyed to Parliament by the founders of Skåne Enskilda Bank. See also Bankkomitén (1883) p. 138, Nordström, J.J. (1853) p. 245, Rosenberg, C.M. (1878) p. 81, Wennberg, J.O. (1829) p. 31.

operate with specie reserves. The Swedish supply of specie, however, was insufficient to allow the Enskilda banks to operate directly with specie.

The Royal proclamation of 1824 did not mention the right to issue notes, nor was any such right mentioned in Skåne Enskilda Bank's first charter, it was, however, permitted to issue printed, non-interest bearing certificates of deposit payable on demand. These could be transferred from person to person in denominations below 20 Rdr. Banco. In practice, these CDs were identical to bank notes.³⁵ Starting with the third Enskilda bank, established in 1836, requirements for bank note issuance were written into the charters. In 1846, uniform such requirements were enacted into law.

A fundamental aspect of free banking is the evolution of an inter-bank clearing mechanism. The safer system associated with the Enskilda banks, as well as their practice of accepting each other's notes, can be dated back at least to the legislation of 1846.³⁶ Still, no regular clearing institution emerged until the establishment of Stockholm Enskilda Bank in 1856. Previously existing Enskilda banks outside the Capital had recognized the importance of having a single clearing institution. Instead this function had been performed by a number of financial actors in Stockholm.³⁷

Two features closely associated with the Enskilda banks during the gold standard period were already contained in the 1864 legislation. First, their notes were to be exchangeable for Riksbank notes or specie at their main office and, second, while they were given the option of delaying such an exchange for six months, such action would result in an interest penalty of six percent per annum. These rules were probably aimed at increasing the stability of the Enskilda bank system, thus decreasing the probability of bank runs.³⁸

³⁵ Skogman, the Crown's representative, did not concede that either Skåne Enskilda Bank, or the second such bank, Wermland Enskilda Bank, had any right to issue notes. This despite the fact that Wermland Enskilda bank in its charter, as well as its balance sheets, used the term "notes" (Skogman, C.D. (1846:1) pp. 181-182, 196-199, Post & Inrikes Tidning 29/4-1835). Both Brisman and Jonung describe the note issuing right as unintended (Brisman, S. (1924) pp. 90-92, Jonung, L. (1989) p. 14). Given the open and positive attitude on private bank note issuance in the Parliament, Skogman must have known that this was the only possible use for these "certificates of deposit" (See Ögren, A. (2003a) Chapter 2, see also Nilsson, G.B. (1981) pp. 26, 399 note 17).

³⁶ Kock, K. (1931) pp. 80, 93-103, Rosenberg, C.M. (1878) pp. 83-84, SFS 1846:1 §11, Skogman, C.D. (1846:1) pp. 196-199

³⁷ Nilsson, G.B. (1989) pp. 107-110, Söderlund, E. (1964) pp. 115-119. Starting in the 1870's, *Skandinaviska Kreditaktiebolaget*, a joint stock bank, assumed clearing responsibilities for the Enskilda banks.

³⁸ SFS 1864:31 §§27-28, Thus, these features were not implemented just to protect the gold holdings of the Enskild banks, but to protect their reserves generally. See Flux, A.W. (1910) pp. 61-63, Jonung, L. (1984) pp. 371-372. The option clause has been presented as an example of how to create stability in a

Enskilda Bank Reserves

According to the Law of 1846, as well as pre-existing bank charters, the principal basis for their note issuance was the Enskilda bank's equity capital. Entered on the asset side of the bank's balance sheet, this equity capital was divided into two parts. Between sixty and seventy five percent consisted of bonds and shares. These were either deposited in a municipal office or were kept in the bank's safe. The rest was legal tender cash. The bank's note issue had to be fully backed by the sum of: 1) the securities held as part of the bank's equity capital, 2) the legal tender held by the bank, either at its exchange office or with the Riksbank, 3) the silver held by the bank and 4) collateral for the bank's loan up to an amount not to exceed fifty percent of the bank's equity capital.³⁹

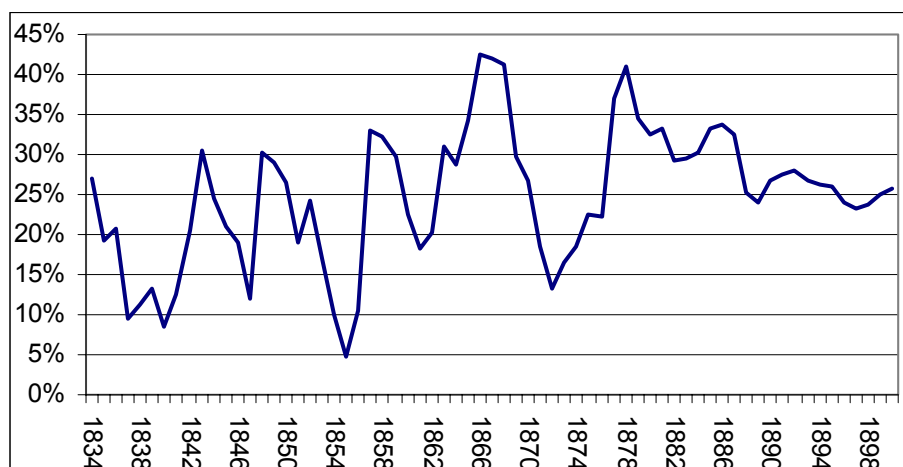
Accompanying the switch from the silver to the gold standard, new bank legislation was enacted in 1874. According to the new rules, the bank's note issue had to be fully backed by the sum of: 1) the securities portion of the bank's equity capital, 2) the reserve fund of the bank, 3) the claims of the bank, not to exceed fifty percent of the bank's equity and on the condition that the bank's main office held gold coin equal to at least ten percent of the bank's equity and 4) any gold holdings in excess of ten percent of the equity capital.

In practice, these rules did not constrain the note issuance of the Enskilda banks. Indeed, they continually failed to reach their allowable note issue limits.

free banking system. Dowd, K. (1993) pp. 31-33, Gherity, J.A. (1995) pp. 722-724, Selgin, G.A. & White, L.H. (1997) pp. 270-272. Despite explicit statements, both in the Law and the bank charters, that the bank's were not entitled to any public support, such support was in fact provided in several critical situations (Brisman, S. (1934) pp. 102-103, 105-106, Schön, L. (2000) p. 165, Ögren, A. (2000) pp. 103-104, Ögren, A. (2003b).

³⁹ SFS 1846:1 §§8, 11, Skogman, C.D. (1846:2) pp. 38-42, 50-54. In its early days, a bank could count the owners' personal promissary notes as part of its equity capital (Post & Inrikes Tidning 2/2, 9/5-1843). The two earliest banks counted their own notes as equity during 1834-39, and until 1846 all the banks counted the notes of other Enskilda banks (Post & Inrikes Tidning 1835-1847, especially 21/3, 29/4-1835, 9/3, 26/4-1836).

Figure 3: Unutilized Note Issuing Rights of Enskilda banks, 1834 – 1900 (in percentages of Total Note Issuing Right)



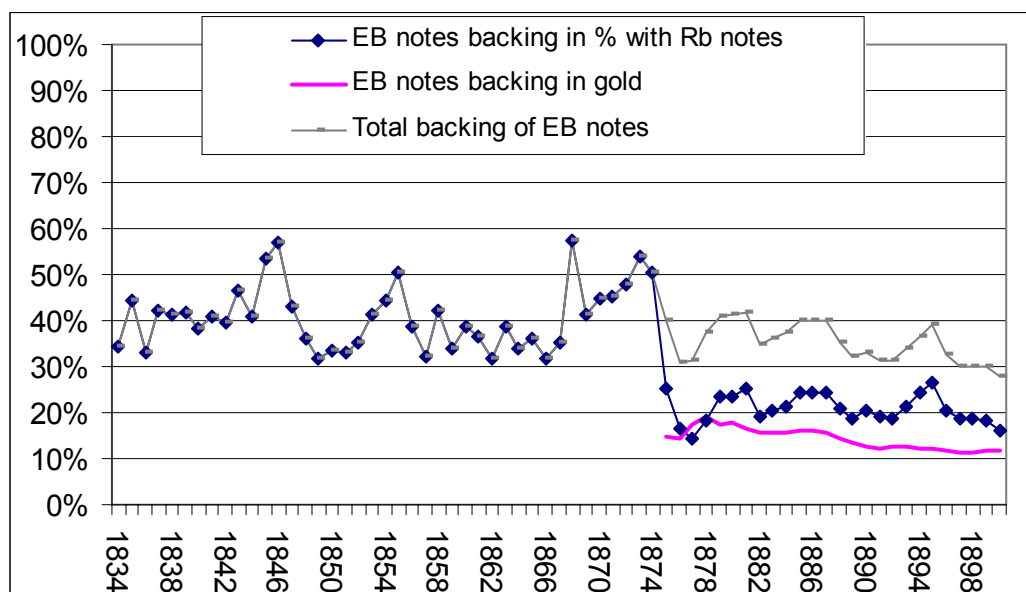
Sources: Post & Inrikes Tidning 1835-1871, Sammandrag af Bankernas Uppgifter 1871-1900

Instead, what effectively limited their note issuance were the liquid reserves they had available for redeeming their notes for legal tender. Even prior to the 1874 legislation, the banks were free to exchange their notes either for coins or for Riksbank notes. At no point did the law, or the bank charters, prevent the banks from limiting their reserves to specie, thus making them independent of the Riksbank. Even after 1874, the Enskilda banks continued principally to hold Riksbank notes as reserves. They did so despite the fact that the Riksbank itself had started accepting Enskilda bank notes in 1869.

According to the Banking Law 1874, the formal backing of the Enskilda banks' notes did not include any holdings of Riksbank notes.⁴⁰ Despite the fact that Riksbank notes legally were as useless for note coverage as were Enskilda bank notes, the Enskilda banks continued to hold large amounts of Riksbank notes, but only negligible amounts of notes issued by other Enskilda banks. Competition was one reason for not holding the notes of other Enskilda banks, but why favor the Riksbank by holding large quantities of its notes? The answer was that the public literally considered the Riksbank notes to be as good as gold. As a result, the effective reserves of the Enskilda banks consisted of Riksbank notes and, to a lesser extent, of specie. In figure 4 below, these effective reserves have been computed as the Enskilda banks' holdings of specie and Riksbank notes, plus their Riksbank notes deposited with exchange agents or in the Riksbank.

⁴⁰ SFS 1874:44 §§26-28. The legislation that required the redemption of notes with gold coins can be seen as limiting the legal tender status of Riksbank notes. Indeed, it was suggested that the constitutional clause conferring such status should be revoked (Flux, A.W. (1910) p. 63, Nilsson, G.B. (1994) p. 101).

Figure 4: Gold and Riksbank Note Backing of Enskilda Bank Notes, 1834 – 1913 (in percentages)



Sources: Brisman (1924) pp. 246-247, Post & Inrikes Tidning, 1835-1871, Sammandrag af Bankernas Uppgifter, 1871-1900.

After 1874, the Enskilda banks held gold equal to between eleven and nineteen percent of their note issue. If Riksbank notes are also counted, their notes were approximately thirty to thirty five percent backed. With the single exception of Stockholm Enskilda Bank, they all held gold equal to between ten and fourteen percent of their total equity capital. Stockholm Enskilda Bank held gold equal to between twenty eight and thirty percent of its equity capital. This made the Bank more attractive to the foreign lenders on whom it depended for many of its operations. Consequently, those banks that wished to attract foreign credits were especially dependent on specie reserves.

Despite this rather low gold backing, the Enskilda banks never came close to their legal note issuing limits. The sources concerning the post 1874 issuance of Enskilda bank notes make it clear that their holdings of Riksbank notes continued to be a matter of importance. Indeed, the ratio of Enskilda bank holdings of Riksbank notes, coins and gold bullion to their note issue was published throughout the period.⁴¹ The 1874 legislation effectively forced the Enskilda banks to hold gold since having ten percent of their equity capital in gold entitled them to issue notes equal to a full fifty percent of

⁴¹ Sammandrag af Bankernas uppgifter 1875-1906, SFS 1874:44 §26.

that equity capital.⁴² Regression analysis, however, indicates that they continued to base their note issuance on Riksbank notes, even after implementation of the 1874 legislation.

Figure 5: Determinants of Enskilda Bank Note Issuance, 1874 – 1900 (OLS Regression)

Dependent Variable: LOG(EBNOTES)				
Sample: 1874 1900				
Included observations: 27				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.376193	0.089828	-4.187937	0.0004
LOG(EBRBNOTES)	0.122716	0.041610	2.949195	0.0072
EBSPECIE	4.543155	1.454567	3.123372	0.0048
LOG(EBNOTES(-1))	0.649499	0.069424	9.355526	0.0000
R-squared	0.958363	Mean dependent var		-2.009537
Adjusted R-squared	0.952932	S.D. dependent var		0.191921
Log likelihood	49.67964	F-statistic		176.4656
Durbin-Watson stat	1.998017	Prob(F-statistic)		0.000000

* Significant at least at the 5% level

Source: Sammandrag af Bankernas Uppgifter, 1871-1900.

The Enskilda banks were not willing to exchange Riksbank notes for gold. This policy has two implications: 1) holding Riksbank notes as reserves provided the banks with more business opportunities than did specie reserves and 2) the Swedish public was prepared to accept Riksbank notes in exchange for Enskilda bank notes. The generally declining level of reserves can be explained by growing confidence in the banking system, making the public willing to accept a lower level of reserves, together with an increasing demand for credit.

It can be argued that the Enskilda banks maintained the level of reserves demanded by their customers. The level of demand for means of payment and credit prevented the Enskilda banks from operating exclusively with specie reserves. Arguably, since the reserves were essential for maintaining the status or quality of the Enskilda bank notes, the public also had an interest in maintaining the "medium powered" characteristic of the notes. This did not require that their issuance be limited to the same extent as required to make them "high powered", i.e. sufficiently backed by specie. Thus, more

⁴² The Enskilda banks waited for the adoption of the gold standard in 1873 before starting to purchase large quantities of gold, increasing their holdings from virtually zero to nearly nine million SEK in only two years (Jonung, L. (1984) p. 372). When their right to issue notes was withdrawn, the Enskilda banks reduced their gold holdings from 9.5 million SEK in 1900 to little more than one quarter million in 1903 (Sammandrag af Bankernas uppgifter 1875-1906).

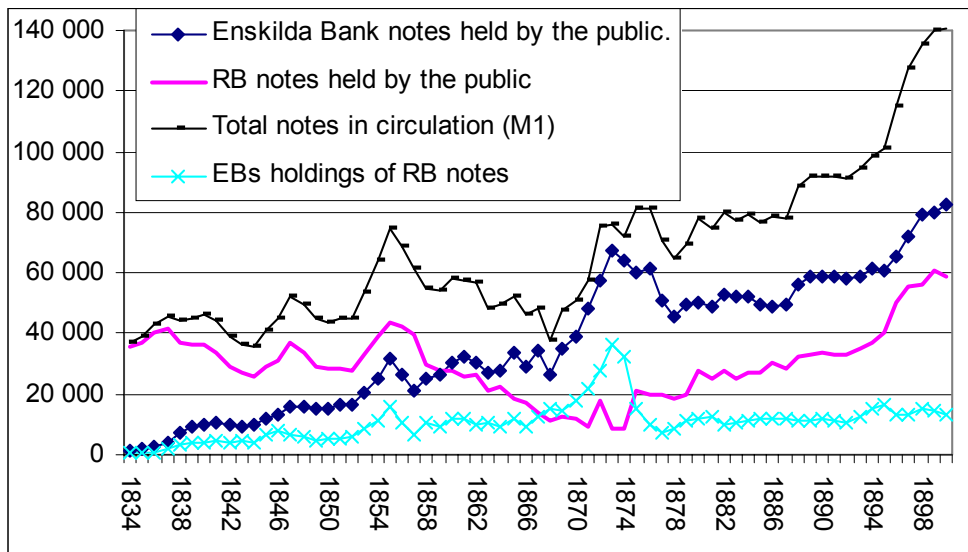
“medium powered” notes could be supplied. By extension, the use of Riksbank notes as Enskilda bank reserves created a claim on the Riksbank’s reserves. Thus the Enskilda banks benefited from the trust in the currency that had been created by the Riksbank’s dedication to maintaining specie convertibility.

From the inception of the system, the Enskilda banks had had the opportunity to practice free banking based exclusively on specie reserves. So doing would have made them independent of the Riksbank, and thus capable of competing with the Riksbank notes. Indeed, that is how the experience of the Enskilda banks is described in the free banking literature. In fact, however, even after they were legally required to hold specie rather than Riksbank note, reserves, the Enskilda banks clearly preferred the Riksbank notes. The public, and therefore the banks, preferred more “medium powered” than fewer “high powered” notes. Thus it can be concluded that, under the circumstances, the actual specie exchange system was more efficient than a hypothetical free banking system.

The Circulation of Currency

The circulation of currency within Sweden during the period 1834 to 1900 depended largely on the note issuance of the Enskilda banks. The Riksbank notes, in turn, provided the base for the total amount of circulating notes. Deducting the Riksbank notes held by Enskilda banks at their exchange offices or on deposit at the Riksbank from the total issue of such notes, ought to provide an accurate estimate of the public’s holdings of Riksbank notes.

Figure 6: Enskilda Bank and Riksbank Notes in Circulation, 1834 – 1900 (1000's of SEK)



Sources: Brisman (1924) pp. 246-247, Post & Inrikes Tidning 1835-1871, Sammandrag af Bankernas Uppgifter 1871-1900, Sveriges Riksbank (1931) pp. 45-49

Starting in the 1860's, Enskilda bank notes became the principal form of circulating means of payment, surpassing the Riksbank notes. Indeed, as early as 1859, the circulation of Enskilda bank notes exceeded that of Riksbank notes. That is, twelve Enskilda banks, three of which were only recently established, jointly managed to out circulate the Riksbank. The five year period 1869-1874 witnessed an economic boom in Sweden. Partly as a consequence, note issuing activity increased resulting, in turn, in a growing demand by the Enskilda banks for Riksbank notes as backing. The amount of Riksbank notes held by the Enskilda banks grew to exceed the amount in circulation. The weaker relationship between Enskilda bank holdings of Riksbank notes and their own note issue, starting in the 1880's, implies both a greater demand for credit and a growing level of public confidence in the banking system. A result of this was an increase in the quantity of Riksbank notes available for circulation.

Enskilda bank note issuing activity reached a peak in 1900 and then declined. The Banking Law of 1897 banned further issue of Enskilda bank notes after 1903 and required their withdrawal from circulation by the end of 1906. The data in Figure 6 ends in 1900 because of the rapid increase in Riksbank notes at the beginning of the 1900's, and the breaking of the relationship between Riksbank and Enskilda bank notes. This expansion was not just the result of the withdrawal of Enskilda bank notes since total note circulation increased by one hundred fifty percent between 1900 and 1913.

There is an important distinction between the banks' ability to issue notes and their ability to keep them in circulation.⁴³ Keeping notes in circulation depended on three factors: 1) the geographical distance between the point of issue and the areas of circulation, 2) the denomination of the notes (smaller denominations tended to circulate longer) and 3) alternative available means of payment.

Throughout the period, the Riksbank was authorized to issue smaller denominations than were the Enskilda banks. This increased the incentive of the latter to spread their notes throughout the Country. In order to accomplish this, the banks opened branch offices or engaged other financial actors as exchange agents. These were usually merchants, private banking firms or savings banks. During their short history, the Filial banks also functioned as distributors of Enskilda bank notes. An often asserted strategy of the Enskilda banks was to get their notes into circulation in isolated areas, thus reducing the chance of quick redemption for legal tender.⁴⁴

In connection with the establishment of an inter bank clearing system, Stockholm Enskilda Bank invented the so-called "postal bank bill" (*postremissväxel*) to substitute for the mailing of bank notes. Instead of mailing bank notes, a postal bank bill was purchased at the nearest bank and sent by ordinary mail. The recipient could then cash the bill at any conveniently located bank. Payable on demand, and not being subject to any discount, the postal bank bill functioned as a lubricant in the clearing machinery. Instead of locking up bank notes in postal bags, and thus removing them from circulation for several days, these written payment orders were utilized. By cashing these postal bank bills, a bank had an opportunity to place its own notes on the market.⁴⁵

The Enskilda banks were willing to bear some discount costs in order to make their notes closer substitutes for Riksbank notes. In order to assure holders of the convertibility of Enskilda bank notes into legal tender, the exchange agents were compensated in positive relation to the quantity of the bank's notes that they exchanged for legal tender.⁴⁶ Furthermore, in at least some parts of the Country, the Enskilda banks paid a small fee to the municipal tax authorities to act as exchange agents in connection

⁴³ Dowd, K (1993) p. 29, White, L.H. (1989) p. 21

⁴⁴ Brisman, S. (1934) pp. 23-25, Petersson, T. (1999) p. 64 Note 136

⁴⁵ Nilsson, G.B. (1989) pp. 113-119. Trust in the postal bank bills as a way of transferring payments is unquestioned. They were even accepted in the countries neighboring Sweden (Flux, A.W. (1910) p. 56).

⁴⁶ Engdahl, T. (2002)

with tax payments.⁴⁷ Thus, despite their non-legal tender status, these notes could be used to pay taxes.

In view of the large circulation of Enskilda bank notes starting in the 1860's, it seems likely that they succeeded in becoming acceptable nation wide. Previously, in 1855, legislation had standardized the size of Enskilda bank notes of a given denomination.⁴⁸ Judging by the large quantity of Enskilda bank notes in circulation by 1869, it seems probable that the Riksbank had been forced to accept them as the Riksbank had been forced to accept them as the principal circulation means of payment.⁴⁹

The achievements of the Enskilda banks were not limited to successfully competing with State issued notes on a fully monetized market. Deliberately or not, the Enskilda bank notes came to replace the widely used local, non-specie connected, substitute means of payment.⁵⁰

It is possible to derive a quality grid among various means of payments with the same face value. The Enskilda banks had an advantage in not being subordinated to the specie standard and therefore not having to cover their critical liabilities, such as demand deposits and bank-post bills, to nearly the same extent as the Riksbank. Since the latter's ultimate responsibility for preserving the specie standard prevented it from holding insufficient reserves, its notes were of a higher quality than the Enskilda bank notes.⁵¹ These banks could then use the Riksbank notes as a base for issuing their own notes, and, as a consequence, they tended to hoard Riksbank notes.

For the ordinary Swede, however, the Enskilda bank notes were a close substitute for Riksbank notes. While not as well backed as the latter, the Enskilda bank notes were of much better quality than other circulating instruments. The Enskilda bank notes were not only related to the specie standard, being backed by Riksbank notes, but they were

⁴⁷ Nilsson, G.B. (1989) pp. 135-136, Smålb 1840, 1845. In 1841, a Parliamentary bill proposing the acceptance of Enskilda bank notes for tax payments, was defeated (StU 1840/41 No 143, 209).

⁴⁸ Rosenberg, C.M. (1878) p. 85

⁴⁹ A bill requiring the Riksbank to accept Enskilda bank notes was rejected during the 1865/66 session (BaU 1865/66 No18). In 1869, the chairman of the Standing Committee on Banking was still opposed (BaU 1869 No6 p. 3).

⁵⁰ An example of this development concerns the right to over issue authorized assignments. In 1834, the Riksbank raised this as a problem, but opposed any corrective measures since their effect would be to harm the rural economy. The abolition of such rights in 1851 was justified by the claim that there no longer was any rural shortage of small denominations (Bankkomitén (1883) pp. 149-151, BaU 1850/51 No2 p. 18). In fact, however, public confidence in authorized assignments had been undermined by a number of frauds that occurred during the crisis of 1847/48. Enskilda bank notes were considered more trustworthy (see Engdahl, T. (2002)).

⁵¹ Ögren, A. (2000) p. 49

also guaranteed by the bank's equity capital and the unlimited liability of the owners. These were confidence inducing features that other substitutes lacked.

From this analysis it can be concluded that the Enskilda bank notes did not displace Riksbank notes because they were preferred by the public. The Swedish need for credit and means of payments institutionalized two types of notes, exchangeable at par. The Riksbank notes were legal tender and could be used as a base for issuing Enskilda bank notes. These notes, in turn, could be used for virtually all domestic transactions, as well as be used for bank deposits.

Expanding the Money Supply

There are two important aspects to the domestic creation of money. The first is the amount of circulating currency that can be used for deposits, and the second is the sophistication of the financial system in terms of being able to create credit through deposits. The amount of currency, or M1, consisted of Riksbank and Enskilda bank notes held by the public. The level of development of the banking system then determined the amounts of M2 (M1 plus commercial bank deposits) and M3 (M2 plus savings bank deposits) that could be based on a given level of M1.

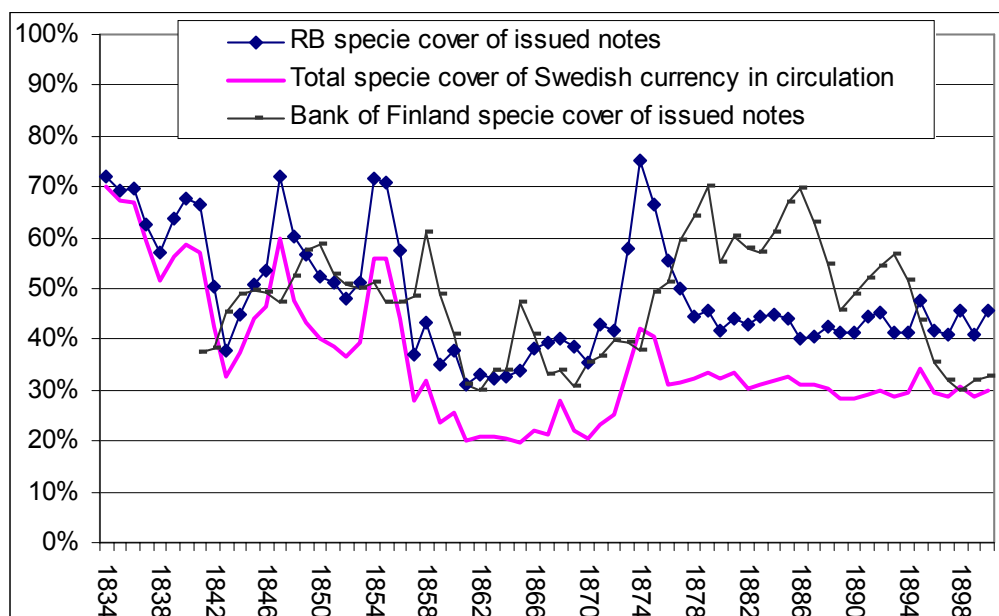
The Total Backing of Currency

If the commitment to the specie standard is viewed as a commitment to an international monetary regime, then it becomes useful to compare the Swedish ratio of total specie reserves to total note circulation with that in other countries. During the period 1880 to 1900, this ratio was lower in Sweden than in the core European countries. The Riksbank also maintained a somewhat lower backing for its notes than did the central banks of England, France and Germany.⁵² The peripheral status of the Swedish economy probably allowed the Country to maintain lower reserves than was the case for the major European economies. Another peripheral economy, Finland, covered its central bank note issue to approximately the same degree as did the Riksbank.

If circulating Enskilda bank notes and their specie backing is included in reserves, then up until the late 1890's, with the single exception of 1874, the backing of notes in circulation was less in Sweden than in Finland. This implies that Sweden's peripheral position is not the entire explanation for the relatively low note coverage.

⁵² Flandreau, M. (2000) Sveriges Riksbank (1931) pp. 45-49, 54-71

Figure 7: Specie Coverage of Notes Circulating in Sweden (1834 – 1900) and Finland (1841 – 1900) (in percentages)



Sources: Brisman (1924) pp. 246-247, Pipping, E.H. (1961) pp. 509, 512, Pipping, E.H. (1969) p. 432, Post & Inrikes Tidning 1835-1871, Sammandrag af Bankernas Uppgifter 1871-1900, Sveriges Riksbank (1931) pp. 45-49, 54-71

The cessation of note issuance by the Enskilda banks early in the twentieth century did not lead to any major increase in total Swedish reserves. The Riksbank's backing of its own notes decreased drastically, suggesting that such notes replaced the previously circulating Enskilda bank notes. It can be argued that the requirements of the specie standard previously would have prevented such a development.

The rather special Swedish system, combining the Riksbank as an issuer of high powered notes and with the ultimate responsibility for preserving international specie convertibility with the private Enskilda banks as note issuers, allowed a greater expansion of the money supply (M1) than otherwise would have been the case. Furthermore, the choice of the Enskilda banks (tolerated by the public) to rely more on Riksbank notes than on specie for their reserves led to a greater expansion of the total money supply than otherwise would have been possible.

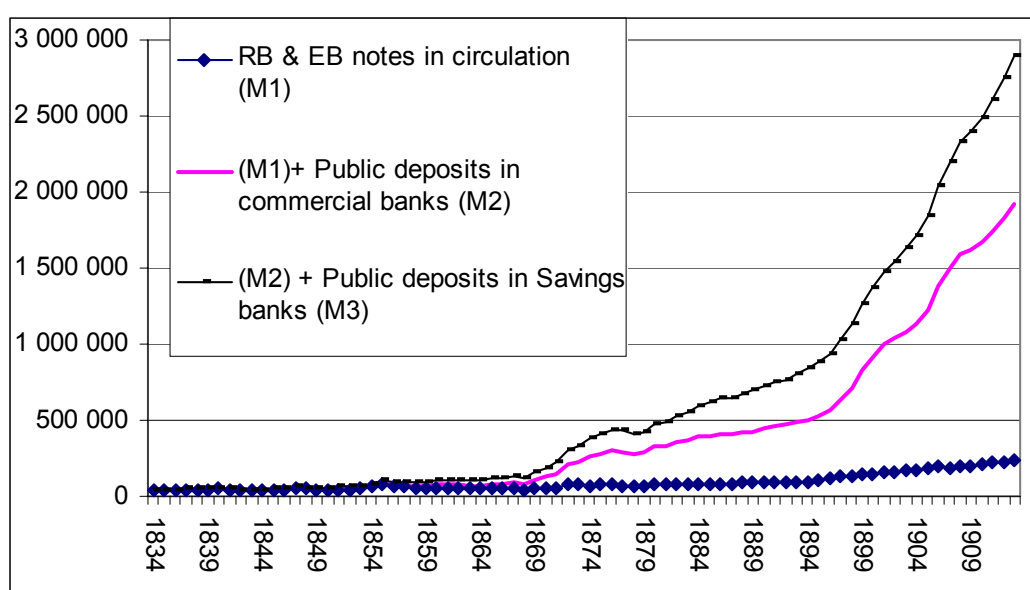
Instead of allowing the Enskilda banks to pump up the domestic money supply, the Riksbank could have borrowed on the international money market in order to purchase specie, as it did during the crisis of 1857, to be used as backing for a greater note issue. Not only would such a course of action have been costly, however, it was believed that

it would damage the reputation of the Swedish currency. Consequently, Parliament refused permission for such a course of action.⁵³

Swedish Monetization

Although Enskilda bank notes were not regarded as legal tender during this period, they were accepted by other Enskilda banks at least as early as 1846 and probably earlier.⁵⁴ The savings banks had begun accepting deposits of Enskilda bank notes early in their history and the Riksbank followed suit in 1869.⁵⁵ This made the Enskilda bank notes as effective in expanding the money supply through deposits as were the Riksbank notes.

Figure 8: The Swedish Money Stock, 1834 – 1913 (M1, M2 and M3 in 1000's of SEK)



Sources: Post & Inrikes Tidning 1835-1871, Sammandrag af Bankernas Uppgifter 1871-1900, SCB (1960) pp. 99, 102-103 Sveriges Riksbank (1931) pp. 45-49, 172-179

Figure 8 shows that, starting in the 1870's, the money stock inclusive of commercial bank deposits (M2) and also savings bank deposits (M3) started to grow rapidly, with a second "take off" occurring in 1895. By 1867, Enskilda bank deposits exceeded the value of Enskilda bank notes in circulation.⁵⁶ From that year forward, the principal source of bank business financing was deposits.

⁵³ Ögren, A. (2000) p. 95

⁵⁴ Rosenberg, C.M. (1878) pp. 83-84

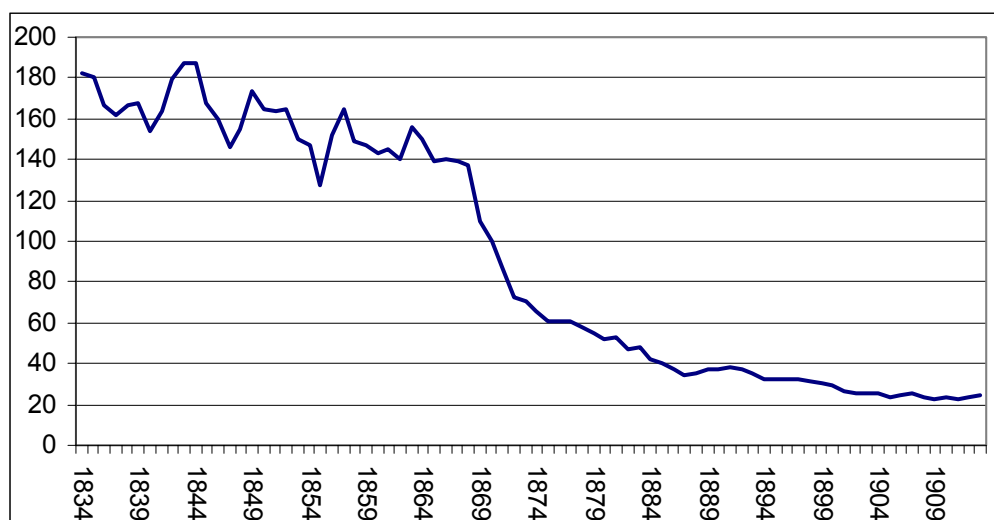
⁵⁵ Lilja, K. (2000) p. 53 note 168, Petersson, T. (2000) p. 24 note 2, Sjölander, A. (2000) p. 4. Aside from their active participation in local credit markets, the savings banks were also entangled with the area's commercial banks. They had overlapping boards, savings bank deposits were made available to the commercial banks and the savings banks functioned as distributors of Enskilda bank notes.

⁵⁶ Sveriges Riksbank (1931) p. 177

The remarkable growth of the Swedish money supply is well illustrated by the fact between 1834 and 1913, M3 per capita increased nearly forty times. To a considerable degree, this was a result of the low starting point for credit money (it increased from thirteen SEK per capita in 1834 to over five hundred SEK in 1913). Obviously, not all components of the money supply grew that rapidly. The money stock in terms of circulating notes (M1) increased three and one half times over during the period. The difference between the extremely rapid growth of M2 and M3 compared to M1 definitely underscores the crucial role played by the banking system in the process of expanding the money supply during these eight decades of profound economic transformation.

Before deposits could become a major source of resources for the banks, a means of payment more official than note substitutes had to circulate as money. In all probability, the creation and issuance of "medium powered" notes was a prerequisite for the creation of a deposit financed banking system, and thus for the monetization of Sweden. A measure of monetization utilized by Fisher and Thurman is the velocity of circulation of means of payments. A decrease of this velocity implies increased monetization.⁵⁷

Figure 9: Velocity of Means of Payment (M3), 1834 – 1913 (index form, 1870=100)



Sources: Krantz, O. (1997) pp. 20-22, Post & Inrikes Tidning 1835-1871, Sammandrag af Bankernas Uppgifter, 1871-1900, SCB (1960) pp. 99, 102-103, Sveriges Riksbank (1931) pp. 45-50, 172-185.

⁵⁷ Fisher, D. & Thurman, W.N. (1989) pp. 629-631. Velocity is calculated from the quantity theory equation; $V = P*Y/M$. All the series are in index form with 1870=100.

Decreased velocity is associated with increased monetization, as it is assumed to result from the substitution of formal for informal means of payments. In terms of monetization, a major acceleration appears to have occurred in the late 1860's, coinciding, not surprisingly, with the rapid establishment of new banks and an increased emphasis on financing banking activity with deposits. In overall economic terms, the 1860's were not a prosperous decade in Sweden. Nonetheless, the foundations for the economic growth experienced during the latter part of the nineteenth century were laid during these years. The increased monetization that occurred may also explain the relative stability of velocity under the gold standard.

Conclusions

The Swedish experience with private note issuance was more than a competition between the Enskilda banks and the Riksbank. To a great degree, the success of the Enskilda bank notes depended on the Riksbank acting to effectively maintain their convertibility into specie. Between 1834 and 1900, it was possible to combine international specie convertibility with the monetary needs of a growing economy. The supply of money expanded at a rate that would not have been possible without the special features of the Swedish financial system.

At least after 1859, Enskilda bank notes became dominant in circulation. At the same time, these notes replaced other means of payment that were independent of the specie standard. Thus, as the principal, nationally accepted, means of payment, the Enskilda bank notes played a major role in the economic integration of Sweden. Such integration would have been impossible without a means of payment having nation wide acceptability, a quality most of the note substitutes lacked.

In addition to the "high powered" Riksbank notes backed by specie, large amounts of "medium powered" Enskilda bank notes, backed by Riksbank notes, were in circulation. Since these were exchangeable at par and were accepted nationwide, they are considered to be currency (M1) and are evaluated in relation to the total specie reserves of Riksbank and the Enskilda banks. Compared to Finland, another peripheral country but with a different monetary system, Sweden enjoyed a higher currency in circulation to specie holdings ratio. The Riksbank alone would not have been able to circulate such a large quantity of currency without increasing its reserves, and thus its costs.

Moreover, the Riksbank and the Enskilda banks together circulated enough currency (M1) to lay the basis for a deposit financed banking system. Thus, Swedish monetization in terms of a circulating money supply accepted nationwide mainly occurred during the late 1860's.

This experience, combining the issuance of “high powered” money in accord with international reserve standards with the circulation of lower quality monetary alternatives, points in the direction of an endogenous money system. Throughout the period, money and credit were closely linked to, and followed, movements in the level of demand. If the restrictions of the specie standard constrained the supply of high powered money, then credit and lower quality means of payment were supplied instead. The principal improvement in monetary quality resulted from the replacement of note substitutes with Enskilda bank notes, which also could serve as deposits. To make their notes exchangeable with Riksbank notes at par, the Enskilda banks had to bear part of the discount costs.

The system of Enskilda banks resembled a theoretical free banking system in that their issuance of notes resulted in the emergence of clearing activities and offices. Furthermore, it was the requirements of the public, not any legal regulations, that effectively limited the note issue. After 1864, a relatively liberal attitude towards the establishment of banks prevailed. Nonetheless, there were special banking laws, including rules limiting the issuance of notes. The most important argument for rejecting the free banking label, however, is that not only was there a central bank but the Enskilda banks voluntarily choose to back their notes with Riksbank notes. The fact that more Enskilda than Riksbank notes circulated among the public was a result of the law of adverse monetary selection: Gresham's Law.

Nothing prevented the Enskilda banks from accumulating specie reserves. Throughout the period, however, they preferred to hold their reserves in the form of Riksbank notes. Even after the legislation of 1874 formally made the Enskilda bank notes redeemable only for domestic gold coins, they continued to base their note issuance on Riksbank notes. Most of the Enskilda banks held gold only as a response to the requirements of the 1874 law. For most domestic note holders, Riksbank notes were a close and acceptable alternative to gold reserves. Thus, allowing the Enskilda banks to issue their own notes, backed by Riksbank notes, was not only preferred by the public. Given the circumstances, it probably was more efficient than a pure free banking system would have been.

Sources and Literature

Sources

Riksdagstryck [Parliamentary Publication]

Bankkomitén (1883) *Bankkomiténs betänkande I. Bankkomiténs underdåniga förslag till förändrad organisation af bankanstalterna*. Norstedts. Stockholm, Sweden. [The Temporary Committee on Banking – Proposed Changes in Bank Organization].

BaU – Bankoutsiktet 6:e Samlingen 1828 – 1900 [Standing Committee on Banking]

BeU – Bevillningsutskottet 5:e Samlingen 1858-1893 [Standing Committee on Ways and Means]

PrAK – Protokoll från andra kammaren 1879 [Minutes of the Second Chamber of Parliament]

PrFK – Protokoll från första kammaren 1879 [Minutes of the First Chamber of Parliament]

RdSkr – Riksdagens Underdåniga Skrifvelser 10:e Samlingen 1834-1913 [Parliamentary Resolutions]

StU – Statsutskottet 4:e Samlingen 1834-1900 [Standing Committee on Supply]

Sources at the National Archive of Sweden

Finanskommittén 1858 – ÄK No 496 at the National Archive of Sweden Vol. 1 – 4. [Temporary Committee on Finance 1858].

Other sources

Flandreau, M. (2000) “Bank of England, Banque de France, and the German Reichsbank – Issued Notes and Reserves, 1880-1913.” Excel file communicated by Marc Flandreau, Professor of Economics, OFCE, 69 Quai d'Orsay, 75007 Paris. May 25th 2000.

Krantz, O. (1997) “Swedish Historical National Accounts 1800-1990 – aggregate output series.” Mimeo. Department of Economic History. Umeå University, Sweden.

Pipping, H.E. (1961) *Från pappersrubel till guldmärke. Finlands Bank 1811-1877*. Frenckellska. Helsinki, Finland.

Pipping, H.E. (1969) *I guldmüntfotens hägn. Finlands Bank 1878-1914*. Frenckellska. Helsinki, Finland.

Post & Inrikes Tidning [Official Swedish Gazette]: March 21, April 29 1835. March 9, April 26 1836. March 29, May 24 1837. March 21, 23 1838. February 12, July 7 1840. February 24 1841. February 24 1842. February 2, April 24, 26 1843. February 5 1844. February 17 1845. February 25 1846. February 5 1847. February 9 1848. February 19, 21, 22, 23 1849. February 20, 21, 25, 28 1850. March 15, 17, 19, 20 1851. February 23, 25, March 1, 4 1852. February 5, 9, 12, 14 1853. March 16, 23, 30 1854. February 7, 8, 10, 13 1855. February 16, 21, 22, 25 1856. February 26, March 5, 10, 12 1857. February 18, 23, 25, 26,

March 6, 9 1858. February 23, 24, 26, March 2, 3, 4 1859. February 24, 25, 29, March 1, 2, 8 1860. March 1, 8, 11, 13, 15, 18 1861. February 10, 12, 14, 17, 19, 21 1862. March 17 1863. February 12 1864. March 3 1865. March 2, November 12 1866. January 16, February 20, March 15, 22, April 12, 16, 20, 26, May 2, 9, September 13, October 30 1867. August 11 1868. February 18 1869. February 21 1870. February 21 1871.

Sammandrag af Bankernas Uppgifter [Summary of Bank Reports]: 1871-1877, 1878-1880, 1881-1883, 1884-1886, 1887-1889, 1890-1892, 1893-1895, 1896-1898, 1899-1901, 1902-1904, 1905-1907, 1908-1910, 1911.

SCB (1960) *Historisk statistik för Sverige. Part III. Statistiska översiktstabeller.* [Historical Statistics of Sweden III. Statistical Surveys- National Bureau of Statistics] SCB Stockholm, Sweden.

SFS [Swedish Code of Statues]: 1846:1, 1855:86, 1861:34, 1864:31, 1874:44

Smålb – Smålandbanken, Bolagsstämmoprotokoll med bilagor, A1A:1-2. Revisionsberättelser, Smålands Privat Banks avdelningskontor i Kalmar 31.1.1840, 31.1.1845. *Nordbankens Arkiv, Landsarkivet i Göteborg, C 156:7:1.* [Auditor's reports of Smålands Privat Bank's branch office in Kalmar, January 31st 1840, January 31st 1845]. Communicated by Prof. Håkan Lindgren, Stockholm School of Economics.

Sveriges Riksbank (1931) "Statistiska tabeller" [Statistical tables] in *Sveriges Riksbank 1668-1924. Bankens tillkomst och verksamhet. Part V.* Norstedts. Stockholm, Sweden.

Literature

Agardh, J.M. (1865) *Om Bank-väsendet och penninge-theorien.* Norstedts. Stockholm, Sweden.

Bell, S. (2001) "The role of the state and the hierarchy of money." *Cambridge Journal of Economics* **25**, pp.149-163

Brisman, S. (1924) *Sveriges Affärsbanker. Grundläggningstiden.* Svenska Bankföreningen. Norstedts. Stockholm, Sweden.

Brisman, S. (1931) "Den stora reformperioden 1860-1904" in *Sveriges Riksbank 1668-1924-1931. Bankens tillkomst och verksamhet, part IV.* Sveriges Riksbank. Norstedts. Stockholm, Sweden.

Brisman, S. (1934) *Sveriges affärsbanker. Utvecklingstiden.* Svenska bankföreningen. Norstedts. Stockholm, Sweden.

Chick, V. (1992) *On Money, Method and Keynes. Selected Essays.* The MacMillan Press LTD. London, UK.

Davidsson, D. (1931) "Tiden 1834-1860" in *Sveriges Riksbank 1668-1924-1931. Bankens tillkomst och verksamhet, part IV.* Sveriges Riksbank. Norstedts. Stockholm, Sweden.

Dowd, K. (1993) *Laissez-faire banking.* Routledge. London, UK.

- Eichengreen, B. & Flandreau, M. (1994) *The Geography of the Gold Standard*. Centre for Economic Policy Research. International Macroeconomics. Discussion paper No1050. London, UK.
- Engdahl, T. (2002) *Demand for financial services and the formalisation of the financial system in the region of Lake Mälaren between 1830 and 1850*. Unpublished manuscript. Department of Economic History. Uppsala University, Sweden.
- Fisher, D. & Thurman, W.N. (1989) "Sweden's Financial Sophistication in the Nineteenth Century: An Appraisal." *Journal of Economic History* **49**, pp. 621-634
- Flux, A.W. (1910) *The Swedish Banking System*. National Monetary Commission. Washington, USA.
- Gherity, J.A. (1995) "The Option Clause in Scottish Banking, 1730-65: A Reappraisal." *Journal of Money Credit and Banking* **27**, pp.713-726
- Goodhart, C. (1995) "Financial Globalisation, Derivatives, Volatility and the Challenge for the Policies of Central Banks." LSE Financial Markets Group an ESRC Research Centre Special Paper Series. Special Paper No74
- Heckscher, E.F. (1965) *Svenskt arbete och liv*. Fourth edition. Bonniers. Stockholm, Sweden.
- Jonung, L. (1984) "Swedish Experience under the Classical Gold Standard, 1873-1914" in Bordo, M.D. & Schwartz, A.J. (Ed.) *A Retrospective on the Classical Gold Standard, 1821-1931*. The University of Chicago Press. USA.
- Jonung, L. (1989) *The economics of private money. Private bank notes in Sweden 1831-1902*. Research report. Stockholm School of Economics. Stockholm, Sweden.
- Kock, K. (1931) *Skånska Privatbanken. Minnesskrift*. Norstedts. Stockholm, Sweden.
- Lilja, K. (2000) *Utav omsorg och eftertanke – en undersökning av Falu stads sparbanks sparare 1830-1914*. Uppsala Papers in Financial History No 11. Department of Economic History. Uppsala University, Sweden.
- Lindgren, H. (2002) "The Modernization of Swedish Credit Markets, 1840-1905: Evidence from Probate Records" *Journal of Economic History* **62**, pp. 810-832
- Lobell, H. (1999) *Vägen mot växelkursstabilitet. Den svenska penning- och valutapolitikens utveckling 1834-1880*. Licentiate thesis. Department of Economic History. Lund University, Sweden.
- McCloskey, D.N. & Zecher, R.J. (1984) "The success of purchasing power parity" in Bordo, M.D. & Schwartz, A.J. (Ed.) *A Retrospective on the Classical Gold Standard, 1821-1931*. The University of Chicago Press. USA.
- McCloskey, D.N. & Zecher, R.J. (1985) "How the gold standard worked, 1880-1913" in Eichengreen, B. (Ed) *The Gold Standard in Theory and History*. Methuen. London, UK.
- Montgomery, A. (1934) "Riksdagen och Riksbanken efter 1809" in *Sveriges Riksdag, senare avdelningen*. Band XIII. Stockholm. Sweden.
- Nilsson, G.B. (1981) *Banker i brytningstid. AO Wallenberg i svensk bankpolitik 1850-1856*. EHF. Stockholm School of Economics. Stockholm, Sweden

- Nilsson, G.B. (1984) *André Oscar Wallenberg. I. Odysseernas år 1816-1856*. Norstedts. Stockholm, Sweden.
- Nilsson, G.B. (1989) *André Oscar Wallenberg. II. Gyllene tider 1856-1866*. Norstedts. Stockholm, Sweden.
- Nilsson, G.B. (1994) *André Oscar Wallenberg. III. Ett namn att försvara 1866-1886*. Norstedts. Stockholm, Sweden.
- Nordström, J.J. (1853) *Afhandlingar hörande till läran om crediten. I. Credit- och bankväsendet*. Norstedt. Stockholm, Sweden.
- Nygren, I. (1985) *Från Stockholm Banco till Citibank. Svensk kreditmarknad under 325 år*. Liber förlag. Stockholm, Sweden.
- Petersson, T. (1999) *Kreditmarknad i omvandling. En studie av sparbanksverksamheten på lokal nivå: Oppunda härads sparbank och stationssamhället Katrineholm 1881-1916*. Licentiate thesis. Department of Economic History. Uppsala University, Sweden.
- Petersson, T. (2000) "Playing it safe? Lending policies of the savings banks in Nyköping 1832-1875." in Färling, L. et.al. *Both a Borrower and a Lender Be – Savings Banks in the Economic Development of Sweden 1820-1939*. Uppsala Papers in Financial History No12. Department of Economic History. Uppsala University, Sweden.
- Rosenberg, C.M. (1878) *Handbok i bankväsendet. En beskrivande framställning af företrädesvis Sveriges bankförhållanden*. Bonniers. Stockholm, Sweden.
- Rothbard, M.N. (1985) "The Case for a Genuine Gold Dollar in Rockwell", L (Ed.) *The Gold Standard – An Austrian Perspective*. Lexington Books. Toronto, Canada.
- Sandberg, L.G. (1978) "Banking and Economic Growth in Sweden before World War I." *Journal of Economic History* **38**, pp. 650-680
- Schuler, K. (1992) "The world history of free banking" in Dowd, K. (Ed.) *The experience of free banking*. Routledge. London, UK.
- Schön, L. (2000) *En modern svensk ekonomisk historia. Tillväxt och omvandling under två sekel*. SNS. Stockholm, Sweden.
- Sechrest, L.J. (1993) *Free Banking. Theory, History and a Laissez-Faire Model*. Quorum Books. Connecticut, USA.
- Selgin, G.A. (1988) *The Theory of Free Banking. Money Supply under Competitive Note Issue*. Rowman & Littlefield. USA.
- Selgin, G.A. & White, L.H. (1994) "How Would the Invisible Hand Handle Money?" *Journal of Economic Literature* **32**, pp. 1718-1749
- Selgin, G.A. & White, L.H. (1997) "The Option Clause in Scottish Banking. A Comment by George Selgin and Lawrence H. White." *Journal of Money Credit and Banking* **29**, pp. 270-273
- Selgin, G.A. (2001) "In-Concert Overexpansion and the Precautionary Demand for Bank Reserves." *Journal of Money Credit and Banking* **33**, pp. 294-300

- Sjölander, A. (2000) "Norms and legislation in the Swedish savings bank business" in Fälting, L. et.al. *Both a Borrower and a Lender Be – Savings Banks in the Economic Development of Sweden 1820-1939*. Uppsala Papers in Financial History No12. Department of Economic History. Uppsala University, Sweden.
- Skogman, C.D. (1846:1) *Anteckningar om Rikets Ständers Bank och allmänna lånerörelsen i Sverige. Sednare delen. I. Ifrån och med år 1809 till och med år 1833*. Hjerta. Stockholm, Sweden.
- Skogman, C.D. (1846:2) *Anteckningar om Rikets Ständers Bank och allmänna lånerörelsen i Sverige. Sednare delen. II. Ifrån och med år 1834 till och med år 1845*. Hjerta. Stockholm, Sweden.
- Smith, V.C. (1990) *The Rationale of Central Banking and the Free Banking Alternative*. Reprint. Liberty Fund. Indianapolis, USA. (Original (1936) *The rationale of central banking*. Westminster. England.)
- Söderlund, E. (1964) *Skandinaviska banken 1864-1914*. Esselte. Stockholm, Sweden.
- Wennberg, J.O. (1829) *Om myntbestämning och realisation*. Hörberg. Stockholm, Sweden.
- White, L.H. (1984) *Free banking in Britain. Theory, experience, and debate, 1800-1845*. Cambridge University Press. USA.
- White, L.H. (1985) "Free Banking and the Gold Standard" in Rockwell, L (Ed.) *The Gold Standard – An Austrian Perspective*. Lexington Books. Toronto, Canada.
- White, L.H. (1989) "Free Banking as an Alternative Monetary System" in White, L.H. *Competition and Currency. Essays on Free Banking and Money*. New York University Press. New York, USA.
- Wray, L.R. (1990) *Money and Credit in Capitalist Economies. The Endogenous Money Approach*. Edward Elgar. UK.
- Ögren, A. (1995) *Riksbankens penningpolitik. Kreditförsörjning och prisstabilitet 1869-1881*. Uppsala papers in financial history No6. Department of Economic History. Uppsala University, Sweden.
- Ögren, A. (2000) *Expansion of the Money Supply, Competitive Note Issuance and the International Adjustment Mechanism: Sweden under the Silver and the Gold Standard, 1834-1913*. Licentiate thesis. Stockholm School of Economics, Sweden.
- Ögren, A. (2003a) *Empirical Studies in Money, Credit and Banking: The Swedish Credit Market in Transition under the Silver and Gold Standards, 1834 – 1913*. Doctoral thesis. Stockholm School of Economics, Sweden.
- Ögren, A. (2003b) "Lender of Last Resort in a Transitional Economy with a Fixed Exchange Rate: Financial Crises and Monetary Policy in Sweden under the Silver and Gold Standards, 1834 – 1913" SSE/EFI Working Paper in Economics and Finance No 537.

Appendix – The Note Issuance Determination Model

Appendix Figure 1: Complete readout from the OLS Regression

Dependent Variable: LOG(EBNOTES)				
Sample: 1874 1900				
Included observations: 27				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.376193	0.089828	-4.187937	0.0004
LOG(EBRBNOTES)	0.122716	0.041610	2.949195	0.0072
EBSPECIE	4.543155	1.454567	3.123372	0.0048
LOG(EBNOTES(-1))	0.649499	0.069424	9.355526	0.0000
R-squared	0.958363	Mean dependent var		-2.009537
Adjusted R-squared	0.952932	S.D. dependent var		0.191921
S.E. of regression	0.041638	Akaike info criterion		-3.383677
Sum squared resid	0.039875	Schwarz criterion		-3.191701
Log likelihood	49.67964	F-statistic		176.4656
Durbin-Watson stat	1.998017	Prob(F-statistic)		0.000000

The dependent variable is Enskilda bank notes in circulation (EBNOTES), the independent variables are the Enskilda banks' total holdings of Riksbank notes (EBRBNOTES), specie (EBSPECIE), and issued Enskilda bank notes lagged one year (EBNOTES(-1)). The model includes the lagged value of issued Enskilda bank notes since it is reasonable to assume a certain stickiness in the issuance of notes, i.e. the amount of notes in circulation the previous year affects the amount of notes current year.

The series are set in relation to total assets/liabilities of all banks. A problem is the series of the Enskilda banks holdings of specie (EBSPECIE), since this series as logarithmic is not significantly stationary. The original series is stationary and has been used in the model.

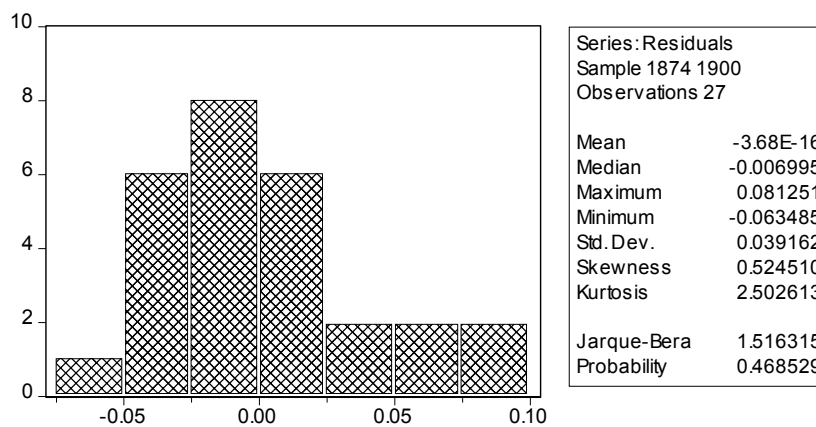
Appendix Figure 2: ADF test of unit roots up to five lags, most significant values.

ADF Test Statistic for series LOG(EBNOTES)	-3.619380	1% Critical Value*	-3.6959
ADF Test Statistic for series LOG(EBRBNOTES)	-4.640437	5% Critical Value	-2.9750
		10% Critical Value	-2.6265
		1% Critical Value*	-3.6959
ADF Test Statistic for series EBSPECIE	-3.339449	5% Critical Value	-2.9750
		10% Critical Value	-2.6265
		1% Critical Value*	-3.6959
ADF Test Statistic for series LOG(EBSPECIE)	-0.520820	5% Critical Value	-2.9750
		10% Critical Value	-2.6265
		1% Critical Value*	-3.8067
		5% Critical Value	-3.0199
		10% Critical Value	-2.6502

*MacKinnon critical values for rejection of hypothesis of a unit root.

The residual is normally distributed, the model does not suffer from serial correlation or heteroscedasticity, and is stable according to the Ramsey RESET test.

Appendix Figure 3: Distribution of Residuals, Histogram Normality Test on the Cross Sectional OLS Regression



Appendix Figure 4: Breusch-Godfrey Serial Correlation LM Test, White Heteroskedasticity Test (including cross-terms), Ramsey RESET Test (general stability and specification test)

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.000119	Probability	0.991382
Obs*R-squared	0.000146	Probability	0.990343
White Heteroskedasticity Test (cross terms):			
F-statistic	1.241716	Probability	0.334270
Obs*R-squared	10.70922	Probability	0.296168
Ramsey RESET Test:			
F-statistic	0.008583	Probability	0.927023
Log likelihood ratio	0.010532	Probability	0.918260

One problem is multicollinearity, as seen in Appendix Figure 5 below there is a high degree of correlation between the lagged value of issued Enskilda bank notes and the Enskilda banks' holdings of Riksbank notes.

Appendix Figure 5: Testing for multicollinearity (Correlations between independent variables)

	LOG(EBNOTES(-1))	LOG(EBRBNOTES)	EBSPECIE
LOG(EBNOTES(-1))	1.000000	0.772762	0.300077
LOG(EBRBNOTES)	0.772762	1.000000	-0.055942
EBSPECIE	0.300077	-0.055942	1.000000

However, running the model without the lagged value of issued Enskilda bank notes does not make the holdings of Riksbank notes insignificant in determine the issuance of Enskilda bank notes. Consequently this multicollinearity does not corrupt the observed importance of Riksbank notes functioning as basis for issuance of Enskilda bank notes (although, the size of the impact of Riksbank note holdings seems to be higher than shown in figure 5).

Appendix Figure 6: Regression to test if Multicollinearity corrupts the results

Dependent Variable: LOG(EBNOTES)				
Sample: 1874 1900				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.648080	0.182402	-3.553038	0.0016
LOG(EBRBNOTES)	0.445430	0.049939	8.919473	0.0000
EBSPECIE	11.91539	2.623730	4.541391	0.0001