Review of the Riksbank's operational framework for the implementation of monetary policy

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The Riksbank attempts to influence interest rates in the economy so that the inflation target is met. In this article we describe how the Riksbank steers the risk-free overnight rate for interbank loans in practice. We present the instruments in the Riksbank's toolkit and how these are used to steer the overnight rate. We find that the Riksbank's operational framework for the implementation of monetary policy performs its task of stabilising the overnight rate well. However, we also show that the framework is not adequate to satisfactorily influence interest rates at longer maturities than overnight. Experience from the latest financial crisis has also demonstrated that the Riksbank should be well prepared to conduct monetary policy under extraordinary circumstances. In this context, there may be a need to add to the Riksbank's toolkit. There is also a need to continuously evaluate the operational framework.

The Riksbank began to evaluate its operational framework for the implementation of monetary policy in the spring of 2008. The financial crisis began shortly afterwards, which taught the Riksbank new lessons about how the framework functions. This article should thus be seen as a status report rather than as a final evaluation – especially considering that we are now in a situation in which the crisis measures taken by central banks abroad are still ongoing. Work is also underway on the regulation of the financial sector which may have consequences for the design of the operational framework.

The operational framework plays a central role for the Riksbank's ability to implement monetary policy. The Riksbank changed its approach to conducting monetary policy in the 1990s. In connection with the crisis in 1992, the Riksbank abandoned the fixed exchange-rate regime and decided instead to conduct inflation targeting.[1] In order to provide a more transparent system for the implementation of monetary policy, a new operational framework was introduced in June 1994. The Riksdag (the Swedish parliament) subsequently increased the Riksbank's ability to attain the inflation target by adopting a new Sveriges Riksbank Act that since 1 January 1999 ensures the Riksbank's independence.

1 Under the Sveriges Riksbank Act, the Riksbank shall maintain price stability, which means that inflation should be low and stable. The Riksbank has specified the target for monetary policy such that inflation should be 2 per cent a year, measured as the annual percentage change in the Consumer Price Index (CPI). Any deviation from the target does not have to be immediately corrected as this could have negative consequences for economic growth.

An Executive Board consisting of six members was entrusted to independently decide on a policy rate at monetary policy meetings held at intervals of six to eight weeks.

Since 1999, the Riksbank has conducted monetary policy by the Executive Board deciding on and signalling the level of the most important policy rate – the repo rate – that is compatible with the inflation target. The Riksbank's operational framework for the implementation of monetary policy is designed to steer the market's overnight rate, that is the interest rate on overnight loans between the banks. The idea is that the framework should stabilise the overnight rate at a level close to the repo rate. In this way the overnight rate should act as an anchor for the yield curve (interest-rate formation at longer maturities). However, in an attempt to steer interest-rate formation at longer maturities more directly, the Riksbank also publishes a forecast of future repo rates, a so-called repo-rate path, that are compatible with the inflation target. The Riksbank's ambition is to stabilise the shortest, risk-free interest rate while the market is allowed to determine interest rates at longer maturities that include various risk premiums.

In the spring of 2008, the Riksbank began to evaluate how well the operational framework for the implementation of monetary policy works. This evaluation mainly entails reviewing how the framework performs its tasks of effectively implementing the Riksbank's monetary policy decisions and steering liquidity in the payment system. This review was started in 2008, but the financial crisis began shortly afterwards and this taught the Riksbank new lessons about how the framework functions under different circumstances. The evaluation thus needs to continue so that we can take these lessons into account. In the meantime, however, we can present a status report that describes how the framework works today and identifies some areas for improvement.

This article consists of three sections. The first section describes how the operational framework works and explains how it came to take its present form by looking back at some high points in its historical development. The second section describes the Riksbank's counterparties and the securities these use as collateral for loans from the Riksbank and in the monetary policy repos. In the third and final section, we discuss some areas in which the framework can be improved.

Steering the overnight rate and liquidity in the banking system

We begin by briefly describing payments during the day in the payment system (intraday payments) and on the overnight market, that is the market for loans overnight between the banks. It is the interest rate on this market – *the overnight rate* – that the Riksbank tries to steer.[2] The Riksbank offers the banks that participate in the RIX payment system the opportunity, when necessary, to borrow from the Riksbank during the day without paying interest but against collateral via so called intraday loans. The conditions for these loans are generous. In this way, the Riksbank encourages the banks to use intraday loans in order

2 A more detailed description of the overnight market is given in Kronestedt Metz (2005) and Eklund and Åsberg Sommar (2011).

to make payments more easily and more efficiently. However, in order to avoid individual banks systematically funding their operations via the Riksbank the conditions for overnight loans are not as generous. The banks therefore balance out their liquidity positions in relation to each other at the end of the day. In this balancing process, banks with a surplus lend to banks with a deficit so that that the banking system as a whole is balanced before the payment system closes for the day.

The liquidity surpluses or deficits that remain after the banks have balanced their liquidity positions with each other constitute the banking system's net position in relation to the Riksbank. If the banking system has a liquidity surplus in relation to the Riksbank this can be deposited overnight with the Riksbank. If, on the other hand, the banking system has a liquidity deficit then the system as a whole can borrow the corresponding sum from the Riksbank overnight.

The conditions governing how the banks can deposit and borrow liquidity overnight form the core of the operational framework. By setting the conditions for the banks' deposits and borrowing at the Riksbank, the Riksbank can steer the interest rate for loans at the shortest maturity – overnight loans. As the Riksbank focuses on balancing the banks' liquidity at the end of the day in this way, the interest rate for overnight loans – the overnight rate – becomes the operational target for monetary policy. The Riksbank stabilises the overnight rate and thus creates an anchor for interest rate formation at longer maturities, which is necessary but far from sufficient to stabilise interest rate formation at longer maturities.

If the banking system has a large liquidity surplus to deposit at the end of the day this may push down the overnight rate. This gives the Riksbank a reason to use some form of instrument to try do draw in this liquidity at longer maturities. In the next section we therefore discuss which instruments the Riksbank uses for this purpose. We also discuss the Riksbank's liquidity management during the financial crisis when it took a number of extraordinary measures, the main measure being to lend to the banks at longer maturities. As we shall see, this had consequences for the Riksbank's steering of both liquidity and interest rates.

THE CONDITIONS GOVERNING INTRADAY CREDIT AND CREDIT OVERNIGHT FORM THE CORE OF THE OPERATIONAL FRAMEWORK.

If two people have accounts in the same bank, a payment between them may be carried out simply by the bank debiting the account of one of them and crediting the account of the other. We then say that the payment is settled (or carried out) in *commercial bank money*. However, if the two people concerned have accounts with different banks, a payment must also be made between these banks. Such interbank transactions are usually

settled in central bank money, that is by debiting and crediting the banks' accounts in the Riksbank's payment system RIX.[3]

RIX participants can increase their credit limit in the payment system by using securities or foreign currency as collateral for intraday loans or by transferring banknotes and coins to the Riksbank. Intraday loans, which are interest free, are registered in the RIX participants' loan accounts in the system. Although the loans are interest free this does not mean that that they are cost free, as the loans are provided against collateral and there are certain costs associated with the management of the securities used as collateral.

Central bank money can also be created on the initiative of the Riksbank. The Riksbank can lend Swedish kronor at longer maturities than intraday and can also buy assets. For example, the Riksbank can buy foreign currency from a RIX participant and pay by crediting the participant's RIX account with Swedish kronor. RIX is open every Swedish banking day between 7 a.m. and 5 p.m. RIX participants who are not entitled to overnight loans have to settle their intraday loans by close of business. Otherwise, they have to pay a fee. In the case of the other participants the procedure is that if the balance of their RIX account is negative then it is considered that they have requested a loan from the Riksbank's lending facility. If, on the other hand, the balance of their RIX account is positive when the payment system closes, then it is considered that they have requested to use the Riksbank's deposit facility. The maturity of the loans and deposits under these so-called standing facilities is overnight from the time RIX closes until it opens the following banking day.

As a rule, the banks can get better conditions for loans and deposits from each other than the conditions that apply in the standing facilities. This is because in a normal situation the banks believe that lending to each other overnight entails no risk. In the first instance, they therefore use the so-called overnight market to lend or deposit money overnight at the *overnight rate*. If, on the other hand, the banks believe that there is a risk of not getting their money back they will not lend to each other. Banks with a liquidity surplus will instead deposit money in the Riksbank's deposit facility and thus in practice refer banks with a liquidity deficit to the Riksbank to borrow from the Riksbank's lending facility.

HOW DOES THE RIKSBANK STEER THE OVERNIGHT RATE?

The operational framework for the implementation of monetary policy is designed so as to make it possible to steer the overnight rate towards the level of the repo rate adopted by the Executive Board of the Riksbank. The primary instruments for steering the overnight rate are the Riksbank's standing facilities, the so-called deposit and lending facilities, and the fine-tuning transactions.

3 The RIX participants are the Riksbank, the Swedish National Debt Office and a number of credit institutions and clearing organisations. Settlement in RIX takes place under the principle of real-time gross settlement. This means that payments are settled one at a time and that the funds transferred to a RIX account become immediately accessible in the account and can be used for other payments.

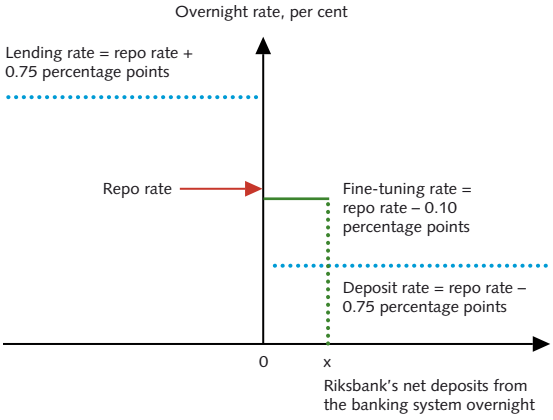
Standing facilities

The Riksbank provides a deposit facility with a deposit rate equal to the repo rate minus 0.75 percentage points and a lending facility with a lending rate equal to the repo rate plus 0.75 percentage points (see Figure 1). At close of business, that part of a bank's loan account that is equal to the bank's holdings in its main RIX account is automatically repaid. If the balance of a bank's loan account with RIX shows a deficit when the payment system closes for the day, the bank has to pay the lending rate on the balance overnight (that is until the next bank day). If the balance of a bank's main account shows a surplus when the payment system closes, the bank earns the deposit rate on the sum overnight. The sum that can be borrowed from the lending facility is limited by the adjusted value of the collateral provided by the bank. There is no limit on how much a bank may deposit in the deposit facility.

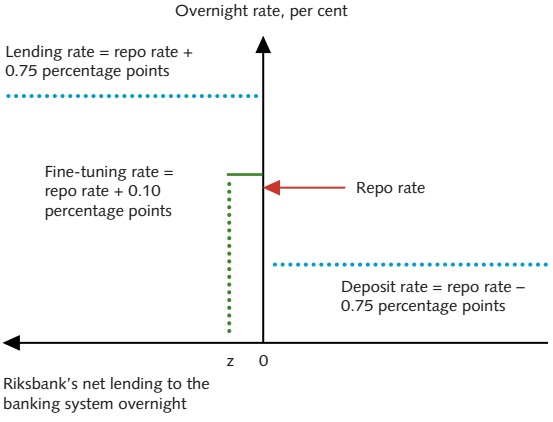
Due to the standing facilities, a bank will never deposit a surplus on the overnight market at a rate lower than the deposit rate or borrow at a rate higher than the lending rate. It will be more advantageous to leave the balances in RIX until it closes. The deposit and lending rates thus form a corridor for the overnight rate. The position of the overnight rate within the corridor is a matter for negotiation between the banks on the overnight market.

Chart 1. The Riksbank's operational framework for the implementation of monetary policy

Panel A. The banking system has a liquidity surplus in relation to the Riksbank



Panel B. The banking system has a liquidity deficit in relation to the Riksbank

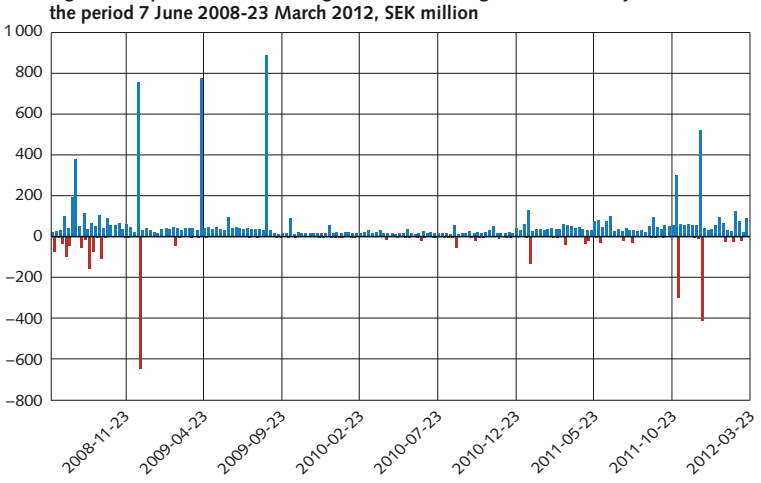


Note. Panel A shows a situation in which at the end of the day the banking system has a liquidity surplus of SEK x million in relation to the Riksbank, while panel B shows a situation in which at the end of the day the banking system has a liquidity deficit of SEK z million in relation to the Riksbank. The figure also shows that the repo rate is the reference rate for the Riksbank's other policy rates.

Several million kronor remain in the standing facilities at the end of almost every banking day (see Figure 1). Why isn't the banking system fully balanced before RIX closes? This is because the surpluses often consist of smaller items divided between several banks. None of these banks is particularly interested in completing a transaction as the transaction costs will be higher than the interest income. Usually, therefore, it is only small sums that end up in the standing facilities. There are, however, some exceptions, as we can see in Figure 1. The extreme values that can be noted at a few points in time in Figure 1 are probably due to liquidity-management mistakes on the part of one of the banks.

During the financial crisis it was unusual for a bank to have a deficit at the end of the day as the Riksbank offered extra liquidity to the banks, which also meant that the lending facility was seldom used in this period.

Figure 1. Deposits (+) and lending (–) in the standing facilities, weekly data for the period 7 June 2008-23 March 2012, SEK million



Source: The Riksbank's weekly reports.

Fine-tuning transactions

Daily fine-tuning transactions were introduced in 1995 as a way for the Riksbank to stabilise the overnight rate around the repo rate and thus avoid fluctuations in the overnight rate being interpreted as policy signals by the market participants.[4]

The fine-tuning transactions are normally carried out every banking day between 4 p.m. and 4.40 p.m.[5] In the fine-tuning transactions, the Riksbank offers credit against collateral or overnight deposits at an interest rate equal to the repo rate plus/minus 0.10 percentage points (see Chart 1). If the banking system as a whole has a liquidity deficit, 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. In this case, the Riksbank receives funds, but not to an amount that exceeds the banking system's total surplus.

The banks know that the banking system's liquidity position in relation to the Riksbank will largely be in balance after the Riksbank has carried out the fine-tuning transactions. This means that the total lending requirement of the banks with deficits will be as large as the surplus of the other banks in the system. If a bank with a deficit finds a bank with surplus, they usually perform a transaction with an interest rate equivalent or almost

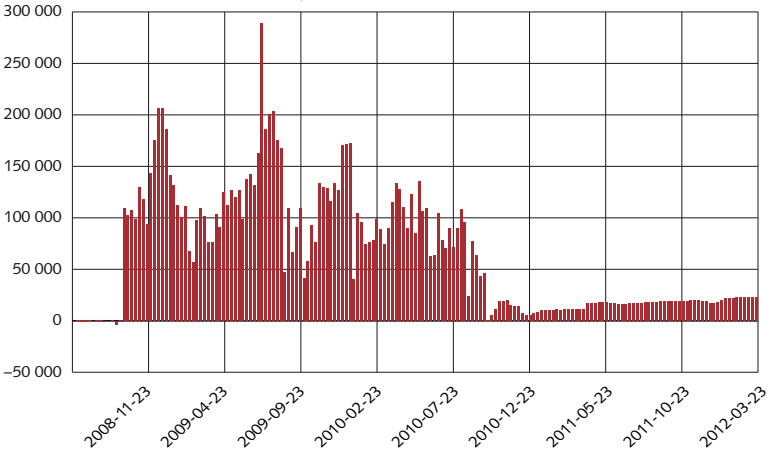
4 See Holmberg (1996).

5 As all the monetary policy counterparties have been able to participate in fine-tuning transactions since 8 October 2008, the Riksbank has expanded the period allowed for fine-tuning, which previously began at 4.20 p.m.

equivalent to the repo rate. According to the banks themselves, the knowledge that the system will largely be in balance at the end of each day contributes to this pricing practice.

Before the Riksbank began to provide extra liquidity during the financial crisis the fine-tuning transactions amounted to very small sums (see Figure 2). However, from mid-October 2008 it was not unusual for the banks to deposit over SEK 100 billion overnight in fine-tuning operations as they did not want to tie up liquidity by bidding to the full in emissions of Riksbank certificates with a maturity of one week. Even after the Riksbank stopped providing extra liquidity the banks have preferred to be liquid. Since the end of October 2010 interest in Riksbank certificates has been non-existent and the entire liquidity surplus has been placed in the fine-tuning transactions.[6]

Figure 2. Fine-tuning transactions, weekly data for the period 7 June 2008-23 March 2012, SEK million



Source: The Riksbank's weekly reports.

The width of the interest rate corridor has varied

Prior to 1 January 1999, the deposit and lending rates were decided on by the General Council of the Riksbank. The Governor of the Riksbank was then able to decide on the level of the repo rate within the interest rate corridor that followed from the General Council's decision. The deposit and lending rates could thus be used to signal monetary policy in the slightly longer term. At its meeting on 6 December 2000, the Executive Board decided that the monetary policy signalling function of the deposit and lending rates would 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. The main reason for this change was that the market attached greater importance to other

6 There has only been one exception. In mid-December 2010 a bank purchased Riksbank certificates for SEK 500 million.

methods that the Riksbank used to signal the long-term direction of monetary policy, for example the speeches of the members of the Executive Board.[7]

Since the new framework came into operation on 1 June 1994, the width of the corridor has been 1.50 percentage points, with only two exceptions.

- Between 11 August 1994 and 12 April 1995 the width of the corridor was 2.00 percentage 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 1.50 to 1.00 percentage points to avoid a negative rate for the deposit facility.[8] The width of the corridor was restored from and including 7 July 2010.

HOW DOES THE RIKSBANK STEER LIQUIDITY IN THE BANKING SYSTEM?

Given that the Riksbank carries out the fine-tuning transactions at the repo rate plus/minus 0.10 percentage points, liquidity in the banking system may be of some significance for the level of the overnight rate. For example, the overnight rate was pushed down by almost 0.10 percentage points when the Riksbank lent large sums to the banks during the financial crisis. There are two reasons for this: first, what the Riksbank lends automatically comes back at the end of the day as deposits and, second, the banks to a large extent make deposits using the Riksbank's fine-tuning transactions at the repo rate minus 0.10 percentage points. It is therefore important for the Riksbank to steer liquidity in the banking system. The Riksbank does this primarily by using monetary policy repos or by issuing Riksbank certificates. These transactions are carried out at the repo rate. According to the Riksbank's regulations for RIX and monetary policy instruments, the Riksbank can also use FX swaps or direct purchases and sales of securities.[9] The different types of transaction that the Riksbank uses to steer liquidity in the banking system are called *open market operations*.

Monetary policy repos and issues of Riksbank certificates

Each week, the Riksbank offers to borrow money from the banks by issuing Riksbank certificates with a maturity of one week. If the banking system has a liquidity deficit instead, which was the case before October 2008, the Riksbank can lend money by conducting a monetary policy repo. The repo procedure entails the Riksbank purchasing acceptable securities from a monetary policy counterpart at the same time as this

7 The speeches of the members of the Executive Board are no longer used as a signalling tool. The Riksbank publishes a forecast for the repo rate instead.

8 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 -0.25 per cent. In Figure 1 we can see that the sums in the deposit facility were unusually low during the following year when the deposit rate was negative.

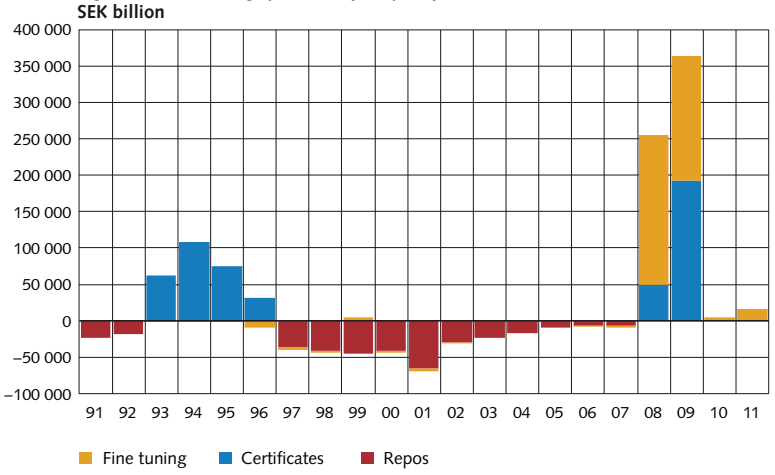
9 Sveriges Riksbank, Terms and conditions for RIX and monetary policy instruments.

counterpart undertakes to repurchase corresponding securities for a predetermined price a week later. The difference between the prices of the repos and certificates in connection with sale and repurchase is determined by the Riksbank's repo rate.

One week was chosen as the period for the maturity of certificates and the frequency of repos and certificates because the Riksbank wanted to be able to change the repo rate every week.[10] This was changed on 1 October 1999 when it was decided that the Executive Board would in the future 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.

The banking system had a liquidity deficit throughout the period 1997-2007. The Riksbank therefore used weekly repos with a maturity of one week to supply liquidity to the banking system (see Figure 3). 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. This would have made liquidity management more complicated for the monetary policy counterparties. In order to be able to continue with the monetary policy repos, the Riksbank carried out a structural foreign currency transaction. Beginning on 8 September 2008, the Riksbank sold foreign currency and bought kronor to a value of SEK 5 billion so that the banking system would continue to be in deficit. The intention was to subsequently begin issuing Riksbank certificates once the banking system returned to a situation with an ongoing liquidity surplus in relation to the Riksbank. This happened sooner than expected.

Figure 3. The banking system's liquidity surplus 31 December 1991-2011, SEK billion



Source: The Riksbank.

10 See Mitlid and Vesterlund (2001).

Steering liquidity during the financial crisis

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 loans at longer maturities. In the first auction of three-month loans on 6 October, the banks borrowed SEK 100 billion. At a stroke, the banking systems' liquidity deficit with the Riksbank became a liquidity surplus.

Initially, the Riksbank borrowed back the liquidity surplus using the daily fine-tuning transactions. To reduce the size of these transactions, the Riksbank began, on 14 October, to issue Riksbank certificates with a maturity of one week. Later, in the period 1 June to 13 October 2010, the banks were also offered, once a week, Riksbank certificates with longer maturities than one week. These certificates fell due at the time of the next monetary policy meeting. In addition, the Riksbank offered loans in US dollars to the Swedish banks during the crisis. The reason for this was the strained situation on the markets for short-term borrowing in US dollars that arose after Lehman Brothers filed for bankruptcy in September 2008. This lending was made possible by an agreement between the Federal Reserve and a number of other central banks, including the Riksbank, under which the Federal Reserve agreed to lend US dollars to these central banks. On 1 October 2008, the Riksbank lent USD 7 billion for a month in a first auction.[11] This was followed by an additional 14 loans at maturities of one and three months. The final loan was offered in August 2009. In the auctions the Riksbank typically offered USD 10 billion (apart from two smaller loans of USD 7 and 5 billion dollars respectively). The last loans were far from fully subscribed as the situation on the market had normalised. The US dollar lending facility was thus phased out.

The structural liquidity position of the banking system

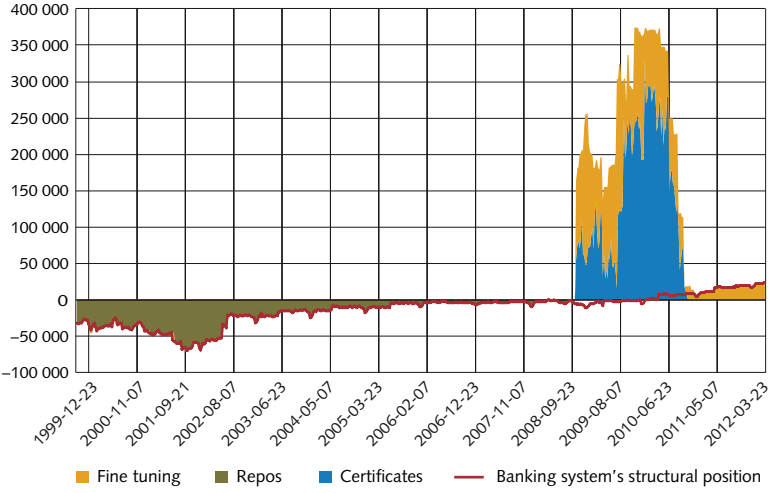
Figure 4 shows that the banking system continues to have a liquidity surplus even after the extraordinary measures in the form of loans to the banks have expired. In other words the banking system has moved from a structural liquidity deficit to having a structural liquidity surplus in relation to the Riksbank. How did this happen? To answer this question we have to go back a decade.

We can see in Figure 4 that the monetary policy repos have decreased in size over time since 2001 and that this trend means that the banking system's structural liquidity position moves from deficit to surplus during the financial crisis. What is this trend due to?

If items on the asset side other than the monetary policy transactions increase (for example through purchases of foreign or domestic assets with payment in kronor), the banking system will have a greater surplus (or a smaller deficit) in relation to the Riksbank. If items on the liability side other than the monetary policy transactions increase, the banking system will have a greater deficit (or a smaller surplus). So what are the items that have driven the banking system towards a surplus?

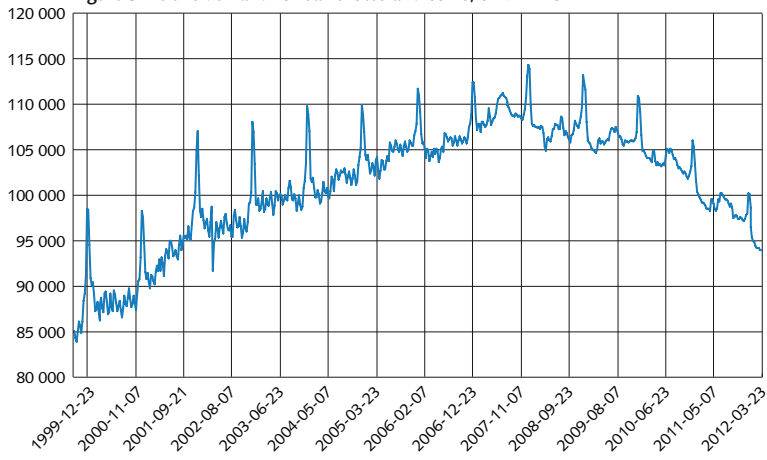
11 This first loan in US dollars was, however, funded through the Riksbank's foreign exchange reserve.

Figure 4. The banking system's structural liquidity position and the Riksbank's open market operations, SEK million



Source: The Riksbank's weekly reports.

Figure 5. Public demand for banknotes and coins, SEK million



Note. The public's demand for banknotes and coins is illustrated in the figure on the basis of movements in the item "Banknotes and coins in circulation" in the Riksbank's balance sheet.
Source: The Riksbank's weekly reports.

The Riksbank's annual payments of profits to the Treasury have had the greatest impact on the development of the banking system's structural position.[12] Part of the Riksbank's profits are paid to the Treasury each year.[13] This is done by crediting the National Debt Office's account in RIX with a sum equivalent to the amount of profits to be transferred.

12 See Nessén, Sellin and Åsberg Sommar (2011) for a more detailed discussion.
13 A detailed description of the method for calculating the transfer of profits to the Treasury is given in Gardholm and Gerwin (2011).

The National Debt Office then deposits the money with a commercial bank as the Riksbank does not pay any interest on the Office's account. This increases the structural liquidity surplus of the banking system. The money in the transfer thus affects the size of the open market operations. This is the main explanation of the fall in the volume of monetary policy repos since 2001 and the fact that there is now a liquidity surplus in the banking system.

Another factor that has contributed to the banking system having a structural surplus in relation to the Riksbank is that the public demand for banknotes and coins has declined (see Figure 5). We can see that the demand for banknotes and coins increased until 2007 but began to fall thereafter. When the public demand for banknotes and coins decreases the banks return more banknotes and coins to the Riksbank and the banks' RIX accounts are credited by the corresponding amounts. This increases the banks' liquidity surplus in relation to the Riksbank and, consequently, their deposits with the Riksbank, for example through the fine-tuning transactions, also increase.

How is the size of the weekly operations determined?

The emission volumes for Riksbank certificates (or previously the size of the repos) are calculated with the help of a forecast of the banking system's liquidity surplus (or previously deficit) for the coming week. Table 1 shows how to calculate the surplus on the basis of the items in the Riksbank's balance sheet. The example is based on the Bank's balance sheet as of 31 August 2011. The banking system's surplus on this day was calculated to amount to SEK 17 571 million. The Riksbank then offered an emission volume of SEK 17 600 million, but no bids were received in the auction. This is because the banks now prefer to use the fine-tuning transactions when they want to have liquidity available on a daily basis. The Riksbank instead drew in SEK 17 539 million of the surplus in fine-tuning transactions. The remaining SEK 32 million were deposited in the deposit facility.

Table 1. The banking system's liquidity surplus 31 August 2011

	SEK million
Gold and foreign currency reserve	324 172
Other assets	4 084
Banknotes and coins in circulation	–99 082
Other liabilities	–144 826
Equity	–66 777
The banking system's surplus	**17 571**

That which above all needs to be forecast in order to determine emission volumes is the public demand for banknotes and coins. This item usually increases in connection with salary payments, before the Christmas shopping period and in connection with holidays. As these increases come at regular intervals from year to year, the forecasts are based on information from the corresponding week in the previous year. The difference between the liquidity forecast and the actual daily surplus (or deficit) is covered by the daily fine-tuning transactions.

If the banks had bid for the entire issue volume of SEK 17 600 billion on 31 August 2011, then the banking system's liquidity position in relation to the Riksbank would have been more or less in balance during the week concerned. Daily changes in the public demand for banknotes and coins would probably then have led to a situation in which, at the end of the day, the banking system would have had a surplus on some days and a deficit on others. In the case of a deficit the Riksbank would have lent money in the fine-tuning transactions, while on the days when the banking system had a surplus the Riksbank would have borrowed money.

Issues of Riksbank certificates are announced by the Riksbank asking for bids at a fixed rate (volume bids). The conditions for each issue (or repo) are announced every Tuesday at 9.30 a.m. and cover

- the type of operation (drawing in liquidity by issuing certificates or supplying liquidity through repos)
- maturity (usually one week)
- the applicable interest rate (the current repo rate)
- the lowest and highest bid volume (in the example SEK 1 million and the total issue volume on 31 August 2011).

The period for submitting bids expires at 10 a.m.. The allocation is then calculated and announced at 10.15 a.m.. If the sum of the bids exceeds the size of the issue (or the repo) the bids are met proportionately in accordance with the ratio between the sum to be allocated and the total sum of the bids. The settlement date is the day after the announcement, which means that certificates (repos) will normally run from Wednesday to Wednesday.

Foreign exchange swaps

Instead of withdrawing liquidity from the banking system by issuing Riksbank certificates the Riksbank could use foreign exchange swaps. This involves selling foreign currency spot for Swedish kronor at the same time as performing the reverse transaction forward (normally from one week up to three months). The Riksbank and the counterparty then agree on a spot price and a forward price for the transaction. By means of this transaction the Riksbank withdraws Swedish kronor from the banking system during the period of the swap agreement. The foreign currency is taken from the foreign exchange reserve. If the Riksbank wishes instead to add liquidity it sells Swedish kronor spot for foreign currency at the same time as performing the reverse transaction forward.

In contrast to when the Riksbank uses monetary policy repos or issues Riksbank certificates, open market operations with foreign exchange swaps are normally carried out using a bilateral procedure. This means that the Riksbank performs a transaction with one or more foreign exchange policy counterparties without a bidding procedure.

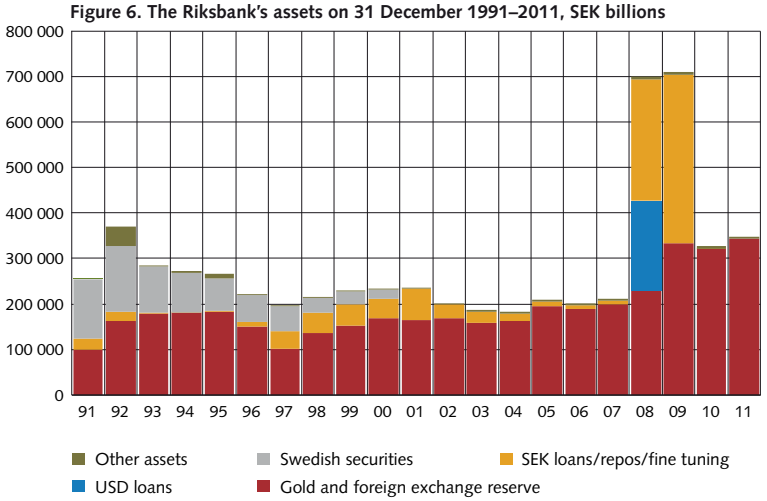
Purchases or sales of securities

The Riksbank can also buy or sell securities on the market in order to affect the financial system's structural deficits or surpluses. However the Riksbank has not used this type of market operation in recent years.

The Riksbank's portfolio of Swedish securities was disposed of in 2001, which is shown in Figure 6. As early as in 1998, the Riksbank reported that it intended to reduce its holdings of government securities by SEK 20 billion. This was because it was considered that the Riksbank's domestic securities portfolio no longer fulfilled any monetary policy function.[14] 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 the market participants. In this way the Riksbank lent Swedish securities that were attractive on the market.

In November 1999, it was decided to transfer the market-maintaining repo facility to the Swedish National Debt Office. It was then that the question was raised as to whether there was any remaining reason for the Riksbank to hold a portfolio of domestic securities, which at this point in time mainly consisted of government bonds (the Riksbank also had a small holding of treasury bills and mortgage bonds, but these matured in 2000). The conclusion was that this was not the case. The assessment of the General Council was that the Riksbank's equity could be reduced by SEK 20 billion. On 17 May 2001, the Riksdag consequently decided that the Riksbank should make an extraordinary transfer of profits to the treasury. On 13 June, the Riksbank transferred its remaining portfolio of Swedish government bonds, to value of SEK 20 billion, to the Swedish National Debt Office.

Figure 6. The Riksbank's assets on 31 December 1991–2011, SEK billions



Note: Gold is reported at market value from 1995.
Source: The Riksbank.

14 The nominal value of the portfolio at that time was SEK 47 billion. For more information see the Riksbank's press release no. 11, dated 9 March 1998.

The Riksbank's counterparties and collateral

So far we have described how the Riksbank can steer the overnight rate and liquidity in the banking system by carrying out different types of transaction with its counterparties in the money and foreign-exchange markets. But how does the Riksbank select the circle of counterparties? In this section we try to provide an overall description of the different categories of counterparty and the securities they use as collateral for loans from the Riksbank and in the monetary policy repos.

COUNTERPARTIES

Which counterparties does the Riksbank need? Since the operational target of the monetary policy operational framework is to stabilise the overnight rate it is natural that the participants who need to be active in the overnight market should be included among the Riksbank's counterparties. This is also the case. When there is friction on the market for short liquidity it is good for the Riksbank to have a large number of counterparties so that the Riksbank can carry out effective liquidity support measures in the form of loans to the market participants that need them. But normally there are only a few large agents on the Swedish market who want to bear the costs of being a counterparty.[15] Different counterparties also have different capacities and needs and there are thus different categories of counterparty.

In Chart 2 we outline how the different categories of counterparty can overlap. A *primary monetary policy counterparty* is a counterparty in fine-tuning transactions and in monetary policy repos/certificates, has access to the standing facilities and is a RIX participant.[16] A *counterparty in monetary policy repos/certificates* is a RIX participant that, unlike a primary monetary policy counterparty, is not a counterparty in fine-tuning transactions. During the financial crisis, however, these institutions also gained access to the fine-tuning transactions and still have that access today. There is also a category of counterparties that are RIX participants with *access to the standing facilities*. In addition, there are *RIX participants* that do not have access to either the Riksbank's facilities or market operations. A *counterparty in foreign exchange transactions* may also belong to one of the categories above, but could equally be an institution that does not even participate in RIX.

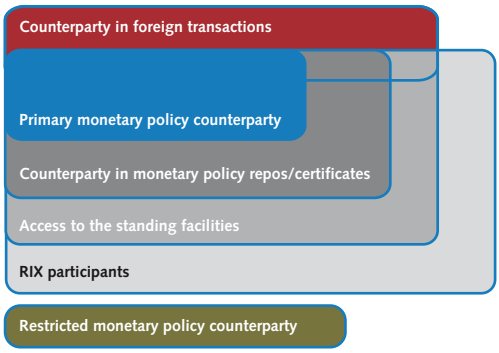
In spring 2009, the category *restricted monetary policy counterparty* was introduced to facilitate funding for the credit institutions that were not monetary policy counterparties to the Riksbank. They could in fact have applied to be monetary policy counterparties. But the Riksbank did not want to extend the circle of participants in RIX with institutions that do not have a natural need to participate in the payment system, since this could entail

15 Counterparties incur costs for having necessary systems in place and the staff to manage them, and also pay a fee for participating in RIX.

16 The primary monetary policy counterparties are a restricted circle of the major banks: Nordea, SEB, Svenska Handelsbanken and Swedbank AB. A current list of RIX participants and counterparties can be found on the Riksbank website www.riksbank.se.

increased operational risks in the system. A credit institution with its registered office in Sweden can instead apply to be a restricted monetary policy counterparty. The Riksbank then decides which operations a restricted monetary policy counterparty is entitled to participate in. Since the Riksbank does not currently have any extraordinary lending there is no reason for any institution to apply to be a restricted monetary policy counterparty.

Chart 2. Different categories of counterparty



Monetary policy counterparties must be RIX participants. The reason is that the Riksbank has considered that those who benefit from participating in the implementation of monetary policy should also contribute to an efficient payment system.

RIX participants have a main account with the Riksbank, where balances are recorded, and a loan account, where credit is recorded.[17] A RIX participant can be granted intraday loans against collateral in accordance with the basic principle that says that a RIX participant also has access to intraday credit.

There are also clearing institutions among the RIX participants.[18] It may seem that a clearing institution should not need intraday loans, since it only mediates payments between other institutions. But the payment system will be more efficient if an institution can make its own payments. The introduction of a central counterparty function can thereby be facilitated without creating further concentration to a number of settlement banks. Consequently the Riksbank also provides intraday loans to clearing organisations.

Only credit institutions can be *counterparties in foreign exchange transactions*. Unlike the monetary policy counterparties, a counterparty in foreign exchange transactions does not need to be a RIX participant.

17 A participant can also have a liquidity settlement account and a central bank credit account with the Riksbank. These accounts are to facilitate securities settlement in Euroclear Sweden and are therefore administered by that clearing institution. In addition, there are five LOM accounts with special settlement procedures that the counterparty can choose to participate in. See Appendix H3 to Terms and Conditions for RIX and monetary policy instruments.

18 A clearing institution mediates payments between its members (or their customers) and functions as a central counterparty in relation to a member (or its customer). The following clearing organisations are RIX participants: Bankgirocentralen, CLS Bank, EMCF, Euroclear Sweden and NASDAQ OMX.

COLLATERAL

According to the Sveriges Riksbank Act, the Riksbank can provide loans for monetary policy purposes, but these must only be granted against adequate collateral. In December 1999, the Executive Board of the Riksbank decided to make some changes to the collateral management process. The aim was to become more flexible with regard to the securities the Riksbank accepts as collateral for loans. There was also an intention to harmonise the Riksbank's regulations with those of the Eurosystem with regard to the assessment and risk control of collateral. The parts of the Riksbank regulations for RIX and monetary policy instruments that concern collateral thus by and large follow the principles of the Eurosystem.[19]

Since then the Riksbank has routinely examined whether securities issued by the Swedish government and Swedish mortgage institutions should be approved as collateral. When investigating securities issued by issuers other than the government and mortgage institutions, the Riksbank uses an application procedure. A counterparty can send an inquiry to the Riksbank as to whether a given security is eligible as collateral.

As part of the management of the financial turmoil of 2007–2008, the Riksbank extended the number of debt instruments eligible as collateral to enable greater lending from the Riksbank. Consequently, on 13 December 2007 the Riksbank decided to accept covered bonds issued by the counterparty itself, or by an institution closely related to the counterparty, as collateral for credit in RIX or as part of the monetary policy operational framework. At that time it was considered that the risk associated with covered bonds was so low that they could be accepted as collateral, even if they were issued by the counterparty itself or by a related institution. At the same time the Riksbank wanted to aim for diversification of the securities a counterparty put up as collateral. It was therefore decided to restrict the proportion of a counterparty's collateral that could be issued by one and the same counterparty or group of related counterparties to a maximum of 25 per cent of the total value of the collateral pledged by the counterparty.

At the outbreak of the financial crisis the Riksbank decided on 22 September 2008 to change the above-mentioned restriction from 25 per cent to 75 per cent.[20] The change was deemed to have a positive effect on the efficiency of the money and bond markets while at the same time not significantly increasing the Riksbank's credit risk. On 8 October 2008 the restriction was completely removed.

19 However, there are significant differences. The Riksbank does not accept bank loans nor securities issued by banks or by credit institutions abroad that are domiciled in the same country as the counterparty pledging them. The Riksbank also makes an extra haircut for its own covered bonds and has higher haircuts for securities without continuous public pricing. A proposal submitted for comments regarding amendments to these regulations with regard to collateral, which is intended to come into force in 2012, is reported in Sveriges Riksbank (2011).

20 See Sveriges Riksbank, basis for decision Ref no. 2008-728-KAP.

Does the operational framework for monetary policy need to be changed?

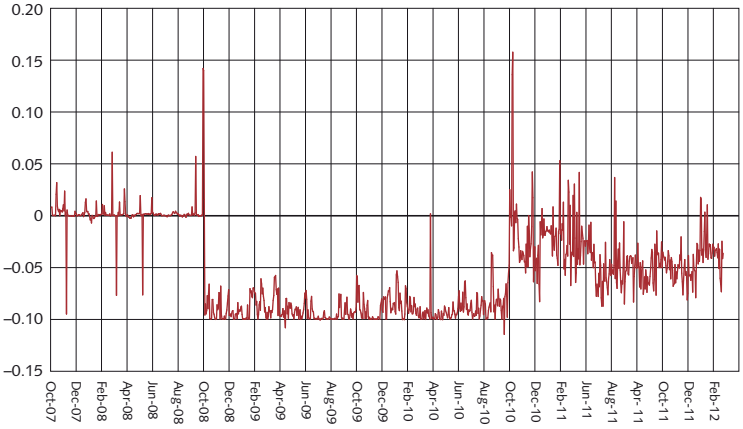
As part of the review of the Riksbank's operational framework for monetary policy we have also studied and compared other central banks' systems with the Riksbank's system. We are not able to present the results of this work in detail here, but we can note that the Riksbank's operational framework is relatively simple, transparent and efficient in an international comparison. It is therefore important that in our future efforts to develop this framework we always carefully weigh the advantages we wish to achieve against the disadvantages that might entail our framework becoming unnecessarily complicated, less transparent and less effective.

Bearing this in mind, we will in this section discuss the question of whether the operational framework is built up in such a way that the Riksbank is sufficiently prepared in terms of competence, market presence and appropriate instruments to be able to efficiently manage shocks to the financial system. First, however, we must focus on the more concrete issue of how well the operational framework performs its task of stabilising the intraday rate around the repo rate signalled by the Executive Board.

We have reached the conclusion in the course of our review that the operational framework for the implementation of monetary policy in Sweden is well able to stabilise the overnight rate both under normal conditions on the financial markets and during a financial crisis. Figure 7 shows that during the entire period from October 2007 to the end of December 2010, the overnight rate remained largely within a deviation interval no greater than 0.10 percentage points above or below the repo rate. After the Riksbank began to implement its extraordinary measures in the form of long-term loans to the banking system in October 2008 and until the extraordinary measures were withdrawn in October 2010, the overnight rate was pushed down to the rate on fine tuning operations. This meant that the overnight rate was 0.10 percentage points below the repo rate. As the banking system was able to invest its liquidity surplus in the fine-tuning operations, the downward pressure on the overnight rate was limited to a maximum of 0.10 percentage points below the repo rate.

Unlike most other central banks, the Riksbank does not explicitly state a target for the *overnight rate*, despite this being the operational target for the Riksbank's monetary policy. Instead, the Riksbank stipulates that the *repo rate*, which is the most important reference rate for the Riksbank's monetary policy operations and standing facilities, will remain at a particular level. This relationship can cause uncertainty over which interest rate the Riksbank is actually trying to steer. The clarity of the operational framework for monetary policy could thus be improved if the Riksbank began to signal a desired level for the overnight rate. This could increase the transparency of the operational framework even further, without needing to radically change it.

Figure 7. The overnight rate's deviation from the repo rate, percentage points



Source: Eklund and Åsberg Sommar (2011).

During the recent financial crisis, the Riksbank implemented a number of extraordinary crisis measures without needing to make any radical changes to the operational framework for monetary policy.

The crisis measures largely entailed the Riksbank

- lending Swedish kronor to the banks at longer maturities
- lending US dollars to the banks at one-month and three-month maturities
- deciding to allow more types of securities and to extend the range of securities accepted as eligible assets for loans from the Riksbank
- extending the number of counterparties allowed to participate in the fine-tuning transactions
- introducing a new category of counterparty: restricted monetary policy counterparties.

Similar measures were taken at roughly the same time by other central banks. Unlike a number of other central banks, however, the Riksbank did not buy any securities. This made the exit process for the Riksbank much simpler when the extraordinary measures were no longer needed.

We can note that the Riksbank dealt very successfully with the crisis with these relatively limited measures. But this does not mean that the next crisis can be dealt with in the same way. There are therefore good reasons for considering whether the readiness of the operational framework to deal with future crises should be improved and in that case how this should be achieved. As part of our review we have identified some areas where there is scope for improvement.

First, the Riksbank has no mechanism apart from the standing deposit and lending facilities and fine-tuning transactions to deal with any frictions in the interbank market that arise as a consequence of an uneven balance in liquidity between the banks. Such frictions are increased by the fact that the banks introduced a restriction at the time of the

financial crisis which means that an individual bank may not have a deficit of more than SEK 10 billion at the close of the day. This restriction means that the banks now try to avoid deficits on the overnight market by meeting their liquidity needs one day earlier, in other words via loans that run from tomorrow to the next day (T/N - Tomorrow/Next loans).

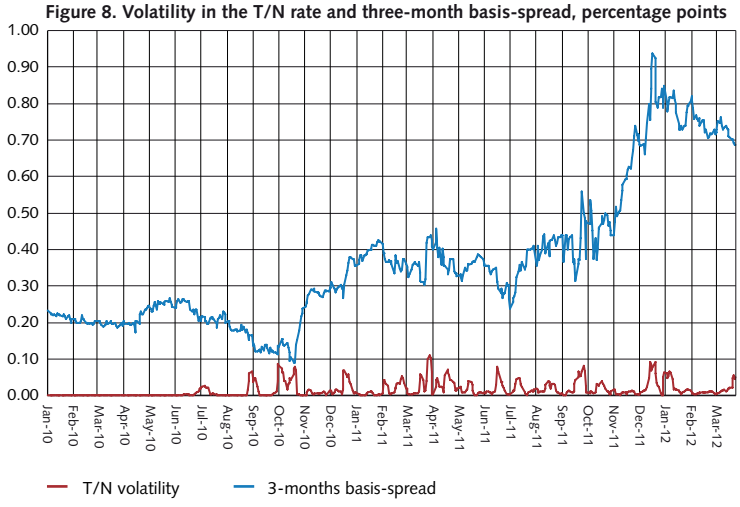
The operational framework is ultimately based on the banks realising that they all gain from balancing liquidity between them at an interest rate close to the repo rate at the close of the day. A bank that has a liquidity surplus today may need to borrow from other banks tomorrow to cover a deficit, and all banks thus stand to gain from the friction-free balancing of liquidity at the close of business. A weakness of this is, however, that it gives individual banks the possibility to abuse the system and indulge in strategic gambits. Individual banks may refuse to cooperate for strategic reasons. Banks with deficits may then be forced to borrow overnight from the lending facility at a penalty rate. The consequence of such frictions when balancing liquidity between banks is an unnecessary volatility in the overnight rate.

It is also difficult to reduce frictions on the interbank market, since the banks do not lend to each other without collateral if there is a counterparty risk in their transactions. However, they would be able to lend to each other against collateral intended for intraday loans overnight that they have deposited with the Riksbank. At present, however, the banks cannot use the collateral deposited for this purpose for administrative reasons.

Second, the Riksbank has no framework for steering the interest rate for the T/N maturity. The reason for highlighting this rate in this context is that interest rate derivatives in Sweden, unlike many other countries, are based on the T/N rate and not the overnight rate. This means that the development of the T/N rate has a direct connection to other interest rate instruments and the formation of interest rates in these submarkets.

As we have noted previously, a stable overnight rate is a necessary but not sufficient anchor for stabilising the formation of interest rates at longer maturities. The rate on the market for the T/N maturity used to be firmly anchored at 0.10 percentage points above the overnight rate. In connection with the phase-out of the Riksbank's extraordinary measures in the form of long-term lending in October 2010, volatility on the T/N market became high at the same time as the three-month rate rose in relation to the overnight rate (see Figure 8). This indicates that the monetary policy transmission mechanism has started to function less well. Nor does it seem to be sufficient that the overnight rate remains within a narrow interval around the repo rate for it to be considered that monetary policy has been implemented in an effective way.

Figure 8. Volatility in the T/N rate and three-month basis-spread, percentage points



Note: Volatility is calculated as the standard deviation of the T/N rate's deviation from the repo rate, calculated using a five-day rolling window. The basis-spread is calculated as the three-month interbank rate minus the three-month STINA rate, which is the average T/N rate for a three month period. It reflects the risk for three-month loans on the interbank market.

Third, the Monetary Policy Department at the Riksbank has no portfolio of domestic assets and hence no systems or routines adapted to the direct purchase of Swedish securities. Consequently, it may take the Riksbank a long time to begin conducting unconventional monetary policy when necessary through quantitative easing.[21] When the Riksbank's portfolio of Swedish securities was disposed of in 2000, it was considered that a domestic portfolio did not fulfil any monetary policy function. However, this conclusion rests on the premise that the markets are effective, which means that central-bank interventions have no long-term impact on the formation of interest rates. The financial turmoil and crisis of 2007–2010 have shown, however that it cannot be assumed that the markets will always function effectively. We have also seen that short-term interest rates may approach zero in a crisis situation. If further stimulation of the economy is desired in such a situation, one alternative is to directly influence long-term interest rates by buying bonds on the market. It is very unusual for a central bank not to have a portfolio of assets in its own currency. Other central banks trade in bonds in their own currency routinely and can thereby take measures at very short notice to directly influence domestic bond yields in a situation where this is called for.[22]

Finally, in practice it has proved difficult to extend the Riksbank's circle of counterparties. It is true that the Riksbank introduced the category of *restricted monetary*

21 Quantitative easing means that the central bank buys assets and finances these purchases by increasing the banks' reserves in the central bank. The purpose of such a measure is to push down interest rates for longer maturities.

22 On 10 May 2012 the Executive Board of the Riksbank decided to establish a securities portfolio to a value of SEK 10 billion.

policy counterparty in spring 2009 to facilitate funding for credit institutions that were not monetary policy counterparties of the Riksbank. However, only a few institutions decided to avail themselves of this opportunity. Nevertheless, this has meant that the Riksbank has an infrastructure in place that enables it to rapidly lend money to more counterparties in a crisis.

Concluding comments

In this article, we have presented a status report on the Riksbank's efforts to evaluate the operational framework for the implementation of monetary policy. The work began in the spring of 2008 but the outbreak of the financial crisis in September of that year taught the Riksbank new lessons about how the system works in different circumstances. At the same time, work is also underway on the regulation of the financial sector which may have consequences for the design of the operational framework. The Riksbank thus needs to continue its evaluation work to take into account all these lessons and the results of the ongoing regulatory work.

To date, however, we have been able to complete a review of how the operational framework functions today. This shows that the Riksbank's monetary policy operational framework functions well both under normal circumstances and during a financial crisis. However, there are good reasons to strengthen preparedness in the system so as to be able to meet future crises that may demand other measures than those taken by the Riksbank in 2007–2010.

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