

The Riksbank's experiences of publishing repo rate forecasts

Riksbank Studies, June 2017

Production: Sveriges Riksbank
Stockholm June 2017
ISBN 978-91-87551-06-2

Contents

Foreword 4

Summary 5

1 Why did the Riksbank start publishing repo rate forecasts? 6

1.1 Previous repo rate assumptions entailed drawbacks and problems 6

1.2 Producing an in-house repo rate forecast became a natural step 7

2 Experiences of publishing repo rate forecasts have been good 8

2.1 Repo rate forecasts have facilitated and improved the Riksbank's analyses 8

2.2 The publication of the repo rate forecasts has provided a better basis for the evaluation and discussion of monetary policy 8

3 Most of the concerns raised in 2007 have not been realised 9

3.1 The Riksbank has not felt forced to stick to the rate forecast 9

3.2 The repo rate forecast has not been perceived as a binding commitment 10

3.3 It is also possible for a committee to produce a repo rate forecast 11

4 But there have also been challenges 11

4.1 Neither the Riksbank's nor others' forecasts have been particularly accurate 11

4.2 The deviations between the Riksbank's repo rate forecast and market rates have periodically been large 13

4.3 But changes in the repo rate forecast have affected market rates 15

5 Concluding comments 16

References 18

Foreword

It is now ten years since the Riksbank began publishing its own forecasts for the repo rate. This makes it an appropriate point at which to reflect upon our experiences. In addition, in their review of the Riksbank's monetary policy 2010-2015, Marvin Goodfriend and Mervyn King recommend the Riksbank to both evaluate its experiences of publishing its own repo rate forecasts and analyse the discrepancies between the market's expectations and the Riksbank's forecasts that existed over parts of the review period. In its report, the Riksdag Committee on Finance also considered that the Riksbank's experiences of its own repo rate forecasts needed to be evaluated in depth.

This Riksbank Study explains why the Riksbank started publishing repo rate forecasts and discusses, on an overall level, what its experiences of this have been. As a complement, more detailed descriptions of various sub-areas are published in the form of three Staff Memos and a Working Paper.¹

Experiences of producing and publishing repo rate forecasts can be evaluated along two dimensions. The *internal* dimension deals with the Riksbank's work of using forecasts of the development of the economy to arrive at an appropriate monetary policy, while the *external* dimension deals with the communication of monetary policy. These dimensions are also largely connected.

Experiences from both dimensions have been good. The Riksbank's internal work on the material for monetary policy decision-making has developed and improved. The possibilities for an open external discussion and evaluation of monetary policy have also improved due to the Riksbank's publication of its own forecasts for the repo rate.

But there have also been challenges. One such challenge is that the repo rate forecasts have not been particularly accurate. Another challenge lies in the differences between market rates and the Riksbank's repo rate forecasts.

Few of the concerns raised when repo rate forecasts were introduced in 2007 have been realised. Against the background of the Riksbank's predominantly positive experiences, there are few alternatives to continuing to publish repo rate forecasts. Two things for the Riksbank to continue to think about, given the challenges that have nevertheless arisen, are how the accuracy of repo rate forecasts can be improved and the relative monetary policy significance of, on one hand, changes in the actual repo rate and, on the other, changes in the repo rate path.

The Executive Board of the Riksbank

¹ See Alsterlind (2017a and 2017b), Iversen and Tysklind (2017) and Åhl (2017).

Summary

The Riksbank started publishing its own forecasts of the repo rate in 2007. This was largely connected with the problems associated with the assumptions that had previously formed the basis of the Riksbank's forecasts of inflation and the real economy: a constant repo rate over the forecast period and a repo rate developing in line with forward rates. In addition, the publication of its own repo rate forecasts formed part of a general development in the direction of more openness around the material used to make monetary policy decisions. Being able to influence market rates with longer maturities provided a further reason for the Riksbank to start to publish its own repo rate forecasts.

The Riksbank's experiences of making its own repo rate forecasts have been good. The repo rate forecasts have improved internal analysis, among other means by facilitating the use of alternative scenarios in which the effects of different monetary policy alternatives can be analysed and illustrated. The cooperation of members of staff and the Executive Board has also been deepened in that the forecasts and monetary policy deliberations are now connected more clearly than previously. In addition, the publication of repo rate forecasts has given the general public greater insight into monetary policy and improved possibilities for evaluation and accountability.

Many of the concerns linked to the publication of repo rate forecasts that existed 10 years ago have not materialised. For example, there was a concern that the repo rate forecast would be interpreted as a binding promise. But, as the Riksbank has amended its repo rate forecasts at more or less every monetary policy meeting since 2007, this concern has proved to be unfounded. Another concern was that the six members of the Executive Board would fail to agree on a repo rate forecast. Even though reservations have been entered against the repo rate forecast relatively often, it has been possible to unite a majority of the members for a specific repo rate path at the time of every decision. One explanation for this is that the individual members have had a certain tolerance of deviations from their own preferred paths under a 'close enough' principle.

Even if experiences have been good on the whole, there have been challenges. One of these has been that the repo rate forecasts have not been particularly accurate. However, this has been a common characteristic of equivalent forecasts in other countries and among other analysts over the last decade. Possible explanations of this include the trend decline in global real interest rates that has occurred in recent decades and the large negative shocks to which the global economy has been exposed since 2008 in the form of both the global financial crisis and the European sovereign debt crisis.

Another challenge arose from the periodically large deviations between the Riksbank's repo rate forecasts and expectations of the repo rate as reflected in the pricing of short and long-term market rates. However, it is difficult to estimate such expectations using market rates. Long-term rates are not just determined by expectations of future short-term rates, but also by different 'premiums' that can, for example, reflect how fixed-income investment over various maturities is linked with various risks or liquidities. There are indications that these premiums may have played a part in the discrepancies between the Riksbank's repo rate forecasts and the estimated repo rate expectations based on market rates.

However, there are indications that the Riksbank's adjustments of its repo rate forecasts have influenced market rates in the same direction, even if the effects have primarily been on short maturities and are not 'one-to-one'.

Against the background of these predominantly positive experiences, there are few reasons for the Riksbank not to continue to publish repo rate forecasts. Two things for the Riksbank to continue to ponder, however, are how the accuracy of repo rate forecasts can be improved and how actual changes of the repo rate should be compared with changes of the repo rate forecast when monetary policy needs to be made more or less expansionary.

1 Why did the Riksbank start publishing repo rate forecasts?

Monetary policy works with a time lag and must therefore be based on forecasts of future developments. These forecasts, in turn, are influenced by the assumptions made as regards the future development of the policy rate. Over the period in which it has had inflation targeting, the Riksbank has used various assumptions on the future development of interest rates in its forecast work.

1.1 Previous repo rate assumptions entailed drawbacks and problems

From 1995 until October 2005, the Riksbank, like most other central banks with inflation targets, made inflation forecasts subject to the assumption that the repo rate would remain unchanged over the forecast period. The forecast method was combined with a simple decision rule: if inflation, according to forecast, was below 2 per cent two years ahead, it would be considered to be signalling a need to lower the repo rate. But if inflation was instead deemed to be higher than 2 per cent, the repo rate would normally need to be raised.

The repo rate assumption and decision rule were easy to understand and were therefore good educational tools. This was particularly important just when inflation targeting was being introduced in the mid-1990s.² The aim then was to rapidly create confidence in the new monetary policy regime and anchor inflation expectations around the new target of 2 per cent. To succeed in this, it was necessary for households, companies and participants on the financial markets easily to be able to understand the motives behind the monetary policy decisions. In this context, the simple rule probably played an important role.

However, there were also considerable disadvantages. For instance, under normal circumstances, it is not a particularly realistic scenario for the repo rate to remain unchanged a couple of years ahead. This could complicate the interpretation of the Riksbank's forecasts. The assumption also made it difficult to assess the Riksbank's forecasts and compare them with those of other forecasters. In addition, the assumption meant that it was difficult to make forecasts that were totally coherent. This was an important reason for dropping the assumption of an unchanged repo rate.

Moreover, it gradually became clear that the decision rule could sometimes be an obstacle to the Riksbank's communication. Too much focus was on the current interest rate decision and the inflation forecast exactly two years ahead. In addition, neither the general public nor the financial markets received any clear guidance as to how the Riksbank viewed interest rate developments subsequent to the date of the decision in question. The Riksbank's forecasts thereby included no information on monetary policy in the period ahead.³

As the Riksbank's credibility increased, there gradually became greater scope to conduct a more flexible monetary policy in which the development of the real economy was also weighed in, which is to say output, employment, unemployment and so on. This also led to a greater need to show that it is the entire expected paths for inflation and the real economy a few years ahead that is important to monetary policy decisions, and not merely the levels we foresee two years ahead. And the focus should be on not only current interest rates, but also expectations of how the repo rate will develop in the period ahead.

In October 2005, the Riksbank instead started to publish forecasts based on estimates of the market's expectations of the development of the repo rate as reflected in the pricing

² In January 1993, the Riksbank announced that CPI inflation would be limited to 2 per cent, which would apply from 1995.

³ For this reason among others, the Riksbank published forecasts based on market expectations of the repo rate according to surveys in articles in the Inflation Reports over the period October 1999 to March 2003. However, according to Heikensten (2005), these forecasts were never assigned any great weight in discussions of monetary policy. See also Leeper (2003).

of the fixed-income market, in the form of so-called forward rates. A forward rate is a future interest rate, for example an overnight rate two years ahead, the level of which is determined today. Forward rates are estimated using the pricing of short and long-term market rates as a starting point.⁴ Compared with assuming that the repo rate will remain unchanged, market participants' expectations, to the extent that they are captured by forward rates, provide a more realistic forecast. This made it easier to evaluate.

But there are also drawbacks in assuming that the repo rate will develop in accordance with the expectations of the financial markets. Just as with the assumption of a constant repo rate, the problem lay in making macroeconomic forecasts based on an exogenously-determined monetary policy. Among other things, the difficulty in making forecasts that were totally coherent persisted to a certain extent. Communicating monetary policy when the market participants and the Riksbank were making different assessments of how the repo rate would develop in the period ahead also proved to be challenging.

Another problem concerned how the market's expectations of the development of the repo rate should actually be measured. Forward rates, which are estimated on the basis of the pricing of short and long-term market rates, do not just reflect market participants' expectations of the future repo rate level, but also different 'premiums'. These premiums can, for example, reflect how fixed-income investments at different maturities are linked with different risks or liquidity.⁵

1.2 Producing an in-house repo rate forecast became a natural step

In February 2007, the Riksbank started publishing its own forecast for the repo rate, known as an interest rate path.⁶ At that time, there were several different reasons that made this seem like a natural step.⁷

The first reason was that the Riksbank, by basing its forecasts for inflation and the real economy on its own assessment of the future repo rate, would avoid the drawbacks and problems inherent in the assumption that the repo rate would develop in line with forward rates, as discussed above.

The second reason was to make it easier to understand the motives behind the Riksbank's decisions. This means that it was also important to publish the interest rate forecasts. This also created better opportunities to evaluate monetary policy. This, in turn, would result in better conditions for accountability and improve the legitimacy of the Riksbank as an independent authority. As transparency makes it easier to evaluate how well monetary policy functions, this would also increase the incentives for the Riksbank to do a good job.

The third reason was that the Riksbank would be able to exert a greater influence on expectations of the future repo rate among households, companies and participants on the financial markets. This was considered important as economic decisions greatly depend on expectations of the future level of interest rates. One way for the Riksbank to influence these expectations is to present a forecast that the Riksbank itself deems reasonable.

4 Forward rates are calculated using interest rates with different maturities. The principle can be illustrated by a simple example: First investing in a 1-year bond and then a 1-year forward rate guarantees an amount in two years and is thus equivalent to a 2-year bond. In this way, the 1-year forward rate one year ahead can be determined, in that the average of the 1-year yield and the 1-year forward rate one year ahead must be the same as the 2-year yield. According to the same principle, forward rates over a number of different horizons and maturities can be calculated on the basis of a longer and a shorter bond yield.

5 Forward rates and forward premiums are described in more detail in section 4.2 below. See also Alsterlind (2017a).

6 Other central banks publishing their own interest rate forecasts are the Reserve Bank of New Zealand (from 1997), Norges Bank (from 2005) and the Czech National Bank (from 2008). The Central Bank of Iceland makes forecasts based on its own interest rate forecast (from 2007), but only published these forecasts over the period 2007-2008. In the Czech Republic and Iceland, the interest rate forecast is a staff forecast. In the United States, since 2012, the central bank has published the Federal Open Market Committee members' view of an appropriate level for the policy rate one, two and three years ahead.

7 See, among others, Rosenberg (2007), Sveriges Riksbank (2007) and Ingves (2007).

2 Experiences of publishing repo rate forecasts have been good

2.1 Repo rate forecasts have facilitated and improved the Riksbank's analyses

The Riksbank's internal analytical work has been significantly improved by the macroeconomic forecasts and monetary policy discussions being based on the Riksbank's own assessment of the future repo rate. Coherency between all components of the forecasts has now been improved. While work on forecasts and monetary policy previously could be more isolated, it is now tightly interconnected. Together with other members of the Riksbank's staff, the Executive Board participates significantly more actively in forecasting, as forecasts for inflation and employment, for example, are influenced by the view of the repo rate over the forecast period.⁸ The Riksbank's own repo rate forecast can also be seen as an integral part of the larger work of developing a well-considered basis for the monetary policy discussions. Alternative scenarios, for both the development of the economy and monetary policy, are a natural part of the background material for monetary policy decisions. Their role in monetary policy analysis and communication has become clearer.

The forecasts that the Riksbank prepares using its own repo rate forecast are the result of the interplay of the *probable* development of the economy and an assessment of which monetary policy will be needed to achieve the *desired* economic development, in terms of a rate of inflation close to the target and the stable development of the real economy. If, for example, the future rate of inflation, based on a certain forecast for the repo rate, is too low, a lower repo rate forecast can be selected, thereby signalling that monetary policy will have to be more expansionary.⁹

One consequence of the work of improving the material for monetary policy decisions was that a greater part of the internal background material could also be published externally. Both monetary policy and alternative scenarios became a part of the Inflation Report, which was accordingly renamed the Monetary Policy Report in 2007. This was a better reflection of the content of the Report.

To sum up, it could be said that the earlier Inflation Report implied economic and inflation forecasts based on certain assumptions concerning monetary policy – that could then lead to a certain reaction in the form of a changed repo rate. In contrast, the Monetary Policy Report is a description of the development of the economy and the inflation outlook expected to result from a monetary policy that the Riksbank deems is well-balanced. And, vice versa, it is also a description of the monetary policy needed to achieve a specific development for inflation and other economic variables.

2.2 The publication of the repo rate forecasts has provided a better basis for the evaluation and discussion of monetary policy

Target attainment is a natural starting point for assessing monetary policy. However, a comparison between the outcomes for inflation and the inflation target does not necessarily show how well monetary policy has been conducted. Inflation is, of course, also affected by a number of other factors than monetary policy, as the economy is constantly being subjected to unexpected shocks. Consequently, even well-founded and carefully-analysed forecasts can turn out to be wrong. Deviations from the inflation target are the rule rather than the exception.

⁸ See Rosenberg (2008) and Hallsten and Tägtström (2009).

⁹ See also Nyman and Söderström (2016).

The evaluation of the Riksbank's work on reaching the inflation target therefore requires insight into the motives behind the monetary policy decisions. For the Riksbank, the forecasts for inflation and the real economy form the basis for this decision. As the Riksbank's forecasts of economic development are, in turn, based on assumptions of the development of the repo rate and other factors, it is more difficult to explain, understand and evaluate the Riksbank's forecasts of economic development if the repo rate forecast is not also published. The transparency involved in publishing an in-house repo rate forecast creates better conditions for accountability and provides legitimacy to the Riksbank as independent central bank. This has also been confirmed by the external review of monetary policy 2010-2015 made by Goodfriend and King (2016). It shows that the general public and market participants perceive the repo rate forecast and the information it provides as something positive – regardless of what opinions they otherwise may have of the Riksbank's monetary policy. In international comparisons, the Riksbank is now considered to be the most transparent central bank.¹⁰ Publishing repo rate forecasts has therefore given a better basis for the evaluation of the monetary policy conducted by the Riksbank.

The continuing external discussion of monetary policy has also improved with the publication of repo rate forecasts by the Riksbank. Discussion becomes less speculative when the Riksbank is open on its view of future monetary policy, and the repo rate forecast often forms the starting point for reporting and discussions of monetary policy in market newsletters and the media. In addition, households and companies have the opportunity to refer to the repo rate forecast when taking decisions on loans, for example.

3 Most of the concerns raised in 2007 have not been realised

Both academic research and the public debate on monetary policy have pointed out various problems and concerns involved in the central bank publishing its own policy rate forecast.¹¹ For the Riksbank's part, however, most of these concerns have not been realised.

3.1 The Riksbank has not felt forced to stick to the rate forecast

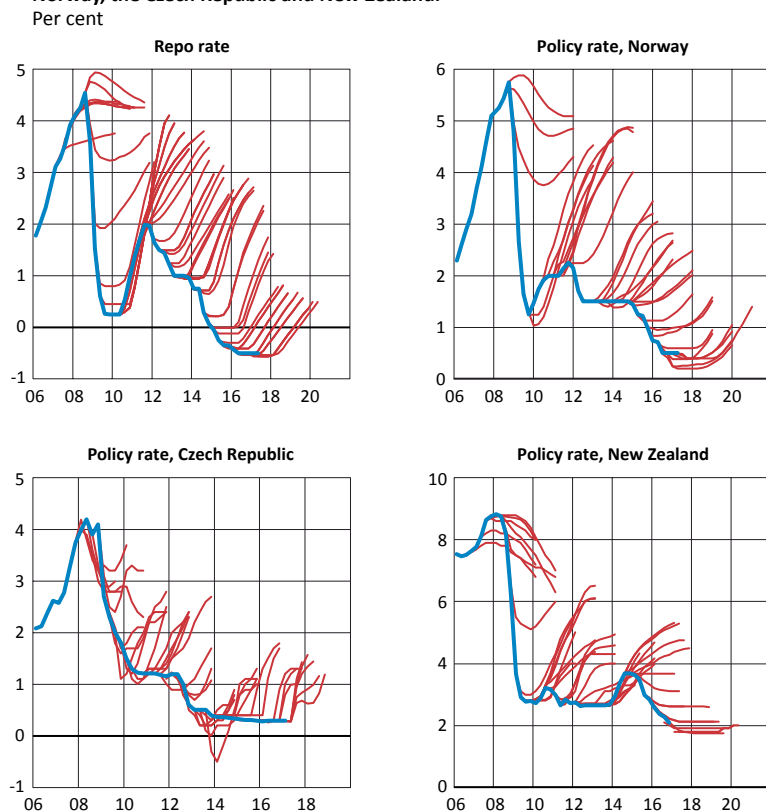
One concern was that the Riksbank might feel forced to stick to the repo rate forecast even if it no longer could be considered well-judged.

But closer scrutiny of the Riksbank's repo rate forecasts shows that the forecast has been changed at virtually every monetary policy meeting since 2007 (see Figure 1). This clearly indicates that the Riksbank has not felt forced to stick to the repo rate forecast when it no longer could be considered well-judged. It has also been very common among other central banks to make changes in the rate forecast (see Figure 1).

¹⁰ See Dincer and Eichengreen (2014).

¹¹ See, for example, Morris and Shin (2002), Blinder and Wyplosz (2004), Mishkin (2004), Gersbach and Hahn (2008), Gosselin et al. (2008) and Goodhart (2009).

Figure 1. The Riksbank's repo rate forecasts and central bank policy rate forecasts in Norway, the Czech Republic and New Zealand.



Source: Alsterlind (2017b)

3.2 The repo rate forecast has not been perceived as a binding commitment

Another concern was that economic agents might perceive the repo rate forecast as a binding commitment and not a conditional forecast based on the current economic situation and forecasts for factors that monetary policy can not influence, such as international growth and the oil price.

There was also a closely related apprehension that market participants would stop searching for other information if they had access to the Riksbank's forecast for the repo rate. This might risk impairing the functioning of the market.

But as we will show later on, the market's view of the future repo rate has largely been different to that of the Riksbank, even though it is difficult to measure their expectations exactly. This shows that the market could not possibly have perceived the repo rate forecast as a pledge. Market participants search for other information and create their own picture of the most probable development going forward. Beechey and Österholm (2012) also find that the accuracy of both survey expectations and forward rate-based forecasts for the repo rate have improved since the Riksbank started publishing its own rate forecasts.¹²

¹² The forecast accuracy is generally low, however; see Beechey and Österholm (2012). This is also discussed in greater detail in Section 4.1.

3.3 It is also possible for a committee to produce a repo rate forecast

Another objection to the Riksbank publishing its own repo rate forecast was that it would be difficult or even impossible for the six members of the Executive Board to agree. It is one thing to establish what the repo rate should be today, but another to establish what the repo rate is expected to be at twelve different points in time in the future.¹³

But neither has this concern been realised. It has always been possible for a majority of Executive Board members to agree on a repo rate forecast, even if one or more of them have entered a reservation against the majority's forecast relatively often. One explanation for at least a majority of board member being able to agree is that they have been able to accept certain deviations between the main scenario for the repo rate and their own forecast. Board members have largely adopted a 'close-enough' principle when it comes to repo rate forecasts.¹⁴

4 But there have also been challenges

Many of the fears expressed with regard to publishing a forecast for the repo rate when the Riksbank began doing so in 2007 have not been realised. Both the Riksbank's internal work and the communication of monetary policy have improved. But there have also been challenges.

4.1 Neither the Riksbank's nor others' forecasts have been particularly accurate

Figure 1 shows the Riksbank's repo rate forecasts together with the actual repo rate in the upper left-hand figure. It is very clear that the forecasts have on the whole overestimated the outcomes. On average, the Riksbank has overestimated the repo rate by around 0.5 percentage points one year ahead and by around 2 percentage points two years ahead.

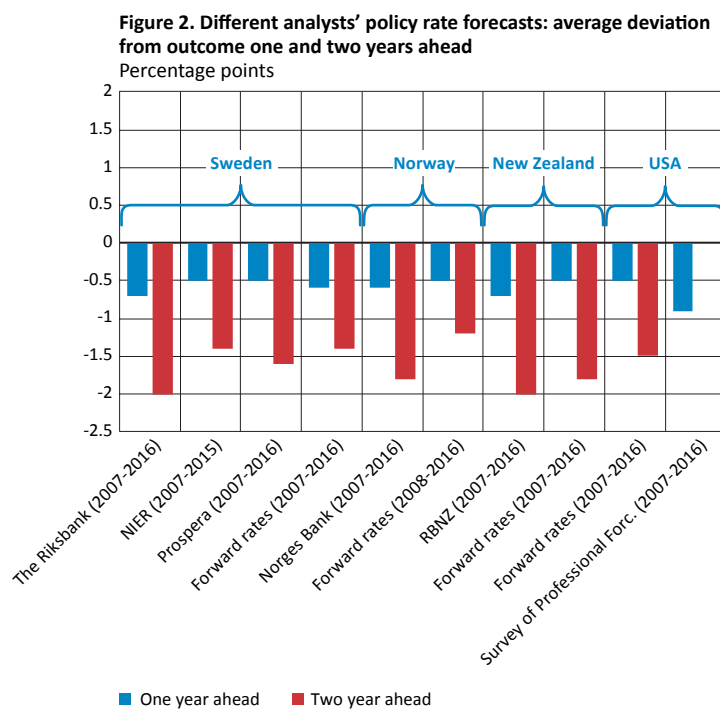
However, this overestimation of the repo rate is not unique to the Riksbank. Figure 2 shows the average difference between different forecasts for the policy rate and the outcome one and two years ahead in Sweden, Norway, New Zealand and the United States. As we can see, other central banks and other analysts as well as forward rates have all overestimated the future policy rate.¹⁵

The forecast deviations are around the same size for different countries and analysts, but we can see some differences. For instance, the central banks have made somewhat larger forecasting errors than the forecasts based on forward rates. We can also see that the forecast deviation is greater two years ahead than one year ahead.

13 Repo rate forecasts are presented in the form of quarterly averages and reach three years or twelve quarters ahead.

14 See also Apel, et al. (2015).

15 For a more detailed description, see Alsterlind (2017b).



Note. A forecast deviation is defined as outcome minus the forecast, so a negative column entails an overestimation of the outcomes. For Survey of Professional Forecasters, only forecasts one year ahead are shown.
Source: Alsterlind (2017b)

Why have the forecasts overestimated future policy rates?

The fact that both central banks and others have overestimated the level of the policy rate in the different countries indicates that certain global factors have surprised all analysts. Two global factors have probably been important for the forecasting errors.

Firstly, there are clear signs that real interest rates have experienced a global falling trend, and there are also many indications that the long-term real interest rate is lower than before.¹⁶ But to explain the forecasting errors, this must have been unexpected. As the decline in real interest rates has been gradual, it is possible that it was difficult to detect it in 'real time'. Future interest rates may have been overestimated in that the assumed long-term interest rates have not been revised down sufficiently.

Secondly, the world economy has been affected since 2008 by severely negative shocks in the form of both the global financial crisis and the European debt crisis, which have had major consequences for monetary policy in the form of significantly lower policy rates over a long time.¹⁷ This development has probably not been expected by most analysts. It is perhaps not so surprising that many analysts assumed there would be a gradual normalisation of the economic situation after the financial crisis – and a return to historically-normal interest rate levels.

However, it is difficult to draw a clear distinguishing line between these two factors, especially with regard to developments since 2008. All in all, it is probably a combination of structural and cyclical factors, which have been difficult to predict, that has contributed to the overestimation of interest rates.

As Figure 2 shows, the Riksbank's forecast deviations have been among the largest. There has been a tendency in the Riksbank's forecasts towards a rapid return to a historically-normal level of interest rates. This could be because the Riksbank has been slower than others in revising the forecast level for long-term interest rates. One possible lesson to be learned from this evaluation is therefore that the repo rate forecasts must better capture

¹⁶ See Sveriges Riksbank (2017) and Ingves (2017).

¹⁷ Moreover, many central banks have made large purchases of assets.

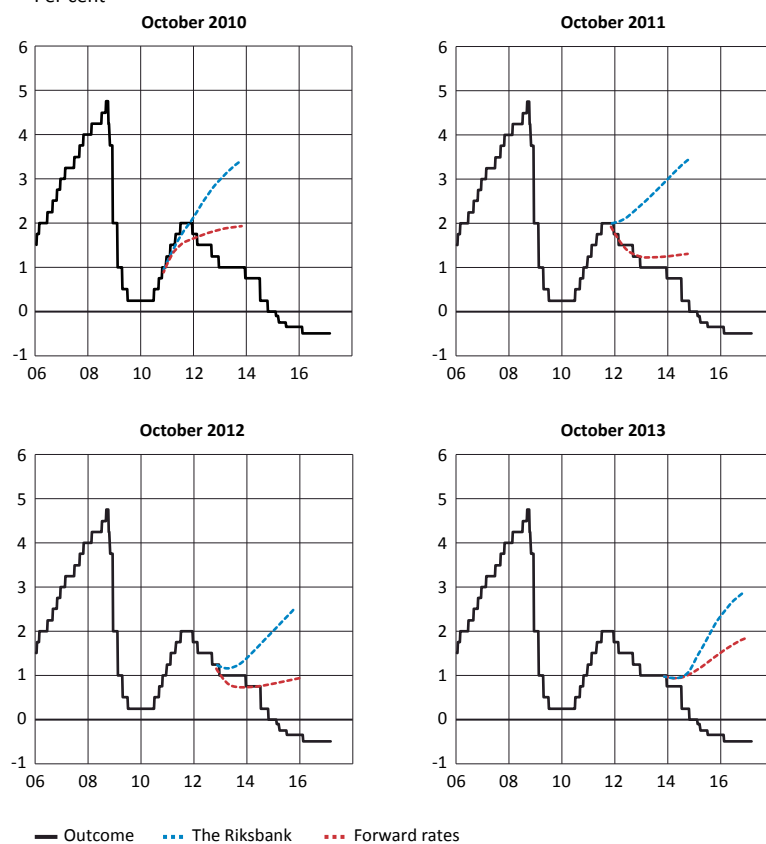
changes in the long-term interest rate levels. Forecasting models that are updated and revised as new information on the long-term interest rates is received would then be very useful. There are signs that such models would have historically made more accurate forecasts than both the Riksbank and forward rates.¹⁸

4.2 The deviations between the Riksbank's repo rate forecast and market rates have periodically been large

One of the reasons why the Riksbank began publishing its own repo rate forecasts was to create better potential to influence expectations of the future repo rate among households, companies and financial market participants. This would mean the Riksbank could affect interest rates on longer maturities, interest rates that are important for households' saving behaviour and companies' investment decisions, which in turn would make monetary policy more effective.

In their review of monetary policy 2010-2015, Goodfriend and King (2016) emphasise the considerable difference that has periodically existed between the Riksbank's repo rate forecast and market expectations as reflected in the pricing on the fixed-income market in the form of estimated forward rates.¹⁹ Figure 3 shows a selection of the figures included in the review. As we can see, market pricing has reflected future repo rates that have periodically been much lower than the Riksbank's own forecasts. This could mean that the Riksbank has only influenced expectations of the repo rate to a small extent.

Figure 3. The Riksbank's repo rate forecasts and market expectations according to pricing on the fixed-income market (forward rates) on selected occasions
Per cent



Note. Market pricing refers to listing the day before the Riksbank's publication of the respective repo rate forecast.

Source: Sveriges Riksbank

¹⁸ This is described by Alsterlind (2017b).

¹⁹ See in particular pp. 89-90 in Goodfriend and King (2016).

Pricing on the fixed-income market does not only reflect expected future interest rates but also premiums

Monetary policy expectations are not directly observable but can be measured in two main ways: by conducting surveys or on the basis of the market pricing of securities with different maturities, in the form of forward rates. Goodfriend and King (2016) illustrate and comment upon the market's expectations more or less exclusively in terms of forward rates.

Forward rates do not just reflect expected future rates but also various premiums. These premiums reflect differences in the characteristics of securities with different maturities. For example, so-called risk premiums reflect the manner in which fixed-income investments at different maturities are linked with various risks and therefore have different expected returns.²⁰ But there may also be differences between fixed-income investments at different maturities that reflect various market frictions. One such difference concerns how easy it is to sell a security on the market, which may give rise to so-called liquidity premiums.

All of these types of premium mean that the differential between different maturities may reflect more than just expectations of the future interest rate level. This means, in turn, that the expected future interest rate may deviate from the forward rate. The differential between the forward rate and the expected future interest rate is usually named the *forward premium*.²¹

In normal cases, forward rates are routinely corrected with a positive premium, so that it can be assumed that expectations are below the forward rates. This is based on the observation that long-term interest rates, on average, are higher than short-term interest rates over longer time periods. But premiums can vary over time and be both positive and negative. Identifying the size of the premiums is no easy task, and the question has occupied the minds of academics and practitioners for a long time.²²

Market pricing can have underestimated the market's monetary policy expectations

Figure 4 shows the Riksbank's forecast for the repo rate two years ahead made on different occasions together with expectations of the repo rate two years ahead according to forward rates and surveys. The figure shows the development during 2011 and 2012, when the difference between the Riksbank's forecast and forward rates was particularly large (see also Figure 3). First of all, we see that survey expectations were above forward rates, and the difference was at most about one percentage point. The fact that survey expectations were above forward rates indicates that forward premiums were negative and that forward rates therefore underestimated market expectations.

Negative forward premiums can reflect that longer fixed-income investments during this period have been considered safer (negative risk premiums) or more liquid (negative liquidity premiums) than short fixed-income investments. The yields on longer maturities were therefore depressed in relation to expected future short yields.

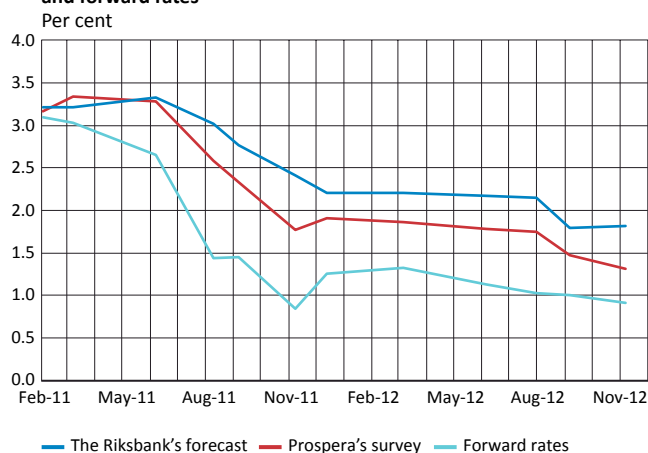
Furthermore, we see that the difference between forward rates and survey changes varies over time, something which suggests that premiums do the same. We can also note that the Riksbank's forecasts were closer to survey expectations than forward rates were.

20 If long-term bonds can be considered to entail a higher risk than short-term bonds, investors will demand compensation for this in the form of a higher expected yield, that is a positive risk premium. But if long-term bonds can be considered to entail a lower risk than short-term bonds, investors will be prepared to pay an 'insurance premium' in the form of a negative risk premium to hold long-term bonds instead of short-term ones.

21 Alsterlind (2017a) provides a more detailed description of forward rates and their division into expectations and premiums.

22 See Alsterlind (2017a).

Figure 4. Expected repo rate two years ahead during the period 2011-2012 according to the Riksbank's forecast, Prospera's survey and forward rates



Note. Prospera's survey refers to money market participants.
Source: Alsterlind (2017a)

In addition to comparing with surveys, models for yields on different maturities, the so-called yield curve, can be used to differentiate premiums from expected future yields. These models provide the same qualitative picture as the analysis of surveys and forward rates in Sweden in 2011-2012, namely that there are signs that forward premiums may have been negative. This consequently indicates in turn that the expected future repo rate may have been above forward rates. But the spread among the models is relatively large, and the results must therefore be interpreted with caution.²³

Different forecasting methods and different assessments affect the repo rate forecasts

As we have shown above, some of the differences between the Riksbank's repo rate forecasts and the expectations of market participants, as they are reflected in forward rates, can hence probably be explained by the fact that it is difficult to measure expectations in a correct manner. But even if we were to measure market participants' expectations of the future repo rate entirely correctly, it is natural that there can be differences between the market's and the Riksbank's forecasts.

All forecasts for the Swedish economy are based on assessments that can vary among different forecasters. This applies, for example, to assessments of initial resource utilisation and to assessments of long-term levels of growth, unemployment and interest rates. In addition, assessments of monetary policy's effects on the real economy and inflation (the transmission mechanism) play a part. The fact that other analysts have expected a lower repo rate can therefore be due to them expecting a lower rate of inflation or weaker economic development than the Riksbank, or that they assessed that a lower interest was required to push inflation towards the target.

4.3 But changes in the repo rate forecast have affected market rates

Even if there have been deviations between the Riksbank's repo rate forecast and forward rates, empirical studies suggest that changes in the Riksbank's repo rate forecast can affect market rates and forward pricing. In this context, there is a difference between expected and unexpected changes in the Riksbank's repo rate forecast. The hypothesis is that it is mostly

²³ See Alsterlind (2017a).

unexpected changes in the repo rate forecast that affect market rates. If market participants understand the Riksbank's behaviour well, market rates will change when new information comes in between monetary policy decisions. Much of the actual change in the repo rate and rate path at the decision will then be expected and not lead to any further change in market rates.

A study by Åhl (2017) suggests that, on the one hand, unexpected changes in the Riksbank's repo rate forecast on short horizons affect forward rates on similar horizons in the same direction, even though the effects are not 'one-to-one'. On the other hand, changes in the repo rate forecast far ahead have only a negligible impact on market rates. Åhl (2017) also compares his findings with similar studies based on data from New Zealand and ascertains that the findings are quantitatively similar.

Brubakk et al. (2017) study how Norges Bank and Riksbank policy rate forecasts affect market rates. They use a different empirical method to Åhl (2017), but the findings point in the same direction; unexpected changes in central bank forecasts have statistically significant effects on market rates in the same direction.

Iversen and Tysklind (2017) use a method similar to the one in Brubakk et al. (2017) and also find that unexpected changes in the repo rate forecast have a significant effect on market rates in the same direction. In addition, the authors find that unexpected changes in the rate path also have statistically significant effects on riskier yields and on the krona exchange rate.

5 Concluding comments

There were three important reasons why the Riksbank started publishing its own repo rate forecasts in 2007. The first was to avoid the drawbacks and problems associated with the assumption that the repo rate develops in line with forward rates. The second was to make it easier to understand the motives behind the Riksbank's decisions. This would also create better opportunities to evaluate monetary policy. In these two areas, the repo rate forecast and its publication have worked as intended.

A third reason for publishing repo rate forecasts was that the Riksbank would be able to influence expectations of the future repo rate more effectively among households, companies and participants on the financial markets. In this way, it would be possible to affect market rates with long maturities to a greater extent. Even if changes in the Riksbank's repo rate forecast do affect market rates, there have periodically been relatively large differences in levels between the Riksbank's repo rate forecasts and forward rates. This can be partly explained by the fact that forward rates contain premiums and hence do not just reflect the market's monetary policy expectations. But it is also probably due to the market and the Riksbank having made different macroeconomic assessments and using different forecasting methods. As described above, however, there are several other, more important reasons for why the Riksbank publishes its own repo rate forecasts than simply influencing market expectations.

Sweden's economy has been exposed to major shocks since 2008 in the form of both the global financial crisis and the debt crisis in the euro area. This has coincided with a long-term downward trend in real global interest rates. The Riksbank and other analysts have largely overestimated the future interest rate level in their forecasts. Even if these forecasting errors very much reflect events that have been genuinely difficult to predict, there is still a lesson to be learnt from this evaluation, namely that repo rate forecasts must capture changes in the long-term rate level in a better way.

The Riksbank's experiences of publishing its own repo rate forecasts have therefore been predominantly good. Together with other members of the Riksbank's staff, the Executive Board now participates significantly more actively in forecasting, as forecasts for inflation

and employment, for example, are influenced by which repo rate forecast is decided. The decision to publish its own rate forecasts coincided with a development of the background material for monetary policy decisions in a broad sense. An advantage of this was that alternative scenarios, both for economic development and monetary policy, were afforded much more space in the monetary policy discussion.

Several of the other concerns that existed ten years ago have been proven unfounded, including the risk of the Riksbank sticking to a rate forecast when it is deemed unsuitable. Repo rate forecasts have been changed at virtually all monetary policy meetings.

Another concern ten years ago was that an Executive Board with six members could find it difficult to agree on a rate forecast. Although one or more board members have entered reservations against the repo rate forecast, this concern also proved to be unfounded. A majority of board members have been able to agree on a rate path at every meeting. But the repo rate forecast places entirely different demands on the Executive Board members to take part in the monetary policy process at an early stage.

Overall, there are few reasons for the Riksbank not to publish its own rate forecasts, in light of the predominantly good experiences.

Having said that, one might nevertheless consider the relative significance in the monetary policy discussion and communication of, on the one hand, changes in the repo rate itself and, on the other, changes in the repo rate path. In their review, Goodfriend and King (2016) are of the view that discussions on changes in the repo rate forecast several years ahead were given far too prominent emphasis during monetary policy discussions, especially bearing in mind the difficulty in predicting the repo rate so far in the future. The analysis of the Riksbank and others has also proved that it is generally difficult to make accurate macro-forecasts more than a year or so ahead. An important future issue for the Riksbank to analyse further is hence what monetary policy significance should be attached to actual changes in the repo rate in relation to changes in the repo rate forecast.

Another theme that could be worth exploring is the interaction between different monetary policy tools and the repo rate forecast. In recent years, the Riksbank has started to use purchases of government bonds as part of its monetary policy arsenal. The purchases primarily affect yields with long maturities and can thus be seen as a complement to the repo rate forecast in this respect.

References

- Alsterlind, Jan (2017a), "Expectations, premiums and forward rates", *Staff memo*, Sveriges Riksbank.
- Alsterlind, Jan (2017b), "Common features in short maturity interest rate forecasts", *Staff memo*, Sveriges Riksbank.
- Apel, Mikael, Carl Andreas Claussen, Petra Lennartsdotter and Øistein Røisland (2015), "Monetary Policy Committees: Comparing Theory and "Inside" Information from MPC Members," *International Journal of Central Banking*, Vol. 11 No. 4, pp. 47-89.
- Beechey, Meredith and Per Österholm (2012), "Policy interest rate expectations in Sweden: A forecast evaluation", *Working Paper No. 127*, National Institute of Economic Research.
- Blinder, Alan S. and Charles Wyplosz (2004), "Central Bank Talk: Committee Structure and Communication Policy", *Paper presented for the session "Central Bank Communication" at the ASSA meetings Philadelphia*.
- Brubakk, Leif, Saskia ter Ellen and Hong Xu (2017), "Forward guidance through interest rate projections: does it work?", *Working paper No. 6/2017*, Norges Bank.
- Dincer, N. Nergiz and Barry Eichengreen (2014), "Central Bank Transparency and Independence: Updates and New Measures", *International Journal of Central Banking*, Vol. 10, No. 1, pp. 189-253.
- Gersbach, Hans and Volker Hahn (2008), "Forward Guidance for Monetary Policy: Is It Desirable?", *Working paper No. 08/84*, CER-ETH – Center of Economic Research at ETH Zurich.
- Goodfriend, Marvin and King, Mervyn (2016), "Review of the Riksbank's monetary policy 2010-2015", Riksdag Printing Office: Stockholm.
- Goodhart, Charles (2009), "The Interest Rate Conditioning Assumption", *International Journal of Central Banking*, Vol. 5, No. 2, pp. 85-108.
- Gosselin, Pierre, Aileen Lotz and Charles Wyplosz (2008), "The Expected Interest Rate Path: Alignment of Expectations vs. Creative Opacity", *International Journal of Central Banking*, Vol. 4, No. 3, pp. 145-185.
- Hallsten, Kerstin and Sara Tägtström (2009), "The decision-making process – how the Executive Board of the Riksbank decides on the repo rate", *Economic Review*, No. 1, pp. 69-84, Sveriges Riksbank.
- Heikensten, Lars (2005), "Thoughts on how to develop the Riksbank's monetary policy work", speech at the Swedish Economics Association, 22 February, Sveriges Riksbank.
- Ingves, Stefan (2007), "Communication – what demands are made of an independent central bank?", speech at the Swedish Economics Association, 24 April, Sveriges Riksbank.
- Ingves, Stefan (2017), "Monetary policy challenges – weighing today against tomorrow", speech at the Swedish Economics Association, 16 May, Sveriges Riksbank.
- Iversen, Jens and Oscar Tysklind (2017), "The effect of repo rate path changes on asset prices", *Staff memo*, Sveriges Riksbank.
- Leeper, Eric M. (2003), "An Inflation Reports report", *Economic Review*, No. 3, Sveriges Riksbank.
- Mishkin, F. S. (2004) "Can Central Bank Transparency Go Too Far?" *Working Paper No. 10829*, Swedish Fiscal Policy Council.
- Morris, S. and Hyun S. Shin (2002), "Social Value of Public Information", *American Economic Review*, Vol 92, No. 5, pp. 1521-1534.
- Nyman, Christina and Ulf Söderström (2016), "Forecasts and monetary policy", *Economic Commentaries No. 6*, Sveriges Riksbank.
- Rosenberg, Irma (2007), "Riksbank to introduce own path for the repo rate", speech at Danske Bank, 17 January, Sveriges Riksbank.
- Rosenberg, Irma (2008), "The monetary policy decision-making process", speech at Sveriges Riksbank, 13 June, Sveriges Riksbank.

Sveriges Riksbank (2007), "Monetary Policy Report 2007:1".

Sveriges Riksbank, (2017), "The long-term repo rate", article in Monetary Policy Report, February.

Åhl, Magnus (2017), "How big is the toolbox of a central banker? Managing expectations with policy-rate forecasts: Evidence from Sweden", *Working paper no 339*, Sveriges Riksbank.



SVERIGES RIKSBANK
SE-103 37 Stockholm
(Brunkebergstorg 11)

Tel +46 8 787 00 00
Fax +46 8 21 05 31
registratorn@riksbank.se
www.riksbank.se