



Material for assessing monetary policy

2010

Introduction

The Riksbank is an authority under the Riksdag, the Swedish Parliament, with responsibility for monetary policy in Sweden. Since 1999, the Riksbank has had an independent position with regard to the Riksdag and the Government. This means that the six members of the Executive Board decide on monetary policy issues without seeking or taking instructions. Nor may any other authority determine how the Riksbank should decide on issues concerning monetary policy.

The way in which the Riksbank carries out the delegated task is followed up in various ways by the Riksdag. For instance, every year the Riksdag Committee on Finance examines whether the General Council of the Riksbank and the Executive Board can be discharged from liability for their administration during the past year. Every year, the Riksdag Committee on Finance also examines and assesses the monetary policy conducted by the Riksbank during the preceding years. The Riksbank compiles and publishes material for this assessment.

The material compiled by the Riksbank is thus a basis for assessment – not an assessment in itself. On the other hand, this does not mean that it is a pure compilation of figures. The material also includes analyses of outcomes, forecasts and events as the Riksbank believes that those who evaluate monetary policy should have access to the Riksbank's interpretation of the material. It is then up to the Committee on Finance, and others who wish to assess the material, to concur with the Riksbank's conclusions or to make another interpretation.

The Material for Assessing Monetary Policy is available on the Riksbank's website www.riksbank.se. It is also possible to order a printed version of the report free of charge on the website, or to download the report as a PDF.

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Monetary policy in Sweden

MONETARY POLICY STRATEGY¹

- According to the Sveriges Riksbank Act, the objective for monetary policy is to maintain price stability. The Riksbank has specified this as a target for inflation, according to which the annual change in the consumer price index (CPI) is to be 2 per cent.
- At the same time as monetary policy is aimed at attaining the inflation target, it is also to support the objectives of general economic policy with a view to achieving sustainable growth and high employment. This is achieved through the Riksbank, in addition to stabilising inflation around the inflation target, also striving to stabilise production and employment around long term sustainable paths. The Riksbank therefore conducts what is generally referred to as flexible inflation targeting. This does not mean that the Riksbank neglects the fact that the inflation target is the overriding objective.
- It takes time before monetary policy has a full impact on inflation and the real economy. Monetary policy is therefore guided by forecasts for economic developments. The Riksbank publishes, among other things, its own assessment of the future path for the repo rate. This interest rate path is a forecast, not a promise.
- In connection with every monetary policy decision, the Executive Board makes an assessment of the repo-rate path needed for monetary policy to be well-balanced. A well-balanced monetary policy is normally a question of finding an appropriate balance between stabilising inflation around the inflation target and stabilising the real economy.
- There is no general answer to the question of how quickly the Riksbank aims to bring the inflation rate back to 2 per cent if it deviates from the target. A rapid return may in some situations have undesirable effects on production and employment, while a slow return may have a negative effect on confidence in the inflation target. The Riksbank's ambition has generally been to adjust the repo rate and the repo rate path so that inflation is expected to be fairly close to the target in two years' time.
- According to the Sveriges Riksbank Act, the Riksbank's tasks also include promoting a safe and efficient payment system. Risks linked to developments in the financial markets are taken into account in the repo rate decisions. With regard to preventing an imbalance in asset prices and indebtedness, the most important factors, however, are effective regulation and supervision. Monetary policy only acts as a complement to these.
- In some situations, as in the financial crisis 2008-2009, the repo rate and the repo rate path may need to be supplemented with other measures to promote financial stability and ensure that monetary policy is effective.
- The Riksbank endeavours to ensure that its communication is open, factual, comprehensible and up-to-date. This makes it easier for economic agents to make good economic decisions. It also makes it easier to evaluate monetary policy.

DECISION-MAKING PROCESS

The Executive Board of the Riksbank usually holds six monetary policy meetings during a year, at which it makes decisions regarding the repo rate. In connection with three of these meetings, a Monetary Policy Report is published and in connection with the other three meetings, a Monetary Policy Update is published. Approximately two weeks after each monetary policy meeting the Riksbank publishes minutes from the meeting, in which it is possible to follow the discussion that led to the interest rate decision and to see the arguments made by the different Executive Board members.

PRESENTATION OF THE INTEREST RATE DECISION

The interest rate decision is presented in a press release at 9.30 a.m. on the day following the monetary policy meeting. The press release also states how the individual members of the Executive Board voted and provides the main motivation for any reservations entered. A press conference is held on the day following the monetary policy meeting.

¹ A detailed description of the monetary policy strategy is contained in the document "Monetary Policy in Sweden". This can be found as a PDF on the Riksbank's website www.riksbank.se under the heading Monetary Policy/Price stability.

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■ Summary

The Riksbank left the repo rate unchanged at 0.25 per cent up to the end of June 2010. The repo rate had then been at this level since July 2009. The repo rate was raised to 0.5 per cent in July and this was followed by three further increases, each of 0.25 percentage points, so that the repo rate was 1.25 per cent at the end of the year. The recovery of the Swedish economy had been much stronger than expected and the assessment of the Executive Board was that there was a need to raise the repo rate in order to stabilise inflation close to the target of 2 per cent and, at the same time, ensure stable growth in the real economy. It was also pointed out that household debt had increased substantially in recent years and that a situation in which debts increase much faster than incomes over a long period of time entails the risk of imbalances building up in the economy. During the year, opinion was divided among the members of the Executive Board about exactly when the repo-rate increases should begin and how quickly the repo rate should be raised, in both the short and long term, to ensure a well-balanced monetary policy.

In the winter of 2009/10, conditions improved on the credit markets and in 2010 the Riksbank therefore gradually stopped offering the banks loans at longer maturities. The fixed-rate loans that had been offered to the banks in 2009 matured during the summer and autumn of 2010, and the Riksbank had thus for all intents and purposes phased out all of the extraordinary measures taken during the financial crisis.

The extensive economic-policy measures taken by governments and central banks around the world in 2009–2010 stimulated the recovery, but also increased budget deficits. During the spring and autumn of 2010, the financial markets were characterised by concern over increasing central government debt and large budget deficits, primarily in the southern-European euro countries. This concern increased towards the end of the year. The assessment was that the tightening measures initiated to consolidate public finances were necessary, but that they would also slow down economic development in large parts of the euro area. Against the background of the increased uncertainty about developments abroad, the Riksbank adjusted the longer-term forecast for the repo rate downwards in July and October 2010.

During 2010, GDP in Sweden increased by 5.5 per cent, an increase that was approximately equal to the fall in the previous year. The upswing was due to the recovery of world trade, which favoured the export-dependent Swedish economy, but also to the strong domestic demand during the year. The labour market also fared better than expected and unemployment began to decline in 2010. Neither the Riksbank nor any other forecaster predicted the strength of the Swedish recovery.

CPI inflation averaged 1.3 per cent in 2010. The fact that CPI inflation was below the target was largely a result of the substantial repo-rate cuts implemented by the Riksbank in 2008–2009. These cuts temporarily pushed CPI inflation down through their effect on mortgage rates. This was predicted in the Riksbank's forecasts. Measured in terms of the CPIF, which is not directly affected by changes in mortgage rates, inflation averaged 2.1 per cent during the year. Inflation expectations in the long term were close to 2 per cent in 2010, which indicates that there was confidence that the Riksbank would attain its inflation target.

The changes in the repo rate during 2010 were very clearly foreseen by the market. For all the decisions, the expected change was almost identical to the actual change. On the other hand, there were from time to time relatively significant differences between the Riksbank's repo-rate path and long-term monetary policy expectations as indicated by market pricing. However, market expectations of the development of the repo rate approached the Riksbank's repo-rate forecasts at the end of the year.

To sum up, the course of events in 2010 meant that it once again became possible to conduct monetary policy in a more normal way. As it became increasingly clear that the upturn would be stronger than previously predicted, the Riksbank revised its forecasts for GDP growth and the labour market. The extraordinary measures taken during the financial crisis were phased out and the Riksbank began to increase the repo rate from an extremely low level.

■ CHAPTER 1 – The process of assessing monetary policy

Assessments of monetary policy are important for several reasons. One reason is the independent position of the Riksbank. A high level of transparency and regular evaluations are necessary to enable the Riksdag and the public to make sure that the Riksbank is performing to a high standard. Another reason is that assessments of monetary policy are central in enabling the Riksbank to develop and improve its monetary policy analysis.

Assessments of monetary policy should have as their starting point what monetary policy can actually achieve. Monetary policy can ensure that inflation is well in line with the inflation target over a number of years. It can also contribute to stabilising developments in the real economy (GDP, unemployment, employment, and so on). On the other hand, both previous experience and economic theory have shown that monetary policy cannot be used to achieve a more permanent higher level of production, employment or growth in the economy.

Over the years, central banks have tested different ways of giving the economy a "nominal anchor", that is a credible target for nominal wage and price formation. Since the early 1990s, it has become increasingly common to formulate the nominal anchor in terms of an explicit inflation target. The Riksbank has such an inflation target according to which the annual change in the consumer price index (CPI) is to be 2 per cent.

The Riksbank chiefly uses a short-term interest rate, the so-called repo rate, as a policy rate to implement monetary policy. The Riksbank also publishes its own assessment of the future path for the repo rate. Such an interest rate forecast (or interest rate path) makes it easier to explain the Riksbank's view of developments and its reasoning when the monetary policy decisions are made. It is also makes it easier to steer expectations regarding future monetary policy. Expectations of future interest rates influence the more long-term interest rates that are important to the economic decisions made by households and companies.

■■ Assessment in real time: was monetary policy well balanced?

In connection with every monetary policy decision, the Executive Board of the Riksbank assesses what repo rate path is needed for monetary policy to be well balanced. A well-balanced monetary policy is normally a question of finding an appropriate balance between stabilising inflation around the inflation target and stabilising the real economy. The Riksbank therefore conducts what is generally referred to as flexible inflation targeting. The fact that the Riksbank tries to stabilise both inflation and the real economy does not mean that it disregards the fact that the inflation target takes precedence.

A flexible inflation-targeting policy contributes to a balanced development on the financial markets, too. However, experiences show that even with such a policy, asset prices and indebtedness

can sometimes develop in a manner that is untenable in the long run. This can entail risks of large price adjustments in the future, which can in turn have unfavourable and serious repercussions on the real economy and inflation. From experience, it appears to be primarily fluctuations in property prices and credit volumes that create problems. This type of risk cannot always be easily quantified or captured in the normal analysis and forecasting work, but may nevertheless need to be taken into account in the monetary policy decisions. A change in the repo rate path may be justified if such risks are assessed as substantial. When it comes to preventing an overly rapid increase in asset prices and indebtedness, the most important factors are effective regulation and supervision. Monetary policy only acts as a complement to these.

An important part of the assessment of monetary policy is to analyse whether the interest rate decisions were reasonable and monetary policy well balanced given the information that was available when the decisions were made. This is called assessing monetary policy in real time. Chapter 2 provides an overview of the Riksbank's decisions for 2010 and the analysis on which they were based. There is also an article that describes some principles for assessing various monetary policy alternatives.

■ ■ Assessment after the fact: target fulfilment

A natural next step in the assessment is to compare the outcomes for inflation with the inflation target, that is, to assess monetary policy after the fact. But, simply comparing the inflation outcome with the target is not sufficient for at least two reasons.

The first reason is that it takes time before changes in central bank policy rates have an effect on inflation. The effect comes gradually and it is difficult to determine exactly how long it will take until the full impact is achieved. Monetary policy must therefore be based on forecasts of the development of the economy and forecasts are always uncertain. During the time it takes for changes in the interest rate to have a full impact on inflation the economy is often affected by new and unexpected shocks. On the one hand, this means that the inflation outcome may be in line with the target even if the monetary policy decisions were incorrect because unexpected shocks nevertheless resulted in the right inflation outcome. But on the other hand, it also means that the inflation outcome may deviate from the target even if the monetary policy decisions were correct, because unexpected shocks that could not be counteracted resulted in the inflation outcome being too high or too low.

The second reason is that monetary policy also aims to stabilise the development of the real economy. A deviation between the outcome and the target for inflation may thus be deliberate. It may be the result of an attempt to achieve a balance between stabilising

inflation and stabilising the real economy. Over time, however, inflation shall return to 2 per cent.

A high level of confidence in the inflation target is very important to the Riksbank's efforts to achieve price stability. Confidence in the inflation target helps to ensure that wage formation and price setting are compatible with the target. It also increases the capacity for monetary policy to stabilise production and employment as potential deviations from the inflation target are perceived as temporary and do not affect inflation expectations. By studying how inflation expectations relate to the inflation target and the Riksbank's inflation forecasts, one can assess the level of confidence in the inflation target.

Chapter 3 of this report analyses target fulfilment in 2010.

■ ■ Forecasts

As monetary policy is based on forecasts it is important that the Riksbank's forecasts are fairly accurate. A reasonable next step in the assessment is therefore to compare the outcome for inflation in the year the assessment refers to with the forecasts for inflation made by the Riksbank for this particular year. These forecasts were used as a basis for the interest rate decisions made then; decisions which may have affected inflation and the real economy in 2010.

What demands can be made of a central bank's forecasts?

The answer is not entirely clear. Practical forecasting work is associated with a number of difficulties, many of which stem from the uncertainty of the forecasts. The economy is constantly affected by unexpected shocks which cannot be predicted. This means that the forecasts will always be more or less inaccurate. Analysing the accuracy of a forecast in an individual year thus provides limited information. A large forecasting error may in itself indicate that the forecast was poor, but it may also be a consequence of a shock occurring that could not have been predicted.

One practical way of assessing whether the Riksbank's forecasts have an acceptable level of accuracy is to compare them with the forecasts of other forecasters. If the Riksbank's forecasts are systemically poorer, this is obviously an indication that it would have been possible to make better assessments than those made by the Riksbank. This also means that there was better information available which the Riksbank would have been able to use as a basis for its decision-making.

Nor should the forecasts systematically overestimate or underestimate the actual outcomes. If this is the case, viewed on average over a long period of time, then this is a sign that there is information that could be used to improve the forecasts.

A fair comparison of the accuracy of different forecasts should take into account the fact that the forecasts are made at different points in time and that different analysts therefore do not have the same amount of information available to them. The closer one comes

to the date when the outcome of the variable being forecast becomes known, the more information the forecaster has regarding the way the variable has developed and on the shocks that have occurred. A comparison of the accuracy of the forecasts should therefore take into account that the forecasts have been made at different times. The comparison of forecasts made in this report uses a method that takes into account such differences.

Chapter 4 of this report analyses the accuracy of the Riksbank's forecasts and compares this with the performance of other forecasters.

■ ■ Implementation of monetary policy

Relatively accurate forecasts and well-balanced monetary policy decisions are not in themselves enough to attain the inflation target in the best possible manner. Monetary policy also needs to be predictable and to have the desired impact on market rates.

Changes in the repo rate and the Riksbank's repo rate forecast have the desired impact if they are reflected in corresponding changes in the market rates charged to companies and households. If the Riksbank is successful in its communication activities, the market participants should also be able to predict rather well how new information or new shocks will affect the repo rate and the Riksbank's repo-rate path. One way of assessing the impact of monetary policy is thus to investigate how well-aligned market expectations are with the Riksbank's forecast regarding the future interest rate.

Chapter 5 analyses the implementation of monetary policy.

The monetary policy decision-making process²

The monetary policy decisions

The Executive Board normally holds six scheduled monetary policy meetings a year. The Executive Board's monetary policy meetings are scheduled around six months in advance, partly as fixed points in the internal work, and partly to inform the general public and others who regularly follow developments in monetary policy.

Bases for the decisions

The forecasting work prior to each monetary policy meeting begins with the Monetary Policy Department analysing new statistics and new events in the economy. The department then produces a forecast and alternative scenarios for how inflation, the repo rate and the economy in general will develop. At a relatively early stage of the process the department presents

² For a more detailed description of the monetary policy decision-making process see K. Hallsten and S. Tågström "The decision-making process – how the Executive Board of the Riksbank decides on the repo rate", *Sveriges Riksbank Economic Review*, No. 1, 2009.

its forecast alternatives to the Executive Board at meetings of what is known as the monetary policy group. At these meetings the members of the Executive Board and the employees at the Monetary Policy Department discuss the forecasts and the alternative scenarios.

The Monetary Policy Department then continues its work and compiles a document that is a first draft of the Monetary Policy Report. This document is revised at a meeting of the Executive Board, where the Executive Board continues to discuss the various alternative forecasts and how they should be presented in the Monetary Policy Report. The editorial work on the Monetary Policy Report continues, but the final adjustments are not made to the text until after the monetary policy meeting. The Monetary Policy Report is published on the Riksbank's website at the same time as the decision on the repo rate is published; normally the day after the monetary policy meeting. The printed version of the report is published slightly later.

Prior to the monetary policy meetings that do not coincide with the publication of a Monetary Policy Report, the forecasting work is similar. The assessments made by the Monetary Policy Department are compiled to form a Monetary Policy Update that is presented at a meeting of the monetary policy group. This report contains a brief description of new information and the updated forecasts and is published together with the press release that announces the decision.

The Riksbank uses various macroeconomic models to create a cohesive picture of the development of the economy and how any new information that becomes available should be interpreted. The models are used primarily to produce alternative scenarios for the repo rate, inflation and the rest of the economy. These alternative scenarios show how developments will probably be if certain events in the economy occur or if monetary policy is conducted differently than is assumed in the main forecast. However, models – no matter how sophisticated they may be – are only simplifications of reality. They must be complemented by analyses and assessments. The assessments become particularly important when unusual events and structural changes that alter the functioning of the economy take place.

On the basis of the material described here, the members of the Executive Board jointly determine what they consider to be a well-balanced monetary policy. Naturally, there are occasionally differences of opinion in the Executive Board as to how inflation and the real economy will develop and thereby as to what constitutes a well-balanced monetary policy. In these cases, it is the majority view that is expressed in the decision and in the Monetary Policy Report or Monetary Policy Update.

■ Stabilisation of the real economy and measures of resource utilisation

A flexible inflation-targeting policy

As of 1999, the statutory objective of monetary policy has been to maintain price stability, which the Riksbank has specified as an inflation target of 2 per cent in terms of the CPI.³ In the preparatory works for the Sveriges Riksbank Act, it was stated that the Riksbank, without prejudice to the price stability target, should furthermore support the objectives of general economic policy with a view to achieving sustainable growth and high employment. This was considered to be a direct consequence of the Riksbank being an authority under the Riksdag and there was thus no need to confirm it by law.

Monetary policy cannot have a lasting effect on real economic quantities such as production and employment. However, monetary policy can have a lasting effect on inflation. Accordingly, the statutory and thereby overriding objective for monetary policy is to maintain price stability. But this does not prevent the Riksbank from attaching importance to achieving good growth and a high level of employment. Although monetary policy is unable to raise growth and employment more permanently by holding the repo rate at a low level for a long time, it may affect these quantities in the short term.⁴ So the best thing that monetary policy can do to support the general objectives for the real economy, apart from stabilising inflation around the inflation target, is to try to stabilise production and employment around sustainable development paths. The Riksbank thus conducts what is known as flexible inflation targeting.

A measure of resource utilisation is often used as an overall measure of the development of the real economy. Resource utilisation states to what extent production resources, that is, labour and capital (a term used to sum up machinery, buildings and so on), are used at a particular point in time. It normally states use in relation to the level sustainable in the long run, which is often regarded as a "normal" level.

No given measure of resource utilisation

One complication is that it is not possible to directly observe the level of resource utilisation in the economy. Nor is there any generally-accepted view of how it should be calculated. As different measures can give conflicting results, it is difficult to determine exactly the level of resource utilisation at any given time. Deciding the level of resource utilisation is thus in many ways a question of judgment.

Some measures are based on surveys, where the decision-makers in individual companies respond to questions regarding the current

³ Although the inflation target is formulated in terms of the CPI, other measures of inflation may be usable for analysing and forecasting the development of inflation. Measures of what is known as underlying inflation are often used to describe the path of inflation and to better explain the monetary policy conducted. One such measure is the CPIF, which is the CPI with a fixed mortgage interest rate. See the article "The CPI and measures of underlying inflation" in *Monetary Policy Report*, June 2010.

⁴ In the long term, growth and employment are determined by other factors, such as technological advances, access to capital and labour and the functioning of the economy.

situation and how they view the future. Other measures, such as the employment rate or unemployment, give an indication of whether there are strains in the labour market.

There are also so called gap measures, which calculate the difference between, for instance, production today (measured as the level of GDP) and the level of production that is sustainable. As it is not possible to observe this long-term level directly, it must be estimated. This is often achieved by means of statistical methods that use historical outcomes to identify a long-term trend for GDP, for instance. The GDP gap then measures the percentage deviation between the current GDP level and this long-term trend.

A common method of calculating the gap is to use what is known as the HP filter to produce the long-term trend.⁵ However, the method has a number of disadvantages. It is a purely statistical method that does not take economic relationships into account. This means that the long-term trend identified by the filter is revised automatically when new outcomes are received and earlier outcomes are revised. The latter is a problem, for instance, when calculating the GDP gap, as revisions are often made to earlier GDP outcomes, and these revisions can be relatively large.

In recent years, academic research has highlighted a gap measure that differs in concept from gaps that are calculated on the basis of what is considered a “normal” level. This gap instead compares production at a particular point in time with a hypothetical level that measures what production would be if nothing prevented prices and wages from adjusting immediately to shocks in the economy.⁶ Although this is a relevant measure for monetary policy from a theoretical point of view, there are a number of problems that make it difficult to use this measure in practice.

The Riksbank's approach

As a result of the uncertainty over measures of resource utilisation, and the fact that research and practical experiences have not resulted in any consensus over a particular measure, the Riksbank takes a broad approach when analysing resource utilisation. The Riksbank's Monetary Policy Reports and Updates therefore describe a number of indicators: measures based on surveys, unemployment statistics and gaps. In addition to the GDP gap, there are also gaps for the total number of hours worked in the economy, for employment and unemployment.

During 2010 the Riksbank also further developed its analysis and introduced two new measures of resource utilisation. The RU indicator (RU being an abbreviation of resource utilisation) is a comprehensive

5 The HP filter (actually the Hodrick-Prescott filter) calculates a long-term trend that varies over time. The user of the method determines how much the trend is allowed to vary. See R. J. Hodrick, and E. C. Prescott (1997) “Post-war U.S. Business Cycles: An Empirical Investigation,” *Journal of Money Credit and Banking* 29, pp. 1–16.

6 A detailed description is given by S. Palmqvist, “Flexible inflation targeting – how should central banks take the real economy into consideration?” *Sveriges Riksbank Economic Review*, 2/2007.

measure of resource utilisation based on the information contained in a number of variables gathered from surveys and from aggregate labour market statistics. The advantage of the RU indicator is that it provides an up-to-date picture, as it is based on variables that are updated relatively often with new outcomes, and that its history is not revised so much when new information is received.⁷

The other measure that was introduced in 2010 is based on a so-called production function, where production is determined by capital and labour and a measure of technological development. The long-term trend in production can then be calculated using assessments of the long-term trends for labour, capital and technology. The contribution from labour, that is, the number of hours worked, can also be divided up into contributions from the trend in average working hours and the trend in employment, which in turn can be divided up into their components. This method of calculating the deviation in production from its long-term trend makes it easier to interpret underlying developments in the economy.⁸

On the basis of the indicators published, the Riksbank makes an overall assessment of the initial level of resource utilisation. However, this is not a quantified assessment, but a qualitative one, and is often expressed as resource utilisation being “higher than normal”, “normal”, or “lower than normal”. The same applies to the development of resource utilisation during the forecast period. With guidance from the forecasts for a couple of different gap measures and forecasts for unemployment and employment, for instance, an overall, qualitative picture of resource utilisation over the coming years is created, for instance, that “resource utilisation will rise and be at a roughly normal level at the end of the forecast period”.⁹

This picture, together with personal assessments of developments in the real economy, is used by the members of the Executive Board in their monetary policy deliberations to reach a repo rate path that in their opinion will provide a suitable balance between stabilising inflation around the inflation target and stabilising the real economy.

7 The RU indicator is described in C. Nyman, “An indicator of resource utilisation”, Economic Commentary no. 4, 2010, Sveriges Riksbank.

8 A description of this method can be found in the article “The driving forces behind trends in the economy can be analysed using a production function”, *Monetary Policy Report*, October 2010.

9 The Riksbank thus publishes quantified forecasts for various gaps, but no quantified forecast that reflects the Riksbank’s overall assessment of the development of resource utilisation.

■ CHAPTER 2 – Monetary policy 2010

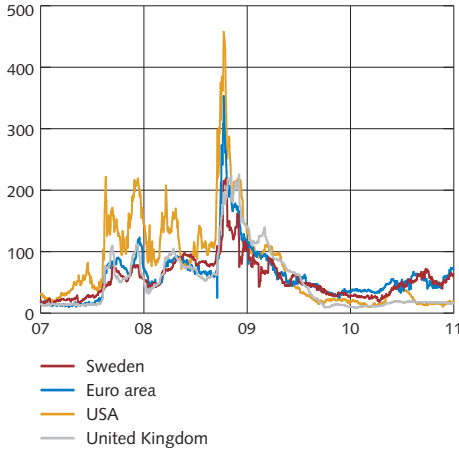
In connection with every monetary policy decision, the Executive Board assesses what repo rate path is needed for monetary policy to be well balanced. This normally involves finding an appropriate balance between stabilising inflation around the inflation target and stabilising the real economy. The Riksbank thus conducts what is generally referred to as flexible inflation targeting. The fact that the Riksbank tries to stabilise both inflation and the real economy does not mean that it disregards the fact that the inflation target takes precedence.

An important part of the assessment of monetary policy is to analyse whether the interest rate decisions were reasonable and monetary policy well balanced given the information that was available when the decisions were made. This is called assessing monetary policy in real time. This chapter provides an overview of the Riksbank's decisions in 2010 and the analyses that lay behind them. As a background to the overview, the chapter begins with a description of economic developments in 2008-2009. There is also an article that describes principles for assessing various monetary policy alternatives.

Summary of Chapter 2

- At the monetary policy meeting on 10 February 2010 the overall picture was that the economic upturn was now on firmer ground and that the financial markets were functioning better and better. The repo rate was held unchanged, but the forecast was that increases would begin in the summer or autumn of 2010 – slightly sooner than had been forecast earlier. At the same time, it was assessed that the repo rate could be increased more gradually and the forecast for the repo rate in the longer run was adjusted downwards.
- After the decision in February, economic activity abroad continued to improve. The picture of a continuing recovery in Sweden remained. Both the repo rate and the repo rate path were held unchanged at the monetary policy meeting on 19 April.
- The spring was marked by unease connected to the weak public finances in several southern European euro countries. At the same time, the Asian economies continued to show a strong performance. Prior to the monetary policy meeting on 30 June the statistics showed that Swedish GDP growth during the first quarter of 2010 was unexpectedly high. The assessment was that it was appropriate to begin a normalisation of monetary policy and the repo rate was raised from 0.25 per cent to 0.5 per cent. However, the repo rate path in the slightly longer run was adjusted downwards as a result of the poorer economic prospects abroad.
- The recovery in the world economy continued during the summer, but the uncertainty over the strength in the recovery increased. The Swedish economy, however, continued to perform strongly. Only minor revisions to the forecasts were made at the monetary policy meeting on 1 September. The repo rate was raised to 0.75 per cent and the forecast for the repo rate was held unchanged.

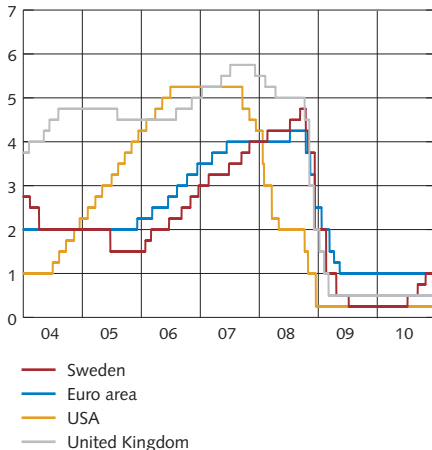
Figure 2:1. Difference between interbank rates and government bond rates (TED spread)
Basis points



Note. The spread is calculated as difference between the three-month interbank rate and the three-month treasury bill.

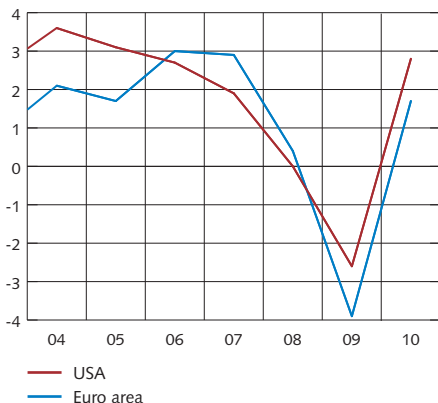
Sources: Reuters EcoWin and the Riksbank

Figure 2:2. Policy rates
Per cent



Sources: Reuters EcoWin and the Riksbank

Figure 2:3. GDP growth
Annual percentage change



Sources: Bureau of Economic Analysis and Eurostat

- After the monetary policy meeting in September the upturn in the Swedish economy continued. At the same time, there was still considerable uncertainty over developments abroad and the unease linked to public finances in some European countries increased towards the end of the year. Despite the fragmented international outlook, the Riksbank assessed that the Swedish economy would remain strong and at the monetary policy meetings on 25 October and 14 December the forecast for GDP growth in 2011 was revised upwards. The repo rate was raised in October to 1.0 per cent and in December to 1.25 per cent. In October the forecast for the repo rate in the longer run was adjusted down again. The forecast for the repo rate in December was in principle unchanged from October.

Background: Economic activity 2008–2009

■ ■ International: Financial crisis and sharp downturn in economic activity in 2008

Growth in the United States and the rest of the world slowed down in 2008 in connection with the increase in financial market turbulence. Interbank rates rose sharply in the United States, the euro area and the United Kingdom (see figure 2:1), as did funding costs for companies and households. At the same time, inflation continued to rise, largely as a result of a rapid upturn in world market prices for oil and other commodities. However, commodity prices peaked during the summer and then began to fall again. Inflation in both the United States and the euro area fell from September.

In the middle of September the financial crisis deteriorated dramatically in connection with the US investment bank Lehman Brothers filing for bankruptcy (see figure 2:1). Market agents' lack of confidence in counterparties' creditworthiness then became acute. Access to credit on the financial markets then declined around the world and some markets more or less ceased functioning. The great uncertainty was reflected in the large fluctuations in stock market rates. Central banks and governments intensified their efforts to improve the functioning of the financial markets and to facilitate the supply of credit. Moreover, central banks cut interest rates substantially to alleviate the effects of the financial crisis (see figure 2:2). On 8 October, for instance, the central banks in the United States, the United Kingdom, the euro area, Canada, Switzerland and Sweden cut their policy rates by 0.5 percentage points in a joint action.

In the United States growth slackened substantially in 2008 (see figure 2:3). GDP fell during the third and fourth quarters. Employment fell and unemployment rose by around 2 percentage points, which contributed to dampening household consumption. The downturn on

the housing market that had been under way for a number of years continued. The US government took a number of measures to restore confidence in the financial markets and among the general public. The US central bank, the Federal Reserve, cut its policy rate substantially during the year (see figure 2:2).

In the euro area and the rest of Europe, too, the financial crisis hit growth hard, and GDP fell during the second and third quarters. Growth in such rapidly-growing emerging economies as China and India also slowed down. World trade fell heavily.

■ ■ Recovery in global economic activity during 2009

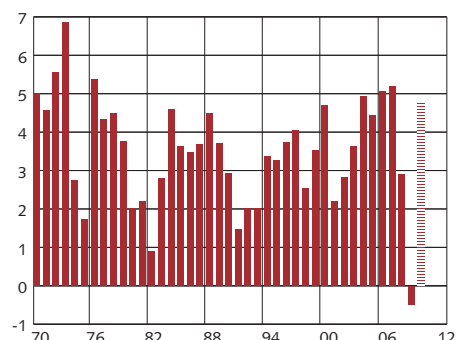
In early 2009 the large fall in global economic activity continued, but after some months there were signals that the fall in the world economy had come to a halt. Signs of a recovery could be distinguished, but the strength of the recovery differed from region to region. The recovery was most apparent in Asia, where growth showed a rapid upturn as early as the second quarter. This growth was mainly due to strong demand in China, which stimulated exports in the area, and by an improvement in domestic demand in a number of Asian countries. The heavy fall in world trade also came to a halt and trade stabilised during the summer. But although economic activity improved in 2009, the world economy as a whole declined by almost one per cent over the year, which is an unusually weak economic performance in historical terms (see figure 2:4).

Over the year the situation on the financial markets around the world improved as GDP stopped falling, which was reflected in the fact that credit spreads fell in most areas. However, the situation was still not normal. Central banks and governments continued to conduct very expansionary policy with different forms of unconventional measures. For instance, central banks lent large volumes to the banking system, which, together with other measures, meant that the central banks' balance sheets expanded substantially (see figure 2:5).

In the United States, GDP began to rise in the third quarter of 2009. This was the first quarter with positive GDP growth since the second quarter of 2008. It could be noted that growth in the United States was mainly due to strong economic policy stimulation from the government and the central bank. At the end of the year the situation in the US labour market improved somewhat as unemployment levelled off and the fall in employment slowed down. However, unemployment was at the highest level since the early 1980s. The policy rate was left unchanged at a record-low level for the remainder of the year.

The recovery in the euro area was also slow. GDP rose slightly during the third and fourth quarters. The labour market situation remained weak. During the spring the European Central Bank (ECB) cut its policy rate to 1 per cent, a level which it held for the remainder of the year.

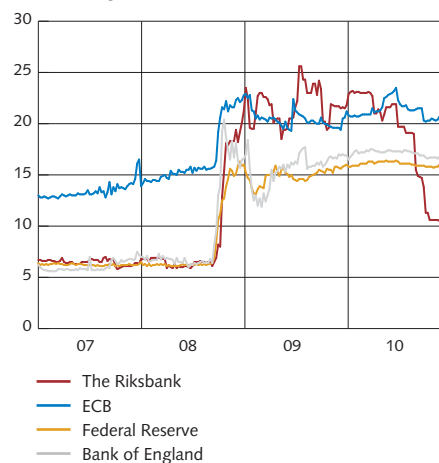
Figure 2:4. GDP, world
Annual percentage change



Note. The striped bar refers to the Riksbank's forecast in the MPR February 2011.

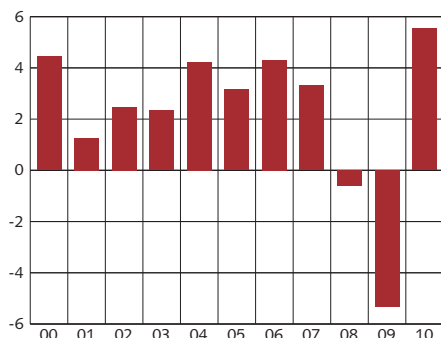
Sources: IMF and the Riksbank

Figure 2:5. Central banks' balance sheet totals
Percentage of GDP



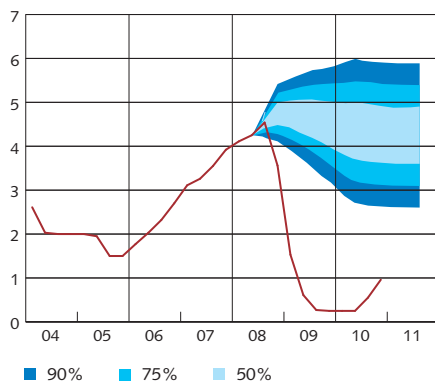
Sources: Bureau of Economic Analysis, Eurostat, Office for National Statistics, Statistics Sweden and the respective central banks

Figure 2:6. GDP
Annual percentage change



Source: Statistics Sweden

Figure 2:7 Repo rate with uncertainty bands from the Monetary Policy Update in September 2008
Per cent, quarterly averages



Source: The Riksbank

■ ■ Sweden: International financial crisis exacerbated economic downturn in 2008

During the first half of 2008 oil prices in the world market rose sharply, which meant that CPI inflation was pushed upwards. Other contributing factors were high world market prices for food, rising mortgage rates and relatively high domestic cost pressures. During summer 2008 inflation reached its highest level since 1993. Both short-term and long-term inflation expectations also rose. Concern that the high inflation would become entrenched contributed to the Riksbank continuing to gradually raise the repo rate up to the beginning of September.

When the global financial crisis worsened in mid-September, the picture changed dramatically. The Swedish financial markets also began to be tangibly affected. The banks' liquidity deteriorated, loan costs for both companies and households rose, and access to credit declined. The international financial crisis exacerbated the economic downturn that had already begun. GDP shrank by 0.6 per cent in 2008, which was a large slowdown compared with the previous year (see figure 2:6).

The Riksbank, other Swedish authorities and the Government took a number of measures to alleviate the effects of the international financial crisis and to improve the functioning of the financial markets. The Riksbank's measures were aimed at facilitating the banks' slightly longer-term funding, for instance, by offering loans in SEK with three-month and six-month maturities. After the Lehman Brothers crash there was a general shortage of funding in US dollars, which also affected agents in the Swedish market. In this situation the Riksbank began to lend US dollars to the banks. This was funded through the foreign currency reserve and through the loan facility offered by the Federal Reserve to the Riksbank and other central banks.

The Riksbank rapidly cut the repo rate to slow down the fall in production and to attain the inflation target a couple of years ahead. Figure 2:7 shows the large and rapid cuts in the repo rate made by the Riksbank from October 2008. The figure also shows the uncertainty bands around the forecast for the repo rate published in the Monetary Policy Update in September 2008. These were based on the forecasting performance of market rates for the repo rate and showed the interval within which the repo rate, given earlier forecasting errors, was expected to be with a 90 per cent probability (the broadest band) over the coming years. The fact that the repo rate was actually below the lower band after only a quarter or so and that after one year it was around 3 percentage points lower illustrates the exceptional developments that took place.

■ ■ Largest fall in Swedish GDP in modern times in 2009

The severe downturn that began at the end of 2008 continued in 2009. After having fallen heavily in the last quarter of 2008, GDP fell

by a further 15 per cent or so on an annual rate (seasonally-adjusted) in the first quarter of 2009. The reason that Sweden was so hard hit by the global recession was that the Swedish economy is highly dependent on exports. The fall in exports was accompanied by an increase in surplus capacity in the industrial sector and a substantial decline in investments. Companies also sold from stock to a great extent during the year, thus reducing investments in stock and contributing to the fall in GDP. At the same time, there was a tangible deterioration in the situation on the labour market. The number of redundancy notices increased rapidly at the start of the year and reached very high levels. The number of new job vacancies also fell by half. Unemployment increased by approximately 2.2 percentage points during the year and amounted to 8.3 per cent in 2009 (see figure 2:8). Both employment and the number of hours worked fell significantly.

The weaker labour market in combination with the sharp decline in wealth in the wake of the falling stock markets also led to a fall in household consumption during the year and to an increase in household saving. However, consumption was upheld relatively well compared with other demand components that fell much further.

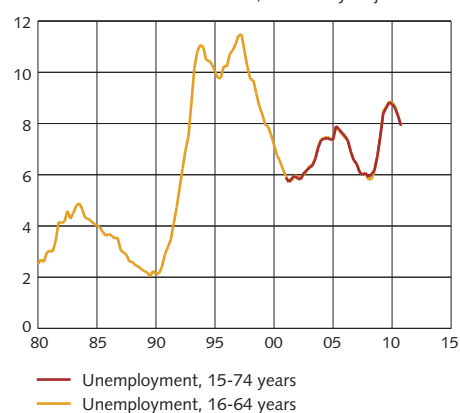
GDP fell by as much as 5.3 per cent in 2009 (see figure 2:6). This is the greatest fall in Swedish GDP in a single year in modern times. In 2008, the fall was 0.6 per cent. The rate of inflation measured as the change in the CPI averaged -0.3 per cent in 2009; it was thus far below the inflation target of 2 per cent. CPI inflation fluctuated considerably during the latter part of 2008 and in 2009 as a result of the substantial changes in the repo rate (see figure 2:9). This is because the CPI includes mortgage interest, which is directly affected by changes in the repo rate. CPIF inflation, which is the CPI excluding the effects of the Riksbank's repo rate changes on mortgage rates, was on average 1.9 per cent during the year.

In 2009, the Riksbank continued to pursue an increasingly expansionary monetary policy in order to mitigate the effects of the international recession on production and employment in Sweden and at the same time stabilise inflation around the inflation target. The Riksbank cut the repo rate from 2.0 per cent at the beginning of the year to 0.25 per cent in early July. The repo rate path, which is to say the Riksbank's forecast for the future repo rate, was successively revised downwards during the first six months of the year. From July, the repo rate was held unchanged at 0.25 per cent and the Riksbank announced its intention of letting the repo rate remain at this low level for a relatively long period of time.

Monetary policy decisions in 2010

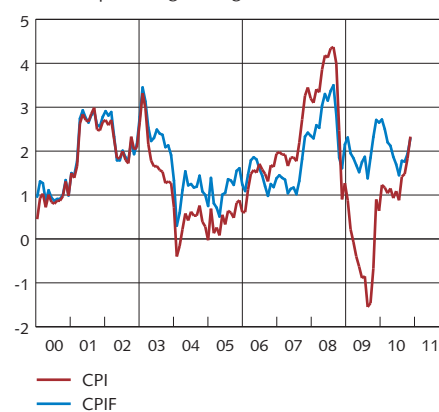
The Riksbank held the repo rate unchanged at 0.25 per cent, the level it reached after the cut in July 2009, until the end of June 2010. The forecast for the repo rate in the short run was adjusted upwards in February 2010 – which entailed an increase with effect from the

Figure 2:8. Unemployment
Per cent of the labour force, seasonally-adjusted data



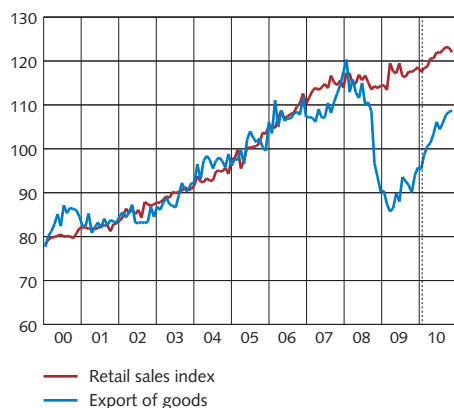
Note. Pre-1987 data has been spliced by the Riksbank.
Sources: Statistics Sweden and the Riksbank

Figure 2:9. CPI and CPIF
Annual percentage change



Source: Statistics Sweden

Figure 2:10. Retail trade index and exports of goods
Index 2005 = 100, seasonally-adjusted data



Note. The broken vertical line indicates the date of publication of the *Monetary Policy Report*, February 2010.

Source: Statistics Sweden

summer or early autumn. In the longer run, however, the repo rate path was adjusted downwards slightly. During the second half of the year the Riksbank began a process of normalising monetary policy. The repo rate was raised by 0.25 percentage points on four occasions, but the repo rate path was adjusted downwards in the longer term on two occasions. The motive given by the Executive Board for the increases was the need to stabilise inflation around the target of 2 per cent and at the same time to attain stable real economic growth. Moreover, the Executive Board pointed out that households' debts had increased substantially in recent years. A sequence of events where debts increase much faster than incomes over a long period of time entails the risk of imbalances building up in the economy. Another part of the normalisation of monetary policy was that the extraordinary loans at fixed interest rates matured over the year and were not renewed by the Riksbank. This contributed to monetary policy gradually becoming less expansionary, as a return to normal market funding for the banks would entail rising market rates. The Executive Board took this into account when assessing the monetary policy that was appropriate over the year.

■ ■ Repo rate held unchanged in February

The signs of a recovery in economic activity became increasingly clear in early 2010 – growth abroad rose and the outcomes for employment and inflation were higher than expected. The financial markets also functioned better. The overall picture was that economic activity was now on firmer ground.

The recovery that had begun in Asia in 2009 now included large parts of the world. The strong growth in Asia looked as though it would continue. In addition, the US economy had grown more quickly than expected at the end of 2009, and several factors indicated that it would continue to recover. The fall in employment had slowed down considerably, the policy rate was at an all-time low and rising housing prices and share prices meant that household wealth increased. World trade also continued to rise after falling substantially at the beginning of the financial crisis. But central banks and governments were still conducting an economic policy with considerable stimulation and it was uncertain what would happen when they gradually withdrew their expansionary measures.

The situation on the financial markets was no longer assessed as an obstacle to the economic upturn. For instance, various risk premiums in the interbank markets had decreased. The so-called TED spread, which shows the difference between the interbank rate and the yield on a treasury bill, was down at its pre-crisis level (see figure 2:1). Companies' access to market funding had also improved.

In Sweden, growth prospects were roughly the same as during the Riksbank's previous assessment in December 2009, but the labour market did not appear as weak as had been feared. Statistics showed that employment was higher than expected. Household consumption

had been stimulated by low interest rates and tax cuts, which had upheld sales in the retail trade. However, the export-dependent manufacturing industry was lagging behind (see figure 2:10). The Riksbank's assessment was nevertheless that international demand for Swedish products, and thus exports, would rise as economic activity abroad improved. At the same time, domestic demand was expected to be strong in the coming period. The high level of household saving to start with, and the fact that there was little need for fiscal policy constraint further ahead, indicated that consumption could be maintained. GDP could therefore grow relatively strongly in the coming years.

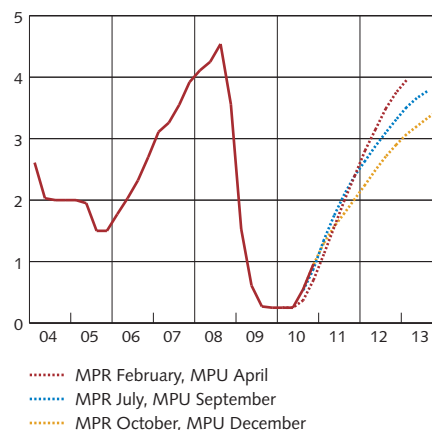
Despite a low level of resource utilisation, inflation had risen more than expected in the December 2009 forecast and underlying inflation was high to begin with. CPI inflation was 0.9 per cent in December 2009, while underlying inflation measured as the CPIF (CPI with a fixed interest rate) was 2.7 per cent. However, underlying inflation was expected to subside during 2010, in line with declining wage increases, rising productivity and an increasingly strong krona.

The Executive Board of the Riksbank assessed that monetary policy needed to remain expansionary to attain the target of 2 per cent inflation and at the same time support the recovery in the economy. The Executive Board therefore decided to hold the repo rate unchanged for a further period of time. After this, the forecast was that increases would begin in summer or autumn 2010 – slightly sooner than had been forecast earlier. This was due to slightly stronger growth in the economy and to the financial markets functioning better. At the same time, it was assessed that the repo rate could be increased more gradually and the forecast for the repo rate in the longer run was adjusted downwards slightly (see figure 2:11)

Deputy Governor Lars E.O. Svensson entered a reservation against the decision and advocated cutting the repo rate to 0 per cent and thereafter a repo rate path 0.25 per cent below the path of the main scenario through the fourth quarter of 2010. He maintained that such a repo rate path would result in a better outcome for both inflation and resource utilisation, with both higher resource utilization and CPIF inflation closer to the target. According to Svensson, such a repo rate path would not cause any problems for the functioning of the financial markets or for financial stability, especially since in his opinion house prices and mortgages did not entail a stability problem and should not affect monetary policy.

The February Monetary Policy Report contained, as usual, two possible alternative scenarios for the repo rate.¹⁰ The purpose of these alternative scenarios is to describe what could happen in the economy if the Riksbank had chosen a different monetary policy than that described in the main scenario. The scenarios represent relatively mechanical calculations performed using Ramses, the Riksbank's general equilibrium model.

Figure 2:11. Repo rate outcome and forecasts in 2010
Per cent, quarterly averages

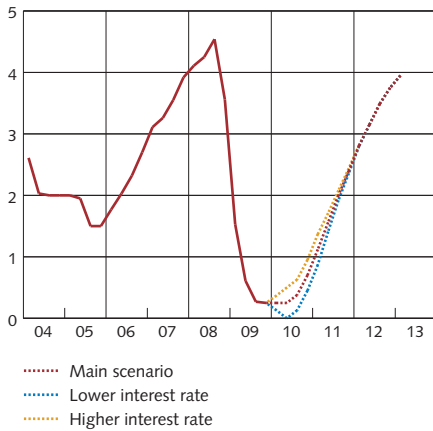


Note. The repo rate forecasts from February and April coincide and are therefore shown with the aid of a common broken line in the figure. The repo rate forecasts from July and September, like the forecasts from October and December, are so close to one another that they are also illustrated with a common broken line.

Source: The Riksbank

¹⁰ Alternative forecasts for the repo rate are published in the Monetary Policy Reports, but not in the Monetary Policy Updates.

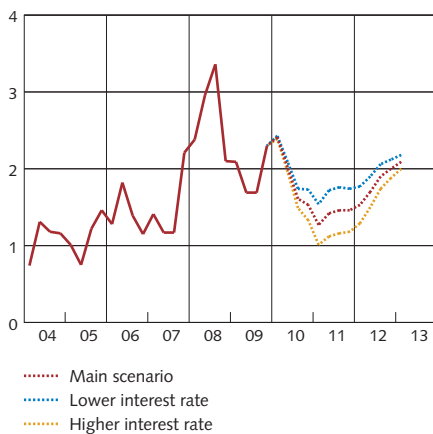
Figure 2:12. Repo rate assumptions
Per cent, quarterly averages



Note. The broken line represents the Riksbank's forecast in February 2010.

Source: The Riksbank

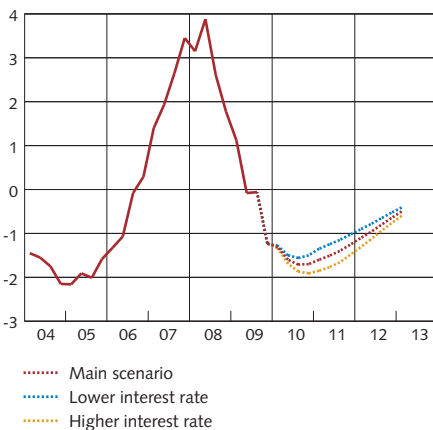
Figure 2:13. CPIF
Annual percentage change



Note. The broken line represents the Riksbank's forecast in February 2010.

Sources: Statistics Sweden and the Riksbank

Figure 2:14. Hours gap
Percentage deviation from the HP trend



Note. The broken line represents the Riksbank's forecast in February 2010.

Sources: Statistics Sweden and the Riksbank

Figure 2:12 shows the Riksbank's main scenario and two alternative scenarios with a lower and higher policy rate respectively.¹¹

Figure 2:13 shows the CPIF forecasts based on the different repo rate paths. The figure shows that the lower repo rate path would mean that CPIF inflation was higher than in the main scenario and approached 2 per cent just over two years ahead. The higher repo rate path would lead to lower inflation and mean that inflation did not approach 2 per cent until the end of the forecast period.

Resource utilisation is often used as a summarising measure of how the real economy is performing. To assess this overall use of the resources in the economy, the Riksbank uses a number of different measures and indicators (see the article in Chapter 1 "Stabilisation of the real economy and measures of resource utilisation"). One of these measures is the hours gap, which illustrates resource utilisation measured as the number of hours worked in relation to an estimated long-term trend. Figure 2:14 shows the forecasts for the hours gap based on the main scenario and the alternative repo rate paths. All of the paths resulted in a negative gap, that is a level of resource utilisation below normal, but the scenario with a lower repo rate led to a less negative gap than the other alternatives.

Although the alternative repo rate scenarios aim to illustrate the effects of another monetary policy than that described in the main scenario, it is difficult to determine which repo rate path to choose merely on the basis of these scenarios. The scenarios do not reflect all of the factors taken into account in the monetary policy decisions, for instance, factors outside of the model used to analyse the repo rate scenarios or risks that are difficult to quantify in the forecasting work.

In connection with the description of the alternative scenarios in the February Monetary Policy Report, the Riksbank discussed the difficulties in knowing how economic agents would act and financial markets would function when interest rates were very low. According to the Riksbank's analyses, it appeared that the very low repo rate had not led to any problems, but there was also a high degree of uncertainty here. Another factor mentioned was the uncertainty over whether the financial crisis could have reduced potential production so that resource utilisation in the economy was actually higher than indicated by the various gap measures calculated.

■ ■ Repo rate also held unchanged in April

After the decision in February economic activity abroad continued to improve and world trade increased (see figure 2:15). However, developments were uneven and there were large differences between regions. Asia still accounted for a large share of the increase in demand. The recovery continued to receive support from extensive economic policy measures by governments and central banks around

¹¹ In the first scenario the Riksbank would conduct a more expansionary monetary policy by cutting the repo rate by 0.25 percentage points in the current quarter and would thereafter set the repo rate 0.25 percentage points lower than in the repo rate path in the main scenario for a further four quarters. After four quarters the repo rate would gradually approach the repo rate path in the main scenario. In the higher scenario, the repo rate would be set slightly higher to the same extent that it is set lower in the previous scenario.

the world. The measures stimulated the recovery, but at the same time meant that the budget deficit grew in several countries.

For individual countries, such as Greece, the problems with public finances were very severe, and there was uncertainty over some countries' creditworthiness. Although the problems had not spread to the global financial markets, they nevertheless weighed down economic developments in the euro area and created uncertainty over the future.

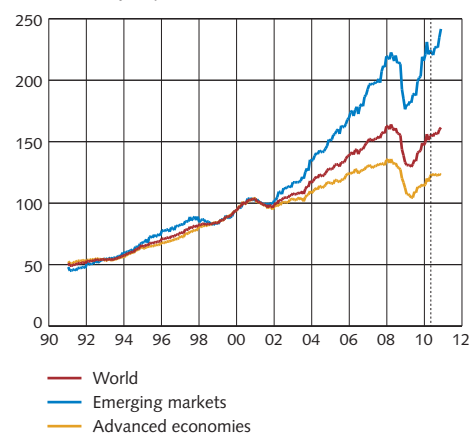
In Sweden, new statistics showed that GDP had been surprisingly weak at the end of 2009. Despite this, the Riksbank did not change its assessment that the recovery in the Swedish economy would continue. This picture was confirmed by the increase in new orders, which was expected to lead to exports accelerating. At the same time, the Riksbank's assessment was that the low repo rate and the expansionary fiscal policy would contribute to strong domestic demand. Moreover, employment had begun to increase and unemployment had stopped rising, which indicated a turnaround in the labour market. GDP growth during the first quarters of 2010 was therefore expected to be stronger than forecasted earlier. However, the level of GDP for 2010 as a whole was estimated to be lower than in the earlier forecast as a result of the unexpectedly weak end to 2009.

According to the Riksbank's forecast, the stronger exchange rate, faster growth in productivity and moderate wage increases would contribute to relatively low inflationary pressures during the forecast period. However, CPI inflation was expected to rise quickly as households' mortgage expenditure would increase in line with future increases in the repo rate. CPI inflation had risen, but the upturn was assessed to be temporary. CPI inflation was expected to fall back over the year and then to rise and be around 2 per cent at the end of 2012.

The Executive Board of the Riksbank decided to hold both the repo rate and the repo rate path unchanged in April. As the financial markets were more stable and the recovery in the economy was continuing, the Executive Board considered it appropriate to gradually normalise monetary policy in the coming period. The Board's assessment was that it would need to begin increasing the repo rate with effect from the summer or early autumn, which was compatible with the assessment made in February (see figure 2:11)

At the meeting in April, Deputy Governor Lars E.O. Svensson entered a reservation against the repo rate path and advocated a repo rate path with a repo rate of 0.25 per cent through the fourth quarter of 2010, and then a return to the repo rate path of the main scenario. According to Svensson, such a repo rate path would result in about the same effects as the lower repo rate path that he had previously advocated, that is, a better outcome for both resource utilisation and inflation, with both higher resource utilisation and CPI inflation closer to the target.

Figure 2:15. World trade volumes
World trade monitor index, 2000=100,
seasonally-adjusted data



Note. The broken vertical line indicates the date of publication of the *Monetary Policy Update* in April 2010.
Source: Netherlands Bureau for Economic Policy Analysis

■ The Riksbank's complementary measures – exit and assessment

Phasing out extraordinary measures during 2010

The disruptions in the financial markets in 2008 and 2009 entailed difficulties for monetary policy. Increased risk premiums meant that changes in the repo rate had less effect than normal on the market rates offered to households and companies. The large cuts in the repo rate also meant that the level of the repo rate approached zero, which limited the Riksbank's capacity to use further repo rate cuts if necessary. The Riksbank, like many other central banks, therefore implemented complementary, so-called extraordinary measures to improve market functioning and ensure that its monetary policy would have a better impact. The Riksbank's extraordinary measures had several overall purposes. To safeguard the supply of liquidity in the financial system in Sweden, to improve the functioning of the financial markets and to enable monetary policy to have a stronger impact in an economy affected by disruptions in the financial markets.¹²

One of the extraordinary measures involved offering the banks loans at longer maturities, from three to twelve months, at both variable and fixed interest rates. The Riksbank offered three one-year fixed-interest rate loans in 2009 for monetary policy purposes. In total, SEK 296.5 billion was lent at a low interest rate compatible with the Riksbank's forecast at that time of a low and unchanged policy rate over at least a year ahead. The monetary policy purpose was to reduce the large difference prevailing between the repo rate and the market rates offered to households and companies. The Riksbank also made it clear that the repo rate would remain at a low level over a long period of time to support the economy in general.

During winter 2009/2010 conditions on the credit markets improved, which was reflected in the banks finding it easier to gain access to long-term funding and funding at a lower cost. During 2010 the Riksbank therefore gradually ceased offering loans at longer maturities. In February the Riksbank ceased offering loans with a 12-month maturity and in April the loans with three-month and six-month maturities ceased.

When the Riksbank's fixed-interest rate loans to the banks matured during the year, the Riksbank had to all intents and purposes phased out all of the extraordinary measures taken during the financial crisis. This means that the banks have had to obtain short-term funding entirely in the private credit markets again. The banks thus also regained the responsibility for the overnight market. When the fixed interest rate loans matured in summer and autumn 2010, the Riksbank offered the banks loans with a 28-day maturity as an underlying insurance, in case the markets should suffer further turbulence. However, the demand for these loans waned as early as the late summer 2010.

¹² For a full account of these measures, see the Riksbank's website, www.riksbank.se.

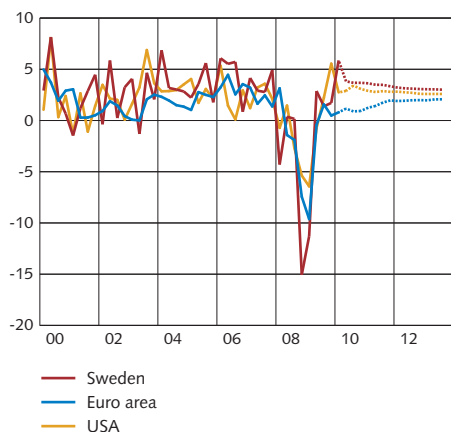
Assessment of the fixed-rate loans

The fixed-interest rate loans in practice extended the banks' net surplus of liquid funds, which was created by the loans to support liquidity (at variable interest rates) offered by the Riksbank to maintain financial stability during the financial crisis. The Riksbank's analysis shows that the fixed-rate loans contributed to creating a large surplus supply of SEK, which pushed down short-term market rates by a total of around 20 basis points at most. For example, the interest rates on bank certificates and commercial paper as well as STIBOR declined, which made short-term funding cheaper for both financial and non-financial companies.

The combination of the expectation of a low repo rate and the announcement of fixed-rate loans also contributed to lower interest rates on more long-term debt instruments, such as government bonds and mortgage bonds. The fact that the ECB lent large amounts to European banks at the same time may also have contributed to lower Swedish bond rates. According to the Riksbank's analysis, the largest effects observed were on bonds with maturities of up to two years, where rates fell by at most 40 basis points altogether. Lower policy rate expectations and expectations of low liquidity risk premiums appear to have been some important factors behind the lower bond rates, but it is difficult to isolate the individual effect from the fixed-rate loans as other simultaneous events may have affected the Swedish money and bond markets.

All in all, the fixed-rate loans contributed to improving the financial conditions for financial and non-financial companies in Sweden. Ultimately, lending to households probably also benefitted to some extent. The fixed-rate loans can therefore also be said to have contributed to the Riksbank being able to conduct a more expansionary monetary policy to support the economic recovery and to hold the inflation rate close to the Riksbank's target, despite the fact that the nominal repo rate was thought to have reached its lower bound.

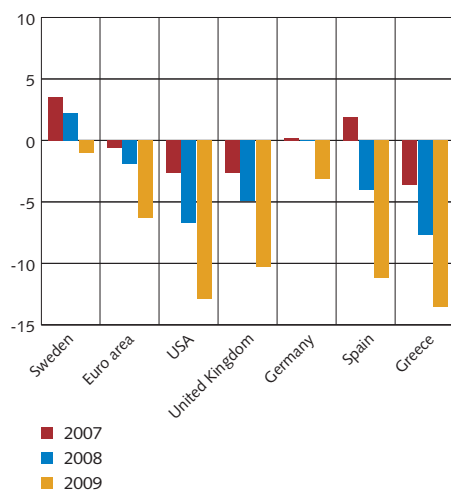
Figure 2:16. GDP in different regions and countries
Quarterly changes in per cent calculated as an annual rate, seasonally-adjusted data



Note. Broken lines represent the Riksbank's forecast in July 2010.

Sources: Bureau of Economic Analysis, Eurostat, Statistics Sweden and the Riksbank

Figure 2:17. Net lending in the public sector
Per cent of GDP



Sources: The IMF and Statistics Sweden

■ Repo rate increased to 0.5 per cent in June

The world economy continued to recover during the spring. In Asia and the United States economic activity strengthened, while developments in the euro area were slower, due to the concern over public finances. However, prospects were bright in Sweden and growth was unexpectedly strong (see figure 2:16)

During the spring, the financial markets were characterised by concern over increasing central government debt and large budget deficits, primarily in the southern European euro countries. It was uncertain how large the European banking sector's exposures were to the countries with high debts and how great the risk of hidden losses was. This contributed to greater nervousness and mistrust on the financial markets. The unease accelerated when Greece encountered difficulties in borrowing on the international bond market. In early May, Greece was therefore forced to accept international assistance from the EU and the International Monetary Fund, IMF. Greece and also other countries in the euro area needed to make extensive cuts in their budgets to avoid a large increase in general government debt (see figure 2:17). These tightening measures were expected to slow down GDP growth in the euro area and thus ultimately to have an effect on Sweden.

At the same time, Asia continued to grow strongly and was expected to remain a driving force in the global recovery. The prospects for the US economy were also positive, and several factors pointed to a continued recovery - for instance, the labour market appeared to have stabilised, consumption increased and company profits improved. It could also be noted that growth in the United States was mainly due to strong economic policy stimulation from the government and the central bank.

In Sweden, statistics showed that GDP had increased from one quarter to the next (seasonally-adjusted) since the second quarter of 2009. GDP growth during the first quarter of 2010 was stronger than the Riksbank had expected in April, and the economy was now recovering on a broad front. Households were increasingly optimistic and consumption rose. The tangible increase in world trade also benefitted Swedish exports and Swedish investment. Exports had increased from one quarter to the next since the third quarter of 2009, and in addition the outcome for the first quarter of 2010 was surprisingly strong. The forecast for a continued increase in exports was also expected to lead to the upswing in the Swedish economy now being driven by good growth in domestic demand and an increase in the demand from abroad for Swedish goods. This would mean that the differences between the services sector, which was not as hard hit by the crisis, and the manufacturing sector declined. Employment had also continued to increase, and unemployment had levelled off, which was unusually early given the historical correlations and the fact that GDP during the post-war period had never fallen so much on average in an individual year as in 2009. The Riksbank's assessment was that GDP

would increase by just over 3 per cent a year on average in 2010–2012.

Despite the relatively strong GDP growth, inflation was expected to be fairly close to the target during the forecast period. There was ample spare capacity to start with. Together with a moderate rate of wage increase, rising productivity growth and a stronger krona, this meant that inflationary pressures would be held back, despite stronger economic activity. Looking across the forecast period, the Riksbank assessed that CPI inflation would be slightly higher than 2 per cent, and that CPIF inflation would be slightly lower. CPIF inflation was expected to rise in 2012 and be close to 2 per cent at the end of the forecast period.

To manage the inflation target of 2 per cent and at the same time have a stable growth in the real economy, the Riksbank's assessment was that it was appropriate to begin normalising monetary policy. The repo rate was raised from 0.25 per cent to 0.5 per cent and was then expected to continue up towards more normal levels as economic activity recovered. However, the repo rate path in the slightly longer run was adjusted downwards as a result of the poorer economic prospects abroad (figure 2:11).

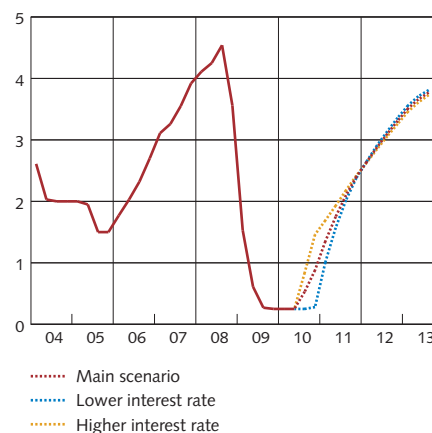
At the monetary policy meeting Deputy Governor Karolina Ekholm entered a reservation against the decision to increase the repo rate, in view of the increased uncertainty prevailing as regards the sovereign debt problems in the euro area. According to Ekholm, the relatively low inflationary pressure made it possible to wait before increasing the repo rate, without compromising the inflation target. She advocated a repo rate path with an unchanged repo rate of 0.25 per cent until September, followed by successive increases in accordance with the profile presented in the Monetary Policy Report.

Deputy Governor Lars E.O. Svensson entered a reservation against the repo rate path and advocated a repo rate path with a repo rate of 0.25 per cent through the fourth quarter of 2010, and thereafter a gradual return to the repo rate path of the main scenario. He maintained that such a repo rate path would result in a better outcome for both resource utilisation and inflation, with both lower unemployment and CPIF inflation closer to the target.

The alternative repo rate paths and accompanying forecasts for inflation and resource utilisation published in the Monetary Policy Report in July are shown in figures 2:18–2:21. The repo rate path considered by a majority of the Executive Board to entail well-balanced monetary policy is the forecast in the main scenario. Figures 2:19 and 2:21 show the accompanying forecasts for CPIF inflation and the hours gap respectively. Figure 2:19 shows that the lower repo rate path would lead to CPIF inflation reaching 2 per cent roughly at the same time as in the main scenario, but being on average higher during the forecast period. With the higher repo rate path inflation would be lower on average than with the other repo rate paths.

Figure 2:21 shows that resource utilisation measured as the hours gap would, given the repo rate path in the main scenario, rise towards

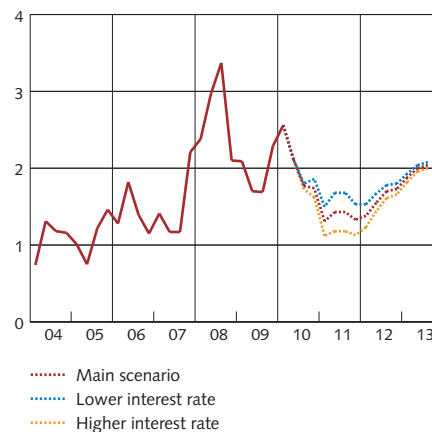
Figure 2:18. Repo rate assumptions
Per cent, quarterly averages



Note. The broken line represents the Riksbank's forecast in July 2010.

Source: The Riksbank

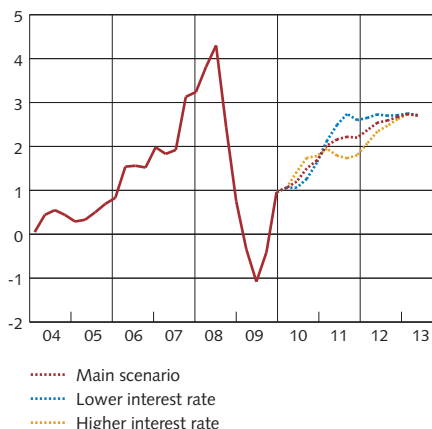
Figure 2:19. CPIF
Annual percentage change



Note. The broken line represents the Riksbank's forecast in July 2010.

Sources: Statistics Sweden and the Riksbank

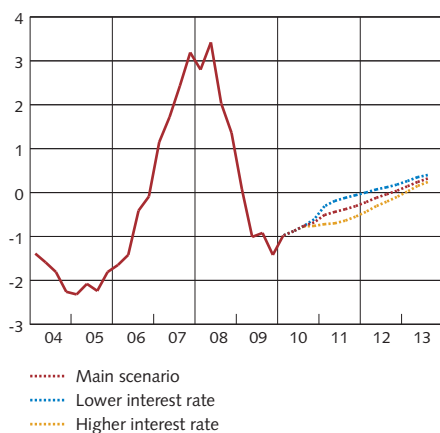
Figure 2:20. CPI
Annual percentage change



Note. The broken line represents the Riksbank's forecast in July 2010.

Sources: Statistics Sweden and the Riksbank

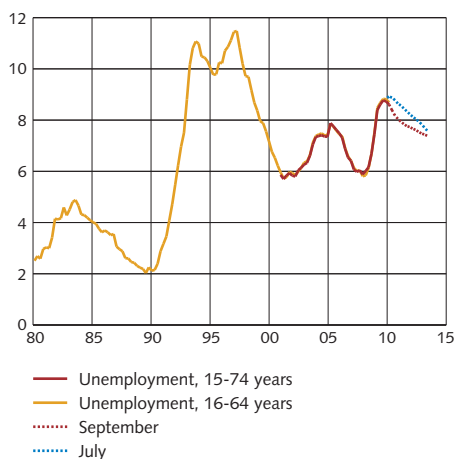
Figure 2:21. Hours gap
Percentage deviation from the HP trend



Note. The broken line represents the Riksbank's forecast in July 2010.

Sources: Statistics Sweden and the Riksbank

Figure 2:22. Unemployment
Per cent of the labour force,
seasonally-adjusted data



Note. Pre-1987 data has been spliced by the Riksbank. The broken line represents the Riksbank's forecast, 15-74 years.

Sources: Statistics Sweden and the Riksbank

a more normal level over around 2½ years and then continue to rise and be above the normal level. With the lower repo rate path, resource utilisation would rise more quickly and be back at a normal level after around 1½ years. It would then continue rising and be above normal for the remainder of the forecast period.

One risk mentioned in connection with the discussion on alternative repo rate paths in the Monetary Policy Report in July was that a lower repo rate contains a risk of overheating tendencies and bottleneck problems further ahead. Although the measures of resource utilisation reported did not indicate any such tendencies, it was pointed out that these measures are very uncertain. It was also pointed out that housing prices and household indebtedness had increased substantially over a long period of time. A large fall in housing prices was not considered likely, but the continued sharp rise in prices and indebtedness entailed an increased risk of price falls further ahead.

■ ■ Repo rate increased to 0.75 per cent in September

During the summer the world economy continued to recover, but the strength of the recovery was uncertain. There were signs that the recovery in the United States had slowed down, for instance, statistics for the labour and housing markets indicated a slowdown and the National Accounts figures pointed to weaker domestic demand than expected. At the same time, there was still concern over public finances in southern Europe, although it was assessed that there was little risk that this would cause serious problems for European banks. The Swedish economy, on the other hand, continued to perform strongly.

For some time now, world trade had been growing, which had caused both Swedish exports and Swedish investment to increase. Domestic factors also pointed to good growth in the Swedish economy. For instance, both households and companies expressed confidence in the future, and households had good scope to increase their consumption. Unlike many other European countries, the government in Sweden did not need to resort to fiscal policy tightening, thanks to the relatively strong public finances in Sweden (see figure 2:17). The fact that the recovery was accelerating was also reflected in the fact that employment had been rising for some time and unemployment had fallen. Moreover, the labour market continued to recover faster than expected (see figure 2:22).

The Riksbank revised up its forecast for Swedish GDP growth in the short term as a result of strong outcomes and indicators. GDP growth was expected to be around 4 per cent in 2010 and then to decline over the following years. The Riksbank also made an upward adjustment to its assessment of the labour market. Employment was expected to return to the same level as prior to the crisis as early as 2011. At the same time, resource utilisation was considered to be very low, but expected to gradually rise and be around normal at the end of the forecast period.

In the Riksbank's assessment, the rising resource utilisation

would gradually have an impact on inflation during the forecast period. Although inflationary pressures were expected to be low in the short term as a result of the stronger krona and falling unit labour costs, they were expected to increase as the labour market improved. According to the forecast, CPIF inflation would continue to fall over the year, and then increase and reach 2 per cent at the beginning of 2013. CPI inflation was expected to overshoot the 2 per cent target temporarily during the forecast period, primarily as a result of the coming increases in the repo rate. In the longer run, when the repo rate had reached more normal levels, CPI inflation was also expected to be around 2 per cent.

All in all, the revisions to the forecasts were minor. The forecast for the repo rate was unchanged in relation to the assessment made in June. To manage the inflation target of 2 per cent and, at the same time, have a stable growth in the real economy, the Riksbank's assessment was that it was appropriate to continue the normalisation of monetary policy that was initiated in the summer. The repo rate was raised to 0.75 per cent and the repo rate path was held unchanged from June. The low initial level of resource utilisation justified the repo rate being lower than normal for a further period. As resource utilisation increased, the repo rate would be gradually raised towards more normal levels (see figure 2:11).

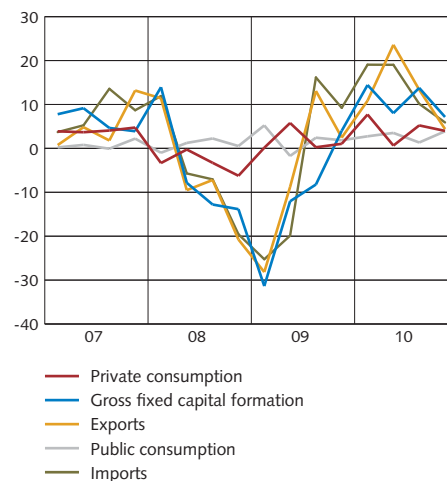
Deputy Governor Lars E.O. Svensson entered a reservation against the decision to raise the repo rate by 0.25 percentage points and against the repo rate path in the Monetary Policy Update. He preferred a repo rate of 0.5 per cent and a low repo rate path that would gradually rise to 1.75 per cent at the end of the forecast period. According to Svensson, the higher repo rate path in the man scenario would, if it became credible and was incorporated in market expectations, imply a considerable tightening of the current actual monetary policy with a substantial increase in market interest rates of longer maturity and a substantial appreciation of the krona, which would lower the already low CPIF inflation and increase the already high unemployment during the forecast period.

Deputy Governor Karolina Ekholm entered a reservation against the repo rate path and advocated a flatter repo rate path with a repo rate at the end of the forecast horizon that was around one percentage point lower than the adopted repo rate path. Her main grounds for the reservation were that weaker developments abroad could be expected to reduce growth and inflation in Sweden, too, in the period ahead. A slower increase in the repo rate should therefore bring inflation to the inflation target and resource utilisation closer to a normal level.

■ ■ Repo rate increased by 0.25 percentage points in October and December

After the monetary policy meeting in September, the upturn in the Swedish economy continued. According to the National Accounts, GDP grew by 4.5 per cent during the second quarter and by almost 7 per cent during the third quarter of 2010, compared with the corresponding quarter in 2009. The upturn was broad and all demand components in the balance of resources rose (see figure 2:23). Confidence indicators and

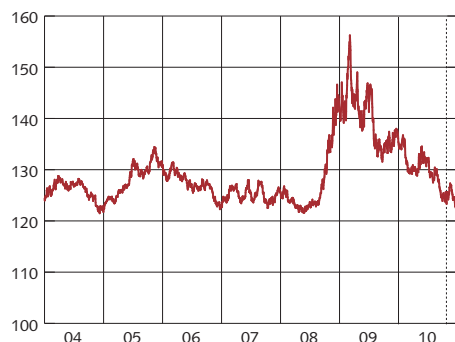
Figure 2:23. Balance of resources
Quarterly changes calculated as an annual rate, seasonally-adjusted data



Note. Data have been updated with outcomes published in March 2011. In connection with the new outcomes, the historical figures have also been revised.

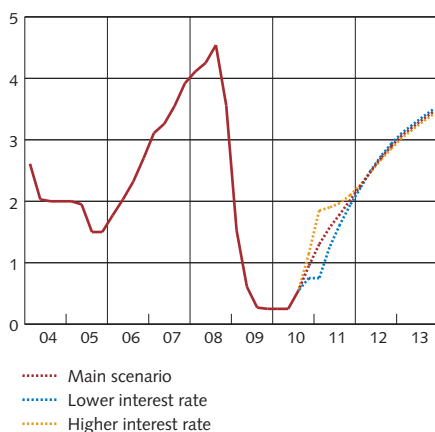
Sources: Statistics Sweden and the Riksbank

Figure 2:24 TCW-weighted exchange rate Index, 18.11.1992 = 100



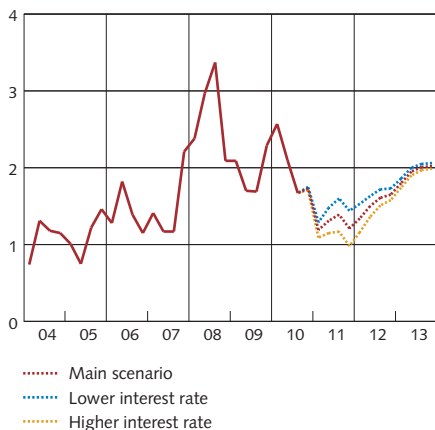
Note. The broken vertical line indicates the date of publication of the Monetary Policy Report, October 2010.
Source: The Riksbank

Figure 2:25. Repo rate assumptions
Per cent, quarterly averages



Note. The broken line represents the Riksbank's forecast in October 2010.
Source: The Riksbank

Figure 2:26. CPIF
Annual percentage change, quarterly averages



Note. The broken line represents the Riksbank's forecast in October 2010.
Sources: Statistics Sweden and the Riksbank

other monthly data, such as the National Institute of Economic Research's economic tendency survey and production in manufacturing and services, provided clear signals that Swedish GDP would continue to grow quickly in the coming period. The broad upswing in the Swedish economy also contributed to a rapid increase in employment. The krona also grew strongly during the autumn as incoming statistics showed that the Swedish economy was strong in relation to those in other countries (see figure 2:24).

At the same time, there was still considerable uncertainty over developments abroad. Emerging economies in, for instance, Asia had been strong during the first half of 2010 and this was expected to continue. However, the recovery in the United States was expected to take time. Although growth prospects in the United States looked better in December than they had in October, developments pointed to the recovery in the US labour market being slow. The short-term forecast for growth in the euro area was also slightly higher in December than in October. During the autumn, however, the financial markets were marked by concern over the sustainability of public finances in European countries with high debts and this concern increased towards the end of the year. The Riksbank assessed in October and December that the large-scale fiscal policy tightening to improve public finances would slow down growth in Europe. The slow recovery in these countries was expected to entail moderate inflationary pressures and the forecast for policy rates abroad was adjusted down in October.

Despite the fragmented picture of developments abroad, the Riksbank assessed that the Swedish economy would continue to be strong during the remainder of 2010 and in 2011. The large upturn in world trade benefitted Swedish exports. A combination of strong public finances, a high level of household saving and optimism also created the conditions for continuing strong consumption. Investment was expected to increase rapidly. The fact that Sweden had not been hit by a declining housing market meant that conditions were much more stable than in many other countries in the euro area and in the United States. In October, the Riksbank revised up its forecast for GDP growth in 2010 and 2011 and in December the forecast was revised up further.

At the same time as the GDP forecasts were revised upwards, the prospects for the Swedish labour market also improved. Together with the strong growth during the third quarter, this meant that resource utilisation in December was assessed as slightly higher than was assumed in October. Resource utilisation was expected to increase gradually during the forecast period in line with the recovery in the economy.

The Executive Board of the Riksbank decided in October to raise the repo rate to 1.0 per cent, and in December they raised it to 1.25 per cent. Inflationary pressures in Sweden were low as a result of the weak economic activity abroad, low labour costs for Swedish countries and a stronger krona, but they were expected to rise as economic activity strengthened. The Executive Board therefore decided, as on earlier occasions over the year, that the repo rate needed to be raised gradually towards more normal levels. In October, however, the forecast for the repo rate in the longer run was revised down in relation to the forecast made in September. The Executive Board assessed that the repo rate did not need to be raised as much in

the coming years, because of the weak activity abroad and the low inflationary pressures in Sweden during the forecast period. The forecast for the repo rate in December was in principle unchanged from October (see figure 2:11).

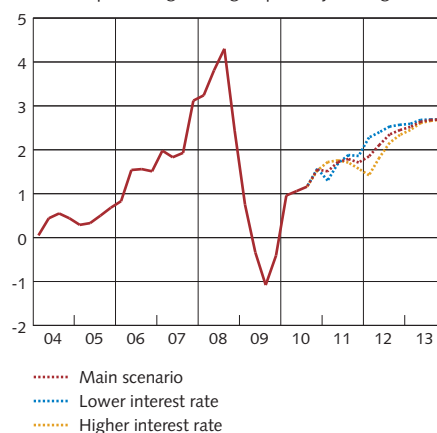
At the monetary policy meetings in October and December Deputy Governors Karolina Ekholm and Lars E.O. Svensson entered reservations against the decision to raise the repo rate by 0.25 percentage points and against the repo rate path in the Monetary Policy Report and the Monetary Policy Update respectively. They advocated an unchanged repo rate at both meetings and a repo rate path that would gradually rise to 2.7 per cent at the end of the forecast period. They considered that the repo rate path in the main scenario entailed a tighter monetary policy than presented in the Monetary Policy Report and the Monetary Policy Update respectively. If the repo rate path became credible it could lead to a further strengthening of the krona than in the forecast contained in the Report or Update and to much higher long-term market rates than at the time of the forecast. This would reduce inflation and raise unemployment. Ekholm's and Svensson's opinion that the repo rate path in the main scenario would lead to a greater strengthening of the krona rate than in the forecast was based on the belief that policy rates abroad would rise more slowly than assumed in the forecast.

The alternative repo-rate paths published in the Monetary Policy Report in October and the associated forecasts for inflation and the resource utilisation are shown in figure 2:25–2:29. As figure 2:25 shows, the repo rate path in the main scenario would entail a gradual increase in the repo rate throughout the forecast period. The lower repo rate path would only entail a pause in the repo rate increases in the immediate future; then the repo rate increases would be made at a faster pace for a period of time. This would bring the repo rate back to the same level as in the main scenario after almost 1½ years and then follow the same path as in the main scenario. The higher repo rate path, on the other hand, would entail faster increases than in the main scenario for a period and after that a return to the repo rate path in the main scenario.

Figure 2:26 shows that CPI inflation would reach 2 per cent at around the same time at the end of the forecast period with all three repo rate paths. However, the lower repo rate path meant a higher inflation rate on average during the period. Figure 2:28 shows that the lower repo rate path would entail resource utilisation measured as the hours gap regaining a normal level sooner than with other repo rate paths. For the remainder of the forecast period the gap would be larger than normal and also larger than with the other repo rate paths.¹³

In connection with the discussion of the alternative repo rate paths in the Monetary Policy Report in October, the uncertainty over which measure of resource utilisation should be used was mentioned, as was the fact that monetary policy may in some situations need to consider other factors than inflation and resource utilisation in the repo rate decisions (see also the article "Stabilisation of the real economy and measures of resource utilisation" in Chapter 1).

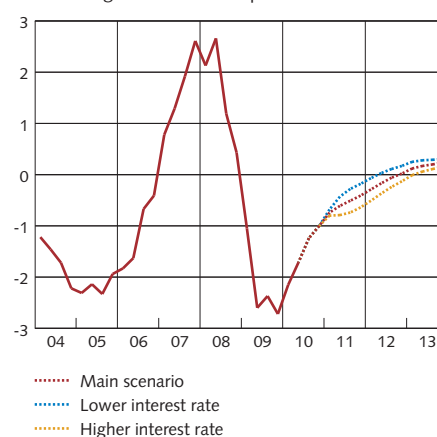
Figure 2:27. CPI
Annual percentage change, quarterly averages



Note. The broken line represents the Riksbank's forecast in October 2010.

Sources: Statistics Sweden and the Riksbank

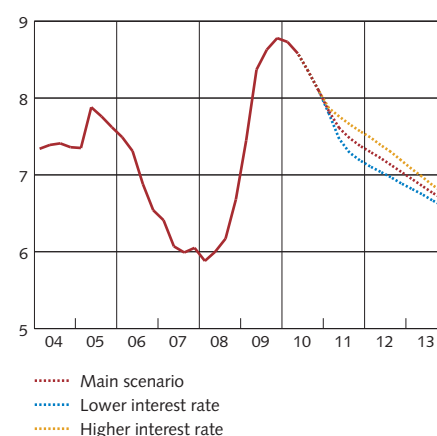
Figure 2:28. Hours gap
Percentage deviation from potential level



Note. The broken line represents the Riksbank's forecast in October 2010.

Sources: Statistics Sweden and the Riksbank

Figure 2:29. Unemployment
Per cent of labour force



Note. The broken line represents the Riksbank's forecast in October 2010.

Sources: Statistics Sweden and the Riksbank

¹³ The article at the end of Chapter 2 illustrates a method for assessing different repo rate paths based on the forecasts for inflation and resource utilisation implied by the repo rate paths. The decision in October 2010 is used as an example in this article.

■ Principles for the evaluation of different monetary policy alternatives

The introduction of a numerical inflation target entailed great progress for practical monetary policy and made it possible to measure and evaluate the target fulfilment of monetary policy in a much more efficient manner than before. However, the Riksbank and most other central banks with inflation targets conduct what is known as flexible inflation targeting, that is, monetary policy endeavours to stabilise both inflation and the real economy. It is therefore desirable to be able to measure and evaluate the stability in both of these dimensions. One way of doing this is to analyse what are known as mean squared gaps.¹⁴ Such analyses have the potential to further improve the communication of monetary policy and to provide support in the monetary policy decision-making process.

Every time the Executive Board makes a monetary policy decision, they assess the repo-rate path needed for monetary policy to be well-balanced. It is normally a question of finding an appropriate balance between stabilising inflation around the inflation target and stabilising the real economy. The fact that the Riksbank tries to stabilise both inflation and the real economy does not mean that it disregards the fact that the inflation target takes precedence.¹⁵

The exact horizon within which the Riksbank aims to ensure inflation is on target depends, for instance, on the reasons why inflation is deviating from the target, the size of the deviation, and the effects on the real economy. It can also depend on how much emphasis the Executive Board members place on stabilising inflation on the one hand, and stabilising the real economy on the other hand. In certain situations there may be reason to allow more time for inflation to return to the target, as a rapid return could have undesirable effects on production and employment. But if the return to the inflation target takes too long, on the other hand, there is a risk that the general public will begin to doubt the Riksbank's intentions and ability to attain the target even in the long term. There is thus no general answer to the question of how quickly the Riksbank aims to bring the inflation rate back to 2 per cent if it deviates from the target. The Riksbank's ambition has generally been to adjust the repo rate and the repo rate path so that inflation is expected to be fairly close to the target in two years' time.

At each monetary policy meeting there are several repo rate paths that could lead to inflation being on target within the forecast period and that provide a reasonable balance between stabilising inflation and stabilising the real economy. One method that can be used to summarise and compare information in the alternative forecasts is to calculate mean squared gaps. First the squared deviation is measured; "the gap" between the forecast for inflation and the inflation target, for instance, in each quarter three years

¹⁴ The method of analysing mean squared gaps is presented in the article "Evaluation of different monetary policy alternatives" in *Monetary Policy Report*, October 2009. A presentation and an analysis using this method were also included in *Material for assessing monetary policy 2009*.

¹⁵ See the document *Monetary policy in Sweden* for a more detailed description of the Riksbank's monetary policy strategy.

ahead. Then the mean squared gap is calculated by taking the average of these squared deviations. Correspondingly, it is possible to calculate the mean squared gap for a forecast of the real economy. The real economy is then usually represented by a measure of resource utilisation (see the article “Stabilisation of the real economy and measures of resource utilisation” in Chapter 1).¹⁶

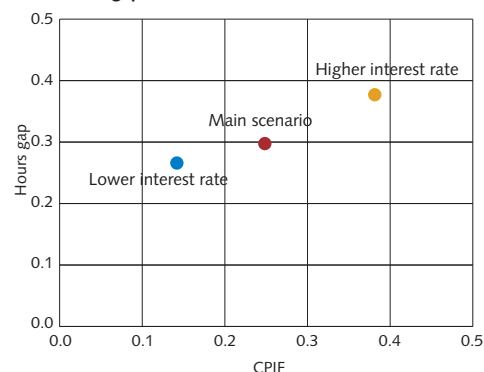
The mean squared gap shows clearly how well inflation is stabilised around the target and how well resource utilisation is stabilised around a normal level, according to a particular forecast. One can then use the mean squared gap for alternative forecasts of inflation and resource utilisation to compare different repo rate paths and thereby also the expected consequences of different future changes in the repo rate.

The method can be illustrated with an example from the Monetary Policy Report in October 2010. In addition to the repo rate path and the forecasts for inflation and resource utilisation according to the main scenario in the October Monetary Policy Report, corresponding forecasts for two alternative repo rate paths are described (see figures 2:25–2:29). Figure 2:30 summarises the information included in figures 2:26 and 2:28 by reporting the mean squared gap for the forecasts given the different repo rate paths.

Figure 2:30 states the mean squared gap for resource utilisation – measured with a gap for the number of hours worked – on the vertical axis and the mean squared gap for inflation on the horizontal axis. Inflation here is measured as the CPIF, that is, the CPI with a fixed mortgage rate.¹⁷ The closer the mean squared gap for inflation is to zero, the more stable the inflation forecast will be around the inflation target. The closer to zero the mean squared gap for hours is, the more stable the forecast for the number of hours worked is around a normal level. A dot that is close to origo in the figure thus means both good stabilisation of inflation around the inflation target and of hours worked around a normal level.

The red dot in the figure shows the mean squared gap according to the main scenario's repo rate path and accompanying forecasts for inflation and hours worked. The blue dot shows what the mean squared gap was with a lower repo rate path than in the main scenario, that is, with a more expansionary monetary policy. The yellow dot, on the other hand, shows what the mean squared gap was with a higher repo rate path and thus a less expansionary monetary policy than in the main scenario (figure 2:25 shows the three repo rate paths).

Figure 2:30. Mean squared gap for forecasts of the hours gap and CPIF inflation, October 2010



Note. The hours gap refers to the difference between the actual number of hours worked and the Riksbank's assessment of the long-term trend for the number of hours worked.

Source: The Riksbank

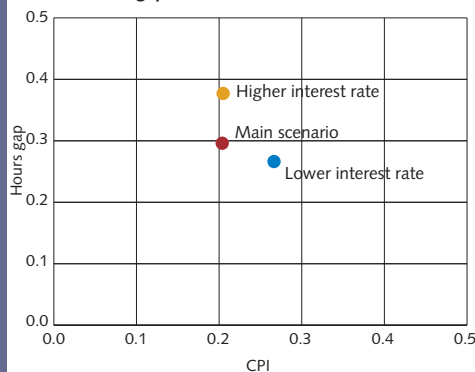
16 More specifically, the mean squared gap for an inflation forecast and a forecast for resource utilisation is calculated as:

$$\sum_{\tau=0}^T (\pi_{t+\tau,t} - \pi^*)^2 / (T+1) \text{ and } \sum_{\tau=0}^T (y_{(t+\tau,t)} - y'_{(t+\tau,t)})^2 / (T+1)$$

where $\pi_{t+\tau,t}$ is the forecast in quarter t for inflation in quarter $t+\tau$, π^* is the inflation target, $y_{(t+\tau,t)} - y'_{(t+\tau,t)}$ is a measure of resource utilisation and T is the forecast horizon (normally 12 quarters).

17 See Chapter 3 for an explanation of the CPIF and of why there is particular justification in certain periods for studying this measure of underlying inflation.

Figure 2:31. Mean squared gap for forecasts of the hours gap and CPI inflation, October 2010



Note. The hours gap refers to the difference between the actual number of hours worked and the Riksbank's assessment of the long-term trend for the number of hours worked.

Source: The Riksbank

It is clear from figure 2:30 that the repo rate path in the main scenario resulted in a dot that is both below and to the left of – that is, “south-west” of – the dot given by the higher repo rate path. The lower repo rate path in turn resulted in a dot that is “south-west” of the repo rate path in the main scenario. In other words, looking at these three repo rate paths, the lower one gave both the lowest average deviation from the inflation target and the lowest average deviation from a normal level for the number of hours worked. The conclusion based on the analysis in figure 2:30 is thus that the lower repo rate path is preferable. The result of the analysis is the same if one makes a corresponding analysis given the alternative repo rate paths presented in February and July.

However, there are difficulties linked to this method that need to be overcome by one means or another in the practical analysis work. One difficulty is to choose which measures of resource utilisation and inflation should be included in the analysis. As the article in Chapter 1 shows, there are a number of possible measures of resource utilisation, and with regard to inflation it is possible to either use the CPI or a measure of underlying inflation that is relevant at a particular point in time. The choice is important as the results of the analysis of mean squared gaps may differ, depending on which measures are used.

One example of this is shown in figure 2:31. The figure contains the same information as in figure 2:30 with the only difference that inflation is now measured in terms of the CPI instead of the CPIF (the forecasts for CPI inflation according to the different repo rate paths are illustrated in figure 2:27). As shown in the figure, the results of the analysis of the mean squared gap are different in this case. The dot given by the lower repo rate path is not south-west of the dot given by the main scenario in this case. This means that none of the repo rate paths stabilises both inflation and resource utilisation more than the other. Based on this analysis, it is therefore not clear which of these two repo rate paths is preferable.

Another difficulty is to also include in the analysis of mean squared gaps monetary policy deliberations that are not fully captured by the forecasts for inflation and resource utilisation. There are, for instance, some types of risk that cannot easily be quantified in forecasts, but which policy-makers may nevertheless wish to take into account in the monetary policy decisions. During 2010, for instance, the majority of Executive Board members wished to include risks linked to household indebtedness in their deliberations on monetary policy.

The Riksbank's work on further developing this analysis method will continue during 2011. This work forms part of a larger project that aims to create a structured analysis framework that can provide support in the monetary policy deliberations.

■ CHAPTER 3 – Target fulfilment 2010

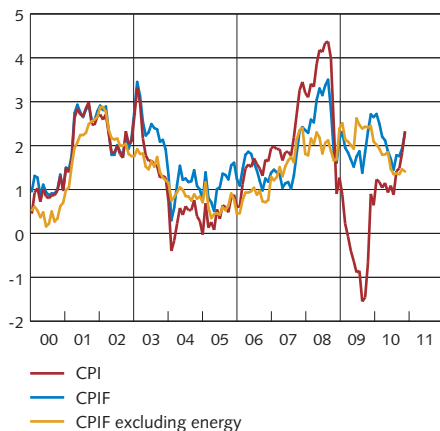
When assessing the Riksbank's monetary policy it is natural to compare the outcomes for inflation with the inflation target. However, there are at least two circumstances that must be taken into account. The first is that it takes time for changes in monetary policy to have an effect on inflation and the real economy. During the time it takes for changes in the interest rate to have a full impact, the economy can be affected by new and unexpected shocks. Inflation and the development of the real economy in 2010 may thus have been affected by shocks that it was not possible to predict when the earlier monetary policy decisions were taken. The second is that monetary policy may

also have taken into account the development of the real economy. A deviation between the outcome and the target for inflation may thus be deliberate. Confidence in the inflation target is highly important to the Riksbank's efforts to achieve price stability and stable resource utilisation as it helps to ensure that wage formation and price setting are compatible with the target. A high level of confidence in the inflation target also increases the possibilities for monetary policy to stabilise production and employment. Consequently, it is important that an evaluation of monetary policy also shows how inflation expectations have developed during the period studied.

Summary of Chapter 3

- CPI inflation averaged 1.3 per cent in 2010. CPIF inflation, which is not directly impacted by changes in mortgage rates, averaged 2.1 per cent over the year.
- The fact that CPI inflation was below target in 2010 was largely a result of the substantial repo rate cuts implemented by the Riksbank in 2008–2009. These temporarily pushed CPI inflation down through their effect on mortgage rates. This was predicted by the Riksbank's forecasts for 2010.
- Inflation expectations in the long term were close to 2 per cent, which shows that the public was confident that the Riksbank would reach its inflation target.
- GDP increased by 5.5 per cent in 2010. This strong growth was due to both the recovery abroad and the strong domestic demand. The labour market improved substantially and unemployment started to decrease during the year.
- Neither the Riksbank nor any other analyst predicted the strength of the Swedish recovery.
- An analysis made with the help of the Riksbank's general equilibrium model shows that the individual factors that have been of greatest importance for the surprising strength of GDP growth are linked to foreign trade, domestic demand and productivity growth.

Figure 3:1. CPI, CPIX and CPIX excluding energy
Annual percentage change



Source: Statistics Sweden

Inflation 2010

According to the Riksbank's inflation target the annual change in the consumer price index, the CPI, should be 2 per cent. After being negative in 2009, CPI inflation increased to about 1 per cent at the end of 2009 and start of 2010, and remained at that level until the autumn (see figure 3:1). The downswing of 2009 was primarily due to the substantially reduced repo rate pressing down mortgage rates. During the first half of 2010, the Riksbank left the repo rate unchanged, which gradually reduced the negative effects on the CPI of the falling mortgage rates. Mortgage rates subsequently started to increase again, contributing to the increase of the CPI. The repo rate increases during the second six months of the year resulted in a more rapid increase of the CPI towards the end of the year. Higher energy prices also contributed to this increase.

The CPI measures the price of a basket of goods and services, including housing costs. Mortgage costs are included in the housing costs. The prices of the different goods and services in the CPI are weighted together on the basis of their relative proportions of consumption. Goods that are consumed on a large scale are thus given a greater weight in the CPI. This also means that large and temporary changes in the prices of individual goods and services can have major but transitory effects on CPI inflation. Various measures of underlying inflation are often used therefore in order to assess the development of the more persistent and long-term rate of inflation. One such measure is the CPIX, which is the CPI excluding the direct effects of the Riksbank's repo rate changes on mortgage costs. Figure 3:1 shows that, in 2010, the average CPIX was closer than the CPI to 2 per cent.

On average, CPI inflation amounted to 1.3 per cent over the year, which can be compared with -0.3 per cent in 2009 (see table 3:1). Measured by the CPIX, underlying inflation was 2.1 per cent in 2010, while, measured by the CPIX excluding energy prices, it amounted to 1.7 per cent.

Table 3:1. Comparison of different inflation measures, annual average
Annual percentage change

	2008	2009	2010
CPI	3.4	-0.3	1.3
CPIX	2.7	1.9	2.1
CPIX excluding energy	2	2.3	1.7

Sources: Statistics Sweden and the Riksbank

It may be interesting to compare the development of inflation in relation to inflation targets in other countries during this period. This is shown in table 3:2. One general problem in this type of comparison of target fulfilment is that these countries may have been exposed to different shocks. But nevertheless, these countries seem to have had certain shocks in common in these years. In 2008, world market prices for oil and other commodities increased rapidly, pushing up inflation. However, commodity prices started to fall during the second half of 2008, at the same time as the financial crisis deepened. Demand was severely dampened and output

fell. Inflation thus decreased significantly until approximately the middle of 2009, when the recovery of global economic activity began. As was mentioned previously, the seemingly dramatic decline of CPI inflation in Sweden (compared with the other countries) is due to the major repo rate cuts, which had a direct effect on the CPI through mortgage costs. In the other countries, the CPI measure does not include such effects. The comparison of CPI inflation in Sweden and the other countries thus provides a more accurate view.

Table 3:2. Comparison of inflation and inflation targets in some countries, annual average

Annual percentage change

	Norway	United Kingdom	New Zealand	Sweden	
Inflation target	close to 2.5	2	1.0 to 3.0	2	
	CPI	CPI	CPI	CPI	CPI
2008	3.8	3.6	4.0	3.4	2.7
2009	2.2	2.2	2.1	-0.3	1.9
2010	2.4	3.3	2.3	1.3	2.1

Note: In Norway, the target is formulated as inflation close to 2.5 per cent over time, while, in New Zealand, it is formulated as inflation of between 1 and 3 per cent on average over the medium term. The measures of inflation in the various countries are the measures designated "CPI" in the official statistics of each country. However, the exact definition of the CPI measure varies somewhat between the countries. For example, in the United Kingdom, CPI is the same as the measure usually designated harmonised index of consumer prices (HICP). However, the CPI measures of Norway, the United Kingdom or New Zealand are not impacted by the direct effects of changes of the policy rate through mortgage costs, as is the case in Sweden.

Sources: Ecwin and the Riksbank

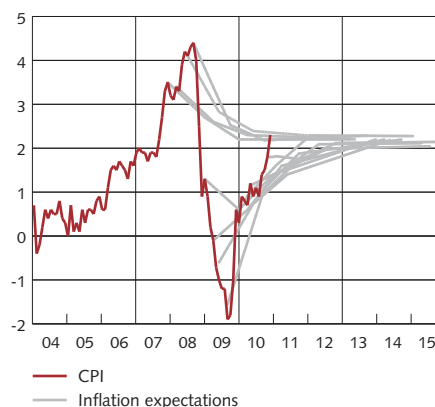
Inflation expectations 2010

A high level of confidence in the inflation target is very important to the Riksbank's efforts to achieve price stability. If the general public is confident that the Riksbank will achieve its target, this is reflected by inflation expectations a few years ahead being close to the inflation target.

A high level of confidence in the inflation target also increases the possibilities for monetary policy to stabilise production and employment. If the economic agents are confident that inflation will be kept stable around the inflation target, monetary policy will not need to react to the same extent when the economy is hit by shocks leading to temporary deviations from the inflation target as it would if there were no confidence in the inflation target.

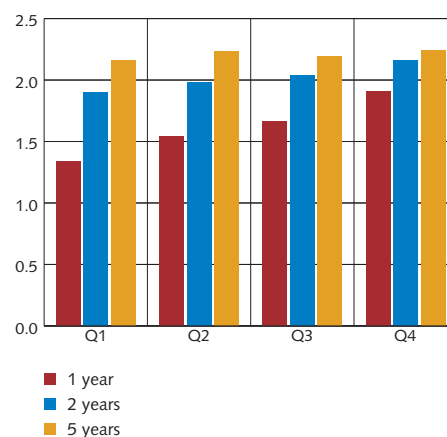
If inflation expectations as indicated in various surveys are stable and close to the inflation target a few years ahead, this can be interpreted to mean that the public is confident that the Riksbank will achieve its target. On behalf of the Riksbank, TNS Sifo Prospera conducts surveys of inflation expectations among money market agents, employer and employee organisations and purchasing managers in the retail and manufacturing sectors. Figure 3:2 shows average expectations regarding CPI inflation during 2008–2010 for one, two and five years ahead among money market participants in the Prospera survey. In 2010, inflation expectations one and two years ahead among all participants combined averaged about 1.6 and 2.0 per cent, respectively (see figure 3:3). Inflation expectations five years ahead were also close to 2 per cent, which shows

Figure 3:2. Inflation expectations among money market participants
Annual percentage change



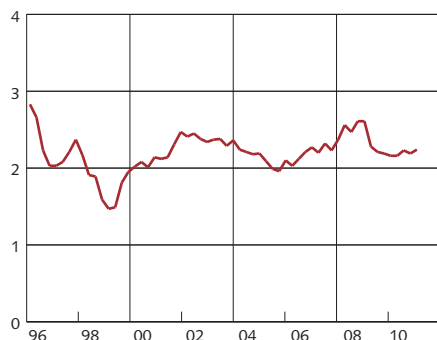
Sources: Statistics Sweden and TNS SIFO Prospera

Figure 3:3. Inflation expectations in 2010, 1, 2 and 5 years ahead, all participants'
Per cent



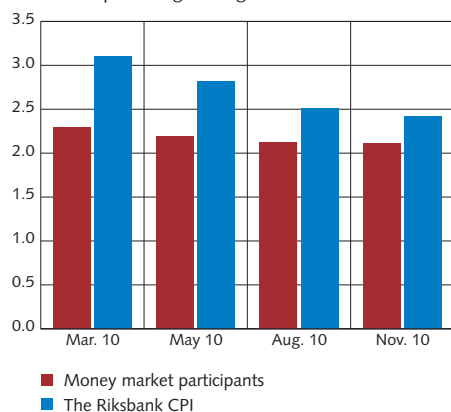
Source: TNS SIFO Prospera

Figure 3:4. Inflation expectations 5 years ahead, all participants
Per cent



Source: TNS SIFO Prospera

Figure 3:5. The Riksbank's inflation forecasts and inflation (CPI) expectations two years ahead among money market participants in 2010
Annual percentage change



Note. The Riksbank's forecasts refer to the most recent forecasts that had been published at the time of Prospera's surveys.

Sources: TNS SIFO Prospera and the Riksbank

that the public has confidence in the Riksbank's inflation target. As can be seen in figure 3:4, inflation expectations five years ahead have also been relatively well-anchored around the inflation target for quite a long time.

The short-term inflation expectations are not strongly linked to public confidence in the inflation target, but are based, to a higher degree, on current actual inflation, which amounted to 1.3 per cent in 2010.¹⁸ The short-term inflation expectations increased during the year.

It may also be interesting to compare inflation expectations with the Riksbank's inflation forecasts. If the economic agents share the Riksbank's view of how inflation will approach the target, inflation expectations should be close to the Riksbank's forecasts. Figure 3:5 shows the Riksbank's inflation forecasts and inflation expectations among money market participants two years ahead as they have developed in 2010.¹⁹ The figure shows that inflation expectations are slightly below the Riksbank's CPI forecasts for 2012. Inflation expectations for 2012 averaged 2.2 per cent, while the Riksbank's CPI forecasts were at 2.7 per cent.

What explains the difference between inflation expectations two years ahead and the Riksbank's CPI forecasts? One possible explanation may be that market participants expect weaker GDP growth and inflation abroad than the Riksbank does, which, in turn, should lead to lower inflation in Sweden, for example via lower prices for imported goods.

The development of the real economy in 2010

During 2010, GDP increased by 5.5 per cent. This increase was approximately as large as the decrease had been the year before (see table 3:3). The upswing was broad, and all expenditure categories developed strongly. The upswing was due to the recovery of world trade and the higher level of economic activity abroad but also to the strong development of domestic demand during the year. GDP growth in Sweden was in fact significantly stronger than in the United States or euro area.

The labour market also developed more strongly than had been expected. Historically, the development of the labour market usually lags behind GDP growth. As GDP fell so steeply in 2009, most analysts expected unemployment to increase strongly in 2010. Instead, the labour market improved significantly during the year. Even though unemployment on average was as high in 2010 as in 2009 (see table 3:3), during 2010, it started to decrease (see figure 2:8).

A measure of resource utilisation is often used as an overall measure of the development of the real economy. However, there is no unequivocal measure of this, and the Riksbank uses a number of different indicators in its assessments.²⁰ Examples of such measures are unemployment, the GDP gap, the hours gap and the so called RU indicator. The GDP gap and the hours gap measure the percentage deviations of GDP and total hours worked from their potential levels, while the RU indicator is

¹⁸ See T. Jonsson and P. Österholm, "The Properties of Survey-Based Inflation Expectations in Sweden", Working Paper no. 114, 2009, National Institute of Economic Research.

¹⁹ It is particularly interesting to monitor inflation expectations among money market participants as this group can be assumed to devote more resources to forecasting inflation.

²⁰ See the article "The stabilisation of the real economy and measures of resource utilisation" in Chapter 1.

a comprehensive measure of resource utilisation according to a large number of variables taken from surveys and labour market statistics. When the measures are positive, this means that the level of activity in the economy is high and that resources in the economy are being used to a greater extent than normal. The opposite applies when the measures are negative. According to the RU indicator, resource utilisation reached a normal level during the year. However, according to both GDP and the hours gap, resource utilisation was significantly lower than normal (see figure 3:6) and the Riksbank's overall assessment is that resource utilisation in 2010 in fact was below normal. This is not surprising, as the decreases seen in GDP and the number of hours worked during the crisis were very large. The recovery of such a large fall in output and employment cannot be expected within one year.

Table 3:3 Production and measures of employment 2008-2010, annual average
Annual percentage change

	2008	2009	2010
GDP	-0.6	-5.3	5.5
Employed, aged 15-74	1.1	-2.1	1.0
Hours worked	0.8	-2.9	2.5
Unemployment, aged 15-74*	6.2	8.3	8.4

*Per cent of labour force

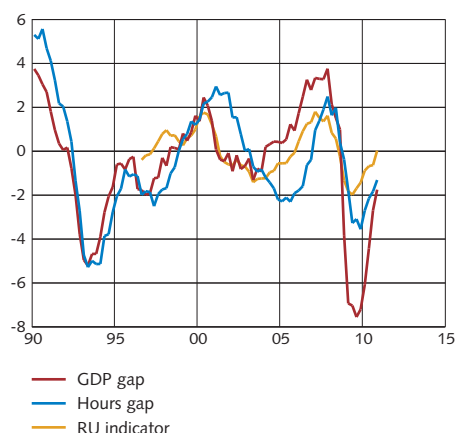
Sources: Statistics Sweden and the Riksbank

Were the deviations from the inflation target the result of a deliberate policy?

As mentioned in the introduction, the Riksbank conducts a policy of flexible inflation targeting, which means that, in addition to stabilising inflation around the inflation target, the Riksbank also strives to stabilise output and employment around long-term sustainable paths. A deviation between the outcome and the target for inflation can thus be intentional in the sense that it is the result of finding a balance between stabilising inflation and stabilising the real economy. In this case, this is only a question of a temporary deviation – over time, inflation should return to the target of 2 per cent. A natural first step in the analysis of the causes of deviations from the inflation target is to investigate whether these may have been deliberate. So, was monetary policy in the period 2008–2010 designed in such a way that it entailed forecasts for CPI inflation that were below the inflation target?

Figure 3:7 shows the actual development of CPI and the Riksbank's forecasts for CPI during the period 2008–2010. In a similar way, Figure 3:8 shows the development of CPIF and the Riksbank's forecasts for CPIF. The unbroken line in the figure shows the actual development, while the broken lines show the forecasts that the Riksbank made in each Monetary Policy Report and Update in the period 2008–2010. The first forecast is thus the one presented in the Monetary Policy Report from February 2008 and applies to developments from the first quarter of 2008 until the first quarter of 2011, that is to say three years ahead.

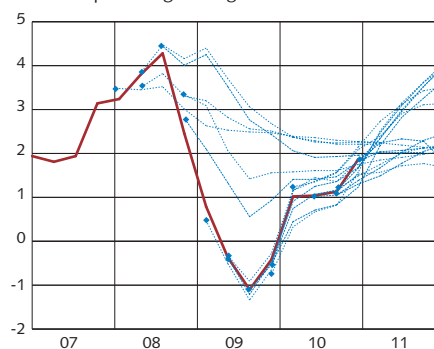
Figure 3:6. GDP gap, hours gap and RU indicator
Per cent



Note. The GDP gap refers to the deviation of actual GDP from the GDP trend, calculated using a production function approach (see the article "The driving forces behind trends in the economy can be analysed using a production function" in the *Monetary Policy Report*, October 2010). The hours gap refers to the difference between the actual number of hours worked and the Riksbank's assessment of the trend for the number of hours worked. The RU indicator is described in C. Nyman, "An indicator of resource utilisation", Economic Commentary no. 4, 2010, Sveriges Riksbank. The RU indicator has been normalised so that the mean value is zero and the standard deviation is one.

Sources: Statistics Sweden and the Riksbank

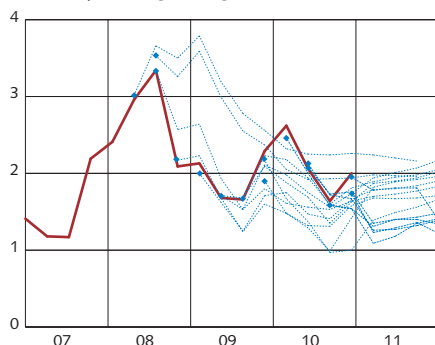
Figure 3:7. CPI, outcomes and forecasts
Annual percentage change



Note. Quarterly data. The broken lines represent the Riksbank's forecasts 2008–2010. The blue marks indicate the starting points for the respective forecasts.

Sources: Statistics Sweden and the Riksbank

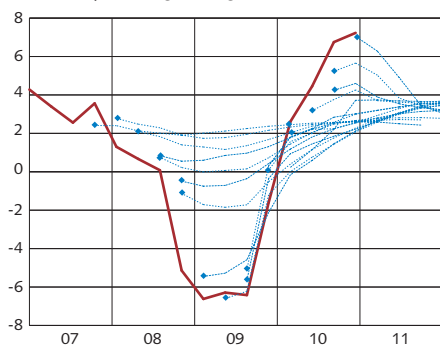
Figure 3:8. CPIF, outcome and forecasts
Annual percentage change



Note. Quarterly data. The Riksbank began to publish forecasts for the CPIF in July 2008. The broken lines represent the Riksbank's forecasts 2008–2010. The blue marks indicate the starting points for the respective forecasts.

Sources: Statistics Sweden and the Riksbank

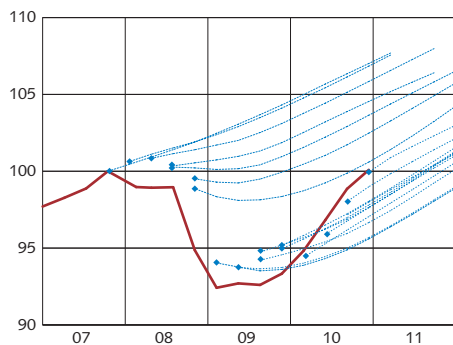
Figure 3:9. GDP growth, outcome and forecasts
Annual percentage change



Note. Quarterly data. The broken lines represent the Riksbank's forecasts 2008–2010. The blue marks indicate the starting points for the respective forecasts.

Sources: Statistics Sweden and the Riksbank

Figure 3:10. GDP level, outcome and forecasts
Index, 2007 quarter 4 = 100



Note. Quarterly data. The broken lines represent the Riksbank's forecasts 2008–2010. The blue marks indicate the starting points for the respective forecasts. GDP growth and forecasts are indexed so that quarter 4 2007 = 100.

Sources: Statistics Sweden and the Riksbank

It is difficult but not entirely necessary to distinguish individual forecasts in the figures. The figures are primarily aimed at providing an overall picture of how the Riksbank's assessments have changed and how well the forecasts have predicted actual developments.

Up to the autumn of 2008, the global financial crisis had only a fairly limited effect on the Swedish economy. However, the Riksbank also noted in Monetary Policy Reports in 2008 that there was a risk that weaker international growth could lead to lower inflation and lower interest rates in Sweden. Various alternative scenarios discussed the risk that economic growth in the United States could be weaker as a result of a continued fall in house prices or because of greater anxiety on the financial markets. The situation changed dramatically following the bankruptcy of the US investment bank Lehman Brothers in September. Demand in the economy decreased heavily and expectations of a rather gentle downturn in economic activity rapidly changed to a much gloomier outlook, while the assessment of inflationary pressures was revised downward (see figure 3:7 and 3:8). Figure 3:9 shows how GDP growth (measured as the annual percentage change) fell during 2008 and how the Riksbank simultaneously revised its forecasts for GDP growth downwards over the short term. Figure 3:10 shows the development of the GDP level and the sharp decline taking place in 2008.

To meet the inflation target over time and to alleviate the effects of the financial crisis on the real economy, the Riksbank made rapid and substantial cuts in the repo rate, starting in October 2008. The aim of these cuts was to dampen the fall in production and employment and to attain the inflation target of 2 per cent. Consequently, there was no conflict between the stabilisation of inflation and the stabilisation of the real economy. Without these cuts, the fall in GDP would have been even greater than it was in practice, and inflation would have fallen below target even in the longer term. The Riksbank was fully aware that the major cuts to the repo rate would mean that CPI inflation would fall below target in the medium term – according to forecasts, in both 2009 and 2010 (see figure 3:7). The mortgage rate level would follow the repo rate down, thus temporarily pushing CPI inflation down. Consequently, from this perspective, the deviation from the inflation target of 2010 can partially be considered to be the result of an intentional policy. Forecasts for underlying CPIF inflation were closer to 2 per cent (see figure 3:8).

Was the strength of the recovery a surprise to everybody?

The strong recovery of the Swedish economy that took place in 2010 meant that unemployment fell and GDP increased faster than was forecast by the Riksbank. Was there a forecaster that predicted this development before any of the others?

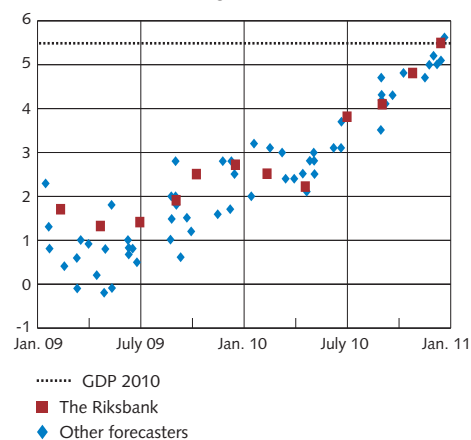
It was expected that a recovery would take place during 2010 (and this was included in the forecasts from 2009), but the strong development of GDP and the labour market came as a surprise. The main reason for the rapid upswing of GDP was that world trade started to increase and economic activity abroad became stronger, which led to increased demand for Swedish products and thus to increasing exports. The reason for the strong recovery was thus the same as the reason for the steep decline preceding it. Sweden is a small, open economy with relatively large exports in comparison to its GDP, and was therefore impacted particularly severely by the large fall in world trade in 2009. In the same way, the Swedish economy benefited from the upturn in world trade in 2010. The composition of Sweden's exports, with its relatively large percentage of investment and input goods, contributed towards reinforcing both the fall and the recovery. However, the upturn in 2010 was also due to the strong development of domestic demand.

As regards the development of the labour market, the traditional pattern in an economic upturn is that activity on the labour market increases with a certain time lag – that is, first production gathers speed and, after a while, the situation on the labour market improves. As GDP had fallen so steeply in 2009, most analysts expected unemployment to increase strongly in 2010. Instead, the labour market improved significantly during the year, with the upturns in production and employment taking place more or less in parallel in 2010.

Figure 3:11 shows the forecasts for GDP growth in 2010 made by various analysts in 2009 and 2010.²¹ The figure is interpreted as follows: Each mark represents a particular GDP forecast. The red marks show the Riksbank's forecasts, while the blue marks show the forecasts made by a number of other forecasters. It is possible to see how high a GDP growth rate a forecaster has predicted by looking at the vertical axel, while the horizontal axel shows when the forecast was made. The dotted line in the figure shows the actual outcome for GDP growth in 2010.

The figure clearly shows that the forecasts follow a common pattern. In 2009 and 2010, all of the analysts underestimated GDP growth for 2010. At the start of 2009, there was great uncertainty about economic activity in the period ahead. Initially, the various analysts believed that GDP growth in 2010 would be about 1 per cent. During the summer and autumn, there were an increasing number of signs of a turnaround in economic activity and analysts gradually revised their forecasts for 2010 upwards to about 2 per cent, which was still far below the actual outcome. The recovery was expected to take a long time. During 2010, the initial assessment was

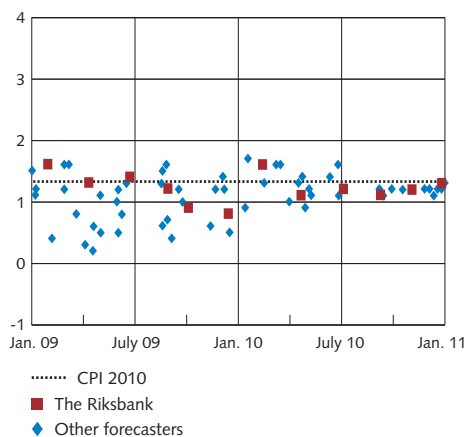
Figure 3:11. Forecasts for GDP growth 2010
Per cent, annual average



Note. Other forecasters refers to those listed in footnote 21.
Sources: National Institute of Economic Research, Statistics Sweden and the Riksbank

²¹ The analysis is based on data gathered by the National Institute of Economic Research. One advantage of these data is that they show exactly when the forecasts were made. The forecast comparison covers ten forecasting institutions and their whole-year forecasts for GDP growth, the CPI and unemployment. The ten forecasting institutions are: the Swedish Ministry of Finance, the Swedish Retail Institute, the National Institute of Economic Research, the Swedish Trade Union Confederation (LO), Nordea, SEB, Svenska Handelsbanken, the Confederation of Swedish Enterprise, Swedbank and the Riksbank.

Figure 3:12. Forecasts of CPI inflation 2010
Per cent, annual average



Note. Other analysts refers to those listed in footnote 21.

Sources: National Institute of Economic Research, Statistics Sweden and the Riksbank

that GDP growth would amount to 2.5 per cent, but, as economic activity continued to strengthen, the forecasts were revised upwards, reaching a level slightly below the actual outcome of 5.5 per cent by the end of the year. All in all, it can be observed that the Riksbank underestimated the outcome of GDP growth in 2010 to a slightly lesser degree than other analysts.

From figure 3:12, which shows the forecasts for CPI inflation, it can be seen that the spread of the various analysts' CPI forecasts is quite wide. It is difficult to discern a clear pattern in the figure. This spread is probably due to the great uncertainty prevailing in 2009 over economic prospects and, consequently, over monetary policy. Several analysts expected a significantly higher interest rate than was the case, which would have contributed to higher CPI inflation over the short term. However, the great majority of analysts forecast a lower interest rate and thus a lower rate of CPI inflation than the actual outcome. During 2010, uncertainty decreased somewhat and the spread of the forecasts became narrower.

Why was the recovery in 2010 underestimated?

The Swedish economy has thus recovered much more quickly than the Riksbank and other forecasters predicted in the summer of 2009. GDP growth in 2010 was over 4 per cent higher than forecast in the Monetary Policy Report of July 2009. CPI inflation was more in line with the Riksbank's assessment. In 2010, CPI inflation was 0.2 percentage points higher than the Riksbank's forecast in July 2009. The deviation between the outcome and the Riksbank's forecast is thus much larger for GDP growth than for the rate of inflation. The focus in this section is therefore on the factors that can help to explain the forecasting error for GDP growth.

As part of the basis for forecasts and monetary policy decisions, the Riksbank uses a so-called general equilibrium model of the Swedish economy.²² The model tries to explain developments and the interplay in the entire economy and not just in a particular part. However, the model can also be used to analyse how unexpected shocks can help to explain various forecasting errors.

■■ A model analysis of the forecasting errors

Figure 3:13 shows the results of such an analysis in which the model was used to calculate the proportion of the forecasting error for GDP that can be traced to different factors. The forecasting error is measured as the difference between the actual development of GDP and the GDP forecast in the Monetary Policy Report of July 2009. The black curve in the figure shows the forecasting error. The fact that the curve is above zero shows that the outcome was higher

22 For a description of the model see L. Christiano, M. Trabandt and K. Walentin, "Introducing financial frictions and unemployment into a small open economy model", Sveriges Riksbank Working Paper Series no. 214, 2007

than the forecast. The forecasting error for GDP growth is presented in the figure as quarterly changes. For example, GDP grew by 1.6 percentage points more in the second quarter of 2010 than the Riksbank estimated in July 2009.

Almost 20 factors that can affect the development of the economy are identified in the model and the bars under the curves show to what extent these factors, according to the model, explain the forecasting error in the different quarters. For example, the factors that played a relatively significant role for the surprisingly strong GDP growth in the second quarter of 2010 related to growth abroad and in Sweden's export markets (the red bar), domestic demand (the yellow bar) and improvements in productivity (the blue bar). Factors relating to imports (the green bar) made only a limited contribution to the unexpectedly strong GDP growth in this quarter. The unexpectedly low level of interest rates abroad and other factors behind the unexpectedly strong Swedish krona (the grey bar) instead counteracted the growth of Sweden's GDP somewhat. The purple parts of the bars show the overall effect of other factors.²³ The relative contribution of the various factors differs somewhat from quarter to quarter, but in general the factors that had the biggest impact on the forecasting error in 2010 related to foreign trade, domestic demand and the development of productivity.

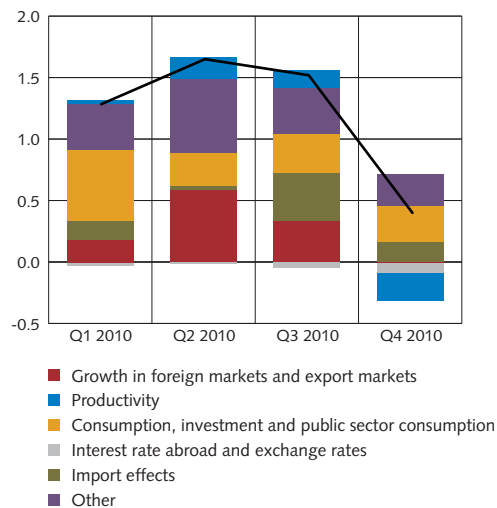
■ ■ Stronger exports than expected

Swedish exports have recovered more rapidly than forecast in July 2009. Apart from the fact that growth abroad was more rapid than expected in 2010, this is also due to what Sweden exports and to which countries – for instance, growth was particularly high in 2010 in precisely those countries that Sweden exports to. The growth of the Swedish export market was approximately 10 percentage points higher than was expected in July 2009. World trade recovered much more rapidly in 2010 than in the assessment made by the Riksbank in the summer of 2009. Countries in Asia, above all, experienced much stronger growth than expected. The upturn in world trade in 2010 was also largely driven by the demand for investment goods and durables, which further benefited Swedish exports. The red bar shows the overall effect of the unexpectedly rapid growth of GDP abroad and the unexpectedly favourable development of the Swedish export markets on the forecasting error for GDP.

■ ■ Stronger domestic demand

One possible reason why domestic consumption and investment (the yellow bar) grew much more rapidly than expected is that the Swedish banks escaped much more lightly from the financial crisis than may have been feared. As a result, the supply of credit was better than expected. It also appears that household confidence

Figure 3:13. GDP growth 2010: Forecasting error and effects of unforeseen shocks
Percentage points



Note. Forecasting error refers to deviation between outcome and forecast in MPR July 2009.

Source: The Riksbank

23 Other factors also include the model's calculation of measurement errors.

in the future strengthened much more quickly than expected, which is probably related to the global recovery. The fact that the labour market has strengthened more than expected may also have affected household consumption as this means that they have not needed to accumulate substantial precautionary savings. The fall in housing investment was also unexpectedly brief. In addition, public consumption increased more rapidly than forecast by the Riksbank in July 2009, which contributed to the development of domestic demand becoming an important factor behind the forecasting error for GDP.

In the course of 2010, imports grew approximately in line with what can be expected from estimates of the import content of domestic demand components and of export goods. Nevertheless, the model identifies the development of imports (the green bar) as a factor that contributed to the surprisingly strong growth of GDP. As the Riksbank's forecast takes more factors into account than those included in the model, it is not self-evident how the model's results should be interpreted. One possible interpretation is that imports, according to the model, grew more slowly in the second half of 2010 than could be expected given the development of other variables, for example the exchange rate which strengthened more than the Riksbank expected in the forecast published in July 2009.

Policy rates abroad were much lower in the period 2009-2010 than the Riksbank forecast in July 2009. When the difference between Swedish and foreign policy rates increases the exchange rate is strengthened, which restrains Swedish exports and dampens GDP growth. Another reason why the exchange rate strengthened more than expected is probably that confidence in the Swedish krona recovered more rapidly than expected. All in all, these factors had a slight negative impact on the growth of domestic GDP in 2010 (the grey bar).

■ ■ Surprisingly strong improvement in productivity

Capturing the development of productivity in a forecast is genuinely difficult. During the first three quarters of 2010, the development of productivity proved to be a positive surprise, which also contributed to GDP growth being stronger than expected (the blue bar). The fact that the development of productivity was stronger than forecast explains why the forecasting error for the growth of GDP was large while the forecasting error for inflation was small. Without the surprisingly positive development of productivity, the strong growth of GDP would probably have led to a higher rate of inflation than predicted in the Riksbank's forecast of July 2009. The forecasting error for GDP growth was smaller for the fourth quarter of 2010. According to the model, this is partly because the development of productivity was weaker than expected and thus counteracted the effect on GDP of, among other things, those factors that led to a higher level of domestic demand than the Riksbank expected in July 2009.

■ CHAPTER 4 – Forecasting performance

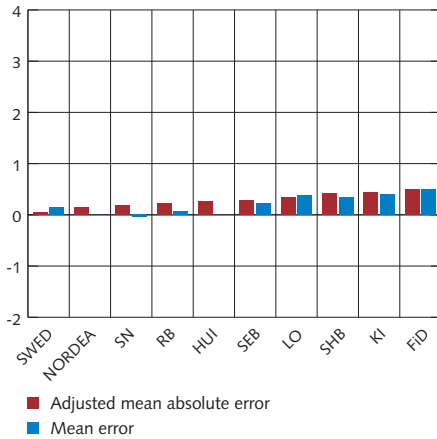
As monetary policy is based on forecasts it is important that the Riksbank's forecasts are fairly accurate. One practical way of assessing whether the Riksbank's forecasts are good enough is to compare them with the forecasts of other analysts. Relatively long periods of examination are necessary to be able to say anything more definite about the accuracy of forecasts. A fair

comparison should also take into account the fact that the forecasts are made at different points in time and that different forecasters therefore do not have the same information available to them. In the comparison carried out in this report a method has been used that takes such differences into account so that the forecasts are comparable.

Summary of Chapter 4

- All of the forecasters underestimated GDP growth in 2010 and overestimated unemployment. Most forecasters underestimated inflation somewhat. All in all, this reflects the unexpectedly strong recovery of the Swedish economy in 2010. Approximately half of the forecasters overestimated the level the repo rate would be at by the end of 2010, while approximately half underestimated this level.
- Compared to other forecasters, the Riksbank produced relatively good forecasts for the outcomes of the CPI, GDP growth and the repo rate in 2010. However, it is not possible to draw any conclusions about general forecasting performance on the basis of a single year. A longer period must be studied to get a more systematic picture of accuracy.
- Adding the forecasts for 2010 to an analysis of all the forecasts made since 1999 does not significantly change the conclusions on forecasting performance: the general accuracy of the forecasters is approximately the same as in an analysis of the period 1999-2009. Like other forecasters, the Riksbank has tended to slightly overestimate GDP growth and CPI inflation. The differences in forecasting performance between the major forecasters are generally limited.
- In the case of forecasts of the repo rate it is difficult to draw general conclusions about forecasting performance as the assessment period is so short. The conclusions may, for example, differ due to the assessment method used.

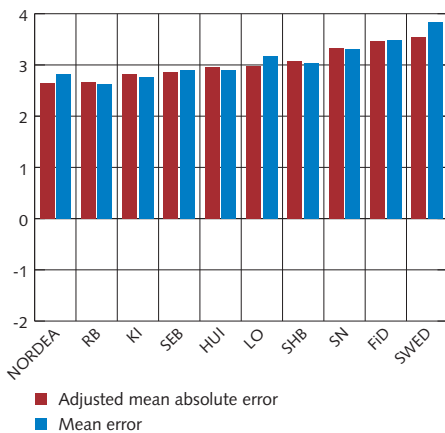
Figure 4.1. Forecasting errors for CPI 2010 of various forecasters
Adjusted mean absolute error and mean error and in percentage points



Note. LO=Swedish Trade Union Confederation, FiD=Ministry of Finance, SWED=Swedbank, SN=Confederation of Swedish Enterprise, KI=National Institute of Economic Research, SHB=Svenska Handelsbanken, RB=Riksbank and HUI=Swedish Retail Institute.

Sources: National Institute of Economic Research and the Riksbank

Figure 4.2. Forecasting errors for GDP growth 2010 of various forecasters
Adjusted mean absolute error and mean error and in percentage points



Note. See the note to figure 4.1 for an explanation of the abbreviations.

Sources: National Institute of Economic Research and the Riksbank

How accurate are the forecasts?

One means of obtaining a comprehensive measure of a forecaster's accuracy is to calculate the average forecasting error (the mean error), that is, to calculate how much the forecasts have on average deviated from the final outcome. However, the mean error says nothing about how forecasting errors vary as positive forecasting errors cancel out negative forecasting errors. It is therefore common to also calculate the average absolute forecasting error (the mean absolute forecasting error).²⁴ These summary measures can then be used to compare different forecasters.

One difficulty with this type of comparison is that different forecasters make their forecasts at different points in time. This means that the forecasts are based on different amounts of information. For instance, some forecasters, but not others, may have been able to take into account a recently-published figure for GDP or the CPI in their forecasts. A forecaster that regularly publishes its forecasts later than others will on average be able to base its forecasts on a larger amount of information – and on average have a shorter forecast horizon – than other forecasters.²⁵

The Riksbank has developed a method that takes into account the fact that different forecasters have had access to different amounts of information when making their forecasts.²⁶ This method is based on the assumption that part of a forecaster's average forecasting error can be explained by the length of the forecast horizon. A forecaster that publishes its forecasts later than others – and therefore has a shorter average forecast horizon – can also be expected to have a slightly better accuracy. A direct comparison between different forecasters' average forecasting errors therefore risks being misleading.

The method involves calculating how much of the forecasting error of each forecaster can be explained by the length of the forecast horizon. The remaining part of the forecasting error, the part that does not depend on differences in the length of the forecast horizon, will then be a measure that can be used as a fairer comparison of different forecasters (see the appendix for a technical description of the method).²⁷

Forecasting errors in the forecasts for 2010

Figure 3:11 in Chapter 3 shows that no forecaster predicted the strength of the recovery that occurred in 2010 sooner than any other. In this section, the method described above is used to acquire a

²⁴ The term forecasting error refers to the difference between outcome and forecast. When calculating absolute forecasting errors, no account is taken of whether the forecasting error is positive or negative; that is the sign of the forecasting error is irrelevant.

²⁵ The term forecast horizon refers to the duration of the period from the point when the forecast is made to the point when the outcome is realised. For example, if, on 30 September, a forecaster forecasts GDP growth in the fourth quarter of the same year, then the forecast horizon is one quarter.

²⁶ M. Andersson and T. Aranki, "Forecasters' ability – what do we usually assess and what would we like to assess?", *Sveriges Riksbank Economic Review*, No.3, 2009.

²⁷ As the Riksbank on average publishes its forecasts slightly later than other forecasters – that is it has a shorter forecast horizon – the method does not adjust to the Riksbank's advantage.

summary measure of the forecasting performance for 2010. However, as noted above, chance may have a major impact in individual years. To get a more systematic picture of the performance of the various forecasters, a longer period than one year must be studied. This is done in the next section.

Figures 4:1–4:4 illustrate the various forecasters' forecasting errors with regard to the forecasts for 2010.²⁸ The red bars show the adjusted mean absolute error, the measure described above – the absolute forecasting error adjusted for differences in forecast horizon. The shorter the bar, the smaller the forecasting error and the higher the accuracy of the forecast. The blue bars show the mean error, the average forecasting error without corrections. This measure shows whether there are tendencies towards overestimation or underestimation in the forecasts of the various forecasters. If the blue bar is positive, the outcomes are on average higher than the forecasts. A negative blue bar shows that on average the outcomes are lower than the forecasts.

The forecasts of all the forecasters for all the variables except unemployment were more accurate in 2010 than in 2009. The mean error for the forecasts of inflation in 2010 was generally small. Most forecasters, however, underestimated the outcome for inflation. All of the forecasters underestimated GDP growth in 2010, while unemployment was overestimated. This reflects the unexpectedly strong recovery that followed the severe economic downturn. The forecasts of the repo rate were divided; half of the forecasters overestimated the repo rate while the other half underestimated it. However, underestimation was generally larger.²⁹

Compared to other forecasters, the Riksbank made relatively good forecasts of the CPI, GDP growth and the repo rate (see figures 4:1, 4:2 and 4:4). However, the Riksbank's forecasts for unemployment were poorer than those of several other forecasters (see figure 4:3).

The accuracy of the forecasts for the period 1999–2010

Figures 4:5–4:8 show the average errors and the adjusted mean absolute errors for the period 1999–2010. The major forecasters – the Swedish Ministry of Finance, the National Institute of Economic Research and the Riksbank – are reported individually, while the others are reported as an average. It may be worth noting that the Riksbank's forecasts up to the third Inflation Report of 2005 were based on the assumption of an unchanged repo rate during the forecasting period.³⁰ This has probably undermined accuracy somewhat.

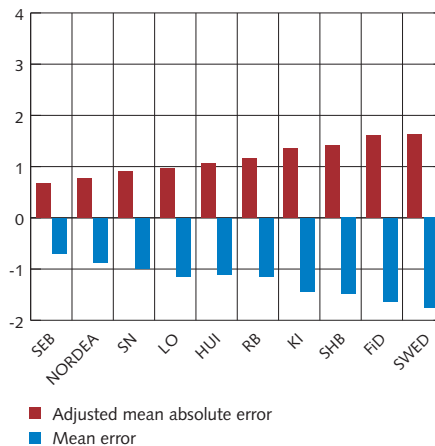
²⁸ In the appendix, another measure of forecasting accuracy is presented. This is based on *squared* forecasting errors rather than *absolute* forecasting errors (see Figures A1–A8).

²⁹ This includes expectations regarding the development of the repo rate according to market pricing. The calculation of these expectations is based on so-called implied forward rates (see "How does the Riksbank calculate monetary policy expectations from market pricing?" in the appendix for a description of the calculations). The expectations included in this analysis are those that prevailed on the day before a decision on the repo rate was made.

³⁰ In 2007 the Inflation Report was renamed the Monetary Policy Report.

Figure 4:3. Forecasting errors for unemployment 2010 of various forecasters

Adjusted mean absolute error and mean error and in percentage points

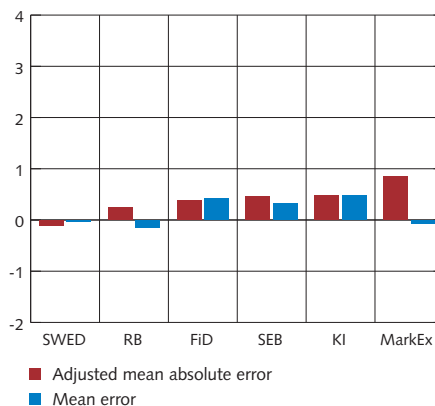


Note. See the note to figure 4:1 for an explanation of the abbreviations.

Sources: National Institute of Economic Research and the Riksbank

Figure 4:4. Forecasting errors for the repo rate 2010 of various forecasters

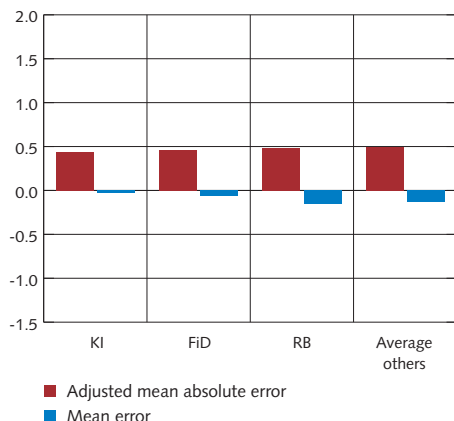
Adjusted mean absolute error and mean error and in percentage points



Note. FiD=Ministry of Finance, SWED=Swedbank, KI=National Institute of Economic Research, MarkEx=Market expectations and RB=Riksbank. While other forecasters present their repo rate forecasts as a value at the end of the year, the Riksbank presents its forecasts as quarterly average values. In order to make the comparison possible, the Riksbank's quarterly values have been interpolated to daily values. This does not affect the result, however.

Sources: National Institute of Economic Research and the Riksbank

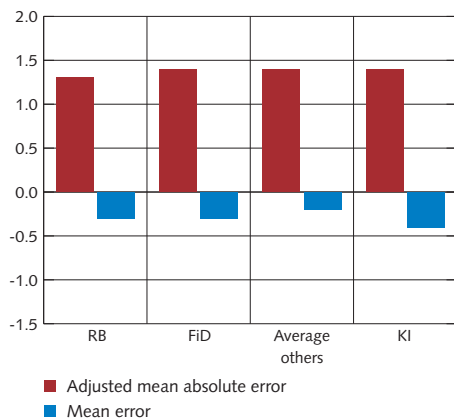
Figure 4.5. The accuracy of the forecasts for CPI among different forecasters 1999–2010
Adjusted mean absolute error and mean error and in percentage points



Note. KI=National Institute of Economic Research, FiD=Ministry of Finance and RB=Riksbank. Other forecasters are Swedbank, Svenska Handelsbanken, Nordea, SEB, the Swedish Retail Institute, the National Institute of Economic Research, the Confederation of Swedish Enterprise and the Swedish Trade Union Confederation (LO).

Sources: National Institute of Economic Research and the Riksbank

Figure 4.6. The accuracy of the forecasts for GDP growth among different forecasters 1999–2010
Adjusted mean absolute error and mean error and in percentage points



Note. See the note to figure 4:5 for an explanation of the abbreviations.

Sources: National Institute of Economic Research and the Riksbank

However, it is important to emphasise that there is relatively great uncertainty here too and it is difficult to find significant differences between the forecasters. One explanation for this is probably that different forecasters' forecasts tend to follow one another relatively well, as indicated by figure 3:11 for example.

The forecasting performance of all the forecasters is approximately the same for the period 1999–2010 as for the period 1999–2009 (see table 4:1). The adjusted mean absolute error was smaller in 1999–2010 than in 1999–2009 for the CPI, but was instead larger for GDP growth and unemployment. However, considering the strong recovery during the year, which surprised many forecasters, it is not particularly surprising that the forecasting errors were in approximately the same range as they were in 2009.

Table 4:1. The accuracy of the forecasts
Adjusted mean absolute error in percentage points

	CPI		GDP		Unemployment	
	1999–2009	1999–2010	1999–2009	1999–2010	1999–2009	1999–2010
The Riksbank	0.51	0.48	1.19	1.34	0.44	0.51
Ministry of Finance	0.45	0.46	1.20	1.41	0.45	0.56
National Institute of Economic Research	0.45	0.44	1.26	1.42	0.42	0.51
Others (average)	0.53	0.50	1.25	1.41	0.45	0.52

Sources: National Institute of Economic Research and the Riksbank

Together, figures 4:5 and 4:6 show that the Riksbank, in the same way as other forecasters, has tended to overestimate CPI inflation and GDP growth somewhat. For the forecasts of unemployment, the average error is almost zero for all of the forecasters (see figure 4:7).

With regard to forecasts of the repo rate it is still too soon to meaningfully assess the forecasting performance of the Riksbank as it has only published repo-rate forecasts for four years. With such a short assessment period, chance plays too large a role to make it possible to draw any general conclusions about forecasting performance. Figure 4:8 nevertheless shows the accuracy of the forecasts for the repo rate in the period 2007–2010 for those forecasters that publish such forecasts.

On average for the four years, all of the forecasters have tended to overestimate the repo rate, but the Riksbank has the second largest adjusted forecasting error of the six forecasters. The primary contribution to the Riksbank's relatively large forecasting error over the period is made by the overestimates in the forecasts for the repo rate (and CPI inflation) produced in July and September 2008 (see figures 3:7 and 3:8). In July and September 2008, the Riksbank attached great importance to the fact that energy prices had increased more than expected during the spring, which led to inflation reaching just over 4 per cent in the summer of 2008. The Riksbank thus saw a risk that the substantial increases in the prices of food and oil would

also lead to rapid increases in other prices. Unusually high inflation expectations also contributed to this assessment.

The sensitivity of the analysis of the repo-rate forecasts can be illustrated by carrying out an alternative form of evaluation, that is by using a given forecast horizon instead of the varying horizon used in the analysis above. This approach is the most common in the literature devoted to the evaluation of forecasts. As pointed out above, the forecasters publish their forecasts at different times. This means that it is not generally possible to compare them with each other in a correct way, as the forecasters have had access to different amounts of information. However, as expectations according to market pricing can be registered every day, it is possible to compare these to the Riksbank's forecasts correctly.

The accuracy of the Riksbank's repo-rate forecasts from 2007 to 2010 has been studied for three different forecast horizons: one quarter, one year and two years.³¹ This has then been compared to the forecasting accuracy of market expectations, which were registered on the day before the announcement of each repo-rate decision. The results are presented in table 4:2 and show that the difference in accuracy between the Riksbank's forecasts and market expectations is very small in all three cases. It can be noted that expectations according to market pricing are marginally more accurate than the Riksbank's forecasts for the two longer horizons. The conclusion is the same irrespective of whether one uses the mean absolute error or the root mean squared error as the evaluation criterion.³² This thus provides a somewhat different picture of the accuracy of the Riksbank's forecasts and market expectations than the results shown in figure 4:8 where the forecasting accuracy of the Riksbank is relatively higher. This analysis therefore further highlights the fact that the differences in the figure should not be over-interpreted, as well as how difficult it is to draw general conclusions about forecasting performance on the basis of this brief evaluation period.

Table 4:2. Mean absolute error and root mean squared error for repo-rate forecasts at different forecast horizons, 2007–2010

	Mean absolute error			Root mean squared error		
	One quarter	One year	Two years	One quarter	One year	Two years
The Riksbank	0.24	1.51	3.42	0.52	2.14	3.55
Market expectations	0.28	1.44	3.39	0.54	2.02	3.54

Source: The Riksbank

³¹ As the Riksbank's forecasts are made for whole quarters, the forecast horizons are not exactly those mentioned above but are generally slightly longer. The fact that Monetary Policy Reports and Monetary Policy Updates are not published at uniform intervals also means that the forecast horizon varies somewhat from forecast to forecast.

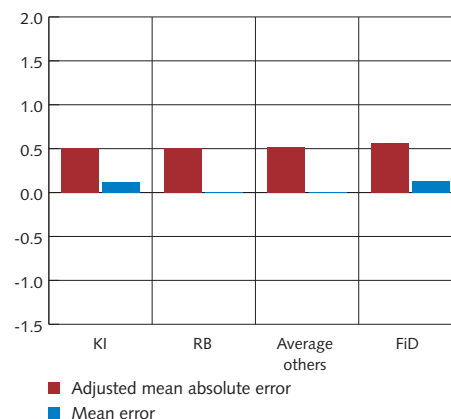
³² The root mean squared error for the forecast horizon h is calculated as

$$RMSE_h = \sqrt{\frac{1}{n} \sum_{j=0}^{n-1} (i_{t+h+j} - i_{t+h+j|t+j})^2},$$

where i_{t+h} is the actual rate, $i_{t+h|t}$ the forecast (made at the point in time t), and n is the number of forecasts. The mean absolute error is calculated as

$$MAE_h = \frac{1}{n} \sum_{j=0}^{n-1} |i_{t+h+j} - i_{t+h+j|t+j}|.$$

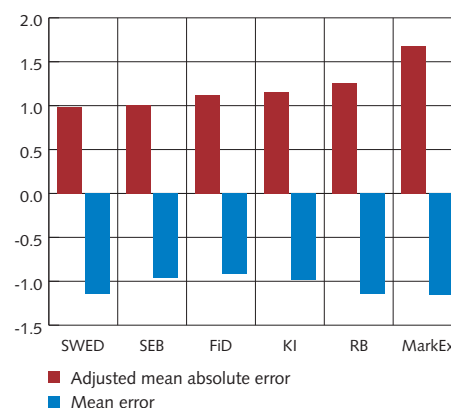
Figure 4:7. The accuracy of the forecasts for unemployment among different forecasters 1999–2010
Adjusted mean absolute error and mean error and in percentage points



Note. See the note to figure 4:5 for an explanation of the abbreviations.

Sources: National Institute of Economic Research and the Riksbank

Figure 4:8. The accuracy of the forecasts for the repo rate among different forecasters 2007–2010
Adjusted mean absolute error and mean error and in percentage points



Note. Forecasts of the repo rate were not published prior to 2007. See the note to figure 4:4 for an explanation of the abbreviations.

Sources: National Institute of Economic Research, Ministry of Finance, SEB, Swedbank and the Riksbank

■ CHAPTER 5 – Implementation of monetary policy 2010

If monetary policy is predictable, market participants will be able to predict how new information regarding the development of the economy will impact the Riksbank's rate setting. Market rates can thus adjust themselves before the Riksbank has even made a decision on the repo rate and repo rate path. This can contribute to a more rapid impact of monetary policy than would otherwise have been the case. This section presents an account of whether the actual repo rate decision was expected, as well as how closely expectations (according to market pricing) of the development of the repo rate

have corresponded with the Riksbank's own repo rate path. In normal cases, there should be minor deviations between the market's expectations and the Riksbank's forecast. However, there are a number of reasons suggesting that larger differences may arise. These include a lack of belief on the market that monetary policy will follow the published path, that the Executive Board may not be unanimous regarding the interest rate path, and that difficulties in estimating risk premiums will lead to shortcomings in the measurement of expectations according to market pricing.

Summary of Chapter 5

- Changes in the repo rate during 2010 were very clearly foreseen by the market. For all decisions, the expected change was almost identical with the actual change.
- During 2010, there were occasionally relatively large differences between the Riksbank's repo rate path and monetary policy expectations as calculated by the Riksbank on the basis of market pricing. These deviations were probably partly due to market participants actually expecting a different development of the repo rate. However, it is difficult to determine exactly why the market participants expected another path.
- The market's expectations of the development of the repo rate approached those of the Riksbank at the end of the year.

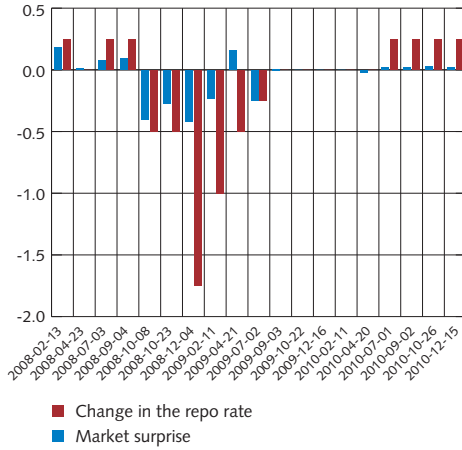
Were the Riksbank's repo rate decisions predictable?

This section compares the Riksbank's repo rate decisions with the market's expectations ahead of each monetary policy decision. If the differences were minor, this can be interpreted as meaning that the repo rate decisions were predictable. The opposite applies if the differences were major.

Figure 5:1 presents a comparison of changes in the repo rate with the market's priced expectations of changes in the repo rate during the years 2008–2010.³³ The red bars indicate the extent of changes in the repo rate, together with their direction, measured as percentage points. The blue bars indicate the difference between the actual

³³ Differences between them (i.e. the surprise in the market) are measured as the change in the 1-month interest rate between the day before the day of announcement and the day of announcement (the Riksbank uses the so-called STINA swap rate for these calculations). As the 1-month interest rate is based on the average expected overnight rate one month ahead, an unexpected change in the repo rate will lead to a change of the 1-month interest rate on the day of announcement, so that the new repo rate level is taken into account.

Figure 5:1. Change in the repo rate and market surprise
Percentage points



Note. Market surprise is measured as the change in a one-month interest rate at the time of the notification.

Source: The Riksbank

change of the repo rate and the change expected by the market. If the blue bar is at zero or almost zero, this means that the market was not surprised by the interest rate decision. When the repo rate is increased, a positive blue bar indicates that the Riksbank increased the repo rate above the market's expectations. The opposite is true when the blue bar is negative. When the repo rate is cut, a positive blue bar indicates that the cut was smaller than suggested by market pricing. The opposite is true when the blue bar is negative.

From the autumn of 2008 until the summer of 2009, there were many moments of surprise. In general, it can be said that, during the autumn of 2008 and the spring of 2009, the market participants succeeded in predicting repo rate cuts, but not the extent of these. Figure 5:1 indicates that, during this period, the market expected the repo rate to be cut more gradually. From a historical perspective, it is not surprising that the market generally expected less extensive repo rate cuts, as repo rate changes are normally undertaken in increments of 0.25 percentage points. However, the financial crisis and the severe downturn meant that circumstances could hardly be described as normal. In such an extraordinary situation, it is not surprising that there prevailed some uncertainty regarding how rapidly and forcefully the Riksbank would react. And neither were these circumstances specific to Sweden. The extent of the surprise was also large in many other countries.

From the autumn of 2009 until July 2010, the repo rate was held unchanged. During this period, the market predicted interest rate decisions almost entirely correctly (that is, the market expected the repo rate to be held unchanged, and both blue and red bars were at zero or almost zero). During the autumn of 2010, the normalisation of monetary policy was initiated and the repo rate was raised by 0.25 percentage points at the monetary policy meetings in June, September and December. These increases were also expected by the market and surprises were negligible.

Did expectations according to market pricing correspond with the Riksbank's repo rate forecasts?

In connection with each monetary policy meeting, the Riksbank publishes its own forecast of the development of the repo rate over the three-year forecast period. A published repo rate forecast makes it easier to explain the Riksbank's view of developments and its monetary policy decisions to the public and the financial markets. The intention is to be able to influence expectations regarding the monetary policy that will be conducted in the future. If this succeeds, the Riksbank can also affect expectations of future interest rates with longer durations – that is, the interest rates of greatest importance for the economic decisions of companies and households.

As the Riksbank publishes a repo rate forecast in conjunction with each monetary policy meeting, the forecast is updated roughly every second month. During this two-month period, new information on the development of the economy emerges. If the Riksbank succeeds in its communication, it should be fairly easy for the market participants to predict how this new information will affect the Riksbank's repo rate forecasts.

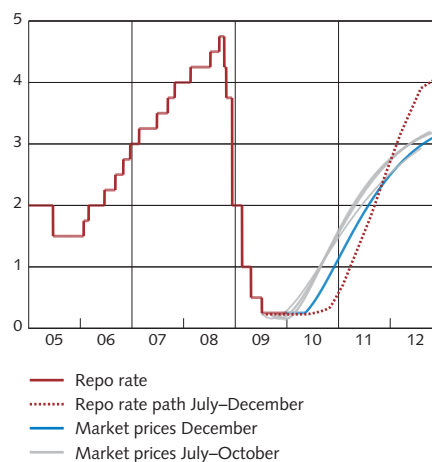
Consequently, in normal cases, relatively minor deviations should be present between the market's expectations and the Riksbank's forecast. However, there are a number of reasons suggesting that larger differences may arise. Among these can be counted a different view of economic development (and thus future monetary policy) that may be held by the market, the market's lack of belief that monetary policy will actually follow the published path, and possible disagreement among the Executive Board on its view of the repo rate path. Furthermore, due to variations in risk premiums over time, it is not unlikely that the measure of market expectations that the Riksbank calculates on the basis of market pricing may have shortcomings at certain times and that deviations may arise for this reason (see article "How does the Riksbank calculate monetary policy expectations from market pricing?" in the appendix). As long as inflation expectations indicate high credibility for the inflation target, shorter periods with slightly greater deviations between market expectations and the Riksbank's forecasts should probably not be particularly problematic. However, if deviations remain for a longer period, the target fulfilment of monetary policy may be made more difficult.

■ Agreement in 2008 but occasional differences in 2009

In 2008, the expectations according to market pricing corresponded relatively well with the Riksbank's repo rate paths. When greater deviations were present, in most cases, the market adjusted its expectations closer to the repo rate path after this was published.

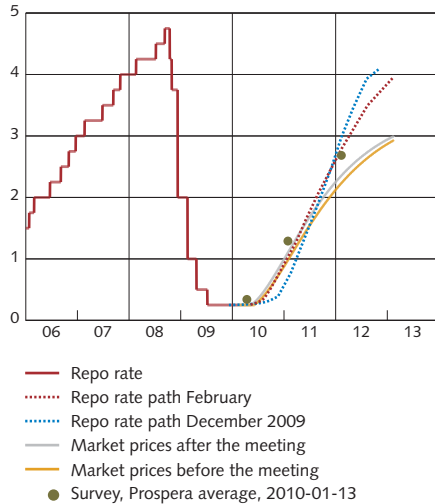
However, during 2009, there arose comparatively large

Figure 5:2. Repo rate expectations measured using market prices, July–December 2009
Per cent



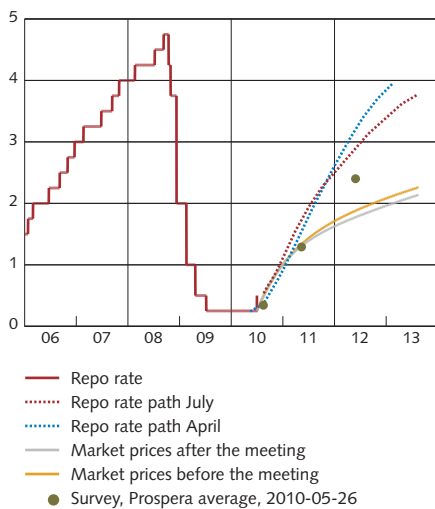
Sources: Reuters EcoWin and the Riksbank

Figure 5.3. Repo rate expectations measured using market prices and surveys, February 2010
Per cent



Sources: Reuters EcoWin, TNS Sifo Prospera and the Riksbank

Figure 5.4. Repo rate expectations measured using market prices and surveys, July 2010
Per cent



Sources: Reuters EcoWin, TNS Sifo Prospera and the Riksbank

differences between expectations according to market pricing and the Riksbank's repo rate forecasts. In advance of the monetary policy meeting in April, the market expected that the forecast for the repo rate over the next year would be lowered again. However, the Riksbank's new forecast entailed a considerably lower repo rate in 2010 and 2011 than the market had expected. Even so, the Riksbank's new forecast did not significantly affect market expectations. In the period leading up to December, market expectations of the development of the repo rate changed very little, even though the Riksbank cut its repo rate forecast further in July, and then held to this forecast during the entire autumn (see figure 5:2). However, in December, expectations according to market pricing approached the Riksbank's forecasts for 2010 and 2011. The Riksbank's recurring information that the repo rate would remain on a low level for a longer period probably contributed to this change of market participants' expectations. The low policy rates abroad – and communication concerning the policy rates' future development – may also have contributed to this.

■ ■ Major differences in 2010, but increased correspondence towards the end of the year

The gap between the repo rate path and the market's monetary policy expectations remained at the start of 2010. In February, the Riksbank left the repo rate unchanged, but adjusted the repo rate path upwards in the short and medium terms. Following this adjustment, there were no longer any deviations between expectations of monetary policy according to market pricing and the repo rate path 1.5 years ahead. However, at longer horizons, market expectations were below the Riksbank's repo rate path. By the end of the forecast period, one percentage point separated them (see figure 5:3).

In April, the Riksbank left both the repo rate and the repo rate path unchanged, but the market's monetary policy expectations had been adjusted downwards compared with February, further widening the gap. In July 2010, the repo rate was raised for the first time since September 2008 and the repo rate path was adjusted downwards in the slightly longer term (see figure 5:4). Despite this, the gap widened further.

At the meeting in September, the repo rate was raised, but the repo rate path was left unchanged. By this point, the gap between the Riksbank's repo rate path and the market's expectations was very wide, amounting to almost 2 percentage points by the end of the forecast period (see figure 5:5).

At the meetings in October and December, the increases continued – the repo rate was raised by 0.25 percentage points on each occasion. The repo rate path was adjusted downwards in October, but was left unchanged in December. At the same time, expectations according to market prices were adjusted upwards in both October and December. The gap between market expectations

and the Riksbank's repo rate path thus decreased towards the end of the year (see figures 5:6 and 5:7). Towards the end of the forecast period, 0.75 percentage points separated the two.

The upward shift of market expectations towards the end of the year may be a consequence of the improvement of economic activity in Sweden. At the end of November, statistics were published showing very strong GDP growth in the third quarter. Foreign market expectations also increased towards the end of the year.

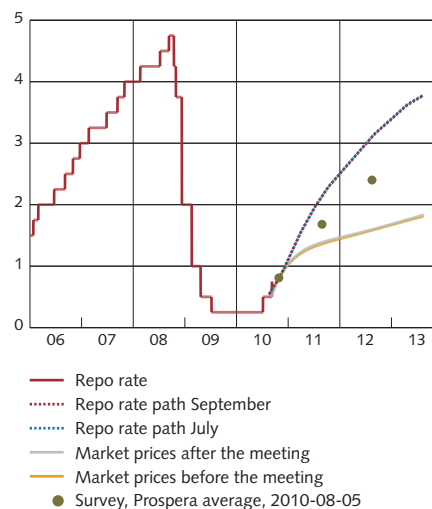
Monetary policy expectations according to surveys and forward rates

The Riksbank generally uses two methods to follow monetary policy expectations – via forward rates and via surveys. After adjustments for risk premiums, forward rates can be interpreted as reflecting the fixed income markets' implied expectations of future interest rate levels, and this market pricing can thus be used on a current basis to interpret expectations of the repo rate's development. In surveys, selected individuals are asked about their expectations of the repo rate's development. Survey questions of this kind are put to money market participants by TNS Sifo Prospera (on behalf of the Riksbank) in a survey conducted each month.

Measures of monetary policy expectations according to the two different methods can differ. In 2009, expectations according to market pricing were higher than expectations according to survey responses. However, in 2010, the situation was the reverse (see figure 5:8). This means that the difference between the Riksbank's repo rate path and market expectations was narrower in 2010 if survey responses (as opposed to market pricing) are used as a measure of expectations (see, for example, figure 5:5).

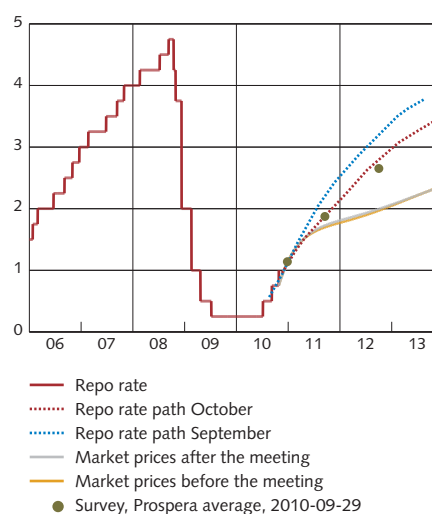
There are several conceivable reasons for the deviation of these two measures. One reason may be that the individuals answering the surveys and the individuals active on the fixed-income markets are not actually the same people, and that these two groups have different expectations. Another reason for the answers to be different is that forward rates are based on the market participants actually investing money on the indirect forecasts that the forward rates imply, something that those responding to the surveys need not do.³⁴ A further potential factor behind the differences may be that forward rates do not just reflect repo rate expectations but may also include time-varying term premiums, as discussed below.

Figure 5:5. Repo rate expectations measured using market prices and surveys, September 2010
Per cent



Sources: Reuters EcoWin, TNS Sifo Prospera and the Riksbank

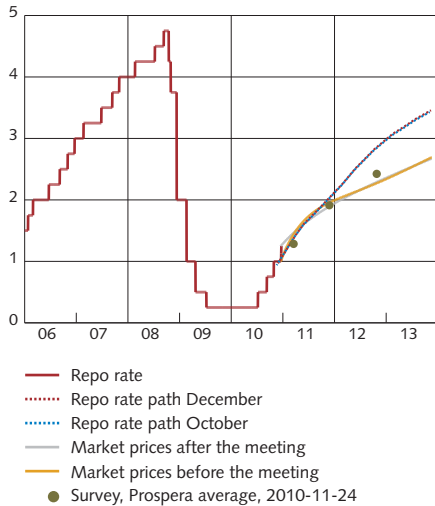
Figure 5:6. Repo rate expectations measured using market prices and surveys, October 2010
Per cent



Sources: Reuters EcoWin, TNS Sifo Prospera and the Riksbank

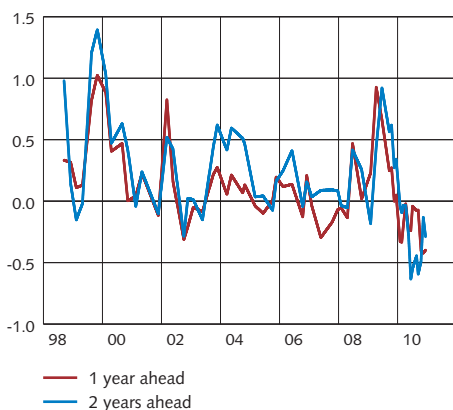
³⁴ For example, survey responses are usually summarised with a mean value, which means that all respondents are weighted equally. In turn, this can mean that extremely divergent expectations have a great impact on the measure. Measures of expectations according to market pricing are only influenced by divergent expectations to the extent that somebody actually sees a potential profit and chooses to invest money on their forecast of the repo rate.

Figure 5:7. Repo rate expectations measured using market prices and surveys, December 2010
Per cent



Sources: Reuters EcoWin, TNS Sifo Prospera and the Riksbank

Figure 5:8 Difference between monetary policy expectations according to Prospera and forward rates
Percentage points



Note. The data refers to money market agents. Given that surveys provide a reasonable picture of market expectations the difference between surveys and forward rates constitutes a (rough) measure of premiums. Forward rates are calculated from government securities using the Nelson-Siegel-Svensson method.

Sources: TNS SIFO Prospera, Reuters EcoWin and the Riksbank

How can the gap between expectations according to market pricing and the Riksbank's repo rate forecasts in 2010 be explained?

Several factors may have contributed towards the occasionally large differences between the Riksbank's repo rate forecast and expectations according to market pricing.

■ ■ The market may question the repo rate path

One possible explanation may be that money market agents consider that a lower interest rate is required for monetary policy to be well-balanced. For example, they may have expected weaker GDP growth and inflation abroad. Such a scenario is probably linked to interest rates abroad being lower than was assumed in the Riksbank's forecasts, with a positive interest rate differential between the repo rate and interest rates abroad arising. In turn, this would lead to an appreciation of the Swedish krona and imported goods becoming cheaper. Inflation, which is determined by a weighing-up of the prices of imported goods and the prices of domestic goods, would thus become lower. Furthermore, both weak GDP growth abroad and a stronger krona would impede Swedish exports. Such a weakening of demand should also contribute towards decreased inflationary pressures in the Swedish economy. All in all, this would mean that the repo rate would need to be adjusted at a slower rate than that suggested by the Riksbank's repo rate forecasts.³⁵

It is reasonable to assume that the differences between the Riksbank's published repo rate path and the path expected by the market participants, as calculated by the Riksbank on the basis of market pricing, were at least partially due to the fact that the market participants expected another development of the repo rate path. On the other hand, exactly why they did this is difficult to determine.

■ ■ Lower growth potential and dissension in the Executive Board

There may also be other reasons for market participants to doubt the repo rate path. It may be the case that market participants believe that the crisis has led to lower growth potential, which, in turn, has lowered the economy's so-called neutral equilibrium interest rate.³⁶ A further possibility concerns dissension in the Executive Board. At every monetary policy meeting held in 2010, reservations were entered against the published repo rate path by at least one member – on four occasions, two members – who considered that the repo rate path for 2010 should be lower.

³⁵ See the article "The repo rate path and monetary policy expectations according to implied forward rates" in the Monetary Policy Report published in October 2010, Sveriges Riksbank.

³⁶ According to the Riksbank's analysis, it is difficult, on the basis of current information, to draw the conclusion that the neutral equilibrium interest rate has become much lower.

■ ■ Assumptions regarding risk premiums may be misleading

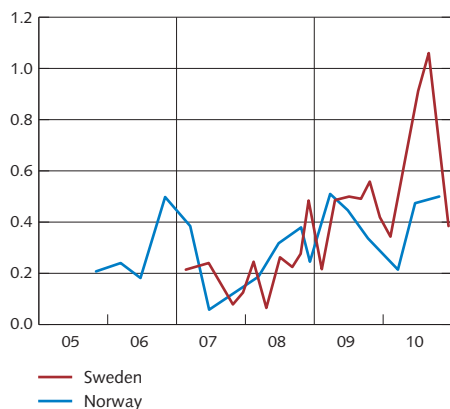
The Riksbank calculates expectations by excluding various risk premiums from the forward rates.³⁷ To do this, the Riksbank makes various assumptions concerning the size of the risk premium. However, one problem is that premiums can vary over time. This is primarily problematic as regards term premiums and implies the risk that the assumed term premiums do not correctly reflect the real term premiums.

Depending on the situation on the market, term premiums can be both overestimated and underestimated. For example, the measures to facilitate the supply of credit implemented by central banks around the world (credit facilities and quantitative easing) might have pushed down interest rates for longer maturities more than is justified by lower expectations of future policy rates. In this situation, it is possible that term premium assumptions will overestimate the actual term premiums and that the market's monetary policy expectations will thus be underestimated. This may have been a factor in 2010, when the central banks' extraordinary measures assumed increasingly great volumes. In this case, the difference between actual market expectations and the Riksbank's forecasts is probably less than is shown by figure 5:7, for example. This illustrates how uncertain and difficult it is to measure monetary policy expectations.

³⁷ Risk premiums consist of a maturity premium, which compensates for interest-rate risk, and other risk premiums that depend on liquidity and credit risks. Interest rate risk is the risk that interest rates will develop unfavourably during the period that an investor owns an instrument. The liquidity premium is to compensate for risks in the ownership of illiquid instruments. Credit risk is the risk that the counterparty in a contract will not be able to fulfil its obligations. See "How does the Riksbank calculate the market's expectations of the repo rate?" in the appendix for a more detailed description.

■ Interest rate paths and market expectations in Norway and Sweden

Figure 5:9. Average absolute deviations between forward rates and the repo rate path
Percentage points



Sources: Norges Bank, Reuters EcoWin and the Riksbank

The Riksbank and Norges Bank are two of a small number of central banks that publish their own interest rate forecasts. Norges Bank started to publish its own interest rate path at the end of 2005, and the Riksbank at the start of 2007. These central banks can thereby be considered to be pioneers in this area, even if New Zealand was first when it started to publish its own interest rate path in 1997. It may thus be interesting to analyse and compare the experiences of these two countries. One specific aspect is particularly interesting to analyse, namely the differences between each central bank's interest rate path and the market's expectations of the interest rate. The size of these differences can provide a view of the impact monetary policy has had in these countries.

Figure 5:9 shows how much the market's expectations of monetary policy – calculated with the aid of forward rates adjusted for risk premiums – have deviated from the interest rate forecasts in Sweden and Norway, respectively. The difference is measured as the average absolute deviation.³⁸ The starting point for each time series is the date upon which interest rate forecasts were introduced in each country, that is to say the end of 2005 in Norway and the start of 2007 in Sweden. The market's expectations of monetary policy have fluctuated in both countries by up to about 0.5 percentage points during large parts of the periods under study. However, during 2010, the deviations in Sweden were significantly greater, reaching a peak of just over 1 percentage point in September. Consequently, this indicates that the major deviations of 2010 were specific to Sweden. However, it is difficult to draw any conclusions on the causes of the deviations on the basis of this comparison.

³⁸ This is obtained by first calculating the absolute value of the deviation between the central bank's forecast and market expectations (after publication) at each future point in time. This gives an absolute deviation per quarter for the forecast in question. Subsequently, the mean absolute deviation is calculated as the average value of these absolute deviations.

A method for considering differences in the amount of information available to different forecasters

Let y_t be the outcome for variable y year t (for example y =GDP growth and t =2010) and assume that the forecast for y is $\hat{y}(h)_{it}$, where h shows how many months prior to the outcome the forecast is published. h is thus a measure of the information available at the time of publication (the lower h is, the shorter the forecast horizon is and the more information is available). i is an index of different analysts.

Analyst i 's various forecasting errors can thus be defined as

$$(1) \ \varepsilon_{it} = y_t - \hat{y}(h)_{it}.$$

The absolute forecasting error is defined as

$$(2) \ \varepsilon_{it}^{abs} = |y_t - \hat{y}(h)_{it}|$$

and the squared forecast error as

$$(3) \ \varepsilon_{it}^2 = (y_t - \hat{y}(h)_{it})^2.$$

The mean error (ME_i) for analyst i is calculated as the average value of its forecasting errors

$$(4) \ ME_i = \frac{\sum \varepsilon_{it}}{n_i} \quad (\text{mean error})$$

where n_i = the number of forecasts made by analyst i . The mean absolute forecast error (MAE) for analyst i is calculated as

$$(5) \ MAE_i = \frac{\sum \varepsilon_{it}^{abs}}{n_i} \quad (\text{mean absolute error})$$

The starting point for the Riksbank's calculation method is that the absolute forecasting errors in equation (2) – or the squared forecasting error in equation (3) – can be divided up into different components: a component that is due to the amount of information available at the time of publication (the forecast horizon), a component that reflects the different forecasters' general forecasting performance (μ_i) and a component that captures the fact that different years can be more or less difficult to forecast for all analysts (λ_t).

The main analysis in Chapter 4 was carried out using absolute forecast errors, where it is assumed that these can be split up as follows:

$$(6) \varepsilon_{it}^{abs} = \alpha h_{it} + \mu_i + \lambda_t + e_{it}$$

The adjusted mean absolute error (AMAE) as reviewed in Chapter 4 is calculated as the forecaster's estimated ability centred around the mean absolute error of all forecasts

$$(7) AMAE_i = \hat{\mu}_i - \frac{\sum \hat{\mu}_i}{j} + MAE$$

where j is the number of forecasters.

For the squared error, the following equation is estimated

$$(8) \varepsilon_{it}^2 = \alpha h_{it} + \mu_i + \lambda_t + e_{it}$$

Ability (A_i) is calculated as

$$(9) A_i = \hat{\mu}_i - \frac{\sum \hat{\mu}_i}{j}$$

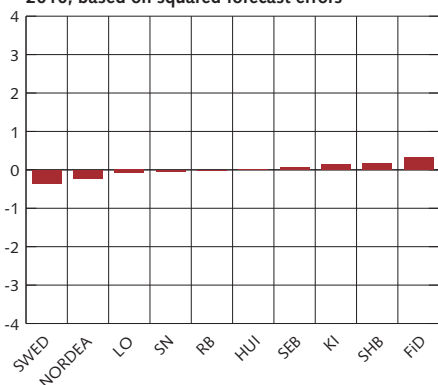
and this is shown in Figures A1–A8. Zero can thereby be interpreted as average ability. Negative values imply that the forecaster makes smaller than average forecast errors when the forecast horizon is taken into account.

It is more common to use the mean squared error than the mean absolute error when evaluating forecast ability. An analysis of forecast ability using the squared forecasting error – and adjusted for the amount of information available – is presented below. The ranking of the various analysts is similar, but not identical, compared with the result shown in Chapter 4. The slight change in analyst ranking when the squared forecast error is used is because large forecast errors are penalised more severely when they are squared, compared with when the absolute value is used. For example, figures A1–A4 show that, for the outcome year 2010, Nordea prepared the best forecasts of GDP, Swedbank prepared the best forecasts of the CPI and interest rate, and SEB prepared the best forecasts of unemployment – this is the same conclusion that was reached in Chapter 4. However, a comparison of Figures A5 and 4:5 shows a change in the internal ranking of the Ministry of Finance and the National Institute of Economic Research as regards inflation forecasts for the period 1999–2010.³⁹ Consequently, the precision measurement used in the analysis makes a certain difference. However, regardless of measure, the differences between the analysts are small.

In Figures A1–A8, forecast ability has been calculated according to equation (9). The figures are thus centred around zero for each variable and period. Negative values in the figures imply that the analyst makes smaller forecast errors than average when the forecast horizon is taken into account.

³⁹ As in Chapter 4, the forecasting performance of the three largest analysts and an average of the other analysts are reported. The performance of individual analysts is in this section centred around zero. The calculation of the average for the other analysts is therefore affected by analysts with a positive forecasting performance and those with a negative forecasting performance offsetting one another.

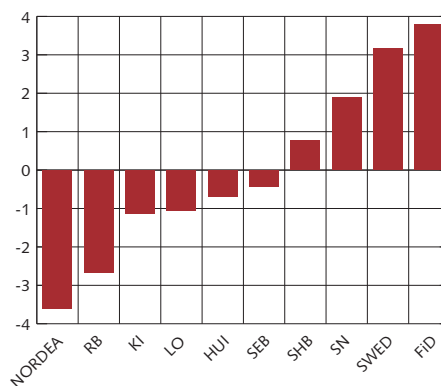
Figure A1. Estimated forecasting performance for CPI 2010, based on squared forecast errors



Note. LO=Swedish Trade Union Confederation, FiD=Ministry of Finance, SWED=Swedbank, SN=Confederation of Swedish Enterprise, KI=National Institute of Economic Research, SHB=Svenska Handelsbanken, RB=Riksbank and HUI=Swedish Retail Institute.

Sources: National Institute of Economic Research and the Riksbank.

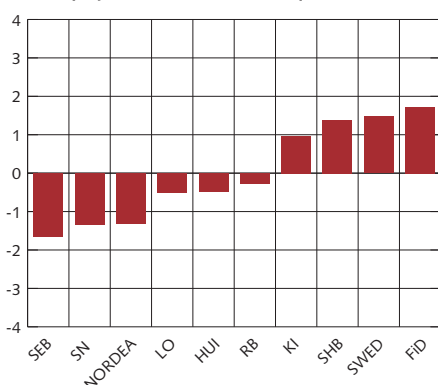
Figure A2. Estimated forecasting performance for GDP growth 2010, based on squared forecast errors



Note. See the note to Figure A1 for an explanation of the abbreviations.

Sources: National Institute of Economic Research and the Riksbank.

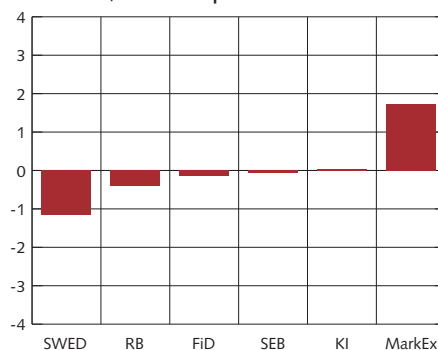
Figure A3. Estimated forecasting performance for unemployment 2010, based on squared forecast errors



Note. See the note to Figure A1 for an explanation of the abbreviations.

Sources: National Institute of Economic Research and the Riksbank.

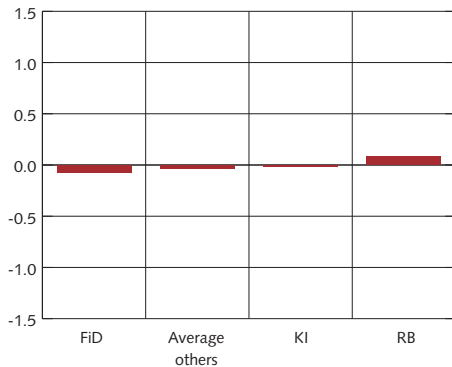
Figure A4. Estimated forecasting performance for repo rate 2010, based on squared forecast errors



Note. FiD=Ministry of Finance, SWED=Swedbank, KI=National Institute of Economic Research, MarkEx=Market expectations and RB=Riksbank. While other forecasters present their repo rate forecasts as a value at the end of the year, the Riksbank presents its forecasts as quarterly average values. In order to make the comparison possible, the Riksbank's quarterly values have been interpolated to daily values. This does not affect the result, however.

Sources: National Institute of Economic Research and the Riksbank.

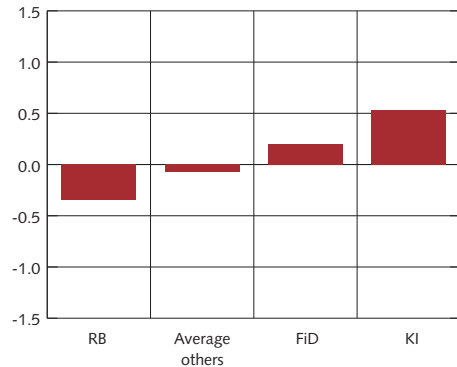
Figure A5. Estimated forecasting performance for CPI 1999–2010, based on squared forecast errors



Note. KI=National Institute of Economic Research, FiD=Ministry of Finance and RB=Riksbank. Other forecasters are Swedbank, Svenska Handelsbanken, Nordea, SEB, the Swedish Retail Institute, the National Institute of Economic Research, the Confederation of Swedish Enterprise and the Swedish Trade Union Confederation (LO).

Sources: National Institute of Economic Research and the Riksbank.

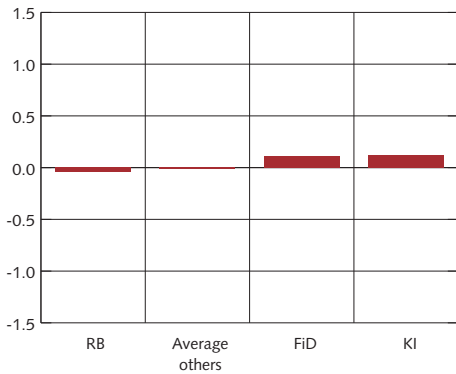
Figure A6. Estimated forecasting performance for GDP growth 1999–2010, based on squared forecast errors



Note. See the note to Figure A5 for an explanation of the abbreviations.

Sources: National Institute of Economic Research and the Riksbank.

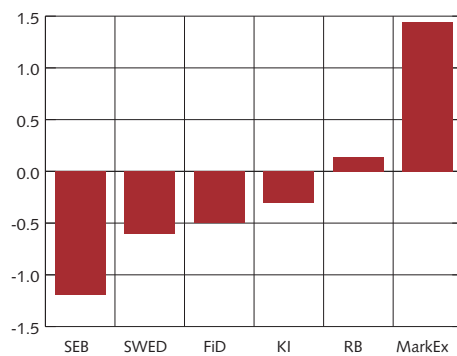
Figure A7. Estimated forecasting performance for unemployment 1999–2010, based on squared forecast errors



Note. See the note to Figure A5 for an explanation of the abbreviations.

Sources: National Institute of Economic Research and the Riksbank.

Figure A8. Estimated forecasting performance for repo rate 2007–2010, based on squared forecast errors



Note. Forecasts of the repo rate were not published prior to 2007. See the note to Figure A4 for an explanation of the abbreviations.

Sources: National Institute of Economic Research and the Riksbank.

How does the Riksbank calculate monetary policy expectations from market pricing?

In order to measure the market's expectations of the future repo rate, the Riksbank uses forward rates. Forward rates are interest rates determined today for investments or loans that will not be executed until a date in the future (settlement date) and which will then run for a determined duration, from settlement date until due date. One example could be the interest rate on a 1-month interbank loan, one year ahead.

Forward rates can be calculated implicitly or observed directly on the market. Implicit forward rates are calculated on the basis of the day's interest rate on interest rate contracts with different maturities. For example, with the help of a six-month interest rate and a nine-month interest rate, the implicit three-month interest rate six months ahead can be calculated. The market-listed forward rates are derived from the price of interest derivatives traded on the markets and can thus be observed directly. The interest rate of forward rate agreements for the three-month interbank rate is an example of an actual three-month forward rate. In general, the levels of implied and market-listed forward rates correspond well. The Riksbank uses both market-listed forward rates and other interest derivatives to calculate forward rates.

The forward rate can be regarded as the sum of the expected average repo rate from settlement date to due date, a term premium that compensates for interest rate risk and other risk premiums depending upon liquidity and credit risks. Interest rate risk is the risk that interest rates will develop unfavourably for an investor during the period that that investor owns an instrument. Interest rate risk arises when there prevails uncertainty around future interest rate development. The liquidity premium is to compensate for risks in the ownership of illiquid instruments. Credit risk is the risk that the counterparty in a contract will not be able to fulfil its obligations. The market's expectations of the repo rate are calculated as the forward rate adjusted for these premiums. The premiums may vary over time. In order to calculate term premiums, the Riksbank utilises rules of thumb based on historical experience and empirical model assessments, among other tools.

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