

# Sweden's financial revolution and economic growth

## ABSTRACT

Both empirical and theoretical research supports the positive link between growth in the financial sector and the real economy. The idea of a financial revolution; i.e. the establishment of the fundamental organizations and institutions required for a successful financial system within a relative short time span, has furthermore been distilled from the historical experiences of among others England, Japan, the Netherlands and the US (North & Weingast (1996); Rousseau & Sylla (1999), (2001)).

Sweden from the middle of the 1850s until the early 1870s experienced what can be considered as a financial revolution. This resulted in a rapid boost in financial services, including the monetization, occurring in the late 1860s and early 1870s. This financial revolution to a large extent was the substitution of formal financial instruments for informal, i.e. was a case of increasing the quality of financial instruments. Empirical results from VAR-tests show that this financial revolution, including the monetization, preceded the increased growth in the real economy, including growth in the emerging industrial sector.

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## **Introduction**

Between 1834 and 1913 the fixed exchange rate was maintained in Sweden while the increasing economic activity was supplied with credit and means of payments. How this problem in practice was solved was the main question of my thesis. One reason for the successful combination of the specie standard with the increasing amount of money and credit was the development of the commercial banking system that at the outset only, and till the end of the century mainly, consisted of note issuing commercial banks, so called Enskilda banks. Two of the most important findings in relation to this was: 1) That the commercial banking system by no means operated in a vacuum in the financial sector, au contraire the system was complemented by other agents on the financial sector, not least the monetary authorities; the Swedish National bank, the Riksbank as responsible for the currency and the National Debt Office as responsible for the State's debt. 2) That the system with the note issuing banks was not an old fashioned relic but a most rational solution to the problems of establishing a commercial banking system in a poor and illiquid economy.<sup>1</sup>

Two questions that it was not possible to pursue within the realm of my thesis was if the financial system as a whole developed in conjunction, and to what extent the financial development really was important for real economic growth. The aim of this paper is to answer these questions, based on the theoretical explanation for why and how the establishment of a financial system, including the monetization, should be beneficial for real economic growth.

The pioneer in researching the importance of the financial system for growth in the Swedish economy was Lars G. Sandberg. In 1978 he published the article "*Banking and Economic Growth in Sweden before World War I*". In this paper he linked the success story of the Swedish economy to the relative sophistication of the Swedish banking system. This in turn he argued was a result of the comparably early law on general schooling, providing the main part of the Swedish population with the ability to read and write.<sup>2</sup> In its argument Sandberg's study was leaning towards what later became Romer's endogenous growth model, that a sophisticated financial system required an educated population, and that this in turn

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<sup>1</sup> The question of the successful combination of the specie standard and the increasing amount of financial services was the main topic of my thesis, see Ögren, A. (2003).

<sup>2</sup> Sandberg, L.G. (1978), (1979)

would affect economic growth. The study made by Sandberg was later extended by Fisher and Thurman who showed that Swedish monetization took place before the 1890s.<sup>3</sup>

The relationship between the financial market and economic growth in Sweden was recently studied by Pontus Hansson and Lars Jonung in the 1997 paper “*Finance and economic growth: the case of Sweden 1834-1991*”. Testing the cointegration relationship between the volume of lending, investments and real GDP in per capita terms, the conclusion for the whole period was that the development of the financial sector and economic growth was a case of mutual interaction. Although for the period 1890 until 1939 it seemed as finance may have had a leading impact on growth, explained by lending working as a proxy for investments. The role of the financial sector at large was assumed to be to meet the quantitative demand for investments.<sup>4</sup> The work by Hansson and Jonung was thoroughly, but since the paper grasped such a long period of time the results also provided foundations for researching new questions regarding the relation between finance and growth.

Based on a theoretical discussion the questions addressed in this paper the importance of an eventual financial revolution, not only as supplier of credit in quantity but as increasing the quality of financial instruments. As money are viewed as the most liquid of financial instruments, the establishment of better quality means of payments are regarded as a vital part of a financial revolution. A following question is if the financial revolution, including the monetization, spurred growth illustrated by GDP, and in particular the emerging industry.

For the monetization I use the new and more accurate series of the Swedish money supply that was constructed for my thesis. The money supply in its most liquid form was calculated as the sum of Enskilda bank notes and Riksbank notes in circulation, i.e. excluding Riksbank notes held as backing for note issuance. For the broad money supply the sum of notes held by the public is added to deposits in commercial and savings banks.<sup>5</sup>

The paper is structured as follows: The next section outlines the theory of the financial revolution and its link to economic growth. This is followed by the question if Sweden experienced what can be considered as a financial revolution. The section thereafter consists of a brief description of Swedish economic growth in the nineteenth century with specific

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<sup>3</sup> Sandberg’s work was criticized by Kindleberger who based on Sweden’s most famous economic historian, Heckscher, argued that Sweden had no banking system worth mentioning before 1900 (see Kindleberger, C. P. (1982) and Sandberg, L.G. (1982)).

<sup>4</sup> Hansson, P. & Jonung, L. (1997), (2001)

<sup>5</sup> Prior series do not contain information on the Enskilda banks holdings of Riksbank notes before 1871, and in case they do for the years 1834 until 1858, their holdings of Riksbank notes was (many times with lacking precision) reported in a questionnaire to the Special Committee on Banking in 1858 – 1860 (see Brisman, S.

regard to the industrial sector. Finally the possible link between the financial sector, money supply and GDP and industry growth is tested statistically using VAR models with the specific aim of tracing an eventual causality.

### **Money, finance and economic growth in theory**

That finance is important for economic growth is supported in theory. Ross Levine points out several functions provided by the financial sector that may facilitate economic growth, such as to lower information and transaction costs, better risk management, pooling of resources (by mobilizing savings), and increasing the possibility to specialize production. This, the so called functional approach to finance and growth nurtures the idea that the financial system has to as a whole i.e. including the structure of the financial system.<sup>6</sup>

Although the literature on finance and growth supports the importance of finance for economic growth, there is still a question of the causality in this matter. Does the financial sector grow in response to real economic growth or vice versa? Several cross country studies supports the importance of finance for economic growth, but the causality is a question that these studies do not fully answer. It seems clear that obstacles to the emergence and growth of a financial system also impede growth in the real economy, but it is not clear if this is because the real economy does not get the investments it demands or if the development of the financial sector in itself spurs economic growth.

As a result of looking at the importance of the financial system as a whole, a growing body of literature has started to embrace the idea of a so called “financial revolution”. This revolution indicates a visible causality running from the financial sector to economic growth. New technologies that require certain financial instruments may have been created independently of the financial sector, but they will not be of importance for the economy until implemented. And the implementation requires financial resources of a certain quality going beyond personal, informal credit arrangements.

The financial revolution stresses the synergy effects when each part of the financial system is put in place as an entire system. Thus, the idea with the financial revolution is that the vital parts of the financial systems are dependent on institutional factors as well as on each other. When these vital parts are established in conjunction with an appropriate set of institutions governing finance, the financial revolution occurs within a relatively short time span making

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(1934), Jonung L. (1974), (1989) and Ögren, A. (2003) Appendix & Chapter 4)). For this series the balance sheets of the Enskilda banks has been used. Also, prior, deposits in Savings banks has been neglected.

<sup>6</sup> Levine, R. (1997)

its mark with a sharp rise in financial services. Although so far the financial revolution is more a schedule of basic parts a successful financial revolution requires, than a fully consistent theory on how the financial revolution comes into place, and how it promotes real economic growth.

In their paper “*Financial Systems, Economic Growth, and Globalization*” Rousseau and Sylla points to five basic characteristics, or parts of a successful financial system: 1) Public finance, including its debt management, is run prudently, 2) A stable currency, 3) Private commercial banks involved in international and/or domestic financial business, 4) Monetary authority (-ies) that can act to stabilize domestic finances and manage international financial relations, and 5) a well functioning securities market.

With somewhat local deviances these principles have been distilled from historical experiences of establishing financial systems that were preceding take off in economic growth: the Dutch case in the early 17<sup>th</sup> century, Britain after the Glorious Revolution 1688, where the financial revolution paved way for the success story of the British economy, USA after the establishment of the financial system in late 18<sup>th</sup> century and from around the 1850s also Germany and Japan. The US example is the extreme in this respect putting all financial foundations into existence within a few years, including a generous possibility for bank establishments.<sup>7</sup>

Implicitly there are many parallels between the literature on finance and growth and the endogenous approach to money. Since it is impossible to make a universalistic definition of money that also serves to exclude all other forms of financial instruments, money is viewed as a financial instrument. Liquidity of the credit instrument, or hereafter the financial instrument, differs and the most liquid form of financial instruments serves as means of payments.<sup>8</sup>

The importance of developing financial instruments as part of fulfilling the tasks of lowering transaction costs, manage specific risks, finance specialization, pool resources in accordance with the needs of the real economy is thus also applicable for money. And as the definition of money is that it is credit that is transferable to third part (with highest possible liquidity), what financial instrument that best serves as money is to be decided on a case by case basis.

As stated by Levine, the primary function of the financial system is to facilitate the allocation of resources in time and in space. Without Levine making it a bigger issue, this statement underscores the enormous potential power of a well designed financial system.

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<sup>7</sup> Rousseau, P.L. & Sylla, R. (2001)

Credit not only involves a spatial transfer of resources, it also involves a transfer from the future to the present. Since it is not theoretically possible to put a limit to the resources of the future, the resources that can be implemented into today's economy are more or less infinite.

There are two questions of importance for the financial system: 1) how the future purchasing power in an optimal way may be implemented as resources in present day economic activities, and 2) how the financial instruments are designed to convince holders of present day resources to exchange these for probable future gains. The second question again stresses the difference not only in demand for different financial instruments for different services, but also that some instruments are of better quality than others. The difference in quality is dependent on among other things the issuer's credibility, the particular function of the instrument and of course what the buyer of the instrument is willing to pay.

Thus, I argue that the intertemporality of credit and financial instruments makes neutrality of financial instruments, and thus money, impossible also in the long run.<sup>9</sup> The way the financial system is designed, the credibility of the issuer, and the technology of the financial instrument decides to what extent future resources may benefit production today.

The real bills doctrine is applicable insofar as the production behind the bill is more or less complete and the acceptor of the real bill does not encounter any risk with this transaction. In fact, historically the financial system in Sweden worked after this guideline for a long time since the formal financial sector was limited to lending money collateralized with existing raw materials and produced goods. It was not until this view on risk free and prudent lending was abandoned that the development of the financial sector took pace.

Credit over time was more the case of the informal credit sector. In fact, the financial revolution as such seems to have been as much a revolution in terms of quality of financial instruments as of quantity. Håkan Lindgren has showed that Sweden as many other economies in the nineteenth century had a large informal financial sector. The increase in size of financial services was not as impressive as it seems if informal credit arrangements were taken into account.<sup>10</sup> If the financial development, or revolution, to a large part was a substitution of formal financial instruments for informal, this implies again the importance of quality in financial relations. Formal financial instruments were better designed to eliminate transaction costs and manage risks than informal instruments.

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<sup>8</sup> For the endogenous approach on money see Chick, V and Wray, R.L.

<sup>9</sup> Or put differently, neutrality in the long run of financial instruments, including money, may be the case if we include all the future resources of all the spaces. That is, the long run is the same as the infinity.

<sup>10</sup> Lindgren, H. (2002). Similar research has reached the same results for Canada, France and the US.

The Swedish experience also supports the importance of quality for financial instruments, including such instruments that were used as means of payments. The Swedish monetization was largely a case of substituting money of better quality for those of inferior, as the latter were personal IOUs, and the former private bank notes and eventually notes issued by the national bank, the Riksbank.<sup>11</sup>

One way of viewing quality and quantity of financial instruments and its implication for economic growth is in terms of risk awareness. There are studies showing that limiting the freedom of the financial sector led to misallocation of credit by crowding out lending to certain groups in society considered as more risky, including lending and investments in newer and as a consequence more risky projects.<sup>12</sup>

Thus, the value of financial instruments (credit) is dependent on the quantity (given a certain quality) and is not linear. The assumption of non-linearity makes possible to assume that it is cheaper, less risky, to engage in financing of new economic ventures since the marginal cost of credit diminish with supply. Again this assumption, given that credit is expressed as a financial instrument (i.e. is a form of money), challenges the idea of money as neutral.

Given that a larger supply of credit lowers its marginal cost, the financial sector after its revolution should be able to supply riskier projects with credit. The definition of a riskier project is a project where the financier in ex ante has a smaller possibility to estimate the pay off, i.e. newer less well known technologies. But, the economic take-off should take place within newer technologies, i.e. what can be considered as a modern sector. A hypothesis is thus that the financial revolution should result in higher growth in the sector of the economy that relied on newer technologies than in the traditional sector of the economy.

### **The financial revolution in Sweden**

The idea of the financial revolution implies two things: 1) that there was a strong case of synergies between different parts of the financial sector in the total financial development, and 2) that the establishment of this entire financial system was positive for economic growth. The former of these statements is investigated in this section of the paper and the latter follows in the next section.

Synergies in the financial system mean that financial variables should have grown in harmony after the financial revolution. As seen in figure 1 below this was largely true in the

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<sup>11</sup> Ögren, A. (2003) Chapter 4

<sup>12</sup> See for instance Temin, P. & Voth, H-J. (2005)

case of Sweden. Monetary variables not including deposits were relatively stable in relation to GDP during this period. When public deposits in commercial and savings banks are included, the money supply grew from thirteen percent of GDP in 1840 to seventy-eight in 1910. In absolute numbers, the growth was even more impressive, as GDP grew quite rapidly from the 1870s and onwards.

*Figure 1: Various financial measures in percent of GDP, 1840 – 1910*

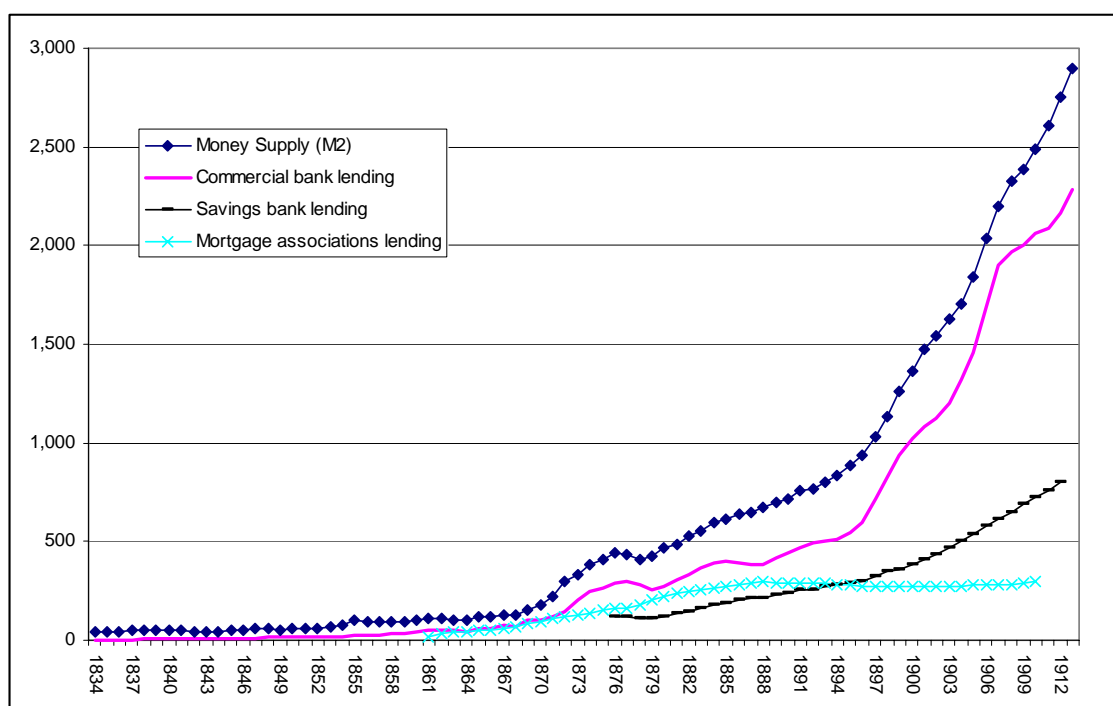
Year	1840	1850	1860	1870	1880	1890	1900	1910
Riksbank total reserve	6.7%	3.6%	2.9%	2.5%	2.2%	1.5%	2.0%	3.4%
Issued Riksbank notes (base money)	9.8%	6.7%	5.0%	3.0%	3.0%	3.2%	3.2%	6.5%
Circulating Riksbank and Private bank notes	11.3%	8.7%	7.3%	5.3%	6.0%	6.4%	6.3%	6.5%
Money Supply (M2)	12.8%	11.5%	13.0%	19.0%	36.0%	49.9%	61.5%	78.3%
Riksbank assets	15.8%	12.3%	10.0%	7.6%	8.9%	9.8%	10.0%	11.0%
Commercial bank assets	4.3%	6.6%	9.9%	19.6%	36.5%	45.2%	61.7%	79.4%
Savings bank assets	n.a.	n.a.	n.a.	n.a.	12.1%	20.8%	21.5%	27.6%
Riksbank lending	8.1%	6.0%	3.9%	2.0%	1.9%	2.9%	2.0%	1.2%
Commercial bank lending	2.3%	3.0%	5.3%	10.8%	20.6%	30.7%	46.0%	64.8%
Savings bank lending	n.a.	n.a.	n.a.	n.a.	9.3%	16.7%	17.2%	22.9%
Mortgage associations lending	0.4%*	1.4%*	2.2%*	9.9%	17.2%	19.9%	12.4%	9.2%
Mortgage associations bond issuance	0.3%*	1.0%*	1.7%*	10.5%	20.5%	22.4%	13.2%	9.1%
Life insurance companies' net insurance fund	n.a.	n.a.	0.1%	0.6%	2.4%	5.3%	7.1%	9.9%
Foreign debt	-2.7%	-3.0%	12.2%	17.9%	20.5%	33.2%	24.3%	38.8%

\* Only the Skåne Hypoteksförening.

Sources: Krantz, O. (2001), Nygren, I. SCB (1960), Schön, L. (2000), Sommarin, E. (1934), Sveriges Allmänna Hypoteksbank (1911), Sveriges Riksbank (1931), Ögren, A. (2003)

Figure 1 supports the complementarities of monetary and financial authorities with liberal possibility for private initiatives. As the national bank the Riksbank acted as guarantor of the Swedish currency, issuing what can be considered as base money that was kept as reserves by the banking system. The National Debt Office as responsible for the State's debt issued bonds to be used as high quality financial assets in the financial system and imported high powered capital from France, Germany and Great Britain, illustrated by the growing foreign debt. The Riksbank as well as the National Debt Office both went through fundamental organizational and institutional changes in the period of the financial revolution.

Figure 2: Money supply and lending in Mill. SEK, 1834 – 1913



Sources: See figure 1 above

Whereas cross country studies supports the fact that financial depth to GDP is of importance for the economic performance of a country, a longitudinal study of the importance of financial growth for GDP will not benefit from increased financial depth. Nevertheless, the increased financial depth indicates a rapid financial development in the case of Sweden. As quantitative evidence supports that a financial revolution took place around 1870, qualitative evidence points out that many fundamental institutional factors changed during the period just before; roughly between 1855 and 1870.

### Increased representation and the institutional framework

The necessity of the political system in facilitating the establishment of an efficient financial system has been thoroughly analyzed as one of the main examples of the importance of institutions for economic growth.<sup>13</sup> Needless to say, this assumes the idea of a well designed financial system as important for economic growth.

After the King Gustav IV had been forced to resign in 1809 a new constitution was launched. The political system was a form of a constitutional monarchy with the Crown acting as Government and the Parliament consisting of male representatives of the four Estates; the

<sup>13</sup> North, D.C. & Weingast, B.R. (1996)

Bourgeoisie, the Clergy, the Nobility and the Peasantry. This constitution was largely based on limiting the power of the Crown by increasing the power of the Parliament, and especially the Nobility. Of special importance in this constitutional design was the forcing of the Government (the Crown) to rely on the Parliament for funding as the latter had the exclusive right for taxation.

From the 1840s it became obvious that belonging to an Estate was not sufficient for agreeing in political matters. The groups in society that had the least influence within the Parliament, which also was the majority of the population, started to make its claims for increased representation. As a result a new constitution based on a two chamber Parliament was instigated in 1865. Comparably this change decreased the influence of the tax financed groups in society; the Clergy, the Nobility and of course the Government (the Crown). The 1865 constitution instead increased the representation of property owing males subject to paying taxes.

The Swedish credit market was heavily regulated. Usury laws and impediments on the possibility to establish banks or banking firms negatively affected the development of the financial sector. The lack of trustworthy means of payments and credits obstructed trade and business ventures. After a long toil in Parliament when the Crown and the Nobility actively tried to maintain a few more or less commercial bank monopolies by resisting freer establishment, most repressions on financial business were revoked in 1864. Establishment of commercial banks ended to be a discretionary matter and instead became due to following standard regulations, why bank charters became granted and prolonged more or less automatic. In addition the law on usury was abolished and it became possible to establish limited liability banks.

The few then existing commercial banks were from the 1840s monitored by the Ministry of Finance. In 1868 the importance of the monitoring role of banks was emphasized by the appointment of a specific banking inspector (in 1876 transformed into an entire office within the Ministry of Finance). This changed marked that the State more redesigned its role as governor of the financial sector by ending its impediment of new businesses to instead engage in inspections of existing businesses to ensure that certain general standards of prudence were met. Moreover, the State started to merge into one actor. This was apparent in the banking law of 1897 meeting two old demands from the Government (the Crown) as well as the

Parliament; the Riksbank was given monopoly on note issuance, and the Government the right to appoint the chairman of the Bank.<sup>14</sup>

### **The Riksbank and the issuance of base money**

One of the keys of developing a financial sector is the establishment of a stable currency not only to open for foreign capital markets, but also to be used as an anchor, or as base money in the banking system. In 1834, after a decision in Parliament 1830, Sweden established a specie standard that was kept for eighty years until the outbreak of World War I.

Modern day economics has emphasized the role played by an, from the government independent central bank. The Swedish national bank, the Riksbank, was from its foundation in 1668 autonomous relative to the Crown. This did not, however, prevent the Riksbank from being utilized for inflationary projects by the Parliament or the Crown, depending on which of the two State powers that for the moment held the actual power. As a result the specie standard was not effective for most parts of the eighteenth century.<sup>15</sup>

Sweden was on a de facto paper standard until 1834 when the silver standard was reestablished after the decision taken by the Parliament in 1830. The importance of the stable currency for the financial sector is illustrated by the fact that this decision was the ignition for the first application to establish a commercial bank. No applications had been filed earlier although the Parliament and the Crown had launched special proclamation to promote private banks seven years prior.

Later, as international markets increased in importance for the Swedish economy, the silver standard was changed into a gold standard in 1873. This change was a result of the German Reichsbank's switch to a gold standard in 1871 and was made in connection to the

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<sup>14</sup> See for instance Nilsson, G.B. Regarding the importance of the political representation for banking legislation see Ögren, A. (2003) Chapter 2

<sup>15</sup> Ahlström, G. (1989), pp. 93-94, Fregert, K. & Jonung, L. (1996), Hecksher, E.F. (1949a), (1949b), Montgomery, A. (1931), Nygren, I. (1984). In 1789 the King Gustav III was denied a loan from the Riksbank, a loan meant to finance warfare against Russia. As a result of this the King instead chartered the National Debt Office with the right to issue domestic bonds, or rather interest bearing promissory notes transferable without restrictions, for the same purpose. These National Debt Office notes were issued to such an extent that in 1791 the Office no longer allowed them to carry interest. Although the National Debt Office Notes were not declared as legal tender, they became possible to use everywhere, including when paying taxes. The National Debt Office issued notes without specie backing and in smaller denominations, and subsequently the Office's notes circulated to a much higher sum than notes issued by the Riksbank. Soon the Office's notes started to depreciate in relation to the Riksbank notes. This meant the parallel existence of two currencies, the National Debt Office's *Riksdaler Riksgäld* on a paper standard and the Riksbank's *Riksdaler Banco* based on silver. The *Riksdaler Riksgäld* became the new unit of account as Riksbank notes nearly fell out of circulation. In 1803 the Riksbank took over the liabilities of the National Debt Office, i.e. its circulating notes. The relationship between *Riksdaler Banco* and *Riksdaler Riksgäld* was fixed at one *Riksdaler Banco* equal to one and a half *Riksdaler Riksgäld*. These currencies existed in parallel until the currency reform of 1855, when the *Riksdaler Riksgäld* became the official unit of account under the name *Riksdaler Riksmünt*.

establishment of the Scandinavian Currency Union when the unit of account was harmonized in the Scandinavian countries to the *Krona*.<sup>16</sup>

Despite the problematic track record of the Swedish currency the fixed exchange rate was kept, and it is probable that the faith in the stable currency grew in time. It became clearer over time that the priority of the Riksbank was to protect the fixed exchange rate above all other objectives.

From the late 1850s the public debt increased and the absolutely largest part of this debt was held by foreigners, subsequently the loans were denominated in foreign currencies. The foreign debt thus put increased pressure on the importance of maintaining the fixed exchange rate as a depreciated currency would add to the problems of repaying this debt. As a consequence the Riksbank did not jeopardize the currency by engaging too heavily into lender of last resort activities. If further funds were needed for the banking system, the State represented by the Government and the Parliament stepped in and through the National Debt Office borrowed funds from abroad (i.e. England, France and Germany).<sup>17</sup>

In the 1870s an increased cooperation began between the Riksbank and the National Debt Office. This was done with the aim of better coordinating the effects the Office's foreign borrowing had on the possibility of the Riksbank to maintain the specie standard.

The Riksbank was not given note issuing monopoly in practice until 1903 when the right to issue notes for the Enskilda banks was abolished. Although the Swedish money stock from the 1830s partly consisted of private bank notes it was obvious throughout the period that the Riksbank was responsible for the currency. Notes issued by the Riksbank was the major part of the reserves held by the banking system, whereas private bank notes never was kept as reserves by the banking system.<sup>18</sup> To what extent the Riksbank was, or when it fully became a central bank in its modern sense is more unclear.

With the outspoken aim of ending the outdated bureaucracy of the Banks' business the organization was fundamentally changed between the 1860s and early 1870s. The staff was downsized, regulations cut to a third, increasing the freedom of the Board and the CEO of the Bank. The previously independent Loan Office became fully integrated into the Bank.

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<sup>16</sup> The Scandinavian Currency Union consisted of Denmark, Norway (joined 1875) and Sweden. The currency union only included coins that were valued at par, this changed in 1894 to include also notes, see Talia, K. (2004)

<sup>17</sup> Ögren, A. (2003) Chapter 6

<sup>18</sup> Due to the private bank note issuance, the Swedish banking system in the nineteenth century has been interpreted as a case of free banking (Jonung, L. (1989), Schuler, K. (1992)). But the role of the Riksbank as responsible for the currency's stable value and the empirical fact that the private banks' reserves consisted of Riksbank notes denies this interpretation (Ögren, A. (2003) Chapter 4).

Modernizing the loan business meant that funds that previously had been locked for specific purposes were freed. As a result old fashioned subsidized agricultural loans and other outdated loans diminished considerably paving way for commercial lending collateralized for instance in bonds, stocks, bills of exchange, name and current account credit. Thus the Riksbank consolidated its own position at the same time as it circulated more of its notes to be used as reserves by the banking system. As a result of this consolidation the Riksbank in 1872 instigated a fund to be utilized in an outspoken sterilizing manner.

Currency wise the Riksbank clearly acted as a central bank. The possibility to deposit funds in a current account which run with interest in the Bank was utilized by the commercial banks, and from 1869 deposits in the Riksbank could be made with Enskilda bank notes, although the Riksbank would not hold onto these notes. But the Riksbank was neither fully the Bank of the State nor the Banks' bank. Instead private commercial banks fulfilled the task of clearing until the late nineteenth century, and the National Debt Office more functioned as the Bank of the State.<sup>19</sup>

### **The National Debt Office managing the public debt**

The importance of managing the public debt was twofold: 1) as was the case of the stable currency it served as a signal of trust to lenders, and 2) if the commitment of the State was trustworthy, the public debt in turn became financial assets/securities to be held by investors. For this to work it was essential to have a well structured tax system ensuring investors in the public debt that the State could extract the revenues needed for repayment.

Initially the National Debt Office was formed to repay the foreign debts that had been accumulated from the Thirty Year Wars and King Karl XII's following warfare in the seventeenth and early eighteenth century.<sup>20</sup> After the Office had been utilized by King Gustav III to finance warfare between 1789 and 1809, the new constitution of 1809 limited the Crowns possibility to utilize it.

The most important change of the objectives of the National Debt Office came when the Parliament of 1853/54 decided to use the Office to raise the funds needed to build the core of the railroad system. In the history of the Office's foreign borrowing the period 1854 to 1866 is seen as a period of trail and error with incomplete organizational and institutional practices.

To raise the capital needed for building the railroad the Office turned to international capital markets. At first the Office lacked experience the experience of managing international

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<sup>19</sup> Brisman, S. (1934), Ögren, A (2003) Chapter 4.

loans. Due to the internal organization of the Office it did not have continuous contact with the international economy and no contracted long term correspondents abroad. The commercial banking system was not competing about arranging the loans.<sup>21</sup> Because of the organization and history of the Swedish State's financial authorities, the National Debt Office and the Riksbank acted as competitors. From the latter half of the 1860s the National Debt Office solved these problems with increased cooperation with the Riksbank and involving more domestic banks. Not only did the Office accumulate knowledge about debt management, new forms of loans were developed to better suit the needs of the State.<sup>22</sup>

The different situations the National Debt Office experienced when arranging a domestic bond loan in the early 1860s and 1870s is an illuminating example for how the financial revolution increased liquidity for security markets. In 1861 the National Debt Office tried to launch a bond loan on the domestic market, the banks administering this loan were paid high commission for this service and despite this loan being aimed towards the domestic market it was denominated into a fixed value in Hamburger Banko and Cologne Silver. To make these bonds liquid and demanded among the public they had to be recognized as a kind of legal tender, that is the bonds and their coupons were transferable to third part without fee and could be used directly for all kinds of tax payments.

Already in 1870 and 1872 the domestic market was liquid enough to absorb two larger bond flotations from the National Debt Office with considerably lower commissions. The loan of 1872 was raised to pay off the loan of 1861, and perhaps as a consequence of the ongoing boom the loan was aimed directly to the domestic capital market without any underwriters.<sup>23</sup>

As was the case with other countries experiencing a financial revolution, Sweden became a large net importer of capital. The costs of these loans diminished over time, and new loans could be raised to pay for older more expensive loans already in the early 1870s. Foreign loans were however always denominated in the lenders currency.<sup>24</sup>

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<sup>20</sup> Ahlström, G. (1989), p.93-94. Then the National Debt Office was named the Parliamentary Office (*Rikens ständers kontor*).

<sup>21</sup> It has been written that the Office did not cooperate with any Swedish commercial banks, but in the 1860s the Office was criticised for its extremely close ties to one of the major commercial banks, the Skandiaviska Kredit AB, in which's board several of the Office's board members also were represented. This bank was involved in the 1861 loan according to the loan contracts of the National Debt Office.

<sup>22</sup> Hildebrand, K. (1934)

<sup>23</sup> Ögren, A. (2003) Chapter 6. So intricate were all the fees of this loan that a professor in mathematics from the Swedish Royal Institute of Technology had to help the Board of the National Debt Office to calculate the actual interest rate paid for this loan.

<sup>24</sup> Ögren, A. (2003) Chapter 5.

Figure 3: Loans taken by the National Debt Office, 1855 – 1913

Year	Official Interest rate in annual percent	Actual Interest Paid in annual percent	Value of sold Bonds (SEK)	Actual capital received (SEK)	Size of Commission in percent of total loan sum
1855	3.5 & 4.5	4	279,900	273,100	2.43%
1858	4.5	5.27	21,841,333	19,703,472	9.79%
1860	4.5	5.002	26,666,666	25,615,074	3.94%
1861	4.5	5.167	3,000,000	2,760,650	7.98%
1864	4.5	5.319	10,091,512	8,790,863	12.89%
1866	5	5.59	26,486,133	23,539,389	11.13%
1868	5	5.961	20,884,000	17,871,301	14.43%
1870	5	5.201	16,170,000	15,778,011	2.42%
1872	4	4.847	23,117,700	20,885,341	9.66%
1875	4.5	4.759	36,730,666	35,271,497	3.97%
1876	4.5	4.872	36,274,600	34,635,568	4.52%
1878	4	4.9	27,238,184	24,233,218	11.03%
1880	4	4.216	118,746,375	114,558,769	3.53%
1886	3.5	3.862	64,546,222	60,059,661	6.95%
1887	3.6	3.709	85,655,360	83,165,623	2.91%
1888	3	3.794	26,666,666	22,113,041	17.08%
1890	3.5	3.638	35,555,555	35,377,777	0.50%
1894	3	3.662	18,000,000	15,840,000	12.00%
1899	3.5	3.763	36,000,000	34,290,000	4.75%
1900	4 & 3.5	3.821	36,320,000	34,816,299	4.14%
1904	3.5	3.643	36,000,000	34,605,000	3.88%
1906	3.5	3.643	43,200,000	41,526,000	3.88%
1907	4 & 3.5	3.77	46,800,000	45,021,600	3.80%
1908	4 & 3.5	3.87	54,480,000	51,483,600	5.50%
1911	4 & 3.5	4.005	72,000,000	66,960,000	7.00%
1913	4.5	4.813	24,480,000	22,888,800	6.50%

Source: Hildebrand, K. (1934) p.172, Ögren, A (2003) Chapter 6

The loans taken by the National Debt Office were different forms of bond loans, mainly aimed for international markets. The Office's bonds were circulating as securities also on the domestic market. One of the investors in National Debt Office bonds was the Riksbank, who held these bonds as assets that could be turned into reserves when necessary.<sup>25</sup> The banking system also held these bonds as assets in a manner that increasingly came to replace cash reserves.<sup>26</sup> On the other side of the coin, the excess funds imported that were not needed by the Swedish State were placed by the National Debt Office either as loans to commercial banks or in the Riksbank.<sup>27</sup>

<sup>25</sup> See Ögren, A. (2003) Chapter 4 & 6

<sup>26</sup> See Ögren, A. (2003) Chapter 3

<sup>27</sup> Schön, L. (1989b)

### **Mortgage associations and the Mortgage Bank of Sweden**

The National Debt Office was not the only agent issuing bonds, bond loans was the traditional form of long term lending in Sweden. Local municipals and companies issued bonds as source of finance. In 1836 the first Mortgage Association was established in Skåne, in the south of Sweden. The Mortgage Associations' lent to the agricultural sector utilizing farms and farm lands as collateral.

Investments in agriculture made it more productive but also increased the values of agricultural properties, seen in an increase in the agricultural sector during the economic boom in the early 1850s. During the international crisis that followed in 1857/58 the values of agricultural properties declined rapidly, and the mortgage associations were blamed for the financial difficulties experienced during this crisis.

The Parliament seized the opportunity to regulate the business of the mortgage associations as a response to the crisis. In 1861 on the initiative of the Parliament, the then existing mortgage associations created a joint mortgage bank, the Mortgage Bank of Sweden (*Sveriges Allmänna Hypoteksbank*), to coordinate and administer their bond issuance as well as lending. The Associations were more or less forced to cooperate with their own joint bank, as the Parliament refused to allow Associations not being part of the Mortgage Bank to issue new bonds for lending collateralized in land.<sup>28</sup> Surely this was one way of limiting the competition the National Debt Office feared from the private Mortgage associations on the international capital market.

The lending of the Mortgage Bank increased rapidly from its establishment and peaked around 1890 and then in absolute numbers kept a fairly stable size. Until the early 1870s its lending kept up in size with the commercial banks (see figures 1 & 2) who then took off. As the Mortgage Bank was forced to lend only on rural properties, it had no possibility to engage in business of the growing industrial sector.

### **The securities market**

Well managed securities, private or public, also served to increase liquidity by making it possible for financial agents to alter their holdings. Increasing liquidity in the economy in combination with high quality securities lowered both transaction costs and risks in holding this securities as these more or less directly could be transformed into the most liquid financial instruments; money. Thus the liquidity preferences among the public as well as for financial agents decreased, inducing a liquidity spiral.

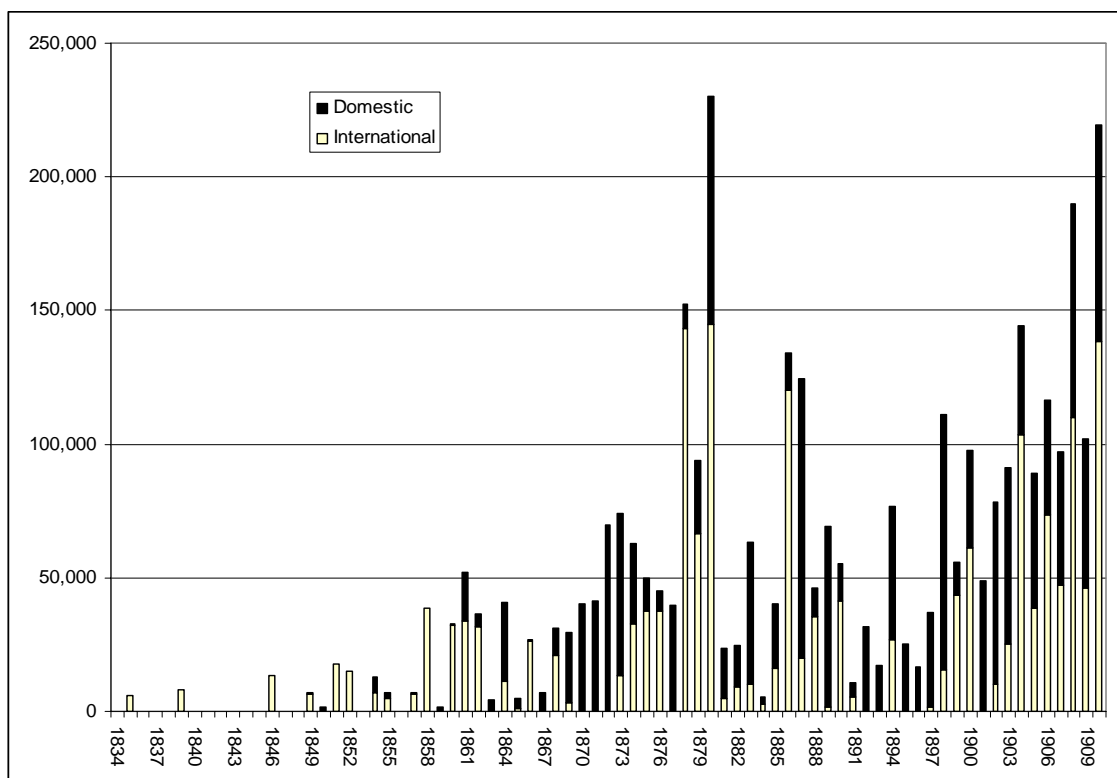
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<sup>28</sup> Sommarin, E. (1936), *Sveriges Allmänna Hypoteksbank* (1911)

In the trade off the banking system faced between holding non-interest earning cash reserves for protection, or investing in lending or interest earning bonds, the decision to do the latter increased overall liquidity in the economy. With the existence of a liquid security market, the cost of transforming interest earning assets into cash reserves decreased, making it possible to substitute securities for cash as reserves.<sup>29</sup>

This development occurred in Sweden, where cash reserves of the banks diminished from fifteen percent of total assets in the late 1850s to around five percent in the middle of the 1870s and then slowly shrank to approximately three percent by the turn of the century.<sup>30</sup> The main papers of trade were not stocks but bonds and bills of exchange. The bond market was well established and consisted to an increasing extent after the middle of the nineteenth century of high quality instruments, i.e. less risky bonds with lower transaction costs when turning them into any other form of financial instrument such as cash.

Figure 4: Swedish Bond Flotations, 1834– 1910 (1000's SEK)



Source: Flodström, I. (1912)

<sup>29</sup> For a discussion on the trade off between vulnerability and bank efficiency and its consequences for developing the financial system see Diamond, D. W. (1997), Diamond, D. W. & Dybvig, P.H. (1983), and Diamond, D. W. & Rajan, R.G. (2001).

<sup>30</sup> Ögren, A. (2003) Chapter 3

It is difficult to know to what extent bonds circulated on the Swedish securities markets, clearly bonds early became a vital part of commercial bank assets. Also bond loans aimed for abroad was bought by Swedish investors, not least the Riksbank and commercial banks. Bonds aimed at the domestic market, however, were normally denominated only in Swedish currency and thus were unlikely to be favored by foreign investors. Judging from the amount of loans collateralized in bonds, public holdings of bonds increased rapidly as well.

The stock market was however not developed in the nineteenth century.<sup>31</sup> Banks were allowed to lend using stocks as collaterals but before 1907 not to otherwise hold stocks as assets. From 1877 bank lending based on stocks became reported separately from lending based on merchandise. Starting from a small amount the importance of lending for stocks increased throughout the period.<sup>32</sup>

### **Life insurances**

The first long term life insurance company in Sweden was founded in 1855. There were foreign insurance companies in Sweden before this and there had been plans to establish a State run life insurance company. Also other private financial agents had attempted to start a life insurance company. Earlier this was not considered as possible due to the problems of raising the equity capital in the poor Sweden at the time. First the only life insurance considered accidental or premature death but from 1868 also interest earning life insurances were instigated.<sup>33</sup>

### **The Banking system and the Swedish monetization**

The commercial banks functioned in a complementary manner by themselves. The banks turned fixed and indivisible assets into liquid liabilities. These liquid liabilities could consist of demand deposits, or as in the case of Sweden, private bank notes. Thus the commercial banking system was important for the financial revolution also as it managed to create better quality financial instruments to be used as means of payments; i.e. the Enskilda bank notes, than what had been used prior (for instance personal IOUs and authorized assignments). In an economy suffering from a lack of trustworthy means of payments, the Enskilda bank note issuance thus became an important part of the formal monetization. This monetization was also an important part in the creation of liquid secondary asset (or security) markets.

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<sup>31</sup> See Waldenström, D. (2003)

<sup>32</sup> Sammandrag af Bankernas Uppgifter 1871-1911

<sup>33</sup> Svenska livförsäkringsbolags förening (1958)

The necessity to complement the business of the Parliamentary Riksbank by allowing for the establishment of private commercial banks was agreed upon in Parliament, thus an official Royal Proclamation in 1824 guaranteed this right, and as all other businesses banks were to be run under the principle of unlimited liability. The Crown had to agree upon each banks' regulations to grant a time limited (ten year) charter. The importance of the need for an anchor currency for banking business was apparent since it was the decision to reestablish the silver standard in 1830 that led to the establishment of the first commercial bank in Sweden, Skåne Enskilda Bank.<sup>34</sup> The Parliament agreed to the note issuing rights of the Enskilda banks, since this was considered as the only way of making it possible to fund banking business in a country suffering from lack of means of payments.

Until the middle of the 1860s, bank establishment was more or less a monopoly affair for those who managed to be granted charters to run banking business. Strong groups in Parliament, and allies to the Crown, had business interests in keeping competition as low as possible. As a result, banking establishment was prevented until political representation changed.

In 1851 the increasing hostility towards the local Enskilda bank monopolies led to an attempt with none note issuing banks relying on central bank credit; the so called Filial banks. The attempt with the Filial banks showed how under established the banking sector was. Initially funds that were meant to support the establishment of three Filial banks had to support eight such banks. Within a few years nineteen Filial banks were established, competing for funds that were only a fraction of what the twelve existing Enskilda banks issued in notes. In addition, the Crown who regulated the charters stopped the Filial banks from the possibility to accept deposits.<sup>35</sup>

By the early 1860s the opposing parts in Parliament agreed to end the attempt with Filial banks, at the condition of freer establishment of commercial banks. From 1865 existing Filial banks either merged with existing Enskilda banks or reformed as new Enskilda banks. In addition a number of new Enskilda banks were opened, increasing the number of commercial banks from nineteen to twenty five and the number of note issuing Enskilda banks rose from twelve. The number of bank offices increased as well from fifty in 1860 to hundred and five in 1866, and then actually reached a level of between four and five offices per bank, a level

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<sup>34</sup> Kock, K. (1931), Ögren, A. (2003) Chapter 2 & 4. Thus the note issuance of the Enskilda banks was neither a coincidence nor made possible by a coupe of the first bank, but was an agreed necessity without which it would not be possible to run banking business (see Ögren, A. (2003) chapter2).

<sup>35</sup> Ögren, A. (2003) Chapter 2

that was kept until after 1900. This rapid bank establishment coincided with the abolishment of the usury law and the possibility to establish none-note issuing limited liability banks.<sup>36</sup>

*Figure 5: No of Commercial banks & offices, Money Supply, Bank assets and Bank lending in Mill. SEK per capita (Stable prices 1834 = 1), 1840 – 1910*

Year	Commercial banks	Commercial bank offices	Riksbank and Commercial Bank Notes	Money Supply (M2)	Commercial bank lending	Commercial bank assets	Savings bank lending	Savings bank assets
1840	6	n.a.	14.1	15.9	2.8	5.4	n.a.	n.a.
1850	8	n.a.	12.2	16.2	4.2	9.3	n.a.	n.a.
1860	12	50	12.1	21.5	8.7	16.5	n.a.	n.a.
1870	30	136	9.9	35.4	20.2	36.5	n.a.	n.a.
1880	44	205	12.6	76.4	43.8	77.3	19.6	25.6
1890	43	190	15.4	120.6	74.2	109.2	40.4	50.3
1900	67	269	20.7	200.3	149.9	201.3	56.1	70.2
1910	80	625	25.9	312.6	258.7	316.8	91.3	110.2

Sources: Brisman, S. (1924), Nygren, I. SCB (1955), Sveriges Riksbank (1931), Ögren, A. (2003)

As seen in figure 5 above, the free bank establishment in the middle of the 1860s led to an enormous increase in financial services provided by the commercial banks from the middle of the 1860s to the middle of the 1870s. Bank assets, lending and the broad money supply all more than doubled, showing the importance of developing a nation wide financial system.

The notes issued by the Enskilda banks were based on the fixed exchange rate maintained by the Riksbank from 1834. Although the Riksbank accepted Enskilda bank notes from banks with an exchange agent or an office in Stockholm from 1869, only notes issued by the Riksbank were kept as reserves by the banking system.<sup>37</sup>

Initially the Enskilda banks funded their business by the issuance of notes without paying much attention to deposits. With the reintroduction of the ‘postal bank bill’ in 1855, deposits became nearly as liquid as notes.<sup>38</sup> Although notes initially might seem as a cheaper source of funds, the discount costs the Enskilda banks faced for exchanging these notes and increased taxes on note issuance made deposits an equally profitable alternative. Deposits also had other

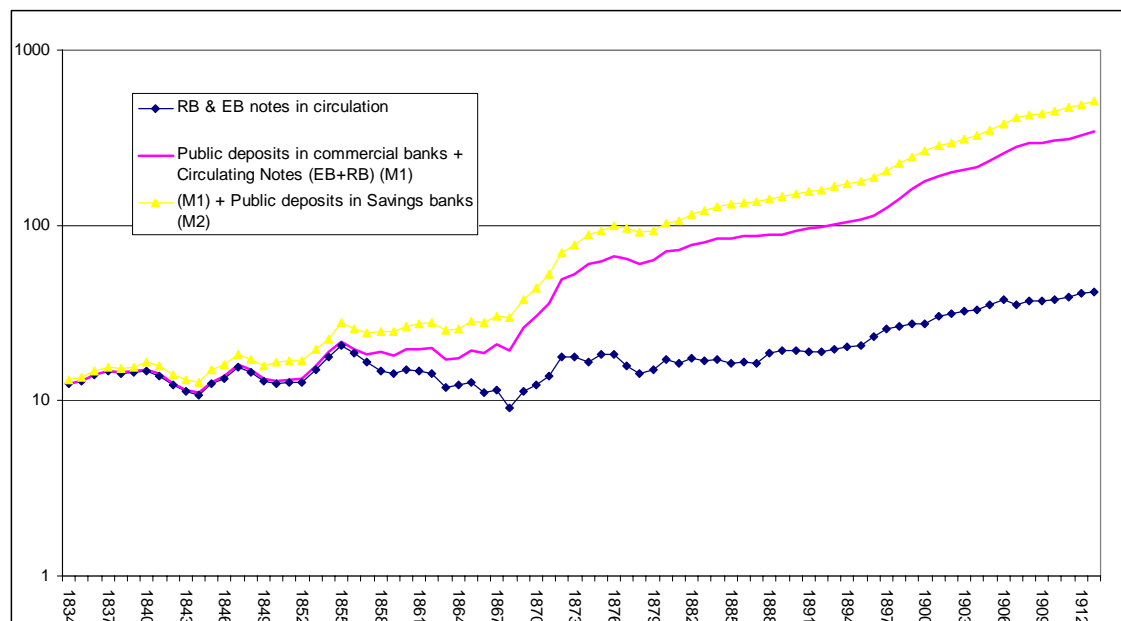
<sup>36</sup> Ögren, A. (2003) Chapter 3

<sup>37</sup> Ögren, A. (2003) Chapter 4

<sup>38</sup> Sveriges Riksbank (1931) pp. 172-185. 1855 this started as a post in the banks’ balance sheets. In the eighteenth century so called domestic bills of exchange had circulated generally believed to be backed by the same laws as foreign bills of exchange. As the Parliament denied this law to be valid for domestic bills of exchange these disappeared from circulation (see Engdahl, T & Ögren, A. (2004). Before the domestic bills of exchange returned in 1855, the only checks circulating were so called Authorized Assignments, a form of (non interest bearing) checks that was drawn on the issuer’s credit (or deposits) in the Riksbank. In accordance with the law, these checks could be issued by the holder of the credit taking the time of circulation into account. In practice this meant that there was no limit to the issuance of checks as long as the issuer was not declared as bankrupt. If this happened the holders of the checks would be the ones to carry the costs, and this also happened during the crises of 1848 when the Authorized Assignments lost popular trust (see Brisman (1924), p.9-11, 18).

advantages, as the amount of notes a bank could issue was regulated by law which was not the case for deposits. The question of note issuance by the Enskilda banks was regularly monitored and debated in terms of banking business prudence, and consequently even though deposits might have been somewhat more expensive for the banks than note issuance, deposits had its advantages.

Figure 6: Per Capita Money Supply in 1000's SEK, 1834 – 1913. Logarithmic scale



Sources: Myrdal, G & Bouvin, S. (1933), SCB (1955), Sveriges Riksbank (1931), Ögren, A. (2003)

The broad money supply stayed fairly stable between 1855 and 1868 but notes in circulation decreased. During this period the Enskilda banks altered their liabilities by substituting deposits for notes. In the late 1860s, from the through year of 1868, both note issuance as well as deposits started to grow again, and from the year 1867, deposits was the main component of the broad money supply. As seen in figure 1, also in relation to GDP the broad money supply increased enormously during a few years in the late 1860s and early 1870s suggesting a breakthrough in monetization between the years 1868 until 1872.

The shift in money supply was accompanied by a shift in the lending pattern of the commercial banks. Discharging the early years with extreme growth, growth in commercial bank lending for the rest of the period was at an annual rate off seven percent.<sup>39</sup> The more

<sup>39</sup> Lending from Savings banks is not included in the series for lending, because data for this series only exists from 1876. As a result, including these figures distorts the growth pattern. Given the indications of a financial revolution, extrapolating the figures from the beginning of the period would neglect such a rapid change. The same problem exists for Savings banks assets.

liquidized the economy became, the less cash reserves banks had to hold and the more lending banks could engage in.

Already from the 1820s, savings among the public was encouraged through the establishment of Savings Banks. In a beginning Savings Bank offices were small, isolated and scattered all over the country. As part of the complementarity of the financial system, the importance of the Savings Banks on the credit market increased with the establishment of commercial banks. Although these organizations were meant to be philanthropic institutions supporting the virtue of saving, this meant an increased opportunity for these banks to channel their funds to the loan market through the commercial banks.<sup>40</sup> A common situation was that the same persons that sat in the Board of the local Savings Bank also sat in the Board of the local commercial bank, and/or that Savings Banks and Commercial Banks shared office.<sup>41</sup>

### **Economic growth and modernization in Sweden**

There are several dates for when Sweden is said to have experienced its industrial breakthrough. Lennart Jörberg in his study of the Swedish industrialization pointed to the 1830s as the starting point of the industrialization, with an acceleration in its growth from the 1870s. Generally the story of Swedish economic growth is attributed to have taken off in the 1870s, but also the 1890s is viewed as an important decade for the Swedish industry and economic growth.<sup>42</sup>

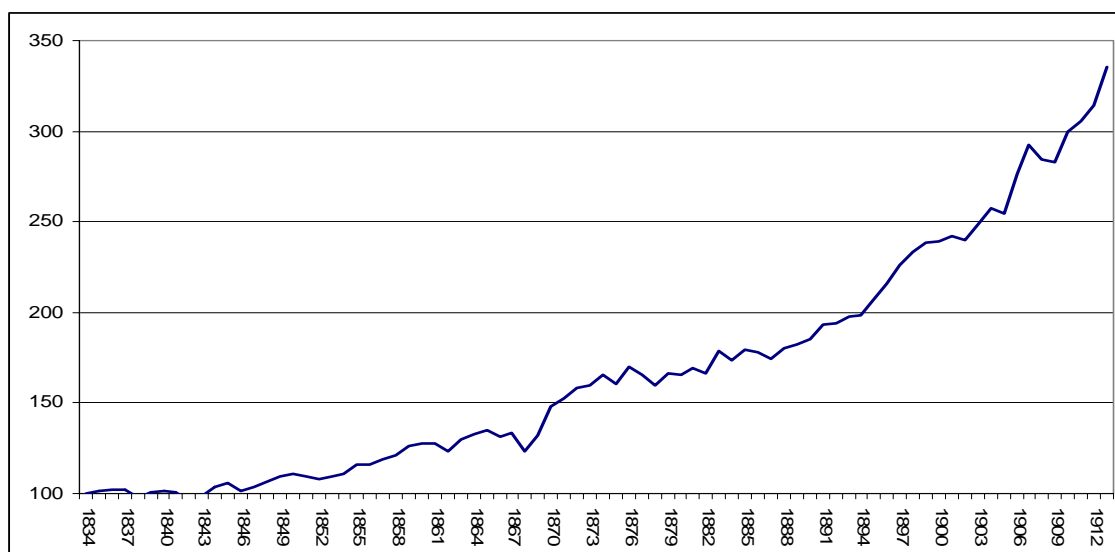
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<sup>40</sup> The importance of the Savings Banks for the Swedish nineteenth century credit market has been analyzed by Ingemar Nygren at Gothenburg University and in a research project at Uppsala University performing micro studies of a large number of Savings Banks.

<sup>41</sup> Hellgren, H. (2003), Petersson, T. (2002). The Savings Banks were successful in competing for funds from the public and as the use of deposits grew in importance, the groups in Parliament that had an interest in working for credit market liberalization in the case of the Commercial Banks worked for large restrictions on the Saving Banks' possibility to run banking business. The result of this became a new Savings Bank law in the middle of the 1890s that forced the Savings Banks to end their loan business and return to the "old values" of philanthropically fostering the public in the virtue of saving. As a consequence a large number of Savings Banks reformed into small local joint stock banks, so called Folk Banks (*Folkbanker*) (Sjölander, A. (2000)).

<sup>42</sup> Hansson, P. & Jonung, L. (1997), Jörberg, L. (1961), Sandberg, L.G. (1978), Schön, L. (2000)

Figure 7: Swedish per capita GDP volume indices, 1834 – 1913 (1834=100)



Sources: Krantz, O. (2001), SCB (1955)

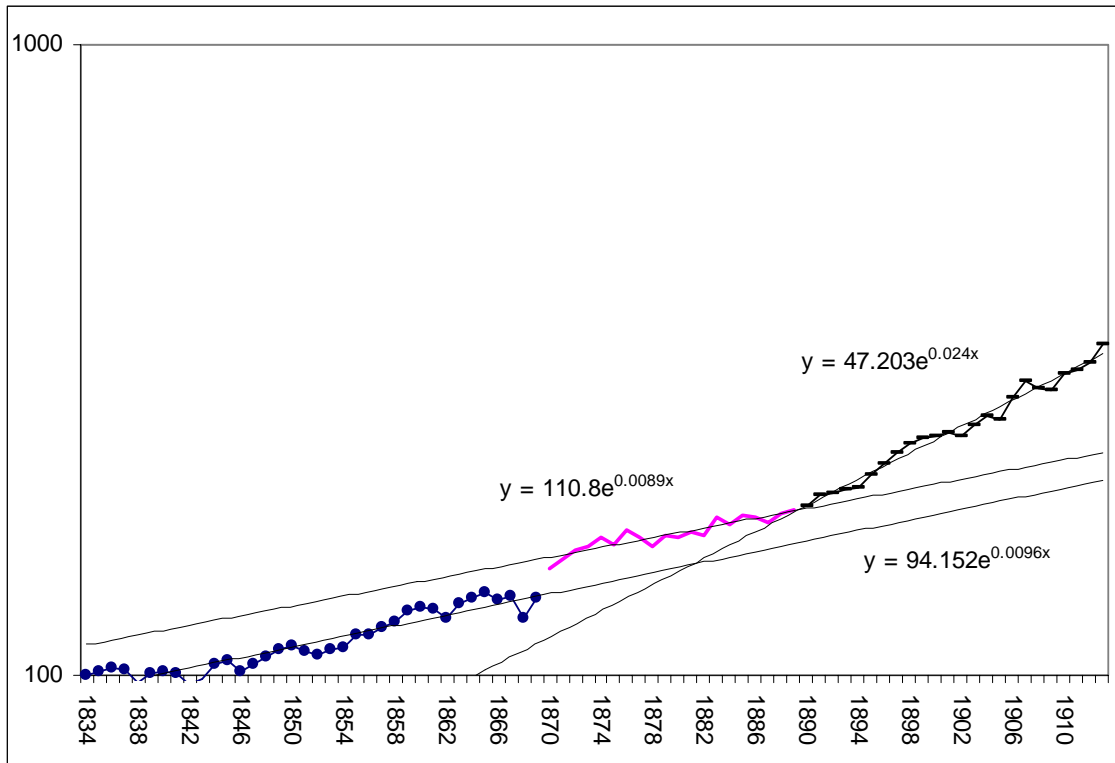
Just looking at the per capita GDP index seem to support both the interpretations that Swedish economic growth went through a positive change in the 1870s as well as 1890s. Average yearly growth during the period 1834 until 1913 was 1.5 percent. Dividing the Swedish GDP growth in accordance with the schedule presented in previous research, shows that a jump in GDP level occurred around 1870, but this without leading to a continuous higher annual growth rate. From the 1890s per capita GDP growth rate was more than two times higher than before.<sup>43</sup>

In figure 8 below, the choice to make the distinction between the two last periods the year 1890 is based on previous research.<sup>44</sup> Whatever year that is chosen for when the shift in GDP took place or when the acceleration in began, this took place after the financial revolution had increased the financial services both in quantity and in quality.

<sup>43</sup> Ignoring the first years of non-growth shows that GDP grew at 1.2 percent per year between 1846 and 1869.

<sup>44</sup> Extending the middle period until 1894 increases growth in the middle period to a yearly average of 1 percent and decreases the average between 1895 and 1913 to 2.35 percent.

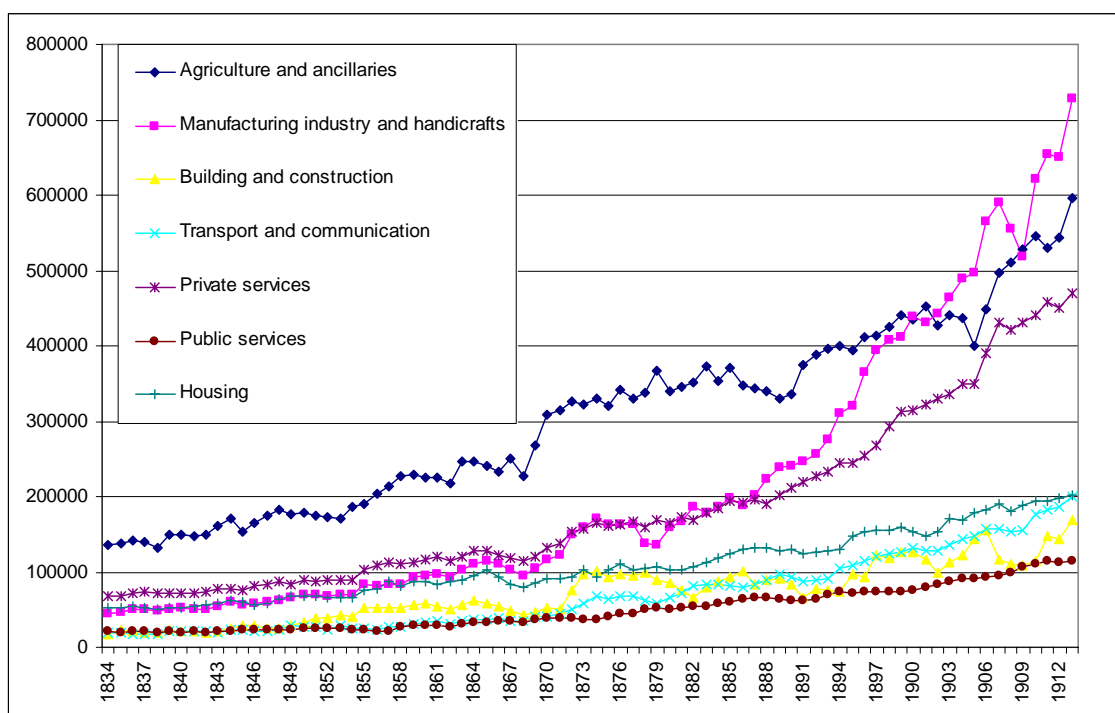
Figure 8: Growth patterns in Swedish Per Capita GDP (in volume index 1834 = 100). Logarithmic scale



Sources: Krantz, O. (2001), SCB (1955)

A subsequent question is when the modern industrial sector came to be the dominant sector. As seen in figure 10 below both the agricultural and the industrial sector grew in absolute terms, but the modern sector grew in relative importance. Agriculture was surpassed by the modern sector as the main share of GDP in the middle of the 1890s.

Figure 9: GDP per sector in stable prices (1000s SEK), 1834 – 1913

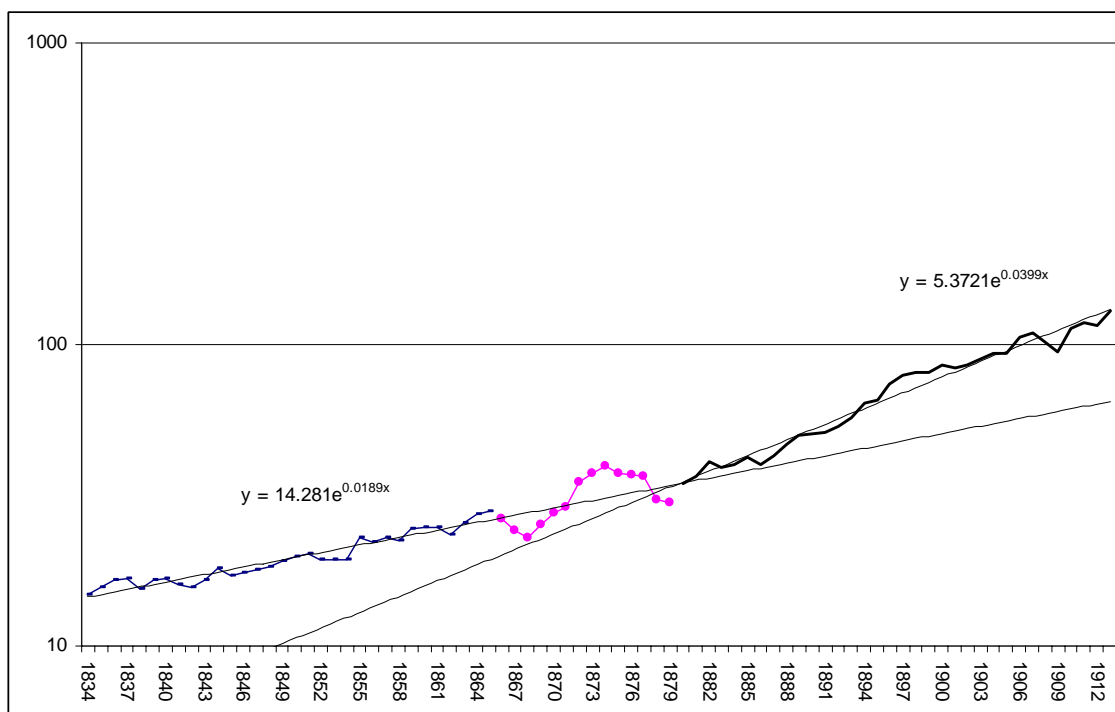


Source: Krantz, O. (2001)

The industrial sector grew in cycles from the middle of the 1850s to the late 1870s. In the late 1880s growth in the sector accelerated rapidly. In relation to the growth of the industrial sector, also the private service sector grew. To some extent this may well have been due to the fact that services that previously had been conducted outside the formal market now became formally priced and paid.<sup>45</sup>

<sup>45</sup> There is a possibility that the so called service revolution of the economy is due to this phenomenon, see Schön, L. (2000).

Figure 10: Swedish per capita Modern Sector in stable prices, 1834 – 1913 (1834=1) Logarithmic scale



Sources: Krantz, O. (2001), SCB (1955)

For the entire period the rate of average annual growth in the modern sector was around 2.5 percent. From the middle of the 1860s until the late 1870s growth in the sector was volatile. The famine in the latter half of the 1860s as well as the boom in the early 1870s and the crisis in the late 1870s affected the sector. It was during the latter part of the period that the highest growth was experienced. From 1880 growth in the industrial sector was almost four percent per year, whereas it before 1865 was somewhat lower than two percent a year, thus average annual growth ratio more than doubled. Since financial crises and booms were visible in the growth of the sector this suggests a link between modern sector growth and the financial sector.

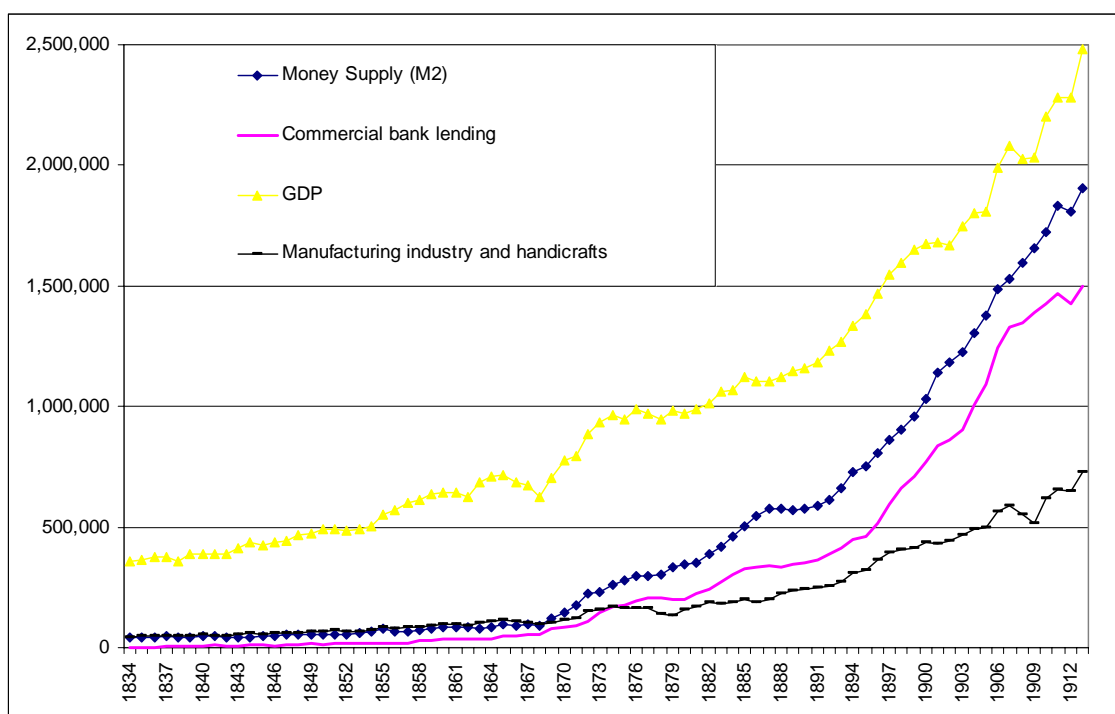
### **Was Sweden a case of finance-led economic modernization?**

In a pioneering study of the financing of the Swedish industry, Torsten Gårdlund studied the balance sheet of nineteenth century industrial firms in Sweden and found that most of them were self-financed, thus denying the importance of the financial sector for the Swedish industrialization. However, from the previous two sections on the financial revolution and economic growth in Sweden it is possible to conclude that that the financial sector underwent a visible take off between 1868 and 1872, and that growth both in the modern, industrial

sector of the economy, as well as in GDP as a whole accelerated after this financial revolution.

Figure 11 below as well supports a general increase in formal financial services and economic growth. If the change from an informal to a formal financial system was important, this should be traceable as a link between measures of the formal financial sector and economic growth.

*Figure 11: Per capita Economic growth (GDP), Industry growth, Money Supply (M2) and Commercial bank lending in Stable prices (1834=1). 1000's SEK.*



Source: Krantz, O. (2001), Myrdal, G. & Bouvin, S. (1933), Ögren, A. (2003)

The next step was to statistically test for a link between the financial sector and growth in GDP and in the industrial sector. To test the causality between the financial sector and economic growth VAR-test was used. To avoid the problem of multicollinearity as many of the variables were closely interrelated; VAR tests were done pair wise. Figure 12 below shows the result that strongly supports the conclusion that the financial sector promoted economic growth.

Figure 12: Statistically significant preceding lags from pair wise VAR tests (5-lags) of per capita values (Mill. SEK) in stable prices (1834 = 1), 1834 – 1913

Dependent variable	Independent D(Notes)	Independent D(M2)	Independent D(Lend)	Independent D(Industry)	Independent D(GDP)
D(GDP)	2 & 5	2 & 5	5	None	
D(Industry)	1 & 2	2 & 5	4		None
D(Lend)	3 & 5	5		3 (5 negative)	(5 negative)
D(M2)	None		None	(2 & 5 negative)	None
D(Notes)		None	(3 negative)	None	(5 negative)

Significant lags at least at the 5 percent level

Changes in all measures of the financial sector positively preceded changes in GDP and industry. Regarding the financial sector the monetization indeed was important. Circulating notes, as well as notes plus public deposits in commercial and savings banks affected not only GDP and Industry, but also the amount of commercial bank lending. An interesting result was that there was no causality from notes to the broad money supply (M2), or vice versa. Although these measures were highly correlated, it is possible that annual figures are too crude to sort out the causality in such a relationship.

Apart from the industrial sector positively preceding lending, causality running from the real economy to the financial sector was negative. However, the figures do not support a general negative relationship as the financial sector, GDP and the industrial sector all grew during the period of the study. The VAR test also could not catch the causality between the industrial sector and GDP at large.

## Conclusions

The Swedish financial revolution was not only an increase in quantity of financial services but also a change from informal financial solutions to formal. As qualities in financial instruments increased, transactions costs decreased, and risks became lower. One of the most important parts of this financial revolution was the formal monetization.

As was the case in other historical experiences, the Swedish financial revolution was built on complementary between different parts of the financial sector. The synergy effects created the financial revolution and made it important for economic growth. Fundamental changes were made from the middle of the 1850s to the early 1870s not only financially but also politically. A stable currency was put into existence in 1834, managed by the Riksbank that prioritized the specie convertibility before all other objectives. The National Debt Office managed the State's debt and managed from the late 1850s to import capital from international capital markets. The Office became better at both organizing its business and creating high quality financial instruments, bonds, to raise capital. Throughout the nineteenth

century bonds were the main security traded. In 1861 the then existing Mortgage Associations, which funded their lending also by bond issuance, jointly established the Swedish Mortgage Bank.

Changes in political representation made a nation wide establishment of commercial banks possible. This took place in the middle of the 1860s and was based on the tasks of the Riksbank and the National Debt Office as well as the growing security market. The banks established, unlimited liability commercial banks, served the purpose of raising funds for their business by issuing notes. Besides being able to invest in local business ventures, these banks managed the monetization by liquidizing fixed assets. This led to the liquidity spiral where banks were able to substitute interest bearing securities for cash reserves, thereby feeding monetization further. In such manner the banks could consolidate more thus lending more.

The financial revolution in Sweden made its mark in the growing financial services and monetization from the late 1860s. Growth in the real economy measured as per capita GDP in stable prices, and growth in the industrial sector of the economy accelerated later in the nineteenth century. VAR tests showed that monetization as well as lending promoted economic growth.

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