

The Riksbank's operational frameworks for monetary policy, 1885–2018

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In this article, we study how the Riksbank's operational framework for controlling the level of interest rates in the economy using different kinds of monetary policy instruments has changed over time. We show how these changes have been driven by changes in the environment in which the Riksbank operates as well as by the stated aims of its monetary policy.

1 Introduction

An *operational framework* for monetary policy consists of the monetary policy instruments, counterparties and collateral for credit used by a central bank to control the level of interest rates in the economy. The use of these different components primarily depends on the environment in which the central bank operates. When this environment changes, it is natural that the central bank may need to reform its operational framework. During the period 1885–2018, the Riksbank has used four different operational frameworks:

- 1885–1961: The discount rate system
- 1961–1985: The penalty rate system
- 1985–1994: The interest rate scale
- 1994–2018: The interest rate corridor

An important question discussed below is what reasons the Riksbank has had for changing its operational framework. Another question we discuss is which rates the Riksbank has tried to control during different periods and why it has chosen these rates in particular. A third question is which instruments, counterparties and collateral the Riksbank has used to control interest rates and how these instruments have been used. To provide an answer to the last question, certain historical events have also been depicted that illustrate how the Riksbank has acted in different situations. However, we do not provide a complete historical overview. The sole intention has instead been to illustrate how certain instruments have been applied.¹

The focus of this article is on the Riksbank's operational framework for monetary policy. For this reason, the various exchange rate systems used during the period are not discussed in any detail. For much of the period 1885–2018, Sweden has had some form of fixed exchange rate system, see Figure 1.² Neither do we discuss in detail the extensive regulatory system applied after the Second World War up until its deregulation in 1985. These systems cannot of course be completely disregarded, but they are discussed only to the extent that they interact with the operational framework.

We go through each of the four operational frameworks used by the Riksbank and explain how they have worked. Such a detailed and comprehensive account of the Riksbank's

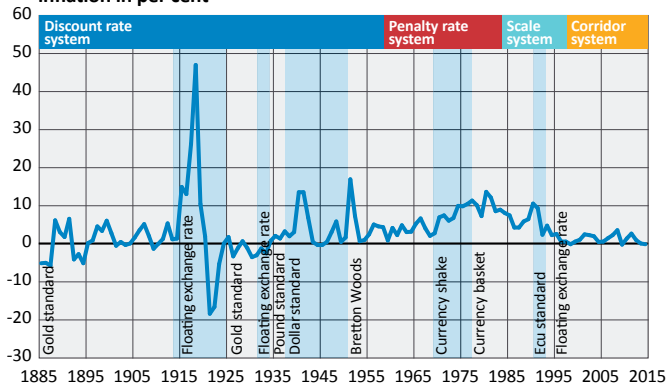
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1 For a review of the Riksbank's 350-year history, see Fregert 2018 and Wetterberg 2009.

2 See Lobell 2010 and Bohlin 2010 for a presentation of Sweden's various exchange rate regimes, and Berg and Jonung 1998 and Carlsson 2011 for the experiment with a floating exchange rate and price level targeting in the 1930s.

operational frameworks has never before been published.³ In conclusion, we summarise and draw some general conclusions from the review. We also try to look forward and ask ourselves whether the current operational framework needs to be reformed.

Figure 1. Operational frameworks, exchange rate regimes and inflation in per cent



Sources: Bohlin 2010, Edvinsson and Söderberg 2010, Lobell 2010, Sveriges Riksbank and Statistics Sweden

2 The discount rate system 1885–1961

We start our study of the Riksbank's operational frameworks in 1885, as, according to Fregert (2018, p. 112), that was the year when the Riksbank started re-discounting private banks' bills of exchange. Monetary policy prior to that, as Fregert describes it, can hardly be characterized as distinctive interest rate policy. By re-discounting bills, which involved the Riksbank exchanging the bills for banknotes, the Riksbank essentially became a bank for other banks. It therefore seems reasonable to talk about a monetary policy *operational framework*.

From 1885 onwards, *the discount rate system* meant that the trade bills discounted, i.e. exchanged for banknotes, by commercial bank customers at the bank could, when necessary, be re-discounted at the Riksbank. Riksbank Governor Arnberg advocated the so-called 'real bills' doctrine, when he spoke of the assets that should be accepted for re-discounting: The bank 'must mainly restrict these to one type of security, namely short-term payment pledges generated by industrial sector or trade sector commercial transactions or what are colloquially referred to as 'commercial bills', i.e. the basis of which is a completed commercial deal. *The bank's actual operations thereby comprise exchanging their banknotes in return for such payment pledges, ...*' (Arnberg, 1886, p. 87, my italics). For commercial banks, therefore, a portfolio of re-discountable bills was an attractive alternative to maintaining a cash liquidity reserve. The bills were redeemed at the Riksbank in exchange for banknotes at a value that was below their nominal value. In other words, the bank paid an implicit interest rate – *the discount rate*. According to Wetterberg (2009, pp. 216–218), the Riksbank used the discount rate policy for the first time in connection with the Baring crisis of 1890.⁴ This crisis had resulted in higher international interest rates, which led to a high demand for relatively cheap lending and the re-discounting of bills at the Riksbank. The General Council of the Riksbank promptly raised the discount rate from 4 to 6 per cent, see Figure 2. The discount rate system had thereby replaced the so-called 'strangulation system'. If previous practice

³ The interest rate scale is described by Norgren (1986), Westman Måtensson (1992) and the interest rate corridor by Hörngren (1994), Mitlid and Vesterlund (2001), Otz (2005) and Sellin and Åsberg Sommar (2012, 2014). The main sources are otherwise from Kock 1961 and 1962, Jonung 1993, the annual administration reports of the General Council of the Riksbank to Sveriges Riksdag (1978–1989), SOU 1982:52, Sveriges Riksbank (1986, 1988) and the annual accounts of monetary policy in the Riksbank's Economic Review.

⁴ Discount rate policy was applied earlier according to Ögren (1995), who has studied the period 1869–1881.

had been followed, lending would instead have been ‘strangled’ and the Riksbank would have refused to re-discount bills instead of raising the interest rate. In Great Britain, France and Denmark, discount rate policy had already had its breakthrough in the 1860s.

The effectiveness of the discount rate policy before the Riksbank was given the monopoly for issuing banknotes in 1904 can of course be questioned. Prior to this date, some ‘private’ banks had the right to issue banknotes and they did not always depend on being able to re-discount bills at the Riksbank as they periodically had a large ‘cash reserve’ in the form of the unutilised part of their right to issue new banknotes. Bank Director A.O. Wallenberg gave his opinion on the effectiveness of the Riksbank’s discount rate policy: ‘Large banking institutions in other countries could, with their capital strength, influence the money market and raise or cut the interest rate depending on the circumstances. The Riksbank does not currently have the capital strength to do this and therefore the powers-that-be want to have exclusive power over the circulating capital’. (Wallenberg, 1885, p. 183). The last banking committee had just presented its proposal to give the Riksbank a monopoly on banknotes, to which Wallenberg was opposed.

Whether or not the Riksbank would be given a monopoly became a long-running issue at the end of the 1880s. But on 12 May 1897, it was finally decided that the Riksbank would be the sole note-issuing bank. The then 27 private note-issuing banks, with a banknote circulation amounting to half of the banknotes in circulation at the time, were allowed to continue to issue notes until the end of 1903. To compensate for the loss of their bank-issuing right, the Riksbank provided lending on favourable terms to the private banks until the end of 1910. Against promissory notes and certain mortgage bonds, these banks could borrow from the Riksbank at an interest rate that was 2/3 percentage points below the applicable discount rate.

If the liquidity was unevenly distributed among banks, this was solved by them lending to each other. The interbank market rate was normally the same as the rate for discounting bills at the Riksbank. An interbank loan was more favourable, however, as the Riksbank applied a minimum maturity period of eight days and the interest for the entire maturity period had to be paid even if the loan was redeemed prematurely.⁵ If the banking system as a whole needed liquidity, it could be supplied by the Riksbank by the banks re-discounting bills or, from 1879 onwards, by them taking loans with bonds as collateral.⁶ The latter was less common up until the 1930s, however, when borrowing from the Riksbank became the most common practice.

In connection with the First World War, the issue of the effectiveness of the discount rate policy resurfaced. After war broke out in July 1914, the demand for Swedish goods from both belligerent parties increased, leading to very strong economic activity. But instead of raising the discount rate to restrict lending, the Riksbank cut the discount rate in January 1915 and again in May 1916. This gave rise to harsh criticism from one of the leading economists of the time, Gustav Cassel, who felt that the Riksbank could have applied the brakes on the economy by conducting a forceful discount rate policy. However, the Riksbank Governor was of the opinion that discount rate rises would not be effective enough in the prevailing climate. Large commercial enterprises that spotted major profit-making potential would not be swayed by a discount rate that was a few percentage points higher, he thought, while a similar move would have inflicted serious damage on smaller players.⁷ The already strong economic activity continued to strengthen even further, causing the Riksbank to eventually cave in and increase the discount rate several times over starting in November 1916 from 5 to 7 per cent, see Figure 2.⁸ It did not dare to raise the discount rate to such levels that would have had a real

5 See Kock 1961, pp. 19–20.

6 In 1879, state leveraging of railway bonds was introduced to increase liquidity within the banking system, see Larsson 1993.

7 See Cassel 1916 for the exchange of views between Cassel and the Riksbank Governor (first deputy in the General Council of the Riksbank) Victor Moll at the Swedish Economic Society’s meeting on 26 September 1916.

8 See Wennerberg 1924 for a detailed account of the Riksbank’s discount rate policy during and after the First World War.

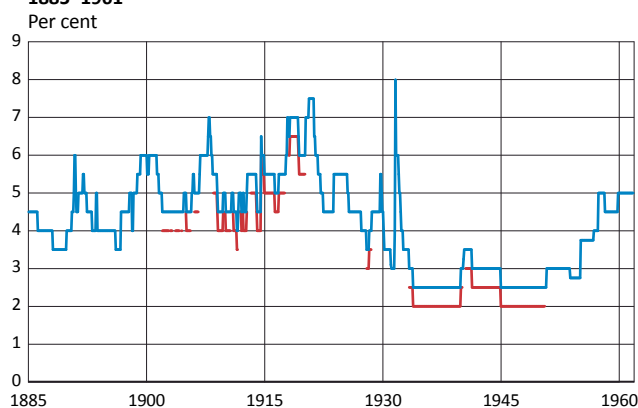
restraining effect on the economy. The result was extremely high inflation of over 40 per cent in the latter stages of the war, see Figure 1. The Riksbank reacted in September 1918 by calling on commercial banks to exercise restraint when granting credit and threatened to repeal their re-discounting rights if the directives were not followed.

In conjunction with the economic boom of 1936–1937, the Riksbank had a new monetary policy instrument at its disposal, once again referring to the ineffectiveness of the discount rate policy. In 1937, the Swedish Riksdag decided to authorise the General Council of the National Debt Office to make treasury bonds and other debt instruments available to the Riksbank for use in monetary policy. The background to this was that the sharp rise in banks' credit balances at the Riksbank as a result of the economic boom would lead to a discount rate rise being relatively futile as a restraining instrument. As a complement, the thinking was that the Riksbank could sell bonds and treasury bills to drain the market of liquidity and in that way push up interest rates.⁹

2.1 The Riksbank's return discount rate

A new instrument in the Riksbank's toolbox was introduced in 1893 in the form of a *return discount rate*.¹⁰ The return discount rate was normally half a percentage point and was paid back at the end of each year. Private banks that had re-discounting agreements with the Riksbank could thereby re-discount their commercial bills at a discount rate that was lower than the official discount rate, see Figure 2. When applied, the banks could re-discount their bills at the Riksbank at the official discount rate minus the return discount rate.

Figure 2. The Riksbank's discount rate and return discount rate, 1885–1961



Source: Sveriges Riksbank

The Riksbank could change the return discount rate without any connection with a change in the official discount rate. This could be perceived as a signal from the Riksbank, which could be interpreted either as a recommendation to banks to adapt their credit policies without changing interest rates or as a sign of an imminent change to the official discount rate.¹¹ The usual pattern was for the Riksbank, when tightening policy, to firstly remove the right to the return discount rate and then raise the official discount rate a few weeks later. When the Riksbank wanted instead to ease monetary policy, it firstly reintroduced the return discount rate and then cut the official discount rate a few weeks later. The following quote from Svenska Dagbladet on 9 November 1905 gives an example of this:

‘We don’t know whether a further raise will become necessary, but the Riksbank has already given an initial warning signal by withdrawing at the end of last week the return

⁹ See Kock 1961, p. 166.

¹⁰ See Häfors 1995, p. 10.

¹¹ See Kock 1961, p. 22.

discount rate of ½ per cent, which the Riksbank normally grants private banks that have a re-discounting agreement with the Riksbank, excepting as always the special re-discounting rate, which is offered to previous note-issuing banks in accordance with Article 41 of the Sveriges Riksbank Act’.

For their best customers, commercial banks normally discounted bills at the Riksbank’s official discount rate. This meant that when the Riksbank removed the right to the return discount rate, banks discounted these bills without making any profit on the deal.

The private banks normally adhered to the Riksbank’s changes in the discount rate, as illustrated by the following quote from Svenska Dagbladet on 6 June 1908:

‘In view of the Riksbank’s rate cut, representatives of private banks with offices in the capital held a meeting in the local office of Sundsvall Bank. The meeting was convened by the Deputy Chairman of the Swedish Bank Syndicate, Bank Director K.A. Wallenberg. It was decided at the meeting to reduce the bill discount rate, loan ratios and credit rates, and deposit rates by ½ of one per cent’.

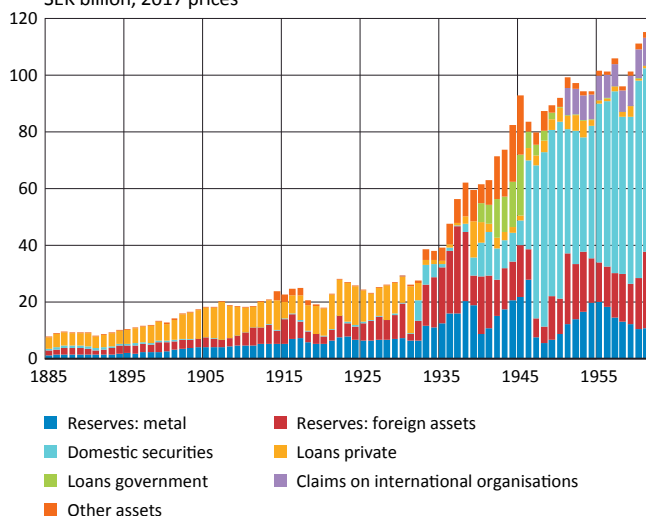
However, problems occasionally arose as regards adherence as the savings banks were not always willing to cut their deposit rates. When this happened, it also led to hesitance among commercial banks to reduce their deposit rates, as they had started to compete with savings banks for customers. Saving banks saw it as their mission to promote saving in the country and therefore maintained relatively high deposit rates.

During the period 9 April 1920 to 1 January 1927, the Riksbank did not apply a return discount rate. The return discount rate made a short-lived return between 2 January and 30 April 1928 before being reapplied on a more permanent basis on 1 June 1933. On 6 June 1952, the Riksbank switched to using a flexible return discount rate adapted to the market situation.

2.2 Low interest rate policy

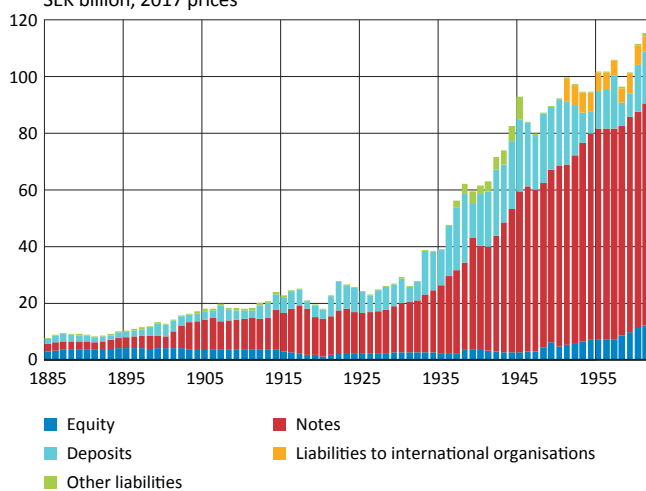
Discount rate policy after the Second World War came to be characterised by a distinctive low interest rate policy, with the discount rate parked on a low level. This principally applied to the long-term interest rate, which was stabilised on a low level via purchases of government securities. The background was that banks had built up their holdings of government bonds during the Second World War. After the end of the war, banks started selling off their bond holdings and instead increase their lending, which exerted upward pressure on interest rates. The Riksbank was then forced to purchase bonds to achieve the goal of stabilising the interest rate on the level that prevailed at the end of the war. Figure 3 clearly shows how the size of the domestic securities balance sheet item increased dramatically from 1946 onwards. The aim of holding interest rates at a low level (below market rates) was to support central government and, above all, housing sector funding. There was also a perception that interest rate policy was not the best weapon against inflation. Instead, fiscal policy and direct regulations were considered more effective and appropriate. The low interest rate policy lasted until October 1954, while the bond purchasing policy lasted until the end of spring 1963.

Figure 3. The Riksbank's assets, 1885–1961
SEK billion, 2017 prices



Source: Sveriges Riksbank

Figure 4. The Riksbank's liabilities and equity, 1885–1961
SEK billion, 2017 prices



Source: Sveriges Riksbank

Periodically, the Riksbank was also forced to sell bonds to prevent a downturn in the long-term interest rate. One example is towards the end of 1945, when expectations of a rate cut spread through the market, putting downward pressure on short-term government securities which the Riksbank did not normally buy and sell. To prevent downward pressure on the long-term interest rate as well, the Riksbank sold significant amounts of longer-term bonds at a fixed interest rate. Sometimes, the Riksbank was put in a very difficult situation due to conflicts of interest, such as in 1947–1948 when a directive from the Committee on Banking and the Riksdag involved keeping the long-term rate at 3 per cent while simultaneously creating a tight credit market. By buying bonds, the Riksbank supplied liquidity which eased the credit market, but this was in direct conflict with the other part of the directive.

During the second half of 1947, the Riksbank began conducting a more differentiated interest rate policy. It concentrated its purchases to more recent issues of long-term loans at a 3-percent interest rate, while allowing more flexible pricing of shorter bonds. But there was no consensus in the General Council of the Riksbank regarding the desirability of more flexible pricing. After much ado, which also led to the Riksbank Governor's resignation, the purchasing policy was redesigned in November 1948. The new design involved consistent

and uniform implementation of the three-percent line throughout the interest rate structure. In 1950, an increase in the level of interest rates had to be accepted in order not to exacerbate the ongoing credit expansion. The level of interest rates for long-term bonds was approaching 3.5 per cent and the discount rate was raised on 1 December 1950 for the first time since February 1945, see Figure 2. Via limited purchasing, the expectations of a continued rise in interest rates were broken.

2.3 The regulatory system

When the Riksbank was unable to use the interest rate weapon, it tightened the economy when necessary by means of voluntary agreements with commercial banks. The crux of these agreements was that the commercial banks were to show restraint in their lending. But it did not always have the desired impact. For example, the discount rate hike of 1950 did not have a credit-tightening effect. Out of necessity, tougher regulations were successively introduced to try to reduce non-priority lending (lending other than to central government and the housing sector). As a result, the monetary policy operational framework was gradually supplemented with a *regulatory system*.¹² A *currency regulation* had already been in place since 1940 which enabled the Riksbank to control the domestic credit market without having to pay too much attention to foreign financial influence. This regulation was a prerequisite for the regulations of the domestic market introduced during the 1950s.

In November 1951, the Riksdag passed an enabling act on the regulation of interest rates, giving the Riksbank the right to determine the interval for banks' lowest and highest interest rates. Banks were thereby obliged by law to give notice of planned interest rate adjustments. According to the new act, companies were furthermore not allowed to issue bond loans without the Riksbank's permission. This act was inspired by the price regulation that applied during the Second World War. An enabling act could enter into force as and when necessary, and the threat of bringing it in empowered the Riksbank to negotiate 'voluntary' agreements with banks.

In 1952, two new monetary policy instruments were introduced as a result of an agreement with banks: *liquidity ratios* and *issuing controls* for commercial banks. The liquidity ratios stipulated the minimum ratio between the banks' liquid assets (cash plus government and housing bonds) and their deposits and other commitments. The agreement imposed higher demands on liquidity than the previous provisions laid down in the Cash Reserves Act, which was abolished. By increasing the liquidity ratio, the Riksbank could force commercial banks to buy more bonds, thereby simultaneously keeping bond rates down and restricting the scope for new loans. This was supplemented with issuing controls, according to which the Riksbank's permission was required before a company was allowed issue bonds or other securities to fund its operations. Issuing controls had two main functions. Firstly, they regulated the rate of interest and other issuing conditions, and secondly they satisfied the government's priority requirements regarding, for example, housing finance and central government borrowing. Both these regulations – liquidity ratios and issuing controls – made it possible to continue with the low interest rate policy for a few more years. The regulatory system survived in a variety of forms up until 1985.

2.4 More flexible rate-setting

At the beginning of the 1950s, the Riksbank implemented certain changes with regard to rate-setting on the money market. In June 1952, for example, the Riksbank abolished the fixed discount rate for re-discounting. The return discount rate would instead be adjusted according to the market situation and the Riksbank's current monetary policy objectives. This measure can be seen as part of the Riksbank's endeavour to create some flexibility in

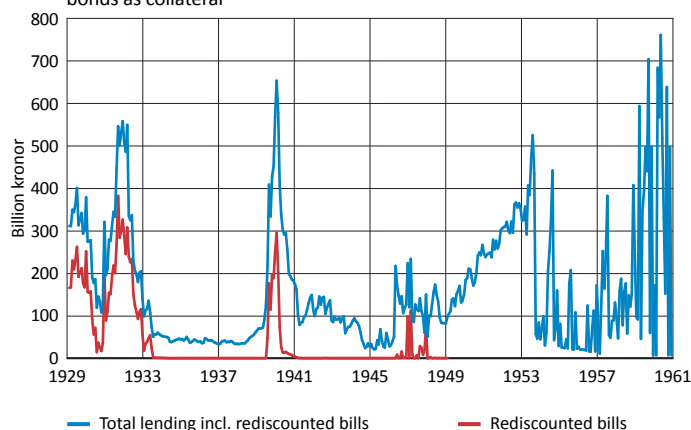
¹² See Larsson and Söderberg (2017) for a historical overview of the regulatory system.

the money market. In connection with the cut in the discount rate in November 1953, the Riksbank also set out the principle that the discount rate would be linked to the money market and only indirectly affect longer-term interest rates on the capital market. This was part of the Riksbank's attempt to divide the market into a money market and a capital market, on which the short-term interest rate could be more flexible while the long-term rate was kept more constant.

The low interest rate policy lasted until October 1954 when the National Debt Office, in consultation with the Riksbank, issued a 16-year government bond loan at an interest rate of 4 per cent to tighten the money and capital markets. They did this after a loan with an interest rate of 3.5 per cent in October proved to be inadequate in order to sufficiently tighten the market. The Riksbank clarified that it was not striving for a similar rate rise across the board, but wanted to promote competition and a partitioning of different loan types into various groups of credit institutions with differentiated and flexible interest rates. At the same time, the Riksbank stopped listing lending rates other than the discount rate, making it possible to freely set lending rates against collateral to credit institutions. No bills were re-discounted during this period. Instead, credit institutions borrowed from the Riksbank with bonds as collateral, see Figure 5. Banks no longer saw it as common practice to create funds where necessary by re-discounting bills but preferred to generate funding by pledging bonds or treasury bills at the Riksbank in the event of emergency liquidity needs.

Figure 5. The Riksbank's loans and approved credit at the end of every month, 1929–1961

Total lending excluding re-discounted bills consists mainly of loans with bonds as collateral



Source: Sveriges Riksbank year-book

The tightening in April 1955 provides another example of how the Riksbank and the National Debt Office cooperated at the time to increase the interest rate on both the money market and the capital market. The Riksbank raised the discount rate from 2.75 to 3.75 per cent while the National Debt Office issued a 24-year loan at 4.5 per cent in order to directly influence the bond rate. To generate more funding from the general public, the National Debt Office also issued two premium bond loans during the first half of 1955. The same type of coordination was apparent when the discount rate was raised by 0.25 per cent in November 1956. The Riksbank itself also intervened directly on the bond market on a few occasions in order to regulate rates even though the era of low interest rate policy was over. During the first quarter of 1957, there was selling pressure on the bond market and the Riksbank took action by purchasing bonds. Instead, a period of rising bond rates began in January 1958, lasting until August that same year. During the year's first quarter, the Riksbank sold bonds from its portfolio to stabilise the interest rate at a suitable level.

On 10 July 1957, the Riksbank increased the discount rate by one percentage point, from 4 to 5 per cent, which aroused considerable attention, as the General Council of the Riksbank had deviated from common practice by not notifying the Government in advance. Indeed, Riksbank Governor Per Åsbrink and the General Council saw a rate rise as absolutely necessary and did not want to risk the Government saying no. This ‘interest rate coup’ led to a political crisis. The majority of the Committee on Banking did not consider the situation to be so serious as to expunge the scope for consultation with the government. General Council Chairman Per Eckerberg, whom the government viewed as the natural contact person between the Government and the Riksbank, was forced to resign.

2.5 Summary

In this section we have seen how the Riksbank’s discount rate originally referred to the rate at which banks could re-discount bills at the Riksbank. But when banks no longer re-discounted bills, the discount rate became a more general policy rate and in the latter stages of the period primarily focused on controlling interest rate levels on the money market. When it was desirable to influence the level of interest rates on the capital market, the Riksbank cooperated with the National Debt Office.

3 The penalty interest rate system, 1961–1985

There was some tendency in the spring of 1961 for banks to start viewing loans from the Riksbank at the discount rate as a normal form of funding rather than a monetary policy instrument. In order to clarify that loans from the Riksbank should only be considered a temporary way of managing short-term liquidity problems, the General Council decided in May 1961 to introduce a higher interest rate – a *penalty rate* – on the portion of banks’ loans at the Riksbank that exceeded a certain amount.

To begin with, the penalty rate in the new monetary policy operational framework was set at the discount rate plus 4 percentage points. But the idea was that the penalty rate could be changed as and when necessary. But at the first signs of a new recession, the Riksbank stopped applying the penalty rate in January 1962. It was reintroduced during the next boom in February 1964 with reference to expansionary economic developments and continued extensive bank lending despite a discount rate hike in January. Beginning on 15 December 1967, the penalty rate was set as equal to the discount rate plus a couple of percentage points, see Figure 6.

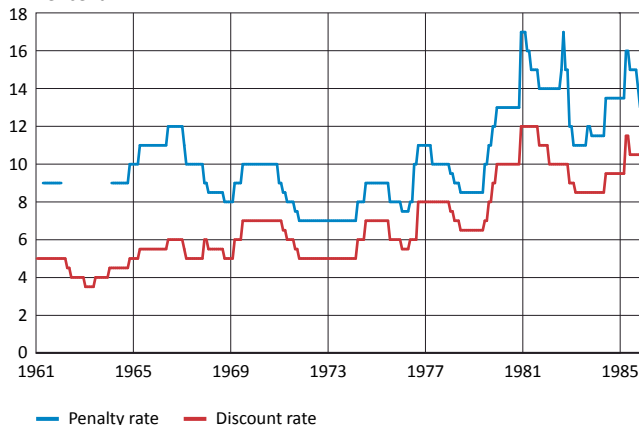
To explain in a little more detail how the penalty rate system worked, we can use the stylised illustration in Figure 7. The figure illustrates that a bank was entitled to borrow an amount equal to a certain percentage of its equity at the discount rate, r_2 . But for loan amounts above this, the bank was obliged to pay a penalty interest rate, r_3 . A bank with surplus liquidity could deposit these funds in an account at the National Debt Office at the deposit rate r_1 .

A bank had to ensure that it had sufficient liquidity every day in order to fulfil the Riksbank’s *reserve requirement*. In Figure 7, R represents the sum of all banks’ reserve requirements. The reserve requirement that applied each time specified the amount a bank was obliged to hold in a current account at the Riksbank. If a bank’s reserve funds looked like they would be less than the reserve requirement, the bank had to borrow from another bank on the overnight market to cover the need. If funds at the end of the day were nevertheless below the reserve requirement, the bank was obliged to borrow from the Riksbank. Depending on the level of the reserve requirement chosen by the Riksbank, banks were allowed to borrow at the discount rate or at the higher penalty rate.

Typically, banks were a long way into the penalty rate zone for long periods, which corresponds to the demand curve R' in Figure 7. All banks were borrowing from the Riksbank

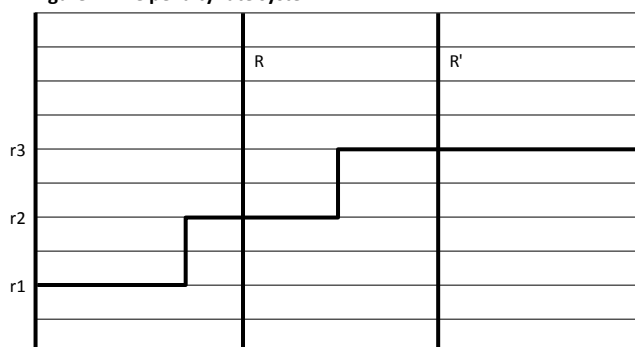
at that time and the overnight market was inactive. But when a bank had money to lend, it did so on the interbank market at approximately the penalty interest rate. When credit policy needed to be tightened, the Riksbank could ensure that banks fell within the penalty rate zone by setting the reserve requirements sufficiently high or by lowering the amount limit for when the penalty rate was to apply.

Figure 6. The Riksbank's discount rate and penalty rate, 1961–1985
Per cent



Source: Sveriges Riksbank

Figure 7. The penalty rate system



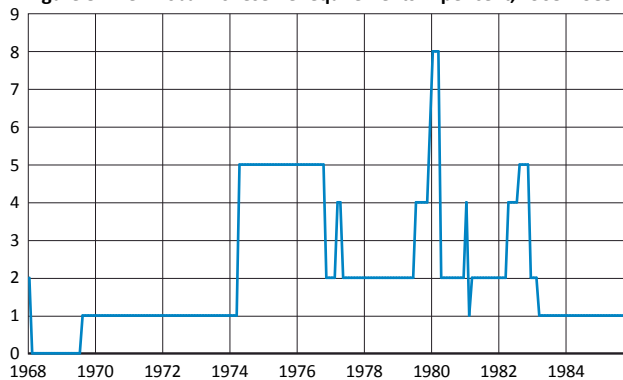
Note. R and R' is the banks' demand for reserves/total reserve requirements, r1 is a deposit rate, r2 is the Riksbank's discount rate, and r3 is the penalty rate. See the description in the main text.
Source: Sveriges Riksbank

3.1 Reserve requirements

From 1969 onwards, reserve requirements constituted an important component in the penalty rate system. At the request of the General Council, the Government decreed on *cash ratios* for banks in accordance with the 1962 Act Concerning Liquidity and Cash Ratios. The Riksbank then issued regulations on how to apply the ratios that were to come into force on 2 January 1968. These regulations stipulated that the five largest banks were to hold at least 2 per cent and other banks at least 1 per cent of their deposits from the general public in a non-interest-bearing current account at the Riksbank. The decree on cash ratios was revoked just one month later, in February 1968, but later reintroduced on 18 July 1969. As from August 1969, every commercial bank was, according to the Riksbank regulations, to hold an amount in their current account at the Riksbank equal to 1 per cent at the end of the day, see Figure 8. To further incentivise banks to fulfil the cash ratios, they were allowed to earn interest from May 1970 until the end of the year on the amount in their current account at the Riksbank that corresponded to the cash ratio. The interest rate was set at the discount rate and was to be disbursed after the end of the year.

The cash ratios were increased from 1 to 5 per cent on 2 April 1974 to reduce banks' high level of cash liquidity and thereby exert greater pressure on them to limit their lending. From the autumn of 1970 and by the end of 1971, the Riksbank had acquired relatively large amounts of Swedish bonds and treasury bills. The subsequent easing in the liquidity situation led to the banks completely phasing out their borrowing from the Riksbank at the end of 1971 and only having to borrow small amounts temporarily during 1972–1973, see Figure 9. The banks' liquidity position in relation to the Riksbank largely corresponded to the funds that were in their current accounts to fulfil the reserve ratio requirements. When liquidity was withdrawn at the beginning of 1974, banks that previously did not need to borrow from the Riksbank were now forced to do so at an amount that exceeded the limit for the penalty interest rate. The measure was intended to reduce the gap between the lower interest rate level in Sweden and the higher level abroad. Figure 9 shows how the net positions of commercial banks in relation to the Riksbank changed at a stroke in 1974. The short-term interest rates on the money market rose sharply. The Riksbank now tried to keep bank borrowing at the Riksbank on a level that was within or close to the penalty rate zone. In this way, the interest rate on the short-term market could be maintained at the intended level.

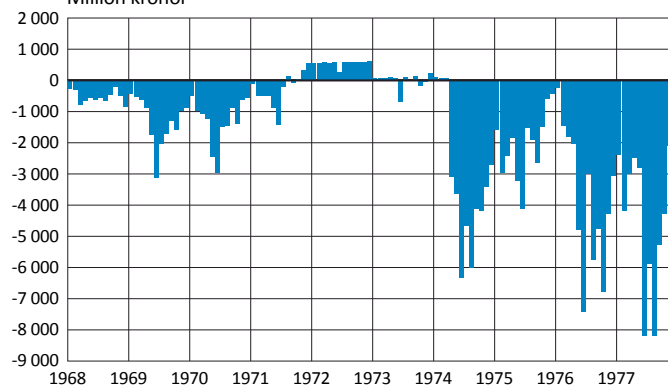
Figure 8. The Riksbank's reserve requirements in per cent, 1968–1985



Source: Sveriges Riksbank

Figure 9. Commercial bank net positions in relation to the Riksbank, 1962–1977

Million kronor



Note. The net position during one month has been calculated as the mean of the differences on the four reporting days of the month between commercial banks' credit balances in their current accounts at the Riksbank and their debt to the Riksbank for loans taken. The current account credit balances do not include funds kept in the account in accordance with provisions laid down in the Cash Ratios Act.

Source: Sveriges Riksbank

Changes in banks' reserve requirements could have a major impact on short-term interest rates if the Riksbank allowed this to happen. An example of this is when the Riksbank

reduced the reserve requirements from 5 to 2 per cent in 1975, which released SEK 3,000 million tied up in banks' current accounts at the Riksbank. This was one of the reasons why the overnight rate fell to a one-year low of 3.5 per cent in mid-November. On other occasions, lower reserve requirements have not been allowed to impact short-term rates, for example on 14 April 1980 when they were cut from 8 to 2 per cent. In conjunction with this reduction, the National Debt Office issued two government bond loans to absorb the increased liquidity. When short-term interest rates on special deposits and bank certificates fell slightly in May, the National Debt Office counteracted this by issuing treasury bills at an elevated discount rate at the beginning of June.

During the summer and autumn of 1979, international interest rates were raised to counteract ever-stronger inflationary tendencies. This was due to the readjustment of monetary policy initiated by the Federal Reserve in October 1979 and resulting in high interest rates to which other OECD countries were also obliged to adapt. In connection with this, Swedish interest rates also needed to be adjusted upwards to counteract currency flows that were attracted to countries with higher interest rates. The Riksbank's discount rate was increased on three occasions – 5 July, 27 September and 23 November – from 6.5 to 9 per cent and the reserve requirements were raised from 2 to 8 per cent, their highest ever level according to Figure 8.

The outflow of currency that began towards the end of 1980 increased sharply in strength in January 1981 when expectations of an imminent devaluation grew ever stronger. At that point, the Riksbank General Council decided on 20 January to raise the Riksbank discount rate from 10 to 12 per cent. To achieve a more substantial increase in interest rates on the money market (special deposits, bank certificates, etc.), the penalty rate was also raised from 13 to 17 per cent, see Figure 6. To increase the impact of the penalty rate, the reserve requirements for commercial banks were also raised from 2 to 4 per cent, increasing the banks' need to borrow from the Riksbank. At the request of the General Council, the Government also decreed on reserve requirements for saving banks and cooperative banks, which were now to hold funds equal to 1 per cent of commitments in current accounts at the Riksbank as from 26 January 1981.

3.2 Control of bank deposit and lending rates

In conjunction with each change in the discount rate, the Riksbank expressed how it wanted banks to adjust their rates. Banks then discussed in the so-called interest rate syndicate (part of the Swedish Bankers' Association) and agreed on proposals for new interest rates, which they presented to the Riksbank the following day. The Riksbank then approved the banks' proposal, possibly after making an adjustment. This is a pattern revealed by Jonung (1993) in a review of minutes taken at regular meetings between banks and the Riksbank during the period 1956–1973. In light of this, it is not particularly surprising that the deposit rates announced by the banks were very much in line with the changes in the discount rate. Even banks' variable lending rates largely adhered to the changes in the discount rate. In 1970, the Riksbank introduced semi-annual analyses of bank lending rates, in which a certain upward drift over the years could be noted. To limit this drift in interest rates, the Riksbank reached agreement with banks at the beginning of 1974 on a maximum permitted increase in average interest rates.¹³

The fixed lending rates for secured loans, local authority loans, industrial loans, etc., followed the variations in issuing rates for corresponding bond loans. As a result of its issuing control instrument, the Riksbank had plenty of opportunities to influence the banks' fixed lending rates.

¹³ The interest rate drift is calculated as the difference, over and above the discount rate rise, in the average interest rate on all variable-rate loans according to the Riksbank's interest rate analysis adjusted for changes in fees.

3.3 Control of money market rates

From the mid-1960s, a growing proportion of credit institution deposits consisted of deposits from professional investors in, for example, large companies, local authorities, insurance companies and foundations. These investors were constantly on the look-out for profitable investments for temporary liquidity surpluses and banks were forced to compete for these funds in an entirely different way to how they competed for slow-moving household deposits. From the beginning, these deposits took the form of 'special deposits', i.e. deposits of large amounts on special terms. In March 1980, *bank certificates* were introduced on the Swedish money market, providing an additional funding option.

Money market rates were of strategic importance for currency flows. Control of short-term money market rates – special deposit rates and rates on bank certificates – was mostly implemented by making changes to the penalty rate. The penalty rate was therefore used in situations when the Swedish krona was under pressure. One example of this is when currency turbulence broke out in the late summer and autumn of 1976 and the General Council's first action was to raise the penalty rate by 2 percentage points. The aim was to counteract the outflow of short-term capital abroad.

The Riksbank's typical reaction to the outflow of currency linked to expectations of an imminent devaluation was as follows. As an initial measure, it raised the discount rate. To achieve a more substantial increase in interest rates on the money market (special deposits, bank certificates, etc.), this was supplemented by a penalty rate hike. To reinforce the impact of the penalty rate, the Riksbank could also raise the reserve requirements for commercial banks, increasing their need to borrow from the Riksbank. From 1982 onwards, a pattern developed whereby the Riksbank's discount rate was adjusted to longer-term trends in international interest rates and the domestic economic situation while the penalty rate and amended reserve requirements were used for short-term adjustments of the interest rates on the money market as dictated by the currency situation.

During the first half of the 1980s, there was a tendency for central banks to use market operations to a greater extent in order to control interest rates. It seems that the Riksbank has also been influenced by this. In January 1985, the Riksbank sold off large volumes of treasury bills to push up interest rates on the money market by as much as 2 percentage points. The intervention on the money market, which was also supplemented by sales of US dollars, was justified by a continuing and accelerating outflow of currency. However, the Riksbank's discount rate and penalty rate were left unchanged, something commented on by the Riksbank Governor in an interview in Svenska Dagbladet on 23 January 1985:

'Will the discount rate and penalty rate now be changed? – No. We concern ourselves less and less often with administratively set interest rates. Instead we use the interest rate weapon via market operations, a strategy we think is very successful'.

3.4 Control of interest rates with longer maturities

The issuing control exercised by the Riksbank since the early 1950s continued to be an important instrument for controlling longer-term interest rates during the penalty rate system era. The Riksbank cut the discount rate four times in 1971, by half a percentage point each time, from 7 to 5 per cent. To create a better balance between long-term and short-term interest rates, the fixed rate on bond loans and other long-term loans was only cut by a quarter of one percentage point during the same period. Long-term interest rates did not always need to follow short-term rates. On 22 August 1975, for example, the Riksbank cut the discount rate from 7 to 6 per cent while fixed rates on long-term loans and interest terms for bond issues were kept unchanged to increase the availability of credit on the domestic capital market. Thanks to the favourable development of the current account and the krona's stability after the devaluation in August 1977, the Riksbank had scope to cut the discount rate in 1978. This was done on three occasions by 1.5 percentage points in total, from 8

to 6.5 per cent. Long-term interest rates were maintained, however, in order to stimulate investment on the capital market and hence facilitate the long-term borrowing of central government and other borrowers.

From 1980 onwards, interest rate setting on the capital market was increasingly determined by the market, with the exception of priority central government and housing loans. On 10 April, the Riksbank General Council requested the Government to issue a decree *on general investment obligations and the regulation of interest rates*. The General Council considered that a formal application of interest rate regulation was preferable to the informal interest rate regulation applied during the 1970s. The Government granted the General Council's request and pursuant to the decree, the General Council issued regulations on how interest rate regulation should be applied. The maximum interest rates allowed were stipulated for different categories of priority loans. However, the interest rate regulation provided scope for a significant upward adjustment of interest rates on non-priority loans. The intention was to achieve greater differentiation of the interest rate structure in the non-priority sector (i.e. not the housing sector and central government). Market participants were to take responsibility for adjusting the interest rates for the business sector's bond and debenture loans, taking into account the market situation, borrowers' credit rating, the loan's maturity and amortisation rate, etc. The aim was to increase the scope of the business sector to compete for capital market resources and create a better balance with interest rates on foreign borrowing. With this freedom in place, interest rates rose significantly on the non-priority section of the capital market. In August, the General Council also decided to allow a hike in the long-term rates for priority bonds of 1 percentage point. At the end of June 1980, the scope of the Act on credit policy funding was broadened so that the decree on issuing control and lending regulation could also be issued for financial companies, which up until then had been outside the Riksbank's control. For insurance companies, the interest rate regulation was abolished as from the beginning of 1982 and in October 1983, central government also started to issue bond loans at the market rate, known as treasury notes.

3.5 Deregulation of the credit market

Ever since the second half of the 1970s, liquidity growth in the economy had been very substantial and its primary breeding ground was in the constantly growing budget deficit. From 1978 until the end of June 1982, when the treasury bill was introduced, most of the budget deficit was financed through borrowings in the banking system and abroad. During the autumn of 1983, treasury notes were introduced and in December the Riksdag took a decision on public savings programmes, which would directly facilitate borrowing from households. These new savings forms made it easier to avoid the budget deficit liquidising the banking system and led banks to increase their lending.

From the mid-1970s onwards, the Riksbank used liquidity requirements and guidelines for the lending that can be approved in order to control bank lending. The Riksbank used liquidity requirements to limit banks' lending that was not funded abroad, that is, lending other than priority construction credits. The practice was that the Riksbank would normally stipulate guidelines for lending growth and then set liquidity requirements so that they were compatible with the stipulated growth. This control method was applied until September 1983 when the Riksbank decided to abolish the liquidity requirements and control lending solely on the basis of a *lending recommendation* with a maximum lending cap for banks' other lending in Swedish kronor.

The main justification for the Riksbank deciding to abolish the liquidity requirement was the unreasonable situation that this had led to for banks. On the one hand, banks would help central government to sell new government securities, such as treasury bills and treasury notes, aimed at the general public but on the other, they were obliged to compete for the same liquid funds from the general public in order to fulfil the liquidity requirements. At the

same time as the Act on finance companies entered into force in 1980, finance companies also became subject to the credit policy legislation. Pursuant to this legislation, the lending of financial companies was also regulated in the same way as banks' lending.

The Riksbank had been aware for some time that external preconditions had gradually limited the scope for conducting an effective credit policy with support from direct regulations. To maintain effectiveness, the dose of measures must be gradually increased both in terms of number and size. As a result, long-term, uninterrupted use of the lending regulation had an increasingly distorted effect on the credit market. For this reason, some regulations were relaxed while others were totally abolished at the beginning of the 1980s. For example, the liquidity ratios for banks were abolished in 1983. The issuing control was also gradually relaxed, as were the investment requirements for insurance companies and the general pension fund, creating the preconditions for the emergence of a secondary market in government and housing bonds. In May 1985, regulation of banks' lending rates was abolished.

3.6 Summary

In this section, we have seen how the combination of the penalty interest rate and reserve requirements could be used by the Riksbank to rapidly tighten the liquidity situation on the money market and thereby control currency flows when it was considered necessary. We also saw how a large number of regulations were used to control several different interest rates and bank lending up until the deregulation of the credit market during the first half of the 1980s.

4 The interest rate scale, 1985–1994

On 21 November 1985, the Riksbank decided to implement a few comprehensive changes. The measures taken were a technical readjustment and not aimed at either tightening or easing monetary policy. For example, it was decided to immediately abolish the lending cap for banks, mortgage institutions and financial companies. To counteract the risk that this would lead to excessively rapid credit expansion, the reserve requirements were simultaneously increased from 1 to 3 per cent and interest compensation for cash funds was discontinued. To be able to adjust short-term interest rates to changes on the money and foreign exchange markets more quickly, the penalty rate system was replaced by an *interest rate scale* for bank borrowing at the Riksbank with effect from 9 December 1985. The right to borrow from the Riksbank at a fixed interest rate without any amount restrictions had been considered problematic. There was therefore a desire to have a system in which market operations could change the prevailing interest rate in smaller steps.

In the new interest rate scale system, banks could borrow an amount equal to a maximum of 25 per cent of their equity overnight at an interest rate of 10.5 per cent. Interest cost increased stepwise for larger amounts in accordance with the following scale:

- 25–75% of equity: 12.5%
- 75–125% of equity: 14.5%
- 125–175% of equity: 16.5%
- over 175% of equity: 18.5%

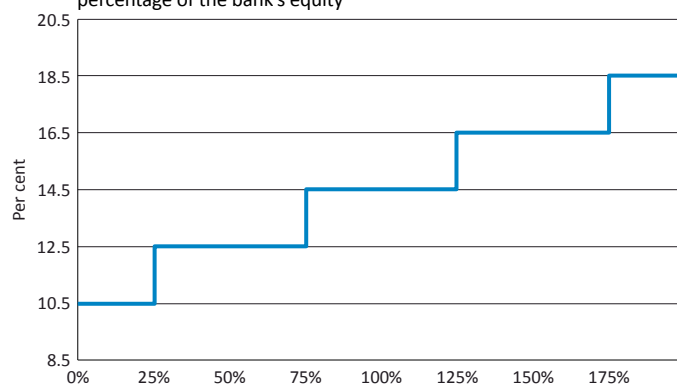
The interest rate scale is illustrated in Figure 10. A specific interest rate scale applied to each individual bank, in which each step was established in relation to the individual bank's equity. This construction meant that costs for bank borrowing at the Riksbank rose when the borrowing volume increased. The Riksbank controlled liquidity in the banking system by buying and selling securities, primarily in the form of repo transactions, so that banks could borrow on a specific step of the interest rate scale at the marginal rate. In other words, the

interest rate scale specified the various marginal rate levels that the Riksbank could apply by controlling liquidity in the banking system.

The Riksbank implemented its market operations either by buying and selling treasury bills or via repos and reverse repos.¹⁴ Initially, the maturities of the repos were normally one or two days, but were sometimes extended to one week. All dealers in securities could be counterparties in these transactions. The Riksbank announced a desired total volume and the counterparties submitted offers for interest rate and volume. These offers were ranked based on interest rate, and allocation began from the highest bidder and then went downwards until the announced volume had been achieved. In some cases, the Riksbank also used volume bids at a fixed repo rate. By implementing these types of operations on the open market, the Riksbank was able to directly influence the interest rate on banks' short-term loan transactions on the interbank market.

Figure 10. The interest rate scale

The borrowing rate at the Riksbank when borrowing a certain percentage of the bank's equity



Source: Sveriges Riksbank

The interest rate scale's bank-specific construction made it beneficial for banks to even out relative differences in borrowing needs on the interbank market at the overnight rate. The bank with the worse liquidity would otherwise have been forced to borrow from the Riksbank at a higher marginal rate. The final result was normally that all banks borrowed at the same marginal rate at the end of the day. However, it was of the utmost importance to the Riksbank that there was an impact on money market rates at 3 and 6 months maturity, as these rates were the most significant for the currency flows that the Riksbank wished to influence.¹⁵ The strategically important rate for six-month treasury bills follows the marginal rate quite well during the period January 1987–May 1994 in Figure 11.

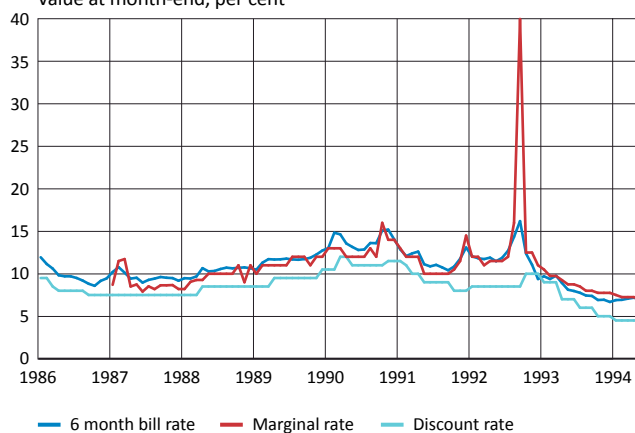
To be able to implement market operations in the form of repos or reverse repos that placed the banking system on a certain desired step of the scale, the Riksbank was forced to make daily forecasts of the banking system's borrowing requirements at the Riksbank. This involved forecasting changes in factors that affected the banking system's borrowing requirements: currency flows, central government borrowing requirements, the National Debt Office's borrowing on the market, special accounts at the Riksbank and the demand for banknotes and coins. In the event of major deviations between the Riksbank's forecasts and the banking system's actual borrowing, the Riksbank could quickly adjust liquidity in the banking system either by supplying liquidity or draining the banking system of it via a market participant.

¹⁴ A repo (short for 'repurchase agreement') involves the Riksbank buying securities on the market with agreements on repurchasing at a later date.

¹⁵ See Westman Mårtensson 1992, p. 25.

If the Riksbank wished to bring about a significant change in the marginal interest rate, it made direct purchases or sales of government securities at times when the Swedish krona had come under strong pressure. By establishing the interest rate scale, the General Council had to some extent delegated the daily decisions on the marginal rate to the Riksbank Governor, allowing the Riksbank to react rapidly to market developments and adjust the interest rate level. A certain amount of automation had also been introduced in that currency flows affected liquidity in the banking system and hence banks' borrowing requirements at the Riksbank and the interest rate level via the interest rate scale, as long as the Riksbank did not counter with a market operation. The Riksbank also implemented market operations in the form of interventions on the money market in order to directly influence the interest rates for treasury bills.

Figure 11. Marginal rate and six-month treasury bill rate
Value at month-end, per cent



Sources: Sveriges Riksbank and Thomson Reuters

Periodically, the Riksbank's signals became unclear when it relied on market operations to influence money market rates, instead of explicitly determining a certain interest rate level. An example of this was reported in Svenska Dagbladet on 5 December 1989:

'An increasing number of dealers on the market are wondering about the Riksbank's tightened monetary policy. The interest rate for six-month treasury bills has been allowed to rise to 12.87 (selling rate). Throughout the spring and summer, the Riksbank has previously held this strategically important interest rate below twelve per cent'. '... There is some irritation aimed at the Riksbank, which is regarded as giving contradictory signals as to where interest rates should be'.

A review at the Riksbank of the period 1 June 1986 to 30 April 1987 compared to the penalty rate period 1 January 1983 to 8 December 1985 showed that the overnight rate had become significantly more variable after the Riksbank had introduced the interest rate scale. On the other hand, variability in interest rates with longer maturities had either decreased or stayed the same, see Koivisto and Zettergren (1988). As variability had decreased the most for slightly longer treasury bill interest rates, which were the Riksbank's primary target variable as they influenced short-term currency flows, the conclusion was that the Riksbank had increased its control over the target variable. According to Hörngren (1994, p. 52), the overnight rate became more stable after the Riksbank switched to always specifying the applicable marginal rate level from 6 April onwards. From 13 May 1993, changes in the marginal rate were announced in direct conjunction with the interest rate decision.¹⁶

¹⁶ See press release 18/1993 of 13 May 1993: 'The marginal rate is being cut to 9.00 per cent'.

In April 1988, the Riksbank was forced to tighten the economy. It raised the reserve requirements from 3 to 4 per cent, introduced a 4-percent reserve requirement for financial companies, increased the discount rate from 7.5 to 8.5 per cent and sold large volumes of treasury bills to bring up short-term market rates. In the autumn of 1988, banks were in dire need of being able to borrow from the Riksbank, due both to the increased reserve requirements and to the surplus in the government budget. According to its own assessment, the Riksbank would have withheld far too large volumes of securities from the market if it had continued to only use repos to prevent banks from being high up on the interest rate scale. In this situation, the Riksbank therefore supplemented its repo operations with direct loans to banks without collateral. By not demanding collateral for the loans, the Riksbank avoided withholding government and mortgage securities from the market. Technically, the direct loans worked in the same way as repos with sales being subject to bids, but the maturity period was longer. During the first half of 1991, the requirement for collateral when lending to banks was reintroduced.

4.1 Reduced role for reserve requirements and the discount rate

The reserve requirement did not play as active a role in the new system as in the penalty rate system. From the beginning, the requirement was set at 3 per cent, which meant that reserve requirement funds amounted to rather modest amounts. The reserve requirement for one month was calculated based on a bank's average deposits two months earlier. This resulted in a change in a bank's deposits affecting its borrowing from the Riksbank with a two-month time lag.

As from 1 July 1988, reserve requirements for financial companies were introduced and the reserve requirement for banks was simultaneously increased from 3 to 4 per cent. The reserve requirement for financial companies was calculated based on their borrowing in both Swedish and foreign currency. The reserve requirements were gradually relaxed over the next few years. In November 1990, the Riksbank decided that reserve requirements would no longer apply for deposits from banks and financial companies. The Riksbank then halved the reserve requirements for banks from 4 to 2 per cent in 1991 and abolished them for finance companies, which bolstered liquidity in the banking system by SEK 12 billion. At the same time, the interest rate scale was adjusted so that the interest rate level for the bank borrowing at the Riksbank was maintained. By 1 April 1994, the role of reserve requirements had run its course and they were reduced to zero. The reason was that other policy instruments were more flexible and did not create the same competitive disadvantages for banks that reserve requirements do.¹⁷

Initially, the lowest step on the scale was equal to the discount rate. But from January 1986 onwards, the role of the Riksbank's discount rate waned. In January, the Riksbank cut the discount rate without changing the applicable interest rate scale. As a result, the discount rate was for the first time completely decoupled from the applicable terms for bank borrowing at the Riksbank. The Riksbank then changed the discount rate as a signal that, in its view, a new interest rate level had been established on the market and this level was expected to continue for some time. The discount rate's controlling effect on interest rates thereby decreased and it came to serve mostly as a guide to banks when setting the interest rate on their deposit accounts and to a lesser extent their lending rates to households. Banks continued to adjust these rates for a while when the Riksbank's discount rate changed despite the abolished regulation of banks' lending rates. From the second quarter of 1992 onwards, the Riksbank began to mechanically set the discount rate entirely on the basis of interest rate developments during the immediately preceding quarter. The discount rate

¹⁷ See Lotsberg 1994.

thereby became a reference rate, entirely decoupled from monetary policy. On 1 July 2002, the discount rate was replaced by the Riksbank's reference rate.¹⁸

4.2 Adjustments of the interest rate scale

The Riksbank implemented an important change to the interest rate scale on 1 June 1986. The basis for lending terms initially comprised the borrowing bank's equity. But a weakness of this measure was that it could be influenced by the bank's year-end accounting strategy. The Riksbank therefore decided to change the capital base from taxed equity to taxed equity plus 50 per cent of the revaluation accounts. The Riksbank also decided to lower the steps in the interest rate scale, as it would otherwise have required huge market operations to prevent bank borrowing rates at the Riksbank being pushed up far above the prevailing interest level. The new interest rate scale was designed as follows:

- loans up to 20% of the new capital base 8%
- loans at 20–40% of the new capital base 10%
- loans at 40–60% of the new capital base 12%
- loans at 60–80% of the new capital base 14%
- loans over 80% of the new capital base 16%

The new interest rate scale actually involved a deepening of the steps in the scale. In the event of maximum borrowing by all banks, each step now corresponded to SEK 6 billion, compared with SEK 5 billion previously, apart from the first step which previously corresponded to SEK 2.5 billion. Deeper steps reduced the likelihood of unforeseen fluctuations in the banking system's liquidity affecting the interest rate level. The Riksbank adjusted the depth of the steps in the interest rate scale once a year taking into account banks' changed capital bases.

On 1 February 1988, the Riksbank once again adjusted the interest rate scale to improve the functioning of the overnight market. The number of steps was increased and their height was lowered from 2 to 1 percentage point while their depth was halved from about SEK 7.3 billion to SEK 3.7 billion. More steps with less height gave the Riksbank better scope to fine-tune the marginal rate and led to softer control of short-term market rates. From 1 March 1990, a step-depth of SEK 3.5 billion applied in a scale in which the lowest step was 9 per cent and the highest was 20 per cent. An upper limit was determined for bank borrowing in the interest rate scale. For borrowing above this limit, the Riksbank reserved the right to apply a higher borrowing rate. The idea was that this could allow flexibility in rate-setting and cope with serious speculation against the krona. In April 1991, the interest rate scale was adjusted so that banks could also deposit funds at a gradually lower rate. Later adjustments to the scale resulted in further lowering of the steps, firstly to 0.5 of a percentage point on 1 September 1991 and finally to 0.25 of a percentage point in April 1993.

4.3 The Riksbank changed its circle of counterparties

Until 30 June 1991, the Riksbank used National Debt Office dealers to implement its market operations on the money market. A trial period of six months then began for institutions that had expressed an interest in being counterparties, known as *primary dealers*, to the Riksbank. In January 1992, the Riksbank entered into primary dealer agreements with four banks and four securities institutions that were adjudged to fulfil the requirements.¹⁹

¹⁸ The reference rate is an interest rate that is determined by the Riksbank once every six months. The rate can be changed on 1 January and 1 July. The reference rate corresponds to the Riksbank's repo rate at the end of the previous six-month period, rounded up to the nearest half-percentage point if necessary. The reference rate serves no monetary policy purpose but is used in some private agreements and in the Interest Act with reference to interest on overdue payments.

¹⁹ See Bergqvist and Westman Mårtensson (1992). The four banks were JP Bank, Skandinaviska Enskilda Banken, Sparbankernas Bank and Svenska Handelsbanken. The four securities institutions consisted of the brokerage firms Consensus, Transferator, United Securities and E. Öhman.

More primary dealers were approved later in the year. The Riksbank saw several benefits of having its own system of counterparties. Above all, there was a need for clearer ground rules between the Riksbank and these counterparties, which, in the Riksbank's view, would contribute to greater liquidity and better transparency on the market. With direct agreements, the Riksbank could impose demands on primary dealers to be active in both the Riksbank's market operations and in the primary and secondary market for government securities. The latter was considered to be of importance to enable monetary policy to have a rapid impact.²⁰

To increase competition and efficiency on the Swedish money market, the Riksbank also decided on 20 December 1990 to allow foreign bank branches to borrow in accordance with the interest rate scale. One problem was, however, how to determine the borrowing base for such branches. This was solved by a branch formed as a result of the conversion of a foreign subsidiary bank being allowed to retain the subsidiary bank's borrowing base while a branch established alongside a subsidiary bank was given a joint borrowing base with the subsidiary bank. A newly formed branch was temporarily given a standard borrowing base of SEK 60 billion.

4.4 Currency turbulence and interventions

At the end of March 1989, a rumour began circulating about an imminent revaluation of the Swedish krona, leading to extensive currency inflows. The reported inflow for the month of April was SEK 6 billion, but the actual inflow was SEK 18 billion. Through forward transactions of SEK 12 billion, however, the Riksbank could avoid increasing the foreign exchange reserves by the actual amount. Forward transactions were used like this to counteract self-reinforcing expectations of a forthcoming change in the exchange rate generated by the currency flows. On 1 June, the Riksbank decided to phase out currency regulation as from the end of June, which caused the currency flows to pick up again. But the inflows did not have any appreciable impact on Swedish interest rate levels.

When doubts about the Riksbank's ability to maintain the fixed exchange rate refused to go away, the Riksbank drastically increased the marginal rate in October 1990 from 12 to 17 per cent in less than a week. Furthermore, it implemented interventions on the money market by selling treasury bills. The interventions were so extensive that the Riksbank was forced to requisition treasury bills from the National Debt Office to a value of SEK 34 billion. This turned the tide and resulted in large currency inflows in late-October. When the Riksdag in December decided that Sweden should seek membership of the European Union, the prerequisites from foreign exchange policy changed. Confidence in the fixed exchange rate increased and in May 1991, the krona was pegged to the European Currency Unit, the ecu. But a new wave of distrust in the Swedish krona occurred after the Finnish mark had been devalued on 14 November 1991. The Riksbank was once again forced to drastically increase the marginal rate by 6 percentage points to 17.5 per cent and to intervene on the money market. This time, treasury bills to an amount of SEK 119.1 billion were requisitioned from the National Debt Office.

However, interest rates in 1991 did not come close to those that the Riksbank was forced to adopt in order to defend the fixed exchange rate in September 1992. On 8 September, the marginal rate was raised from 16 to 24 per cent, after the Finnish mark had been allowed to float freely. On 10 September, the marginal rate was increased to 75 per cent and on the 16 September to 500 per cent! This arrested currency outflows and the marginal rate could be lowered to 50 per cent only four days later, on 20 September. But the average borrowing costs for banks were never close to the extreme marginal rate levels on account of the Riksbank implementing a number of measures to reduce the negative effects of the high

²⁰ In November 2003, a new regulatory framework for monetary policy was introduced, part of which involved primary dealers being renamed primary monetary policy counterparties.

interest rates. To reduce banks' funding costs, the Riksbank extended the 15-percent step in the interest rate scale and also gave mortgage institutions loans on special terms to facilitate their short-term funding. At a marginal rate of 50 per cent, the situation for mortgage institutions was eased by the Riksbank lending them SEK 18 billion at an interest rate of 20 per cent on maturities up to four weeks.

4.5 The interest rate scale during the period with a flexible exchange rate

On 12 November 1992, the National Debt Office published a central government borrowing requirement that was greater than expected. This marked the beginning of a week of large currency outflows and massive interventions by the Riksbank on the foreign exchange market. As a large proportion of the currency flows were caused by companies and banks settling their debts prior to closing their annual accounts and were being driven by concerns about increased interest rates, the Riksbank considered it counterproductive to raise interest rates as it had done in September. Instead, the Riksbank intervened on the foreign exchange market. This resulted in an emptying of the foreign exchange reserves and the abandonment of the fixed exchange rate as an intermediate target for achieving price stability on 19 November.

To stress its determination to continue to safeguard the price stability target, the Riksbank set the marginal rate at 12.5 per cent at the transition to a flexible exchange rate. This was one percentage point higher than the exchange rate that prevailed at the start of the November crisis. On 15 January 1993, the Riksbank General Council adopted an inflation target, according to which the rate of inflation in the consumer price index should be 2 per cent from 1995 onwards. The marginal rate was cautiously lowered in small steps over the next 12 months. The Riksbank also intervened on the money market on 25 February and 8 March to raise short-term market rates to a level more in line with the current marginal rate. In addition, the Riksbank intervened on the foreign exchange market during the first quarter of 1993 to signal that the exchange rate was still of considerable importance to monetary policy. But currency interventions decreased during the spring as political unease faded and the krona strengthened. During the summer, some krona purchases were made to support the currency but the Riksbank stopped intervening on the foreign exchange market after that.

At the beginning of the 1990s, the Riksbank took on a market maintenance role. In 1992, the Riksbank started to provide a *repo facility* in which market makers could borrow government bonds. The idea was to improve liquidity in debt security trading. Operations were extended in March 1993 to include treasury bills and then again in June to cover housing bonds. Such a facility could help to reduce volatility in interest rates, which was due to a market maker, when necessary, having difficulty obtaining certain securities. Well-functioning money and capital markets were considered important to ensure efficient transmission from the Riksbank's policy rate to short-term market rates and then to longer-term interest rates on the capital market. The responsibility for the market maintenance repo facility was taken over by the National Debt Office in 1999.

4.6 Summary

In this section, we have seen how the Riksbank could affect short-term interest rates by implementing market operations that place banks on a certain step on the Riksbank's interest rate scale. The bank's costs for borrowing from the Riksbank was determined by which step it was placed on. The Riksbank gradually reduced the height of the steps on the interest rate scale. In the next section, we look at how this development ultimately led to abandonment of the interest rate scale and the introduction of a new monetary policy framework.

5 The interest rate corridor, 1994–2018

From the start, the interest rate scale seems to have been seen as a temporary solution if we read an article in Svenska Dagbladet on 31 October 1986 under the heading ‘The Riksbank abolishes the interest rate scale’.

‘Riksbank Director Anders Sahlén said that the Riksbank could consider abolishing the interest rate scale in the long run. Instead, the Riksbank would control interest rates by setting a price/interest rate on Riksbank loans overnight to every bank that asks to borrow. This would make the actions of the Riksbank more consistent with a free market. But these measures are not immediately imminent’.

On 1 June 1994, the interest rate scale was replaced by a new operational framework for monetary policy in the form of an interest rate corridor. The interest rate corridor is similar to some extent to the system proposed by Anders Sahlén in the 1986 newspaper interview. But according to Hörngren (1994), the reason for the reform of the operational framework was the change in conditions brought on by the transition from a fixed to a flexible exchange rate. With a fixed exchange rate, it was a question of keeping currency flows balanced and adjusting the interest rate in relatively large and clear steps could therefore be an appropriate course of action. With a flexible exchange rate system, however, small and gradual adjustment to the policy rate may be preferable. But a problem arises with the interest rate scale in this regard. For example, imagine if the height of the steps had been lowered from 0.25 percentage points to, say, 0.10 percentage points. The incentive for banks to lend money to each other in order to even out liquidity among themselves would then have risked being too weak. Instead, banks would probably have left their funds at the Riksbank overnight, which would have led to a deterioration in the functioning of the overnight market. The Riksbank therefore decided that it needed an entirely new operational framework for monetary policy.

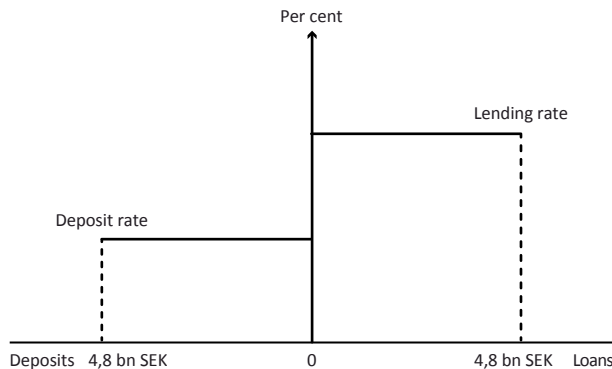
In this new operational framework, an interest rate scale with many steps was replaced by just one deposit rate and one lending rate, see Figure 12. Each bank was offered a deposit and lending option corresponding to 4 per cent of the interest calculation base, which amounted to SEK 4.8 billion for the banking system as a whole. As before, the Riksbank controlled liquidity with the help of open market operations such as monetary policy repos or reverse repos, although the latter were now in the form of issued Riksbank certificates. However, the maturity of the repos was extended in the new system to 2 weeks and the intention was that the repo rate would play a more central role in the operational framework. The operational framework became particularly clear when repos at a fixed interest rate were used and the banks only bid on volume. The Riksbank also had the option of setting repos at a variable interest rate, whereupon banks bid on both volume and the interest rate at which they wanted different volumes. The size of the weekly repos was balanced so that banks were not expected to have to either borrow or invest funds at lending or deposit rates during the repo’s maturity period. Gradually, an overnight rate that was close to the repo rate decided on by the Executive Board became the operational target for the corridor system. It was then anticipated that changes in the overnight rate would spread to interest rates with longer maturities, which also seems to have been the case according to Fransson and Tysklind (2016). They also find that adjustments to the repo rate have a significant impact on interest rates offered to households and companies.

5.1 Standing facilities

Deposit and lending rates in the so-called ‘standing’ deposit and lending facilities were set by the Riksbank General Council and constituted the corridor within which the Riksbank Governor could decide the level of the repo rate. These decisions could be taken every week and in as small steps as desired. The primary function of decisions on the interest rate

corridor's deposit and lending rates was hence to signal slightly longer-term interest rate policy. However, the Riksbank's most important signalling interest rate was the repo rate, which specified the desired level of the overnight rate one week ahead. In February 2007, the Riksbank also started to publish its own forecast for the future repo rate.

Figure 12. Deposit and lending terms in the interest rate corridor



Source: Sveriges Riksbank

With a few exceptions, the corridor width has been 150 basis points since the new system came into operation on 1 June 1994:

- During the period 11 August 1994 to 12 April 1995, the width of the corridor was 200 basis points. On 11 August, the Riksbank announced that it had increased the lending rate to 8 per cent while the deposit rate was left unchanged at 6 per cent. At the same time, the repo rate was raised from 6.92 per cent to 7.20 per cent.
- When the Executive Board decided to cut the repo rate to 0.50 per cent on 20 April 2009, they also decided to narrow the interest rate corridor from 150 to 100 basis points to avoid a negative rate for the deposit facility.²¹ The corridor width was reset on 7 July 2010.

For the first few years with the new framework, the Riksbank applied a penalty interest rate of 1 percentage point if a bank's utilisation of the facilities exceeded 4 per cent of its rate calculation base (a measure of the bank's size). The primary purpose of the penalty rate was to continue to provide incentive for banks to participate in overnight trading, according to Hörngren (1994, p. 51).

Under the new Riksbank legislation that came into force in 1999, monetary policy decisions are taken by the *Executive Board of the Riksbank* and not as previously by the Riksbank General Council and the Riksbank Governor. On 5 October 1999, the Executive Board decided to change the decision process for setting the policy rates, i.e. the repo rate and the deposit and lending rates. According to the new process, the Executive Board would only decide on policy rates at the special monetary policy meetings held at intervals of six to eight weeks. This dissolved the close relationship between the repo-rate decisions and the weekly market operations. On 6 December 2000, the Executive Board decided that the monetary policy signalling function of the deposit and lending rates should be abolished. The deposit and lending rates would instead be changed when the repo rate was changed, so that the repo rate would always be in the middle of the interest rate corridor. According to the decision-making material²², the principal reason for the change was that there were other ways of signalling the long-term direction of monetary policy, to which the market attached more importance. Another reason mentioned was to remove the asymmetry

²¹ However, when the repo rate was cut to 0.25 per cent on 8 June 2009, the width of the corridor was left unchanged and the deposit rate thus became minus 0.25 per cent.

²² See Elvhult 2000.

regarding the relative costs of using the facilities compared with utilising the overnight market.²³ A third reason for the change was that the incentive for banks to bid for repos might decrease if the repo rate was close to the ceiling in the interest rate corridor.

5.2 Fine-tuning transactions

However, experience of the new system showed that the overnight rate did not on average correspond to the repo rate when the overnight rate was allowed to fluctuate freely within the interest rate corridor. According to Holmberg (1996), fluctuations in the overnight rate had sometimes been interpreted as policy signals in the market. This constituted an unwanted lack of clarity in monetary policy signalling, which meant that the Riksbank needed to stabilise the overnight rate in some way. This was achieved by introducing *fine-tuning transactions* at the end of each day in 1995. Fine-tuning transactions are normally carried out every banking day between 4 p.m. and 4.40 p.m. In these, the Riksbank offers credit against collateral or overnight deposits at the policy rate plus or minus 0.10 percentage points respectively. If the banking system as a whole has a liquidity deficit at the end of the day, the Riksbank lends funds, although not to an amount that exceeds the banking system's total deficit. A similar procedure applies if the banking system as a whole has a liquidity surplus at the end of the day. In this case, the Riksbank receives funds, but not to an amount that exceeds the banking system's total surplus. Allocation takes place on a 'first come, first served' basis, as long as there are funds left to lend or deposit.

During the period 29 October 2014 and 18 February 2015, fine-tuning transactions were performed at the repo rate instead of at the repo rate plus or minus 0.10 percentage points. The reason was that when the repo rate was cut to zero per cent, the intention was to avoid a negative fine-tuning rate due to uncertainty about how a negative interest rate would work. When the Riksbank cut the repo rate to –0.10 per cent on 18 February 2015, the rates for fine-tuning transactions were reset to the repo rate plus or minus 0.10 percentage points.

5.3 Monetary policy repos and Riksbank certificates

Already during the interest rate scale era, in December 1992, the Riksbank began issuing its own promissory notes, known as *Riksbank certificates*, instead of performing reverse repos when the Bank wanted to drain liquidity from the market. The reason was that the Riksbank wanted to help limit so-called 'supply commitments'.²⁴ A common practice had emerged on the money market of issuing a supply commitment instead of supplying the physical security in order to regulate payment in the event of a repo. In this way, the repo counterparty avoided the lengthier procedure of registering the underlying securities. But one of the risks associated with this was that the counterparty might not have coverage for the supply commitment.

The Riksbank certificate is a discount security. When the certificate is used in a reverse repo, it is discounted at the interest rate accepted when the bid was made. Since the interest rate corridor was put into operation, the Riksbank has exclusively carried out repos at a fixed interest rate, with the exception of four repos during the period February to March 1995 which were implemented at a variable rate. This meant that the repo volume was allocated according to private players' bids on volume and interest rate at auction. In this way, the bids acted as a guidance for the level of the repo rate. The experiment did not turn out well, however, as the change in method had undesirable effects on the interest rate level, exactly contrary to the Riksbank's expressed expectations²⁵.

23 If, for example, the repo rate is close to the lending rate, the alternative costs for borrowing in the lending facility compared with borrowing at the overnight rate (close to the repo rate) will, relatively speaking, be lower than the alternative costs for utilising the deposit facility compared with investing the surplus at the overnight rate.

24 See press release 65/1992 of 12 November 1992: 'The Riksbank issues Riksbank certificates'.

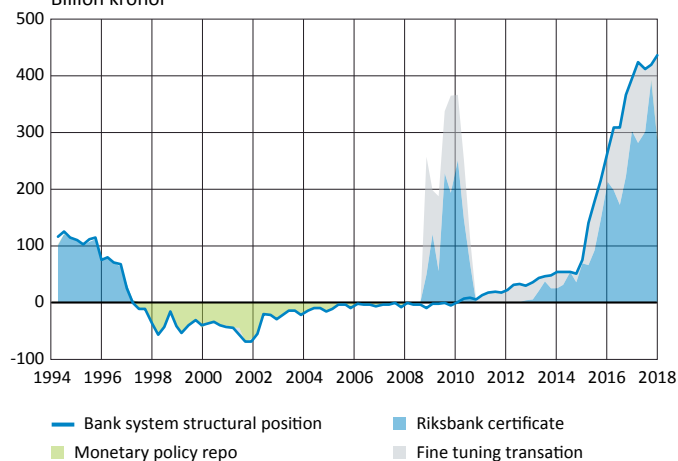
25 According to press release 5/1995 of 9 February 1995: 'Prevailing interest rate expectations mean that the Riksbank now considers that variable repos can be introduced without the change in method having undesirable or drastic effects on the interest rate level'.

The Riksbank's recurring problem of determining the volume of Riksbank certificates to issue was made considerably easier as liquidity forecasts from 1994 onwards no longer needed to take central government payments into account. According to a government decision, these would occur directly in the market as a result of the National Debt Office's facility for investing surplus funds and financing deficits at the Riksbank being abolished as from 1 July 1994.

When the Riksbank defended the fixed exchange rate in late-1992, it bought Swedish kronor and sold foreign currency forwards, thereby building up a large negative forward position (SEK 131 billion on the last day of 1992) in foreign currency. As a result, the foreign exchange reserves looked larger than they actually were. In March 1995, the Riksbank decided to scale back the large forward liability in order to reduce the balance sheet total. This resulted in the reported foreign exchange reserves on the asset side of the balance sheet and the banking system's liquidity surplus on the liability side of the balance sheet decreasing by the same amount. As a result of the reduced liquidity surplus, the Riksbank changed the maturity period for weekly Riksbank certificates from two weeks to one week as from 2 July 1996. The forward liability was definitively abolished on 1 September 1997. Already by 15 April 1997, however, the scaling back of the forward liability had resulted in the banking system's liquidity surplus turning into a liquidity deficit, and the Riksbank had to switch to supplying liquidity to the banking system via monetary policy repos instead of, as before, draining the system of liquidity by offering Riksbank certificates. This shift is clearly visible in Figure 13.

The banking system had a liquidity deficit throughout the period 1997–2007, see Figure 13. The Riksbank then used weekly monetary policy repos with a maturity of one week to supply liquidity to the banking system. During the summer of 2008, the repos were so small that there was a risk of having to alternate between supplying liquidity to or draining liquidity from the banking system in the weekly operations. At that point, the Riksbank implemented a 'structural' transaction in foreign currency. Beginning on 8 September 2008, the Riksbank sold foreign currency and bought kronor to a value of SEK 5 billion. This was done so that the banking system would still have a funding requirement and the weekly repos could continue. This avoided a situation whereby, alternately, repos were carried out to supply liquidity or certificates were issued to reduce it. One reason for avoiding this was that the Riksbank's counterparties felt such weekly zigzagging would make short-term liquidity management more administratively demanding. The intention was to begin issuing Riksbank certificates once the banking system was in a stable situation with a liquidity surplus in relation to the Riksbank. However, this happened more quickly than expected.

Figure 13. The Riksbank's open market operations, 1994–2018
Billion kronor



Source: Sveriges Riksbank

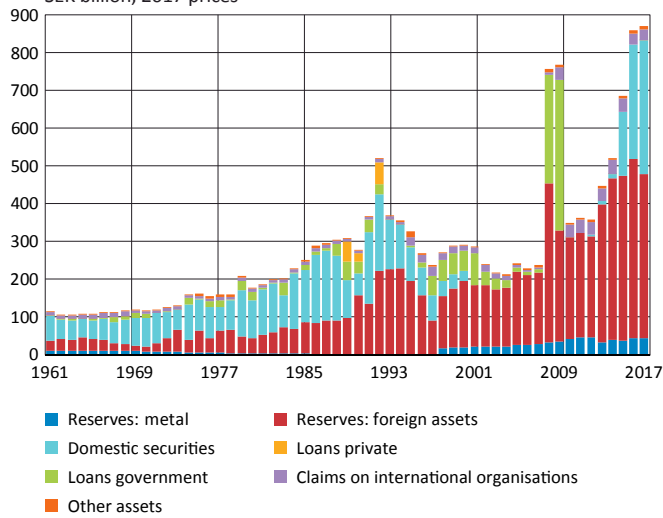
In October 2008 it was clear that the international financial unease was also affecting the financial markets in Sweden. The market for long-term loans was working less and less effectively. In this situation, the Riksbank launched a *loan facility in Swedish krona* to increase access to credit with longer maturities. In the first auction of three-month loans on 6 October, banks borrowed SEK 100 billion. At a stroke, the banking system's short-term funding requirement at the Riksbank became an investment requirement. Figure 13 treats lending during the 2008–2009 crisis as temporary, as the loans were time-limited, and it therefore did not affect the banking system's structural liquidity position in relation to the Riksbank.

Initially, the Riksbank borrowed back the surplus liquidity via its daily fine-tuning transactions. To reduce the size of these transactions, the Riksbank began issuing Riksbank certificates with a maturity of one week on 14 October. The dramatic rise in lending to the private sector in Figure 14 is mirrored in increased issuance of Riksbank certificates and increased deposits in the form of fine-tunings in Figure 13 and Figure 15 (Riksbank certificates are included in the latter figure in the Other liabilities item). During the period 1 June to 13 October 2010, Riksbank certificates with longer maturities than one week were also offered. These certificates matured in conjunction with the next planned monetary policy meeting. In connection with the introduction of longer certificates, Riksbank certificates were also made available for resale. This applied to both certificates with a maturity of one week and those with longer maturities. They could be resold to the Riksbank at an extra cost of 2 basis points and with next-day payment. The purpose of this option was to make the certificates more attractive and hence be able to scale back a larger share of the surplus liquidity at longer maturities instead of borrowing large amounts overnight every day.²⁶

In Queijo von Heideken and Sellin (2014), we studied how the Riksbank's operational framework for monetary policy functioned before, during and after the financial crisis, i.e. the period October 2007 to February 2014. We found that the banking system's large liquidity surplus, which was the result of the Riksbank's extraordinary lending during the crisis, can be associated with short-term interbank rates being pushed down towards the fine-tuning rate. However, this effect was minor, when most of the surplus was invested in Riksbank certificates. We also noted that the larger the surplus was, the less the turnover was among the monetary policy counterparties in the overnight market. But this effect was also minor, however, when most of the surplus was invested in Riksbank certificates. Our general conclusion was that the operational framework had successfully managed to stabilise short-term rates close to the repo rate. We had reached the same conclusion earlier with the help of a minor technical analysis in Sellin and Åsberg Sommar 2012 and 2014. How well short-term rates follow the Riksbank's policy rates is illustrated in Figure 16. For most of the period, rates with tomorrow-next maturities (STIBOR T/N) and one-week maturities (STIBOR 1W) follow the Riksbank's repo rate and are within the corridor constituted by the Riksbank's deposit and lending rates.

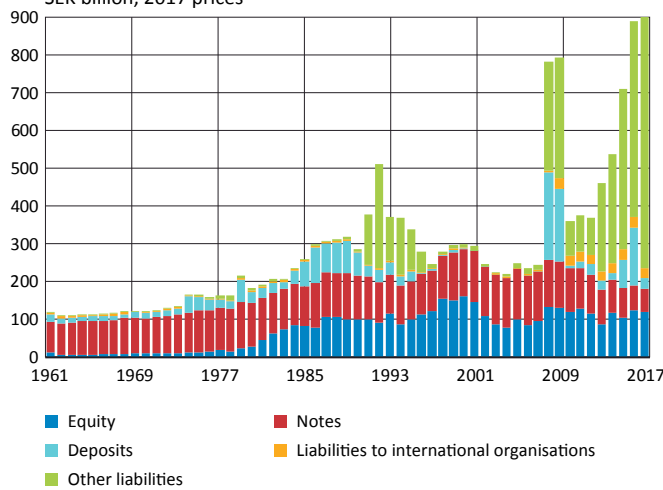
²⁶ In 2014, a minor adjustment was made to the issuance terms to avoid excessively frequent resale, which would have an unnecessarily large impact on interest rates on the overnight market. The Riksbank consequently decided to raise the fee for resale from 2 to 10 basis points as from 16 December and to remove the right to resale on the bid submission date. The background to this was that participants who had been allocated Riksbank certificates had on occasion immediately resold them to the Riksbank to ensure that there was plenty of liquidity to invest overnight.

Figure 14. The Riksbank's assets, 1961–2017
SEK billion, 2017 prices



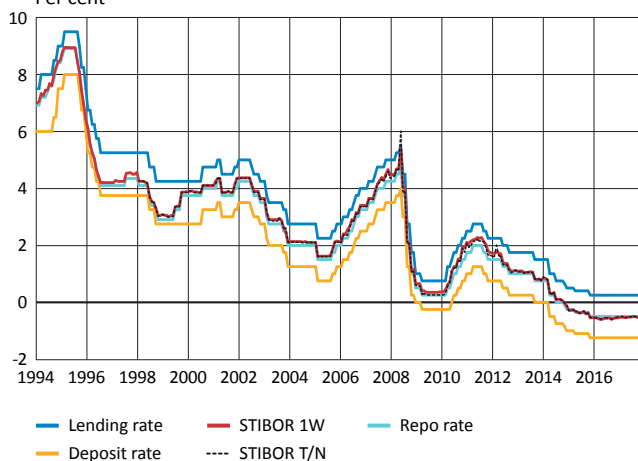
Source: Sveriges Riksbank

Figure 15. The Riksbank's liabilities and equity, 1961–2017
SEK billion, 2017 prices



Source: Sveriges Riksbank

Figure 16. The Riksbank's policy rates and short-term market rates, 1994–2018
Per cent



Source: Sveriges Riksbank

5.4 Purchase and sale of bonds

The Riksbank's portfolio of Swedish securities was phased out in 2001, see Figure 14. As early as 1998, the Riksbank announced that it intended to reduce its holdings of government securities by SEK 20 billion and that 'the reason is that the current size of the Riksbank's domestic securities portfolio – with a nominal value of SEK 47 billion – no longer fulfils any monetary policy function.'²⁷ At the end of the 1990s, the portfolio was mainly used for market maintenance purposes, which meant that the Riksbank provided a repo facility in Swedish securities to market makers. This enabled them to borrow a security which was difficult to gain access to on the market.

In November 1999, the Government decided to transfer the market-maintaining repo facility to the National Debt Office. In connection with this, it was also determined that there were no remaining reasons why the Riksbank should hold a portfolio of domestic securities.²⁸ Holdings in the Swedish portfolio consisted at that point mainly of government bonds. There was also a smaller holding of treasury bills and mortgage bonds, but these matured in 2000. On 17 May 2001, the Riksdag decided that the Riksbank should make an extraordinary transfer of profits to central government. On 13 June, the Riksbank transferred its remaining portfolio of Swedish government bonds to the National Debt Office to value of SEK 20 billion. The conclusion that a domestic portfolio does not fulfil any monetary policy function is built on the premise that 'today's efficient markets have led to interventions not in practice having any long-term effect on the formation of interest rates'.²⁹ The financial crisis of 2008–2009 showed, however, that it cannot be assumed that the markets will always function efficiently. We have also seen that short-term interest rates may approach zero in a crisis situation. If further stimulation of the economy is required in such a situation, one alternative is to buy bonds on the market.

As a supplementary monetary policy measure, the Riksbank started to purchase Swedish government bonds in February 2015. These purchases were funded by the Riksbank increasing deposits from the monetary policy counterparties, see Figure 13 and Figure 15. This has led to the banking system having a large liquidity surplus in relation to the Riksbank since 2015. The purpose of the purchases was to push down the general level of interest rates in the economy. When the rate on safe assets falls as a result of the central bank's purchases of government bonds, it becomes more attractive for investors to seek alternative assets. In this way, the lower government bond rates spread to other parts of the financial markets. Other channels function because the purchases are interpreted as the Riksbank's policy rate remaining low for a longer period or because the banking system's surplus increases.

The Riksbank purchased bonds with the help of reverse auctions in which the Riksbank's monetary policy counterparties and the National Debt Office's dealers could participate. A reverse auction is a lowest-bid auction in which the bidder offering the highest interest rate (the lowest price) receives the first allocation. After that, the bidder offering the second-highest interest rate receives allocation and so on until all the volume on offer has been allocated. In this way, the pricing and allocation of the Riksbank's transactions are transparent for the market. According to De Rezende, Kjellberg and Tysklind (2015), the Riksbank's purchases of government bonds have contributed towards pushing Swedish interest rates lower than they otherwise would have been. They also show that purchases have contributed to reducing the interest rate differential in relation to other countries and to the krona being weaker than it otherwise would have been.

²⁷ Press release 11/1998 of 9 March 1998.

²⁸ See Risberg and Lybeck 2000.

²⁹ See Risberg and Lybeck 2000, p. 4.

5.5 Summary

In this section, we have seen how the Riksbank took yet another step to bring about a more flexible operational framework for monetary policy by replacing the interest rate scale with the interest rate corridor. In the new system, the policy rate could be adjusted in steps that were as small as desired. Thanks to daily fine-tuning transactions, the overnight rate could also be controlled with more precision regardless of whether the banking system had a liquidity deficit or a liquidity surplus in relation to the Riksbank.

6 Summary and conclusions

An operational framework for monetary policy needs to be continuously developed and adapted both to a changing environment and to what the system will be able to achieve. It is often a question of minor adjustments but in the event of major challenges, the changes may even involve replacing an entire operational framework with a new one. This is a pattern that we have found when studying the Riksbank's operational framework for monetary policy from 1885 until the present day.

In the *discount rate system* (1885–1961), the Riksbank introduced the return discount rate in 1893 giving the system more flexibility. But in the end, changes to the discount rate proved to be far too blunt an instrument to be able to rapidly counteract unwanted currency flows that threatened the fixed exchange rate. The *penalty rate system* (1961–1985), which replaced the discount rate system, enabled more rapid increases in the interest costs for banks to borrow from the Riksbank. Borrowing at the penalty rate primarily impacted money market rates, which was of crucial significance for currency flows. When the Riksbank General Council wanted to have the option of adjusting the interest rate in smaller steps, the Riksbank replaced the penalty rate system with the *interest rate scale* (1985–1994). The height and depth of the scale were adjusted on several occasions and the height of the steps was gradually reduced over time. Eventually, a point was reached where it was no longer possible to reduce the height of the steps without it having negative consequences for activities on the interbank market. At this point, the Riksbank introduced the *interest rate corridor* (from 1994), in which there were no restrictions on the size of the steps taken when adjusting policy rates. In 1995, the new operational framework was complemented with daily fine-tuning transactions to reduce variability in the overnight rate.

A lesson to be learnt from the Riksbank's application of different operational frameworks is how important it is for a central bank to control the shortest interest rate – the overnight rate. When it introduced both the interest rate scale and the interest rate corridor, the Riksbank seems to have undervalued the importance of the overnight rate. When introducing the interest rate scale, the focus was originally on the six-month interest rate, but after a while the Bank also started to take the development of the overnight rate into consideration. The same pattern was repeated when the Riksbank introduced the interest rate corridor in 1994: To begin with, the focus was on the two-week interest rate, but after a few months, fine-tuning transactions were introduced to stabilise the overnight rate. Although the Riksbank has the ambition to control a longer interest rate, the necessity to stabilise the overnight rate is unavoidable as it is of major importance as an anchor for the yield curve and is the interest rate that the Riksbank has typically found the easiest to influence. Provided fixed-income markets are working well, changes in the overnight rate will affect market rates with longer maturities and hence also the interest rates charged to households and companies. If fixed-income markets are not working well, the Riksbank must act to rectify the situation. At the beginning of the 1990s, the Riksbank took on a market maintenance role, which was later taken over by the National Debt Office. It is obviously in the Riksbank's interest that this or some other authority takes on the responsibility for the satisfactory functioning of the financial markets to ensure that monetary policy has an effective impact.

Another lesson to be learnt is the importance of clear *signalling* by a central bank. As early as during the discount rate era, the Riksbank developed a clear strategy for signalling how it expected interest rates to develop in the future via adjustments to the return discount rate. During the penalty rate era, adjustments to the penalty rate became instead a clear signal of what level short-term interest rates should be on. During the early stages of the interest rate scale era, the Riksbank changed its tactics. Instead of, as previously, announcing a policy rate, it implemented market operations and let the market guess which level of interest rates the Riksbank wanted to have. This led to the signalling periodically being unclear but the situation was rectified when the Riksbank started to announce decisions on adjustments to the marginal rate. During the early stages of the interest rate corridor era, the Riksbank's deposit and lending rates served as a tool for the General Council to signal the direction of monetary policy in the slightly longer term. When the Executive Board took over the decisions on all the Riksbank's policy rates, focus shifted to decisions on the repo rate. The deposit and lending rates were determined based on the repo rate that was in the middle of the interest rate corridor. The importance of clear signalling by the Riksbank is further illustrated by the less successful experiment with variable repos in early-1995. After that, the Riksbank always used a fixed interest rate for monetary policy repos. Since February 2007, the Riksbank has also published its own forecast for the future repo rate.

A third lesson is that a central bank needs to choose its *monetary policy counterparties* based on what it wants to achieve. If it wants to control short-term money market rates, which seems to have been the natural choice for the Riksbank for most of the period studied, it needs to have counterparties that are active on the market. During the discount rate period, the most important tool was the re-discounting of commercial bills and the Riksbank then signing re-discounting agreements with commercial banks. When the Riksbank introduced the primary dealer system in 1991, it instead placed explicit demands on counterparties to be active on the markets that were relevant to monetary policy. When the Riksbank began buying Swedish government bonds in February 2015 as a complementary monetary policy measure, it turned to National Debt Office government bond dealers.

A fourth lesson is that the Riksbank must be prepared to change the kinds of *financial instruments* it uses in its operations and as loan collateral. The financial markets develop over time, which means that some financial instruments disappear and new ones are added. From the early-1930s onwards, the discounting of commercial bills dominated in the Riksbank's implementation of monetary policy. But when companies gradually stopped using bills, the Riksbank increasingly had to use credit with bonds as collateral. The early 1980s saw the development of the money market in Sweden and the Riksbank could use the new treasury bills to implement its market operations.

A final lesson we can learn is that a central bank needs to offer both *lending and deposits* for monetary policy purposes in order to effectively be able to control the shortest interest rates both when the banking system has a liquidity deficit and when it has a liquidity surplus. During the earlier periods, the Riksbank only offered lending for monetary policy purposes. This meant that monetary policy tended to be ineffective during periods when the banking system had plenty of liquidity. During the penalty rate period, this was rectified by introducing reserve requirements to force banks to borrow from the Riksbank. During the interest rate scale period, deposit steps were gradually introduced in the scale, and in the interest rate corridor period, the very idea is for the Riksbank to always offer both lending and deposits and hence set the bounds for the overnight rate. Using the implicit interest rate corridor, consisting of fine-tuning transactions, the Riksbank has succeeded in controlling the overnight rate regardless of whether the banking system has had a liquidity deficit or a liquidity surplus.

The current operational framework with an interest rate corridor and fine-tuning transactions has worked well. But can it cope with the new challenges facing the Riksbank?

These challenges primarily consist of rapid changes that are currently ongoing on the payments market, with a growing requirement to be able to make rapid payments round the clock, 365 days a year. These changes will impose greater demands on the payment systems provided by the Riksbank, as regards, for example, opening hours. The operational framework for monetary policy needs to be adapted to these changes. However, our preliminary assessment is that the corridor system is sufficiently flexible to be able to make the necessary adjustments within the current operational framework.

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