Material for assessing monetary policy

2011

SVERIGES RIKSBANK

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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, where a printed version of the report can be ordered free of charge or a PDF can be downloaded.

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Monetary policy in Sweden[1]

MONETARY POLICY STRATEGY

- 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 its own assessment of the future path for the repo rate. This repo-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 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 Executive Board members 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. The document is available as a PDF file on the Riksbank's website, www.riksbank.se, under the heading Monetary policy/Price stability.

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Summary

During 2011, the Swedish economy moved from a period of strong recovery at the beginning of the year to a sudden slowdown at the end. The monetary policy decisions during the year reflected this. CPI inflation averaged 3.0 per cent. CPIF inflation was 1.4 per cent. Inflation expectations in the long run were securely anchored around the inflation target. GDP increased by almost 4 per cent, and unemployment declined for most of the year. In the forecasts made in 2010 the Riksbank, like other analysts, underestimated the outcome for CPI inflation in 2011. On the other hand, the level of the repo rate at the end of the year was overestimated. The Riksbank's decisions on the repo rate in 2011 were anticipated well by market agents, but during the second half of the year it appears that market agents were expecting a lower repo rate in the coming years than was forecast in the Riksbank's repo-rate path.

Monetary policy 2011 – from a strong recovery to a sudden slowdown

The repo rate was increased during the first half of the year on three occasions, then held unchanged in September and October and finally cut in December. At the beginning of 2011 the repo rate was 1.25 per cent and at the end of the year it was 1.75 per cent.

The monetary policy discussions of the Executive Board and the repo-rate decisions made in 2011 reflected the phases that the Swedish economy went through over the year: a strong recovery during the spring, increased financial unease during the summer and autumn with deteriorating growth prospects abroad, and an abrupt slowdown at the end of the year. At the start of the year the discussion concerned, among other things, what impact rising international inflation, increasing inflation expectations and an ever higher resource utilisation would have on inflation in Sweden. The question of the level of resource utilisation in the Swedish economy was infocus in the monetary policy discussions throughout the year. Other questions that recurred were how the forecast for foreign policy rates should be formulated, their impact on the exchange rate and which measures of resource utilisation the analysis should focus on.

During spring 2011, the recovery abroad was deemed, as a whole, to be continuing at a good pace. The Swedish economy, which had grown by a good 6 per cent in 2010, continued to develop strongly, although underlying inflationary pressures were low. The recovery proceeded faster than in many other countries and resource utilisation increased rapidly. Energy and commodities prices increased, pushing global inflation up. Together with increased interest expenditure for housing connected to the successively increasing repo rate, the higher prices for energy and commodities pushed up CPI inflation. In addition, inflation expectations increased slightly. The Riksbank raised the repo rate at all three monetary policy meetings during the first half of the year, from 1.25 per cent at the beginning of the year to 2.0 per cent in July. The repo-rate path was adjusted upwards in February, but at the monetary policy meetings in April and July the repo-rate path was held unchanged. The repo-rate forecasts up to the end of July showed that the repo rate would also need to be raised during the second half of 2011.

However, during the summer and autumn unease over developments in the public sector debts in the United States and several countries in the euro area increased, and growth prospects abroad deteriorated. This unease affected developments on the financial markets and stock markets around the world fell substantially. The poorer growth prospects abroad, the slowdown in world trade, and the unease on the financial markets had a negative effect on the outlook for the Swedish economy. Growth was thus deemed to be slowing down more than the Riksbank had previously expected. Consequently, in September and October, the Executive Board decided to leave the repo rate unchanged at 2.0 per cent, and refrained from making the increases that had been planned earlier. The repo-rate path was adjusted downwards at both meetings.

At the end of the year, unease over public sector finances in the euro area intensified, and global growth prospects deteriorated further. There were also clear signs that growth in Sweden slowed down substantially during the fourth quarter. The poorer economic outlook also began to have a negative effect on the labour market. Moreover, inflation was lower than expected in October and November. The Executive Board therefore decided in December to cut the repo rate to 1.75 per cent and adjusted the repo-rate path downwards.

- **Target fulfilment – repo-rate increases and the banks' increased margins contributed to high CPI inflation**

CPI inflation was on average 3.0 per cent in 2011, which was higher than the Riksbank had forecast in 2010. Measured in terms of the CPIF, which is not directly affected by changes in mortgage rates, inflation averaged 1.4 per cent during the year. This was close to the forecasts made by the Riksbank in 2010.

How was target fulfilment in 2011? As it takes some time before the monetary policy decisions made in 2011 have a full impact on the economy, it is not possible to evaluate them yet. The outcomes for inflation and the real economy in 2011 were probably affected more by the monetary policy decisions made in 2009 and 2010. It is therefore primarily these decisions and the forecasts on which they are based that should be assessed.

CPI inflation averaged 3.0 per cent in 2011. The fact that it overshot the target was partly because the Riksbank began to raise the repo rate in July 2010, which meant that mortgage rates increased. Mortgage rates in their turn affect households' housing costs, which are included in the calculation of the CPI.[2] This effect was predicted in the Riksbank's forecasts. But CPI inflation was even higher than the Riksbank had been expecting in 2010. This is explained by two factors. The first is that mortgage rates increased faster than was justified by the repo-rate increases – the banks' funding costs and margins on mortgage loans to households increased more than the Riksbank had expected. The second is that changed weights on mortgage rates when calculating the CPI in 2011 mean that the impact of the rising mortgage rates was greater than the Riksbank had forecast.

Measured in terms of the CPIF, which is not directly affected by changes in mortgage rates, inflation averaged 1.4 per cent during the year. This was close to the forecasts made by the Riksbank in 2010. According to these forecasts, CPIF inflation would gradually increase and be close to 2 per cent at the end of the forecast period, at the same time as resource utilisation would rise towards a normal level. In periods of significant changes in the repo rate, the CPIF provides a better picture of inflationary pressures.

GDP increased by 3.9 per cent in 2011 and unemployment continued to decline for most of the year. During the latter part of the year, growth slowed down substantially, and the improvement on the labour market came to a halt. Growth in 2011 was nevertheless slightly higher than the Riksbank had expected in its forecasts during most of 2010.

Inflation expectations in the long term were close to 2 per cent, which shows that the public was still confident that the Riksbank would reach its inflation target.

- **Forecasting performance – small differences between forecasters**

The Riksbank underestimated CPI inflation in 2011, but overestimated the level of the repo rate at the end of the year, which was also the case for other forecasters. An analysis of the forecasts made during the period 1999-2011 shows that the differences in forecasting performance between the forecasters are generally small.

A comparison of different analysts shows that the Riksbank and other forecasters underestimated CPI inflation in 2011. All analysts overestimated unemployment in 2011 and the level of the repo rate at the end of the year. The Riksbank was among the better forecasters with regard to forecasts

[2] When the Riksbank adjusts the repo rate, other interest rates in the economy are gradually affected, for instance, households' mortgage rates. Normally the Riksbank raises the repo rate to reduce inflation, but the direct impact of higher mortgage rates means that CPI instead increases further.

of GDP growth, while the Riksbank's forecasts for the repo rate were poorer than those of many other analysts. However, in general there were no major differences between the analysts.

Relatively long periods of examination are necessary to be able to say anything more definite about the accuracy of different analysts' forecasts. An analysis of the forecasts made in the period 1999-2011 shows that the Riksbank and most other analysts have tended to overestimate GDP growth somewhat. However, the forecasts for CPI inflation and unemployment have on average been close to the actual outcomes. The differences between the forecasting performance of the forecasters are generally minor.

- **Predictability and monetary policy expectations – decisions on the repo rate were anticipated well by the market**

During 2011 the Riksbank's repo-rate decisions did not entail any surprises for market agents. Both surveys and market pricing indicate that, during the second half of the year, market participants expected a lower repo rate in the coming years than the Riksbank had forecast.

Repo-rate decisions in 2011 were accurately predicted by market participants. Surveys indicate that, during the second half of the year, market participants expected a lower repo rate in the coming years than the Riksbank had forecast. Expectations of monetary policy derived from pricing on the money market give the same picture. However, the interpretation of these expectations has been complicated by the financial unease.

- **Areas for development in the field of monetary policy identified in 2011**

Important areas for development identified by the Riksbank are to strengthen the financial analysis in the forecasting and modelling work, to develop the analysis of the current status of the economy and to better estimate monetary policy expectations.

In the Riksdag Committee on Finance's assessment of monetary policy in 2008-2010 (report 2010/11:FiU24), the Committee expressed the wish that the Riksbank should indicate in the material for assessing monetary policy areas that required closer analysis. As a result of the assessment work in the past year, the Riksbank has identified some areas where monetary policy analysis requires further development. One important area aims to better integrate financial analysis into the forecasting and modelling work. This entails, for instance, developing new forecasting routines so that changes in financial conditions can be included in the forecast in a more systematic manner.

Making a good analysis of the current status of the economy, for instance of GDP, employment and inflation, is an important condition for the forecasts and thus for monetary policy. This is another area where work is being done to assess and further develop methods. Here, for instance, a more in-depth analysis of the labour market is needed. There have been major changes in economic policy in recent years, which have changed the incentive structure in the labour market. It is important that the Riksbank closely follows current developments to capture any changes in the functioning of the labour market. This concerns, for instance, an extended analysis of the developments for vulnerable groups both inside and outside of the labour market and whether changes in economic policy can be considered to affect the labour market in the longer run.

Given the large differences that could be observed between different measures of monetary policy expectations in 2011, there is also a need to refine the methods used to measure these expectations.

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. This report provides a basis for assessing monetary policy.

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 tried 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 an inflation target, which specifies that the annual change in the consumer price index (CPI) is to be 2 per cent. But although the inflation target is formulated in terms of the CPI, other measures of inflation may be useful in analysing and forecasting future inflation, which is discussed in an article at the end of this chapter.

The Riksbank primarily uses a short-term interest rate to implement its monetary policy. Interest rates are steered through the repo rate. The repo rate has a direct effect on the interest rate with the shortest maturity, the so-called overnight rate on the interbank market. This is the interest rate the banks apply when they lend to and borrow from each other from one day to the next. Changes in the overnight rate then spread to interest rates with higher credit risks and longer maturities. In the end, the adjustment has spread to the interest rates at which households and companies borrow from financial institutions. How much of the original adjustment of the repo rate impacts households' and companies' interest rates varies over time.

The Riksbank also publishes its own assessment of the future path for the repo rate. This interest rate forecast (or repo-rate path) makes it easier to explain the Riksbank's view of developments and the Executive Board's reasoning when the monetary policy decisions are made. It is also makes it easier to steer expectations regarding future monetary policy. Expectations of future repo 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 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 balance in 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. If these risks are assessed as substantial they may justify an adjustment to the repo-rate path. When it comes to preventing an overly rapid increase in asset prices and indebtedness, the most important factors are probably 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 in 2011, the analyses on which they were based, and the questions that were given greatest focus in the Executive Board's monetary policy discussions. There are also two articles. One of them summarises economic developments during 2009-2010. The other describes a method for assessing different 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. 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 often has time to be 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 inflation target may thus reflect the balance to be achieved 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. If confidence in the inflation target were shaken and inflation expectations were to become stuck at a level high above the target, monetary policy would need to be tighter to bring down expectations, which is costly for the economy as growth would then be lower and unemployment higher.

By studying how inflation expectations relate to the inflation target and to 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 2011.

■ 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 2011.

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 analysts. If the Riksbank's forecasts are systematically poorer, this is obviously an indication that it would have been possible to make better assessments than those made by the Riksbank. It 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 outcome date for the variable being forecast, the more information the forecaster has regarding the way the variable has developed and on the shocks that

have occurred. 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.

■ Predictability and monetary policy expectations

An assessment of monetary policy should also take into account the implementation of monetary policy.

If the Riksbank succeeds well in its communication, monetary policy will be predictable. Market agents will then be fairly well able to predict how new information will affect the repo rate. Market rates can thus adjust before the Riksbank has even made a decision on the repo rate. It also means that the decision on the repo rate will not cause any unnecessarily large fluctuations in interest rates on the market.

As mentioned earlier, the Riksbank also publishes a forecast for the repo rate in connection with every monetary policy meeting. These forecasts make it easier for the Riksbank to explain its views on future monetary policy. Another purpose is to influence the expectations of monetary policy. In this way, the Riksbank can influence interest rates with longer maturities and thereby the interest rates that are most important for households' saving patterns and companies' investment decisions.

One way of assessing the influence of monetary policy on expectations is thus to examine whether households' and financial markets' expectations well-aligned with the Riksbank's forecast for the future repo rate.

Chapter 5 analyses how predictable monetary policy has been and how well the different measures of expectations of the repo rate have agreed with the Riksbank's repo-rate forecast. There is also a discussion of the reasons for and significance of the differences in expectations and the Riksbank's forecast. The chapter also contains an article that studies the influence of monetary policy on monetary policy expectations in Sweden and in two other countries with central banks that publish their own policy rate forecasts, namely Norway and New Zealand.

CPI and other measures of inflation

Inflation can be measured in many different ways. One key question is therefore which price index the Riksbank's inflation target should refer to. The need for a nominal anchor that prevents inflation from drifting off is thus an argument in favour of specifying an inflation target in terms of a broad price index that represents ordinary purchases and that is well-known to the public. This has been the most important argument for the Riksbank when specifying its inflation target in terms of the CPI, which Statistics Sweden calculates and reports every month. In addition, the CPI statistics are of good quality, are not normally revised, and are published soon after the end of the month. The CPI measures the price of a basket of goods and services, including 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 weighting in the CPI.

Even if 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. Large and temporary changes in the prices of individual goods and services can have major, but transitory, effects on CPI inflation. Monetary policy should not react to such effects. To describe the more long-time development of inflation and to better explain its monetary policy, the Riksbank can choose to highlight various measures of what is known as underlying inflation. There are several ways of calculating such measures, and common to all of them is that one makes an adjustment for fluctuations in prices that are expected to have a temporary effect on the CPI, but not to affect its general trend, such as temporary rises and falls in energy prices. [3]

The calculation of the CPI includes households' housing costs. These housing costs depend, for instance, on mortgage rates, which in turn are affected when the Riksbank adjusts the repo rate. For example, an increase in the repo rate will lead to higher mortgage rates. Normally, the Riksbank increases the repo rate to counteract a future increase in inflation, but the direct effect of the higher mortgage rates is that the CPI will instead rise further. There is thus reason to analyse inflation measures that are not directly affected by the Riksbank's repo-rate adjustments. One such measure is the CPIF, which is the CPI with a fixed mortgage rate. When calculating the CPIF, the effects of fluctuations in household mortgage rates over time are thus disregarded. In the longer run, when the repo rate has stabilised, CPI inflation and CPIF inflation coincide.[4] But during certain periods, when the repo rate is raised or cut substantially, as has been the case in recent years, there can be a significant difference between CPI inflation and an inflation measure adjusted for the direct effects of interest rate changes.

[3] See Jesper Hansson, Jesper Johansson and Stefan Palmqvist (2008), "Why do we need measures of underlying inflation?" *Sveriges Riksbank Economic Review,* 2008:2, pp. 23-40, Sveriges Riksbank.
[4] See Jesper Johansson, Stefan Palmqvist and Carina Selander, "The CPI will increase more rapidly than the CPIF over the next few years", *Economic Commentary* no. 5, 2011, Sveriges Riksbank.

CHAPTER 2 – Monetary policy 2011

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. However, 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 well balanced given the information that was available when the decisions were made. This chapter provides an overview of the Riksbank's decisions for 2011 and the analysis behind these. As a background to the overview, economic developments 2009–2010 are described in an article at the end of the chapter.

Summary of Chapter 2

- The monetary policy discussion in the Executive Board reflected the phases that the Swedish economy went through in 2011. At the start of the year, the discussion revolved around subjects such as the risk that the high level of CPI inflation would influence long-term inflation expectations and wage formation. Differing views of the measure or measures to be used as a basis for the assessment of resource utilisation and differing views of the level of resource utilisation characterised the monetary policy discussion throughout the year as a whole. There were also issues that recurred, for example how the forecast for foreign policy rates should be formulated.
- At the start of 2011, the recovery abroad was deemed, as a whole, to be continuing at a good pace. The recovery proceeded faster in Sweden than in many other countries and resource utilisation increased rapidly. Together with increased interest expenditure for housing connected with the successively increasing repo rate, higher prices for energy and commodities pushed inflation up, although underlying inflationary pressures were low. In addition, inflation expectations increased slightly. The Riksbank raised the repo rate at all three monetary policy meetings during the first half of 2011, from 1.25 per cent at the beginning of the year to 2.0 per cent in July.
- However, during the summer and autumn, unease over the development of sovereign debt in both the United States and several euro area countries increased. Growth prospects abroad deteriorated. Growth in Sweden was thus deemed to be slowing down more than the Riksbank had previously expected. In September and October, the Executive Board therefore decided to refrain from previously planned repo-rate increases and thus to leave the repo rate unchanged at 2.0 per cent.
- Unease over the development of public finances in the euro area escalated and global growth prospects deteriorated further at the end of the year. There were now clear signs that growth in Sweden was drastically slowing down. Inflation was also lower than expected in October and November. In December, the Executive Board decided to cut the repo rate to 1.75 per cent.

Important issues in the monetary policy discussion 2011

In 2011, the repo rate was raised at each monetary policy decision until late summer, from 1.25 per cent at the start of the year to 2.0 per cent in July. During the autumn, the repo rate was held unchanged and, in December, it was lowered to 1.75 per cent. These decisions reflect the phases that the Swedish economy passed through during the year: recovery during the spring, increased financial unease during the summer and autumn, and a drastic slowdown at the end of the year. Even if there were slight differences, on the whole a consensus prevailed regarding the analyses and assessments leading to the forecast for growth and inflation. However, opinions were divided regarding the conclusions for monetary policy. This was manifested by two members of the Executive Board entering reservations against the interest-rate decision and/or the decision on the repo-rate path at each monetary policy meeting.

■ Matters related to economic developments

Until the summer of 2011, the recovery of the world as a whole seemed to be continuing at a good pace. Energy and commodities prices were increasing, pushing up global inflation. The Swedish economy was continuing to develop strongly, and resource utilisation was increasing rapidly. The higher prices for energy and commodities were pushing inflation up, and inflation expectations also rose slightly. CPI inflation was above the inflation target, but underlying inflationary pressures were low. During this period, there was a difference between the majority and minority views of monetary policy that, somewhat simplified, can be said to have been grounded in different opinions regarding when and at what rate the repo rate should be raised.

Given the economic prospects, the majority thus decided to raise the repo rate at each meeting until July. The assessment also included unease over the possibility that impulses from the high energy and commodity prices, rising inflation expectations and increasing resource utilisation would have an impact on domestic price increases. Some measures of resource utilisation and shortages in certain sectors were close to or even above normal levels. It was noted that there was a risk that these factors could influence wage formation and that wage increases would be pushed up to levels that would be hard to reconcile with the inflation target. Furthermore, it was emphasised, for example at the interest rate decisions in April and July, that the repo-rate forecast assumed that the high level of CPI inflation would not make a more marked impression in long-term inflation expectations and wage formation. Several members of the majority noted that repo-rate increases could contribute towards dampening household indebtedness, which had grown in a manner that would not be sustainable in the long term.

The minority of the Executive Board preferred to see the repo rate be held unchanged in the short term, and then be raised more rapidly later on. The minority argued that there was no need to make monetary policy less expansionary, but that scope existed to allow resource utilisation and inflation to increase more rapidly. Long-term inflation expectations remained at around 2 per cent. While CPI inflation was

undoubtedly high, underlying inflation was low and it seemed more relevant to base monetary policy on the development of the CPIF, which is to say the CPI with a fixed mortgage rate. As regards resource utilisation, the minority argued that unemployment was still high, that there was spare capacity in the economy, and that the majority had overestimated resource utilisation in its forecasts. In the minority's view, the consequences of this overestimation were that the repo-rate path had been set too high. A lower repo-rate path in the immediate future would also have the advantage of leading to a more rapid lowering of unemployment, which, in the minority's view, would reduce the risk of so-called persistence effects that could cause the labour market to develop more sluggishly.

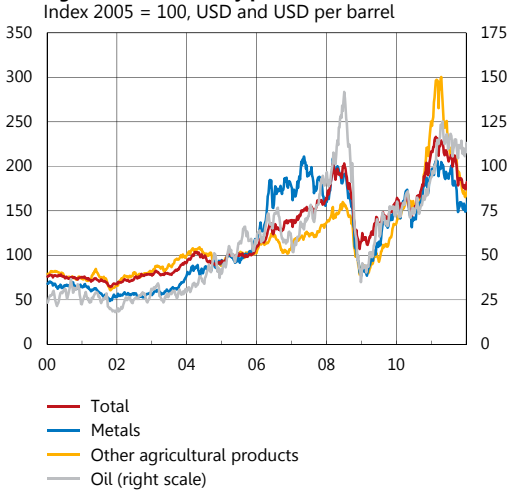
Both the majority and the minority raised the issue of determining a normal level of resource utilisation, given experiences from the latest economic upswing and the reforms of the labour market that had been implemented. How much could demand for labour increase and how rapidly could resource utilisation increase before bottlenecks would form and inflationary pressures in the economy start to rise? Which level of unemployment was sustainable over the long term? It was noted that effective matching and effective wage formation are important preconditions not only for achieving high employment and low unemployment in the long term, but also for preventing temporary disruptions from leading to unemployment becoming established at a high level (see the article "Low unemployment – a challenge" in the *Monetary Policy Report*, July 2011).

The risks in developments abroad formed another matter for discussion. At the start of the year, relative calm prevailed on the financial markets, but several members of the Executive Board emphasised that the situation was hardly stable and that there existed a risk of increased turbulence and a weakening of developments abroad. These risks were linked to the problem of high sovereign debt in certain countries.

However, during the summer and autumn, unease over developments in the sovereign debts in the United States and also several countries in the euro area increased, and growth prospects abroad deteriorated. The poorer growth prospects abroad, the slowdown in world trade, and the unease on the financial markets had a negative effect on the outlook for the Swedish economy. Growth was thus deemed to be slowing down more than the Riksbank had previously expected. Inflation outcomes at the end of the year were also lower than expected.

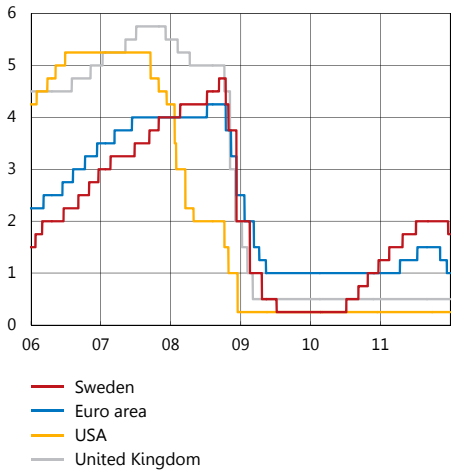
The issue that was naturally most in focus over the rest of the year was how much the Swedish economy would be affected by the deteriorating financial outlook abroad. Outcome data for output and exports, for example, still showed strong growth. On the other hand, forward-looking indicators pointed to a slowdown, although it was difficult to determine how severe and persistent this would be. It was not until the end of the year that any clear signs emerged that growth in Sweden had slowed down substantially during the fourth quarter. Several members of the Executive Board pointed out that there was unusually great uncertainty over developments. A discussion also took place over how monetary policy ought to be conducted, given this increased uncertainty.

Figure 2:1. Commodity prices
Index 2005 = 100, USD and USD per barrel



Sources: The Economist and Intercontinental Exchange

Figure 2:2. Policy rates
Per cent



Source: Reuters EcoWin

Deteriorating economic prospects and reduced inflationary pressures justified successive downward revisions of the repo-rate path during the autumn and a lowering of the repo rate in December. However, the minority argued that there was scope to conduct an even more expansionary monetary policy and justified this stance by claiming that, in their assessment, both resource utilisation and expectations of foreign policy rates were lower than the majority had assessed. Even accepting the majority's assessment of foreign policyrates, the minority's view was that a lower repo-rate path would result in a better-balanced monetary policy. These arguments were taken up over the whole year and were partly grounded in a different opinion of certain matters of principle.

■ Recurring differences of opinion

Certain issues were repeatedly brought up in the monetary policy discussion throughout the year and contributed to a difference of opinions on how monetary policy should be conducted.

One of these issues was the forecast of foreign policy rates and how these might affect the exchange rate. According to the minority, a lower forecast for foreign policy rates than that in the Riksbank's main scenario would have been easier to justify, considering the prevailing implied forward rates and the minority's assessment of future monetary policy in the economies in question.

Another matter of principle that was raised repeatedly in the monetary policy discussions, and regarding which the majority and minority had different opinions, was that of the assessment of resource utilisation. The majority's view was that no measure of resource utilisation was robust enough to alone form the basis for the assessment of resource utilisation and thereby the balancing of monetary policy. Instead, the assessment of resource utilisation, as before, should be based on an overall qualitative assessment of several indicators. The minority considered that it would be simplest and clearest if the monetary policy assessment were to be based on a specific measure of resource utilisation as target variable. This measure need not be directly linked to inflationary pressures in the economy, but to what is sustainable over the long term, for example the gap between actual unemployment and the assessed long-term sustainable level of unemployment.

Monetary policy decisions in 2011[5]

■ Strong growth in Sweden and abroad during the spring

In the spring, the recovery in the world as a whole was deemed to be continuing at a strong pace in 2011. Growth was strong in Asia. In the euro area, the indicators pointed to a continued recovery, but, at the same time, there was still uncertainty over the sustainability of public finances in several European countries. The inflation rate in the euro area had increased, primarily because energy and food prices had risen (see Figure 2:1). Given the rising inflation, in April the European Central Bank

[5] A compilation of the monetary policy decisions for 2011 can be found on page 28.

raised its policy rate for the first time in two years, from 1 per cent to 1.25 per cent (see Figure 2:2).

In the United States, economic prospects continued to improve – companies were optimistic, employment growth was good and unemployment was falling. At the same time, newly-received statistics showed that GDP had been poorer than expected during the second half of 2010. The housing market was also weak.

The Swedish economy had developed strongly at the end of 2010 and GDP was expected to continue to grow at a strong rate at the start of 2011 (see Figure 2:3). The recovery went faster in Sweden than in many other countries (see Figure 2:4), and various forward-looking indicators also pointed to a strong performance further ahead. The Riksbank thus deemed that the strong development in Sweden would continue in 2011, before levelling off slightly in 2012.

■ Rising CPI inflation and high energy and commodity prices in Sweden

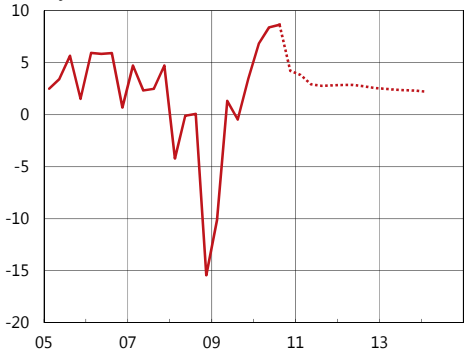
The higher prices for energy and commodities pushed inflation up in Sweden and were expected, at the start of2011, to continue to influence inflation in 2011-2013. This was expected to take place both directly, via rising prices for petrol, electricity and food (for example), and indirectly, via rising costs for companies. CPI inflation was also expected to continue increasing due to rising mortgage rates.

At the same time, inflationary pressures were low in the spring, as a result of the appreciation of the krona and low domestic cost pressure. However, underlying inflation was expected to increase as spare capacity in the economy decreased and the rate of wage increases accelerated.

At the start of the year, inflation expectations one and two years ahead increased. Even if inflation expectations were not troublingly high, they had risen for several surveys in a row and it was thus important to follow their development in the period ahead. On the other hand, over longer time horizons, inflation expectations were well-anchored around the inflation target.

According to some indicators, resource utilisation had increased rapidly and was now largely normal. In the February Business Tendency Survey from the National Institute of Economic Research, labour shortages continued to increase in some sectors, while capacity utilisation in the manufacturing industry increased rapidly (see Figure 2:5). In addition, the so-called RU indicator suggested that resource utilisation was already on a normal level. At the same time, other indicators, such as the level of unemployment, pointed to spare capacity in the economy. The Riksbank's overall assessment was therefore that resource utilisation was somewhat lower than normal. During the forecast period, GDP and the number of hours worked were expected to increase quickly and thus lead to an increase in resource utilisation. Resource utilisation was therefore assessed as normal or slightly above normal towards the end of the forecast period

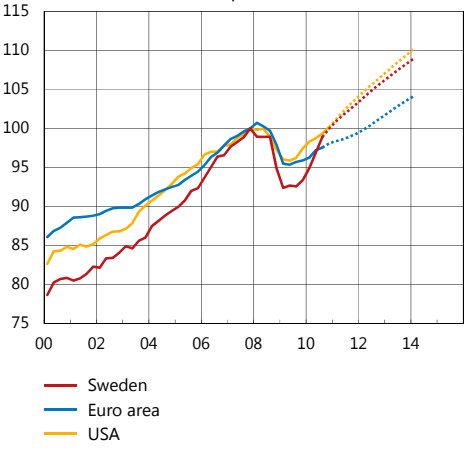
Figure 2:3. GDP
Quarterly changes in per cent, annual rate, seasonally-adjusted data



Note. The broken line represents the Riksbank's forecast in February 2011.

Sources: Statistics Sweden and the Riksbank

Figure 2:4. Comparison of recovery in Sweden, the euro area and USA
GDP level, index 2007 quarter 4 = 100



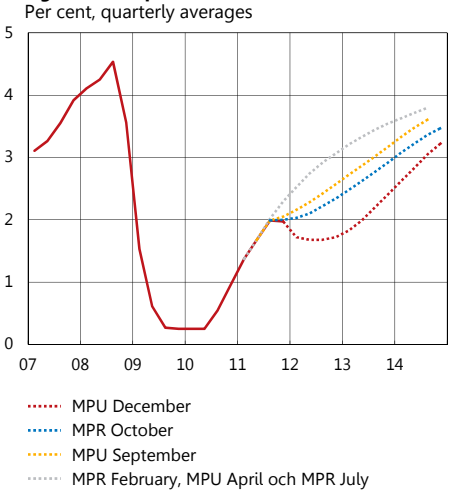
Note. The quarter prior to the recession breaking out in the USA = 100. The broken line represents the Riksbank's forecast in February 2011.

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

Figure 2:5. Proportion of companies reporting a shortage of labour
Per cent, seasonally-adjusted data

Source: National Institute of Economic Research

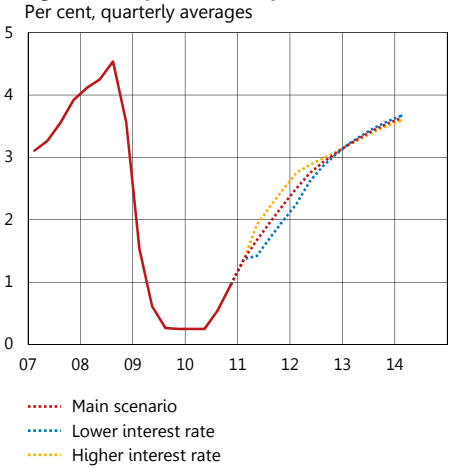
Figure 2:6. Repo-rate outcome and forecasts in 2011
Per cent, quarterly averages



Note. The broken line represents the Riksbank's forecasts in 2011. The repo-rate forecasts of February, April and July are so close to each other that they are illustrated using a shared broken line.

Source: The Riksbank

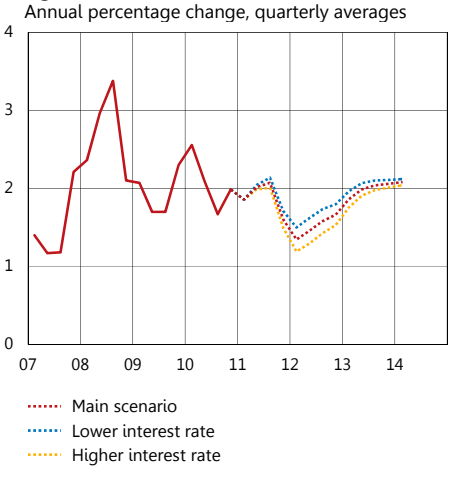
Figure 2:7. Repo-rate assumptions
Per cent, quarterly averages



Note. The broken line represents the Riksbank's forecast in February 2011.

Source: The Riksbank

Figure 2:8. CPIF
Annual percentage change, quarterly averages



Note. The broken line represents the Riksbank's forecast in February 2011.

Sources: Statistics Sweden and the Riksbank

■ The repo rate was raised by-0.25 percentage points in both February and April

To stabilise inflation close to the target of 2 per cent and simultaneously avoid excessive resource utilisation, the Riksbank's Executive Board deemed it appropriate to continue the repo rate increases that had started in 2010. The Executive Board therefore decided to raise the repo rate by 0.25 percentage points both in February and in April, from 1.25 per cent to 1.75 per cent (see Figure 2:6). In February, the repo-rate path was also adjusted upwards compared with the forecast in December 2010. In April, the Executive Board decided to leave the repo-rate path unchanged compared with February. One important condition for not adjusting the repo-rate path upwards was that the high CPI inflation did not make a more significant impression on various agents' long-term inflation expectations and on wage formation. The Executive Board emphasised that if these conditions should change, there may be consequences for monetary policy. The Executive Board also assessed that a gradual rise in the repo rate could contribute to slower growth in household borrowing and thus reduce the risk of imbalances building up in the Swedish economy.

Deputy Governor Karolina Ekholm and Deputy Governor Lars E.O. Svensson entered a reservation against the decision to raise the repo rate by 0.25 percentage points to 1.5 per cent in February, and against the repo-rate path of the main scenario in the Monetary Policy Report. They preferred a repo rate equal to 1.25 per cent and a repo-rate path that would then gradually rise to 3.25 per cent by the end of the forecast period. In April, these members also entered a reservation against the decision to raise the repo rate by 0.25 percentage points to 1.75 per cent and against the repo rate path in the Monetary Policy Update. They preferred a repo rate equal to 1.5 per cent and a repo-rate path that first would rise slower and then faster than the path in the Monetary Policy Update, reaching a level of about 3.9 per cent at the end of the forecast period. On both occasions, the justification for the reservations was that such a repo-rate path would imply a level of CPIF inflation closer to 2 per cent and a faster reduction of unemployment towards a longer-run sustainable rate.

■ Alternative scenarios for economic development

All macroeconomic forecasts contain a considerable measure of uncertainty. The forecasts in the main scenario of the Monetary Policy Reports were based on a number of important assumptions of economic development in the period ahead. A number of alternative scenarios for economic development are published in each Report. These scenarios reflect the risks addressed in the monetary policy discussion. The scenarios are based on analyses using the Riksbank's general equilibrium model, Ramses.

In the February Monetary Policy Report, the alternative scenarios showed that, if inflation in Sweden were to increase as a result of higher energy prices abroad or stronger domestic demand (for example), monetary policy would need to be tightened more than in the main scenario. If, on the other hand, productivity were to improve unexpectedly quickly or the krona were to appreciate further, leading to

lower inflation than in the main scenario, then the repo rate would have to be raised at a slower rate.

■ Alternative repo-rate scenarios

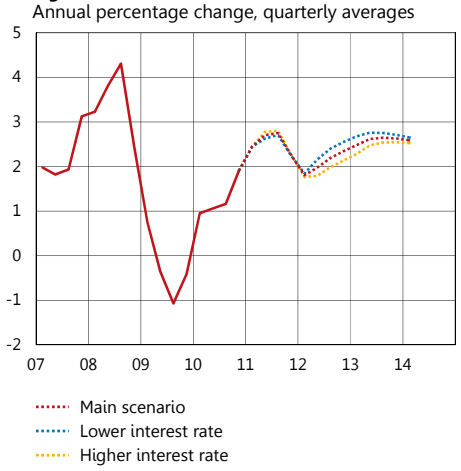
The February Monetary Policy Report also contained, as usual, two alternative scenarios for the repo rate.[6] The purpose of these alternative scenarios is to describe what could happen in the economy if the Riksbank had chosen a different monetary policy than that in the main scenario. The repo rate path considered by a majority of the Executive Board to entail well-balanced monetary policy is the forecast in the main scenario. The alternative scenarios represent simulated results made using Ramses.

Figure 2:7 shows the Riksbank's main scenario and two alternative scenarios with a lower and higher policy rate respectively.[7] Figure 2:8 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 CPIF inflation and mean that it would not approach 2 per cent until the end of the forecast period. Figure 2:9 shows corresponding forecasts for the CPI. The lower repo-rate path would lead to a level of CPI inflation approaching the target within one year, before again rising and overshooting the target for the rest of the forecast period. The higher repo-rate path would entail lower inflation over the greater part of the forecast period.

Resource utilisation is often used as a summarising measure of how the real economy is performing. To assess the overall use of the resources in the economy, the Riksbank uses a number of different measures and indicators.[8] One of these measures is the GDP gap, which illustrates resource utilisation measured as the current level of GDP in relation to an estimated long-term trend. Another means of forming an impression of resource utilisation is to study the development of unemployment. Figures 2:10 and 2:11 show the forecasts for the GDP gap and unemployment based on the main scenario and the alternative repo-rate paths. All of the paths in Figure 2:10 would result in a negative GDP gap in the short term, that is to say resource utilisation below the normal level. Over the slightly longer term, the lower repo-rate path would lead to the GDP gap becoming slightly larger than in the main scenario, and somewhat larger than normal. But in this case, too, the GDP gap would be slightly larger than normal at the end of the forecast period. In the scenario with a higher repo rate, the effects would be the reverse and resource utilisation would be lower over the longer term. Figure 2:11 also shows how the higher repo-rate path would entail higher unemployment than the main scenario, while the lower repo-rate path would entail lower unemployment.

The alternative repo-rate scenarios aim to illustrate the effects of another monetary policy than that described in the main scenario and

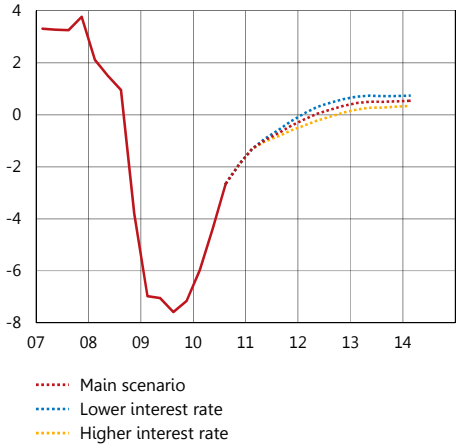
Figure 2:9. CPI
Annual percentage change, quarterly averages



Note. The broken line represents the Riksbank's forecast in February 2011.

Sources: Statistics Sweden and the Riksbank

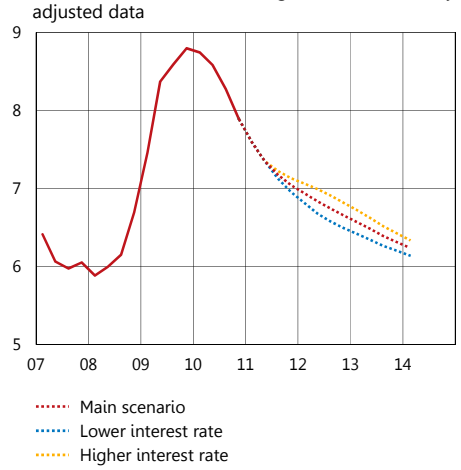
Figure 2:10. GDP gap
Per cent



Note. The GDP gap refers to the GDP deviation from trend, calculated using a production function. The broken line represents the Riksbank's forecast in February 2011.

Sources: Statistics Sweden and the Riksbank

Figure 2:11. Unemployment
Per cent of the labour force, aged 15-74, seasonally-adjusted data

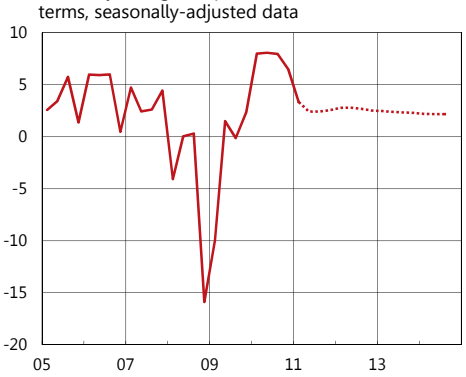


Note. The broken line represents the Riksbank's forecast in February 2011.

Sources: Statistics Sweden and the Riksbank

[6] Alternative scenarios for the repo rate are published in the Monetary Policy Reports, but not in the Monetary Policy Updates.
[7] 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.
[8] See the article "The stabilisation of the real economy and measures of resource utilisation" in the *Material for Assessing Monetary Policy* 2010.

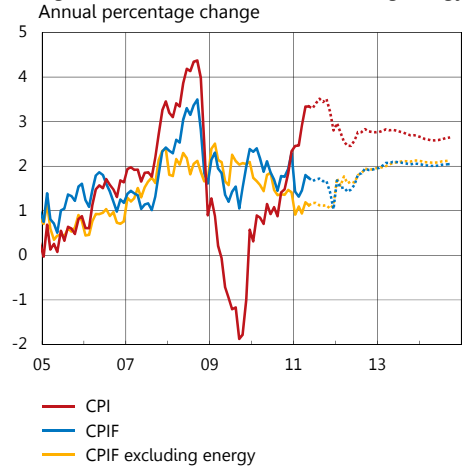
Figure 2:12. GDP
Quarterly changes in per cent calculated in annualised terms, seasonally-adjusted data



Note. The broken line represents the Riksbank's forecast in July 2011.

Sources: Statistics Sweden and the Riksbank

Figure 2:13. CPI, CPIF and CPIF excluding energy
Annual percentage change



Note. CPIF is CPI with fixed mortgage rate. The broken line represents the Riksbank's forecast in July 2011.

Sources: Statistics Sweden and the Riksbank

they have been very important for the minority's analysis. The minority's opinion that, even accepting the majority's assessment of foreign policy rates, a lower repo-rate path would make for a better-balanced monetary policy is based on this kind of analysis (see Figures 2:8 and 2.11). However, the majority's opinion is that it is difficult to determine, solely on the basis of these scenarios, which repo-rate path should be chosen (see the article "A method for assessing different monetary policy alternatives" in this chapter). 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 may be difficult to quantify in the forecasting work. According to the majority opinion, there were also difficulties in quantifying resource utilisation.

■ Fragmented outlook in the early summer

The recovery in the world economy continued during the spring and early summer, but the outlook was fragmented and marked by uncertainty. The economic situation in Europe was divided. The prospects in some northern European countries, such as Germany, improved partly because of the increase in exports, while developments in several countries in southern Europe were held back by the need for fiscal policy tightening. Since the monetary policy meeting in April, concern had grown that the long-term ability of countries with weak public finances to service their debts was not good enough. At the same time, the recovery in the US economy was still slow.

■ Strong growth in Sweden, but expected to level off towards the end of the year

The Riksbank's assessment at the start of the summer was that the Swedish economy was continuing to perform strongly, but was expected to enter a calmer phase with more normal growth rates in the period ahead (see Figure 2:12). Monthly indicators such as the Economic Tendency Survey and the purchasing managers' index also suggested good growth ahead. One reason for conditions being so favourable was that Sweden, thanks to its strong public finances, was not expected to need any fiscal policy tightening. Moreover, Sweden, unlike many other countries, had not suffered negative effects from a falling housing market. Resource utilisation and labour shortages in certain sectors continued to increase from the low levels prevailing during the crisis. Capacity utilisation within the manufacturing industry was now close to a historically average level. On the other hand, other indicators, such as the level of unemployment, indicated that resource utilisation was still relatively low. The overall assessment was that resource utilisation was still slightly lower than normal, but that it would rise and be normal or slightly higher than normal in the years to follow.

With regard to inflation, the difference between the various measures was still substantial. CPI inflation was high, and was expected to be far above the target of 2 per cent throughout the forecast period, primarily as a result of mortgage rates being expected to rise in line with the repo rate (see Figure 2:13). Moreover, a great difference had arisen between the interest rates paid by households and the repo rate, which also contributed to a rapid increase in households' interest expenditure.

CPIF inflation excluding energy prices was low, on the other hand. When measured as an annual percentage change, the CPIF was below 2 per cent in May, and, when rising energy prices are excluded, it was around 1 per cent. The fact that the krona had strengthened the year before, at the same time as the rate of increase in unit labour costs was low, contributed to holding back underlying inflation. However, the inflationary pressures in the economy were expected to increase as resource utilisation rose and as wages increased at a faster rate.

Inflation expectations had risen during the spring. Long-term inflation expectations were generally anchored around the inflation target, but they had also risen slightly. The rise in inflation expectations one and two years ahead was probably connected with the rising CPI inflation. The expectations that inflation in the short and medium terms would rise corresponded well with the Riksbank's own inflation forecasts, which suggested that the inflation expectations did not constitute an immediate problem. However, this development entailed risks, and the Riksbank continued to carefully monitor whether the high level of CPI inflation would make an impression on inflation expectations and wage formation.

■ The repo rate was raised by 0.25 percentage points in July

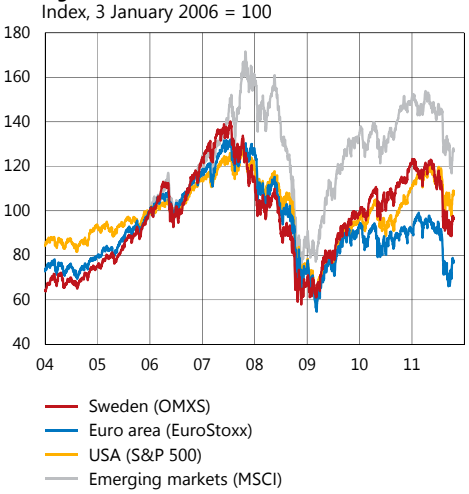
The Executive Board of the Riksbank considered that the repo rate needed to be raised to stabilise inflation around the target of 2 per cent and resource utilisation around a normal level. Accordingly, the Board decided in July to raise the repo rate by 0.25 percentage points to 2.0 per cent, and at the same time hold the repo-rate path unchanged, compared with the assessment in April. As in April, the Executive Board emphasised that, if the high rate of CPI inflation were to have a more tangible influence on various agents' long-term inflation expectations and on wage formation, monetary policy could need to be tightened more than in the main scenario of the Monetary Policy Report The report also noted that household borrowing had entered a calmer phase, but that debts were still increasing faster than incomes. A gradually rising repo rate could further dampen this rate. The risk of imbalances developing in the Swedish economy would then decrease.

Deputy Governor Karolina Ekholm and Deputy Governor Lars E.O. Svensson entered a reservation against the decision to raise the repo rate by 0.25 percentage points to 2.0 per cent and against the repo-rate path in the Monetary Policy Report. They preferred an unchanged repo rate equal to 1.75 per cent and a repo-rate path that would first rise slowly to 2 per cent in the third quarter of 2012 and then rise faster to about 3.8 per cent by the end of the forecast period. This was motivated by their assessment that the Report's forecasts of foreign policy rates and Swedish resource utilisation were both too high. Their repo-rate path would imply CPIF inflation closer to 2 per cent and a faster reduction of unemployment towards a longer-run sustainable rate.

■ Alternative scenarios in July

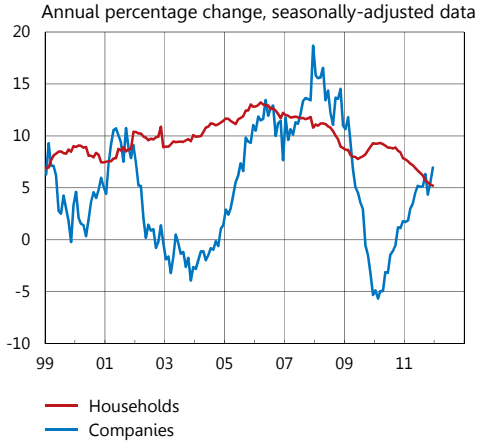
The July Monetary Policy Report discussed two alternative scenarios for economic development. The first scenario assumed that the high rate of CPI inflation would have a more tangible impact on various agents' long-term inflation expectations and wage formation. In this case, wage

Figure 2:14. Stock market movements
Index, 3 January 2006 = 100



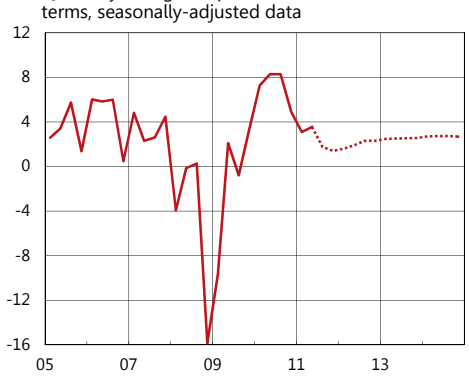
Note. Figure from *Monetary Policy Report*, October 2011.
Source: Reuters EcoWin

Figure 2:15. Bank lending to companies and households
Annual percentage change, seasonally-adjusted data



Source: Statistics Sweden

Figure 2:16. GDP
Quarterly changes in per cent calculated in annualised terms, seasonally-adjusted data



Note. The broken line represents the Riksbank's forecast in October 2011.
Sources: Statistics Sweden and the Riksbank

increases above what is allowed by productivity would lead to higher inflation. Monetary policy would then have to be tightened more than in the main scenario. The second scenario assumed that economic activity abroad would be weaker due to the worsening of the fiscal problems in the euro area, for example. In this case, economic activity in Sweden would also be weaker and inflation lower. The repo rate would then have to be raised at a slower rate than in the main scenario. The scenario also discussed the possibility that monetary policy should be allowed to be more expansionary than it is under the simple policy rule used in the model. Such a monetary policy would bring inflation closer to the target at the same time as unemployment would be lower.

The alternative repo-rate scenarios presented in the July Monetary Policy Report are illustrated in the appendix Alternative repo-rate scenarios.

■ Unease over fiscal problems in the summer and autumn

During the summer and autumn, the financial markets were characterised by an unease rooted in the sovereign debt problems in both the euro area and the United States. In several countries, fiscal policy tightening was expected to be more far-reaching than had previously been assumed. The unease was also heightened by the worsened outcome of the economic statistics. This led to a sharp fall in the stock exchange and to increased pessimism among households and companies (see Figure 2:14).

Unease over the fiscal problems increased during the autumn. In its forecasts, the Riksbank assumed that the most acute fiscal problems in the euro area would be resolved in an orderly manner. But this would require major fiscal policy tightening, which was judged to hamper growth in the euro area over a long period of time. The Riksbank revised its forecasts for growth in the euro area down in both September and October. Growth in 2012 was expected to be very low. GDP growth in the United States was also revised downwards on both occasions. It had proved to be weaker than expected in the first six months of 2011. In addition, the housing market, corporate investments and employment had continued to develop weakly. The rate of growth in several countries in Asia had slowed down and the prospects for continued growth had deteriorated somewhat.

■ More pronounced slowdown in the Swedish economy

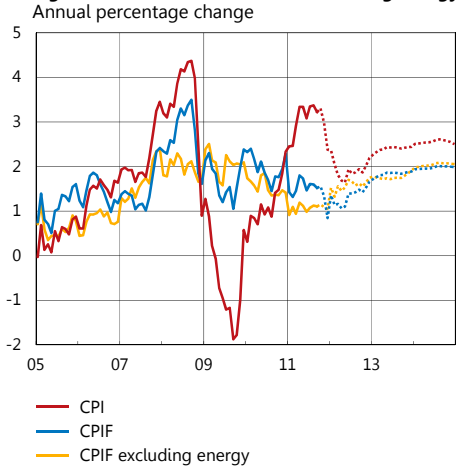
The poorer growth prospects abroad and the unease on the financial markets had a negative effect on the Swedish economy. The slowdown in Swedish growth was thus expected to become more pronounced. The main effect on Sweden so far had been a decline in confidence among households and companies. The development of the Swedish stock market was both weak and volatile (see Figure 2:14). Both housing prices and lending to households had been increasing at a slower rate for some time, which together with the increased uncertainty, was expected to mean that households would take on debt to a lesser extent than before (see Figure 2:15).

Exports were also now expected to be weaker than the Riksbank's earlier assessment due to the slowdown in world trade. GDP growth was therefore expected to slow down more suddenly and be slightly lower

than normal in 2012 (see Figure 2:16). Unemployment was expected to decrease at a slower pace. Resource utilisation was on the whole expected to increase slightly slower than had been assumed previously, and was not expected to reach a normal level until the end of 2014.

Underlying inflationary pressures were low, largely due to the low rate of increase of unit labour costs and the appreciation of the krona in 2010. However, CPI inflation was high and reached 3.2 per cent in September (see Figure 2:17). But a gloomier world outlook and lower inflation abroad contributed to the assessment that inflation in the longer run would now be slightly lower. However, CPI inflation was expected to be much higher than CPIF inflation over the entire forecast period, which was because mortgage rates had risen due to the Riksbank's repo rate increases. Moreover, mortgage rates had increased by more than could be justified by changes in the repo rate due to the banks' higher funding costs and increased margins on mortgage loans to households.

Figure 2:17. CPI, CPIF and CPIF excluding energy
Annual percentage change



Note. CPIF is CPI with fixed mortgage rate. The broken line represents the Riksbank's forecast in October 2011.

Sources: Statistics Sweden and the Riksbank

■ The repo rate was held unchanged at 2 per cent in both September and October

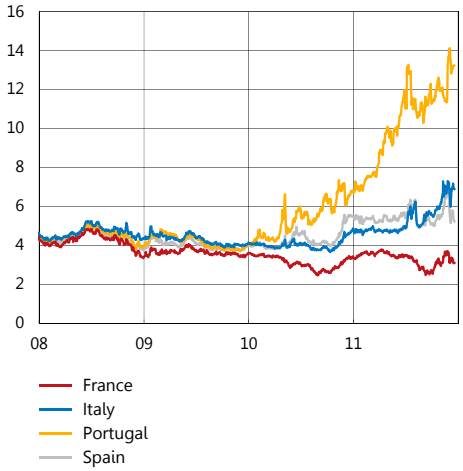
Given the assumption that the slowdown in the Swedish economy was expected to be more pronounced, the Executive Board of the Riksbank assessed that it was appropriate to hold the repo rate unchanged at 2 per cent in September and to postpone continued increases somewhat (see Figure 2:6). The repo rate was also held unchanged in October, when the Executive Board also made the assessment that the weaker level of resource utilisation and the lower inflationary pressures justified a slightly lower repo-rate path in which the repo rate was held unchanged at 2 per cent and any further increases of the repo rate would be postponed until some way into 2012.

The Executive Board of the Riksbank decided unanimously to leave the repo rate unchanged at 2 per cent in September. However, Deputy Governor Karolina Ekholm and Deputy Governor Lars E.O. Svensson entered a reservation against the repo-rate path in the Monetary Policy Update. They preferred a repo-rate path that would remain at 2 per cent until mid-2013 and then rise to 3 per cent by the end of the forecast period. In October, both of these members entered reservations against the decision to hold the repo rate unchanged and against the repo-rate path in the Monetary Policy Report. They preferred to lower the repo rate to 1.75 per cent. They also preferred a lower repo-rate path that would stay at 1.5 per cent from the first quarter of 2012 through the first quarter of 2013, and then rise to just above 3 per cent by the end of the forecast period. On both occasions, these reservations were justified by their assessment that the Report's forecasts of foreign policy rates and Swedish resource utilisation were both too high. Their repo-rate path would imply CPIF inflation closer to 2 per cent and a faster reduction of unemployment towards a longer-run sustainable rate.

■ Alternative scenarios in October

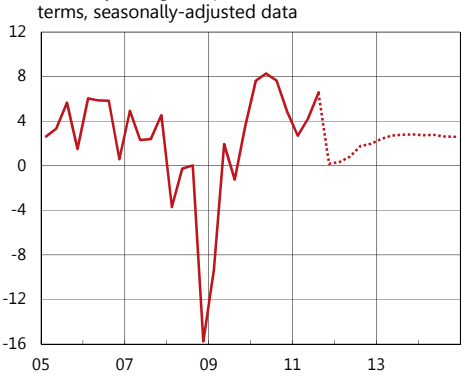
The October Monetary Policy Report discussed two alternative scenarios for economic development. The first scenario assumed that the fiscal problems in the euro area in particular would become more severe than was assumed in the alternative scenario discussed in July. Such a

Figure 2:18. Government bonds with 10 years left to maturity
Per cent



Source: Reuters EcoWin

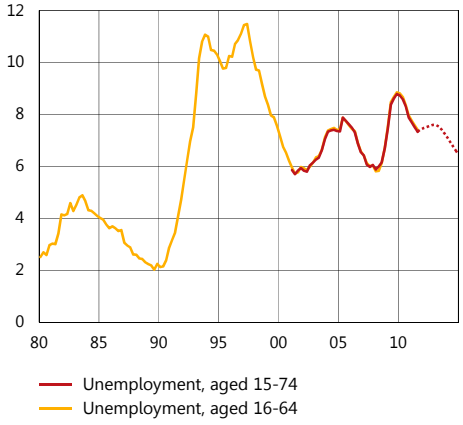
Figure 2:19. GDP
Quarterly changes in per cent calculated in annualised terms, seasonally-adjusted data



Note. The broken line represents the Riksbank's forecast in December 2011.

Sources: Statistics Sweden and the Riksbank

Figure 2:20. Unemployment
Percentage of the labour force, seasonally-adjusted data



Note. Pre-1987 data have been spliced by the Riksbank. The broken line represents the Riksbank's forecast in December 2011 for the age group 15-74.

Sources: Statistics Sweden and the Riksbank

development would lead to greater negative effects for the Swedish economy, with weaker growth as a result. This would lead to a lower repo rate compared with the main scenario. As in July the possibility of conducting an even more expansionary monetary policy was discussed. The second alternative scenario assumed that inflation abroad would become entrenched at a high level at the same time as growth would level off and unemployment would rise. The higher inflation abroad in this scenario would push up Swedish inflation via higher import prices. To fend off the threat of inflation, the Riksbank would have to raise the repo rate at a faster rate than in the main scenario.

The alternative scenarios presented in the October *Monetary Policy Report* are illustrated in the appendix Alternative repo-rate scenarios.

■ Poorer global growth prospects at the end of the year

There was still substantial concern over the development of public finances in the euro area during the late autumn and the prospects for global growth were deemed to have deteriorated further. The economic prospects for the euro area in particular weakened in relation to the assessment in the Monetary Policy Report published in October. The situation in the United States looked somewhat brighter in the short term, but, according to the Riksbank's forecast, growth in the longer term would be negatively impacted by the poorer growth prospects in Europe.

These poorer growth prospects contributed to the debt-servicing ability of certain euro area countries being called into question, and government bond yields in Italy and Spain gradually rose to all-time highs, despite continued rescue purchases from the ECB (see Figure 2:18). The uncertainty also led to volatile stock market prices and increased pessimism among households and companies in Europe. In December, a new plan was presented to tighten economic policy control in the EU. In its forecast, the Riksbank assumed that sufficient measures would be taken to resolve the most acute problems in the euro area and that the problems in the largest euro area countries would not escalate. The fiscal policies of several countries were expected to become tighter, with new savings programmes for 2012 and onwards.

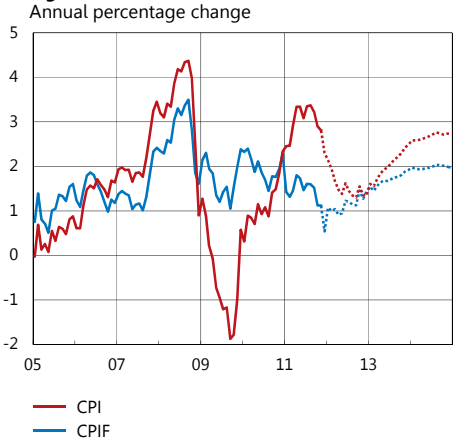
■ Clear signs that growth in Sweden was slowing down

The National Accounts showed surprisingly strong growth in Sweden for the third quarter. Compared with the corresponding quarter in 2010, GDP increased by 4.6 per cent. Contributing to the strong GDP growth were robust growth in exports and weak imports.
But even if the GDP outcome was stronger than expected, there were now clear signs that the expected weakening of economic activity had started and that growth had slowed down rapidly in the fourth quarter (see Figure 2:19). Falling orders for the Swedish export industry pointed to exports being negatively affected by the lower demand from abroad. Household consumption had already been surprisingly weak in the third quarter. Unease on the financial markets reduced confidence among Swedish households, leading households to increase saving and cut back on consumption.

The poorer economic developments also affected the labour market in Sweden. It became increasingly clear that the improvement on the labour market experienced in 2010 and 2011 had come to a halt, and slightly increasing unemployment was expected in 2012 (see Figure 2:20). The Riksbank's assessment was that the normalisation of resource utilisation would take place more slowly than was assessed in October.

Inflation was lower than expected in October and November. The annual rate of increase in the CPIF was only 1.1 per cent in November, and, adjusted for energy prices, the rate of increase in the CPIF was 0.8 per cent. CPI inflation was also lower than assessed in October, amounting to 2.8 per cent in November. The fall in inflation was broad and not concentrated on any particular product or service. Moreover, weaker domestic demand and low inflation abroad contributed to the Riksbank revising its assessment of inflation further downwards for 2012 and 2013 (see Figure 2:21).

Figure 2:21. CPI and CPIF
Annual percentage change



Note. CPIF is CPI with fixed mortgage rate. The broken line represents the Riksbank's forecast in December 2011.

Sources: Statistics Sweden and the Riksbank

■ The repo rate was cut to 1.75 per cent in December

As inflationary pressures were low, at the same time as development abroad had deteriorated and domestic economic activity had weakened, the Executive Board of the Riksbank decided to cut the repo rate by 0.25 percentage points to 1.75 per cent in December (see Figure 2:6). The forecast for the repo rate was adjusted downwards at the same time. According to the Riksbank's forecast, concern over the sovereign debt problems would wane and confidence among households and companies would gradually return, which, together with the expansive monetary policy, would contribute to a gradual rise in resource utilisation and inflationary pressures. The Executive Board's assessment was that gradual increases in the repo rate from the end of 2012 up to just above 3 per cent at the end of 2014 would stabilise inflation around the target of 2 per cent and resource utilisation around a normal level at the end of the forecast period.

Deputy Governor Karolina Ekholm and Deputy Governor Lars E.O. Svensson entered a reservation against the decision to cut the repo rate to 1.75 per cent and against the repo-rate path in the Monetary Policy Update. They instead preferred cutting the repo rate to 1.5 per cent and a lower repo-rate path that would stay at 1.25 per cent from the second quarter of 2012 through the third quarter of 2013, and would then rise to just below 3 per cent at the end of the forecast period. This was justified by their assessment that the Monetary Policy Update's forecasts of foreign policy rates and Swedish resource utilisation were both too high. Their repo-rate path would then imply CPIF inflation closer to 2 per cent and a faster reduction of unemployment towards a longer-run sustainable rate.

Monetary policy decisions 2011

14 February	The repo rate was raised by 0.25 percentage points to 1.5 per cent. The forecast for the repo rate was adjusted upwards. Two members entered a reservation against the decision to raise the repo rate and against the repo-rate path in the Monetary Policy Report.
19 April	The repo rate was raised by 0.25 percentage points to 1.75 per cent. The forecast for the repo rate was held unchanged. Two members entered a reservation against the decision to raise the repo rate and against the repo-rate path in the Monetary Policy Update.
4 July	The repo rate was raised by 0.25 percentage points to 2.0 per cent. The forecast for the repo rate was held unchanged. Two members entered a reservation against the decision to raise the repo rate and against the repo-rate path in the Monetary Policy Report.
6 September	The repo rate was held unchanged at 2.0 per cent. The forecast for the repo rate was adjusted downwards. Two members entered a reservation against the repo-rate path in the Monetary Policy Update.
26 October	The repo rate was held unchanged at 2.0 per cent. The forecast for the repo rate was adjusted downwards. Two members entered a reservation against the decision to hold the repo rate unchanged, instead preferring to lower the repo rate to 1.75 per cent. The two members also entered a reservation against the repo-rate path in the Monetary Policy Report.
19 December	The repo rate was cut by 0.25 percentage points to 1.75 per cent. The forecast for the repo rate was adjusted downwards. Two members entered a reservation against the decision to lower the repo rate to 1.75 per cent, instead preferring to lower the repo rate to 1.5 per cent. The two members also entered a reservation against the repo-rate path in the Monetary Policy Update.

Background: Economic developments 2009-2010

Severe downturn in global economic activity in 2009

Early 2009 saw a continuation of the severe downturn in global economic activity begun ay the end of 2008. However, some way into 2009, there were signs that the fall had come to a halt and that a recovery had begun. The strength of the recovery considerably varied from region to region. The recovery was most apparent in Asia, where growth showed a rapid upturn as early as the second quarter. 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 2:22).

Over the year the situation on the financial markets around the world improved, which was reflected in a fall in credit spreads in most regions. GDP stopped falling but the situation was still not normal. Central banks and governments continued to conduct very expansionary policy (see Figure 2:2), which included different forms of unconventional measures and which meant that the central banks' balance sheets expanded substantially (see Figure 2:23).

Figure 2:22. GDP growth in Sweden and the world
Annual percentage change, seasonally-adjusted data

Note. The broken line represents the Riksbank's forecast in February 2012.

Sources: The IMF, Statistics Sweden and the Riksbank

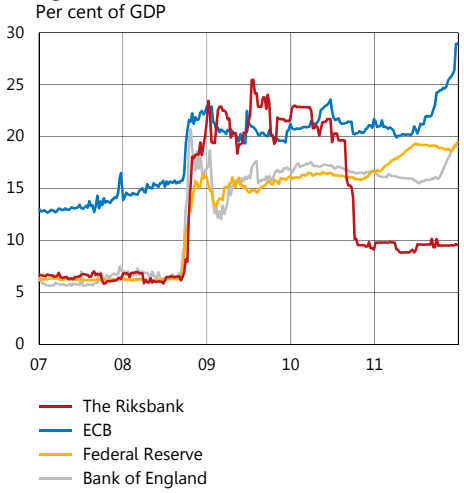
Sweden: largest fall in GDP in modern times in 2009

In Sweden, too, the severe downturn that began at the end of 2008 continued in 2009. GDP fell heavily in the first quarter. The reason that Sweden was so hard hit by the global recession and the collapse in the world economy was the Swedish economy's strong dependence on exports. GDP fell by as much as 5.0 per cent in 2009 (see Figure 2:22).

The rate of inflation measured as the change in the CPI averaged -0.5 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 2:6 and 2:24). This is because the CPI includes mortgage interest, which is directly affected by changes in the repo rate. CPIF inflation, which is the CPI with a fixed mortgage rate, was on average 1.7 per cent during the year.

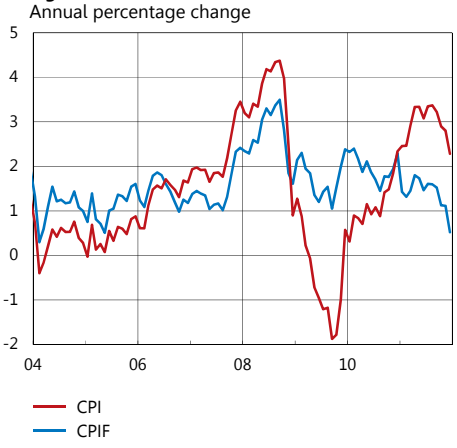
In 2009, the Riksbank continued to conduct an increasingly expansionary monetary policy. Its purpose was to alleviate the effects of the international recession on production and employment in Sweden and at the same time to stabilise inflation close to the target level. The Riksbank cut the repo rate from 2.0 per cent at the beginning of the year to 0.25 per cent in early July. 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. The Riksbank, like many other central banks, supplemented its repo-rate cuts with what are known as extraordinary measures. One of these was to offer the banks loans at longer maturities. For instance, the Riksbank offered three one-year fixed-interest rate loans in 2009 for monetary policy purposes.

Figure 2:23. Central bank's balance sheets
Per cent of GDP



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

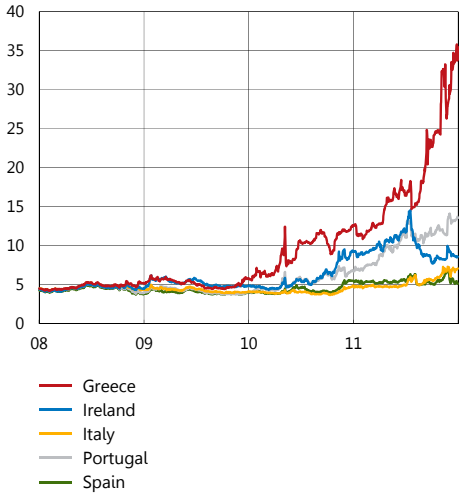
Figure 2:24. CPI and CPIF
Annual percentage change



Note: CPIF is CPI with fixed mortgage rate.

Source: Statistics Sweden

Figure 2:25. Government bonds with 10 years left to maturity
Per cent



Source: Reuters EcoWin

Figure 2:26. TCW-weighted exchange rate
Index, 18 November 1992 = 100

Note. TCW refers to a weighting of Sweden's most important trading partners.

Source: The Riksbank

International economic activity improved during 2010

At the beginning of 2010 economic activity abroad continued to improve, and world trade increased; however there were still substantial regional differences. Asia still accounted for a large share of the increase in demand. During the second half of the year, international economic activity continued to improve.

However, the recovery was supported by extensive economic policy measures by governments and central banks around the world, which meant that budget deficits in several countries increased. During the spring, concerns over public finance problems in certain countries in southern Europe, including Greece, intensified, and market rates in the debt-ridden countries increased (see Figure 2:25). Concerns increased during the spring when Greece and eventually also Ireland and Portugal experienced difficulties borrowing on the international bond markets and were forced to accept help from the EU and the International Monetary Fund (IMF).

During the autumn the financial markets continued to be marked by the sovereign debt problems in the euro area. In the United States, economic activity strengthened at the beginning of the year, but during the summer there were signs that the US economy had not developed as strongly as first believed and uncertainty arose over continued developments.

Strong recovery in the Swedish economy 2010

During 2010, Swedish GDP increased by 6.1 per cent. The upswing was broad, and all parts of the components of GDP developed strongly. The increase was mainly due to the recovery in world trade and strengthening in global activity, which benefitted Swedish exports and Swedish investment. Exports were also boosted by the fact that the krona was very weak in 2009 and parts of 2010 (see Figure 2:26). Domestic demand was strong and households and companies had a high level of confidence in the future. GDP growth in Sweden was also significantly stronger than in the United States and the euro area.

CPI inflation rose and amounted to 1.2 per cent during the year. The increases in the repo rate during the second half of the year contributed to the rise in the CPI. Measured in terms of the CPIF, that is, the CPI with a fixed mortgage rate, underlying inflation was on average 2.0 per cent in 2010 (see Figure 2:24).

The Riksbank left the repo rate unchanged at 0.25 per cent up to the end of June 2010. During the second half of the year, the Riksbank began to raise the repo rate; it was increased by 0.25 percentage points on four occasions and the repo-rate path was adjusted down in the longer run on two occasions. 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.[9]

[9] See the article "The Riksbank's extraordinary measures – exit and assessment" in the *Material for Assessing Monetary Policy* 2010.

A method for assessing different monetary policy alternatives

The quantified inflation target has involved a major step forward for monetary policy. For instance, it has made it possible to measure and assess target fulfilment of monetary policy in a much better way 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, which is to say production and employment. It is therefore good if one can assess monetary policy in both of these dimensions. This article presents a method for making such an assessment in a simple and transparent manner. Such analyses have the potential to further improve the communication of monetary policy and to provide support in the monetary policy decision-making process.

This article first describes the method and then gives an example of how it can be used to illustrate differences in monetary policy deliberations. The example is based on the situation at the monetary policy meeting in October 2011 (see earlier in Chapter 2 for a more detailed description of the situation at that time). One advantage of the method is that it is easy to use. However, a disadvantage is that it does not capture all of the factors relevant to the monetary policy decision. The article therefore concludes with a discussion of other factors that need to be taken into account when assessing monetary policy.

An easy way of comparing different interest-rate paths

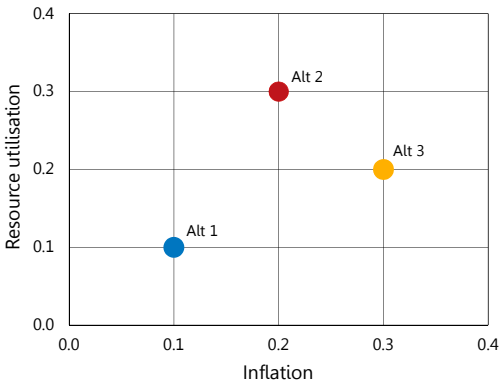
Every time the Executive Board makes a monetary policy decision, they assess the repo-rate path needed for monetary policy to be well-balanced. It is thus normally a question of finding an appropriate balance between stabilising inflation around the inflation target and stabilising the real economy.[10]

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. 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. In general, however, the Riksbank has endeavoured 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 can be several repo-rate paths that could lead to inflation being on target within the forecast period, and that also provide a reasonable balance between stabilising inflation and stabilising the real economy. The development of the real economy can be represented by a measure of resource utilisation, which measures the extent to which the labour force and capital are used in relation to what is considered normal. To summarise and compare the consequences of some alternative repo-rate paths, one can calculate what are known as mean squared gaps. First the squared deviation for a particular repo-rate path is measured; “the gap” between the inflation

[10] See the document *Monetary policy in Sweden* for a detailed description of the Riksbank's monetary policy strategy.

Figure 2:27. Mean squared gap for forecasts of resource utilisation and inflation, example



Source: The Riksbank

target and the forecast for inflation in each quarter three years ahead. The mean squared gap for inflation is attained by taking the mean value of these squared deviations. The mean squared gap for the forecast for resource utilisation is measured in a corresponding manner.

Thus, in this method, a particular repo-rate path is linked to two numbers – two mean squared gaps. These show clearly how well inflation is stabilised around the inflation target and how well resource utilisation is stabilised around a normal level on average during the forecast period, according to the forecasts for inflation and resource utilisation linked to the repo-rate path. With the aid of the mean squared gaps, it is then possible to compare the consequences of different repo-rate paths and in this way make a simple comparison between different monetary policy alternatives.[11]

Figure 2:27 gives one example. The figure shows the mean squared gap for resource utilisation on the vertical axis and the mean squared gap for inflation on the horizontal axis. The smaller the mean squared gap for inflation, the more stable the inflation forecast is around the inflation target. And the smaller the mean squared gap for resource utilisation, the more stable the forecast for resource utilisation is around a normal level. A point in the figure close to origo, that is, far down and far to the left, thus implies a good stabilisation of both inflation around the inflation target and resource utilisation around a normal level.

Figure 2:27 contains three dots to illustrate the mean squared gaps for forecasts of inflation and resource utilisation, given three alternative paths for the repo rate. In this example, the dot linked to Alternative 1 lies both below and to the left of – or "south-west" of – the other two dots. In other words, looking at these three repo-rate paths, Alternative 1 gives both the lowest average deviation from the inflation target and the lowest average deviation from a normal level for resource utilisation. The conclusion is then that Alternative 1 is the best of these three alternatives according to this approach. However, it is not possible to rank Alternative 2 and Alternative 3 in this example. Neither of these dots is "south-west" of the other, that is to say that neither of these alternatives has a mean squared gap that is smaller than the other alternative with regard to both inflation and resource utilisation. The choice between them is then determined according to this approach by which weight is given to stable inflation and stable resource utilisation respectively.

Examples using the method – choice of repo-rate path with different measures of inflation and resource utilisation

The description of the above method assumes that one has forecasts for a measure of resource utilisation and a measure of inflation. As there is no unequivocal way of measuring resource utilisation, there are in practice several conceivable measures that can be used in the analysis. With regard to inflation, the Riksbank's inflation target is expressed in terms of the CPI, but it is also relevant to study the development of measures of underlying inflation. It is particularly important to focus on CPIF inflation in periods when the repo rate changes a lot, as CPI inflation then tends to follow the repo rate in the short term (see the article "The

[11] The mean squared gap method is based on the view that a well-balanced monetary policy is one that minimises a loss function consisting of the squared gaps for inflation and resource utilisation. However, the method does not capture all factors relevant to the monetary policy decision. Mean squared gaps were presented in the article "Evaluation of different monetary policy alternatives" in the *Monetary Policy Report,* October 2009. Analyses using this method have also been included in the material for assessing monetary policy in recent years.

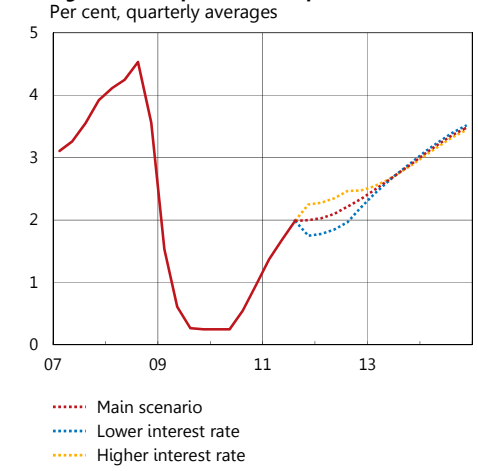
CPI and other measures of inflation" in Chapter 1 for a discussion of different measures of inflation). The repo-rate path that is preferable according to the mean squared gap method may vary depending on which measures of resource utilisation and inflation are used in the analysis. The members of the Executive Board may place different emphasis on different measures when making repo-rate decisions, and it may therefore be interesting to compare the consequences of different repo-rate paths for different measures of resource utilisation and inflation. This is illustrated below with an example taken from October 2011.

Figure 2:28 shows the repo-rate assumption according to the main scenario presented in the Monetary Policy Report in October 2011, together with two alternative repo-rate paths discussed in the report. The first alternative path called "Lower repo rate" refers to a scenario where the repo rate is set 0.25 percentage points lower than in the main scenario for four quarters. In the second alternative scenario called "Higher repo rate", the repo rate is instead set 0.25 percentage points higher than in the main scenario's repo-rate path for four quarters. Using this method thus requires an idea of how different repo-rate paths affect the forecasts for inflation and resource utilisation. In the alternative scenarios for the Monetary Policy Reports, the Riksbank uses the general equilibrium model Ramses to calculate these effects.

The mean squared gaps for the forecasts for resource utilisation and inflation in the main scenario and in the two alternative repo-rate paths are shown in Figures 2:29- 2:32. The figures compare the mean squared gap for inflation measured either using the CPI or the CPIF and for resource utilisation measured using either a GDP gap or an unemployment gap.[12] These are two of several indicators of resource utilisation studied by the Riksbank. In practice, the monetary policy decisions have not been based on any of these individual explicit measures of resource utilisation, but have instead been made on the basis of an overall, qualitative assessment that weighs together a large number of indicators of resource utilisation (see the article "The stabilisation of the real economy and measures of resource utilisation" in Material for assessing monetary policy 2010).

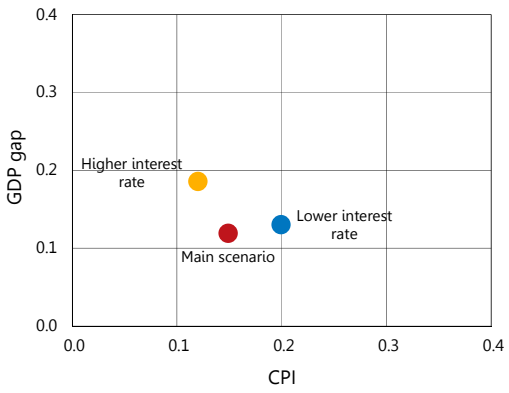
The difference between Figure 2:29 and Figure 2:30 is that the mean squared gap for resource utilisation is calculated with the forecast for the GDP gap in Figure 2:29 and with the forecast for the unemployment gap in Figure 2:30. The mean squared gap for inflation is calculated using the forecast for CPI inflation in both cases. With the GDP gap, the analysis shows that the repo-rate path in the main scenario provides a better result according to the mean squared gap than the alternative with a lower repo rate, as the dot associated with the main scenario is "south-west" of the dot associated with the alternative with a lower repo rate. However, it is not possible to rank the main scenario and the alternative with a higher repo rate, and it is therefore not clear from the analysis which of these two repo-rate paths gives the best result.[13] If one instead measures resource utilisation using the unemployment gap, Figure 2:30

Figure 2:28. Repo-rate assumptions
Per cent, quarterly averages



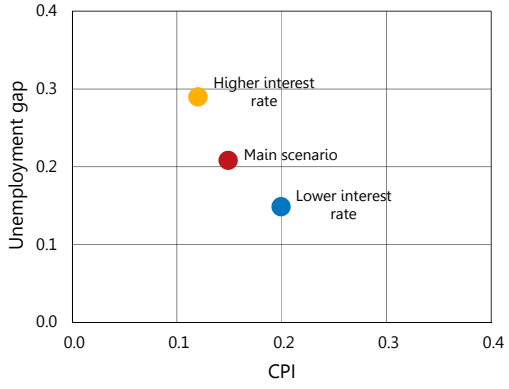
Note. Repo-rate assumptions in *Monetary Policy Report*, October 2011.
Source: The Riksbank

Figure 2:29. Mean squared gap for forecasts of the GDP gap and CPI inflation



Note. Repo-rate assumptions according to Figure 2:28.
Source: The Riksbank

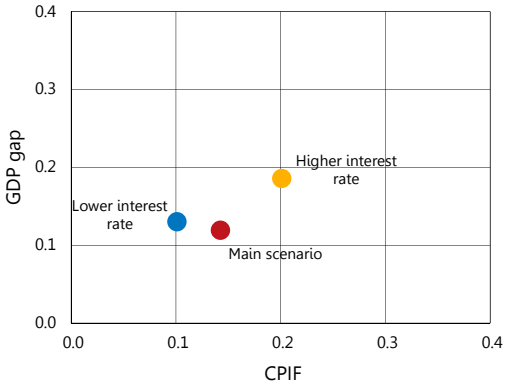
Figure 2:30. Mean squared gap for forecasts of the unemployment gap and CPI inflation



Note. Repo-rate assumptions according to Figure 2:28.
Source: The Riksbank

[12] The GDP gap is the difference between GDP and an estimate of the "normal" level of GDP, sometimes also known as the longer-run sustainable GDP level. The unemployment gap is, correspondingly, the difference between unemployment and an estimated longer-run sustainable level of unemployment.
[13] Although the repo-rate path in the main scenario provides a more stable development of GDP around a sustainable level, the alternative path with a higher repo rate gives an inflation rate more stable around the inflation target, according to this analysis. The path considered preferable then depends on what weight one gives to stable CPI inflation and stable resource utilisation respectively.

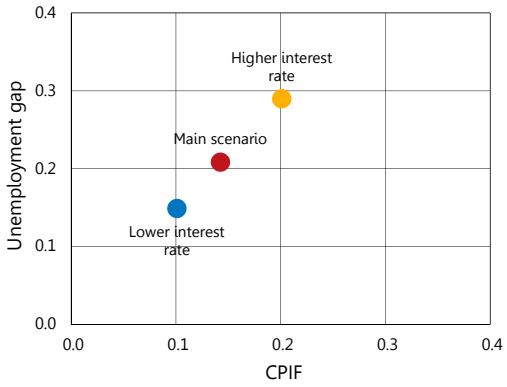
Figure 2:31. Mean squared gap for forecasts of the GDP gap and CPIF inflation



Note. CPIF is CPI with fixed mortgage rate. Repo-rate assumptions according to Figure 2:28.

Source: The Riksbank

Figure 2:32. Mean squared gap for forecasts of the unemployment gap and CPIF inflation



Note. CPIF is CPI with fixed mortgage rate. Repo-rate assumptions according to Figure 2:28.

Source: The Riksbank

shows that it is not possible to rank one of the three alternatives ahead of the others on the basis of this analysis.

Figures 2:31 and 2:32 show the result of the corresponding calculations when inflation is measured using the CPIF instead of the CPI. Using the GDP gap the result is that the repo-rate path of the main scenario or the alternative path with a lower repo rate is better according to the mean squared gap than the alternative with a higher repo rate. However, it is not possible to rank the path in the main scenario and the alternative with a lower repo rate. If the analysis is based on the unemployment gap, it is clear that the alternative with a lower repo rate gives a better result than the other two alternatives according to the mean squared gaps.

Put simply, the overall message from the four figures is that the repo-rate path in the main scenario can provide a reasonable balance between stabilising inflation and stabilising resource utilisation, according to the mean squared gaps, if one gives greater weight to the development of the GDP gap or CPI inflation.[14] If one instead puts greater focus on the unemployment gap or on CPIF inflation, this points to the alternative with a lower repo-rate path. Of course, individual Executive Board members may have different opinions and make different assessments of what should be given greatest weight when a monetary policy decision is made. For example, the different measures of resource utilisation and how to relate to them are questions discussed widely both in Sweden and abroad.[15] Both members who have an expressed preference for specific measures and members who prefer to form an opinion by means of a broader outlook may find it valuable to receive this information on the consequences of the different alternative repo-rate paths.[16]

Other factors are also important to the monetary policy decisions

This article has used the monetary policy decision made in October 2011 to illustrate how the mean squared gaps can be used in monetary policy decision-making. The mean squared gaps are part of the extensive material produced prior to each monetary policy decision. However, one weakness in the analysis of the mean squared gap is the difficulty of also including monetary policy deliberations that are not completely captured by the forecasts for inflation and resource utilisation or by the model used to calculate the effects of monetary policy on the economy. For example, the method, as it is applied here, does not take into account the fact that decision-makers may normally want to avoid a monetary policy with substantial increases and cuts in the policy rate. Empirical studies show that central banks often prefer to adjust the policy rate slowly and in small stages (known as interest-rate smoothing). This may be because, for instance, the central banks do not want to create unnecessary fluctuations on the financial markets or in other parts of the economy. There are also 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. At the beginning of 2011, for

[14] It is important to emphasise that this does not necessarily mean that the majority of Executive Board members focused solely on the GDP gap and/or CPI inflation when the decision was made in October 2011.
[15] See, for instance, Wickman-Parak, Barbro (2012), Monetary policy and unemployment – a constantly topical debate, a speech held on 24 January, Sveriges Riksbank, and Svensson, Lars E. O. (2011), For a better monetary policy: Focus on inflation and unemployment, a speech held on 8 March, Sveriges Riksbank.
[16] The method is also flexible to the extent that the results of the analyses using different measures can be weighed together. For example, the mean squared gap can be calculated by putting half of the weight onto developments in the GDP gap and half on developments in the unemployment gap.

example, the risk of a build-up of imbalances linked to households' increasing indebtedness was something that the majority of the Riksbank's Executive Board included in their monetary policy deliberations.

A further weakness is that the method is based on historically-estimated links between changes in the repo rate and their effects on the real economy and inflation. It is uncertain whether monetary policy will influence economic development in the same way as the historical links suggest. This matter was discussed at the October 2011 meeting, for example. The minority that placed great weight on the analysis of various repo-rate scenarios argued that the analysis nevertheless captured the direction in which inflation and resource utilisation were being influenced by various repo-rate paths.

The Riksbank has made good progress in the work on further developing this method and incorporating it into a broader analysis framework. In addition to the application described here, where alternative repo-rate paths are compared, the method has also been used to illustrate the effects of various alternative scenarios, for instance, different assumptions regarding developments in policy rates abroad.

The work on further developing the monetary policy decision-making material to improve the support provided to the Executive Board prior to its monetary policy meetings will continue during 2012. A large part of this work concerns following the discussions that are now underway regarding the lessons learnt from the financial crisis and what they imply for practical monetary policy – for instance, the best interplay between monetary policy and financial stability. There is currently substantial research being carried out in this field, both in Sweden and abroad.

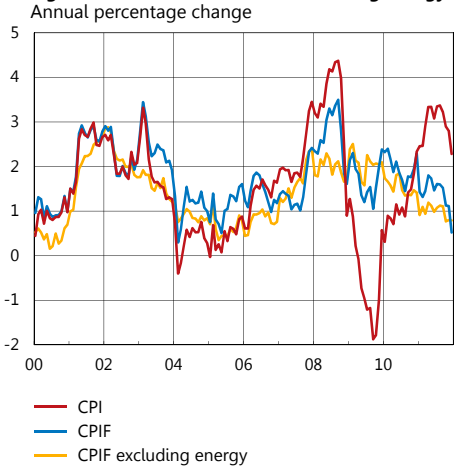
■ CHAPTER 3 – Target fulfilment

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 has time to be affected by new and unexpected shocks. Inflation and the development of the real economy in 2011 may thus have been affected by shocks that it was not possible to predict when the earlier monetary policy decisions were taken. The other circumstance is that a deviation between the outcome and the target for inflation can thus be intentional for the purpose of alleviating the effects of a shock on the real economy. A further aspect is that a high level of confidence in the inflation target increases the possibility for monetary policy to attain the inflation target and to stabilise production and employment, as it contributes to wage formation and price setting being compatible with the inflation target. 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 3.0 per cent in 2011. The fact that CPI inflation was above the target was partly due to the Riksbank beginning to raise the repo rate in July 2010. The increases in the repo rate temporarily push up CPI inflation through the effect on mortgage rates. This was predicted by the Riksbank's forecasts for the development of CPI in 2011. However, the changed weightings for the different mortgage rates in the calculation of the CPI meant that the impact of the repo-rate increases was greater than assumed in the Riksbank's forecasts. Moreover, mortgage rates increased faster than was justified by the repo-rate increases, which led to CPI inflation being higher in 2011 than the Riksbank had expected.
- Measured in terms of the CPIF, which is not directly affected by changes in mortgage rates, inflation averaged 1.4 per cent during the year, which was close to the forecasts made by the Riksbank in 2010.
- GDP increased by 3.9 per cent in 2011 and unemployment continued to decline for most of the year. However, during the latter part of the year there were clear signs that growth slowed down suddenly, and the improvement in the labour market came to a halt. Growth in 2011 was nevertheless slightly higher than the Riksbank had expected in its forecasts during most of 2010.
- An analysis using the Riksbank's general equilibrium model shows that the most important surprises for the development of inflation were the rapid increases in import prices towards the end of 2010 and the relatively weak domestic cost pressures. But as these two factors have had counteracting effects on CPIF inflation, the forecasting errors were relatively small during the first three quarters of the year.
- Inflation expectations in the long term were close to 2 per cent, which shows that the public was still confident that the Riksbank would reach its inflation target.

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



Note. CPIF is CPI with fixed mortgage rate.
Source: Statistics Sweden

Inflation 2011

During autumn 2010 CPI inflation rose relatively quickly, from around 1 per cent in August to 2.3 per cent in December (see Figure 3:1). During the first half of 2011 inflation continued to increase and in August peaked at 3.4 per cent. After that, inflation declined to 2.3 per cent in December 2011. On average, CPI inflation amounted to 3.0 per cent over the year, which can be compared with 1.2 per cent in 2010 (see Table 3:1).

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

	2009	2010	2011
CPI	-0.5	1.2	3.0
CPIF	1.7	2.0	1.4
CPIF excluding energy	2.1	1.5	1.0

Source: Statistics Sweden

When the repo rate is raised or lowered substantially, large but transitory effects on CPI inflation arise through the impact of the repo rate on households' mortgage interest costs. The substantial repo-rate adjustments in recent years therefore mean that the CPIF is a more appropriate measure for describing long-term developments in inflation (see the article "The CPI and other measures of inflation" in Chapter 1). While CPI inflation rose and was relatively high during 2011, CPIF inflation fell from 2.0 per cent in 2010 to 1.4 per cent in 2011 (see Table 3:1).

■ Low CPIF inflation

When analysing which factors affected the development of the CPI in 2011, it is useful to begin with an analysis of the CPIF measure of underlying inflation excluding energy. When adjusted for the effects of varying energy prices, CPIF inflation was 1.0 per cent in 2011, compared with 1.5 per cent in 2010. The continued fall in CPIF inflation excluding energy prices in 2011 was due to a broad decline in the rate of inflation. Prices of services, but above all prices of goods excluding food and energy, increased at a slower rate than the average since 1995. During 2011 goods prices fell by around 1 per cent calculated as an annual percentage change.

One reason for CPIF inflation excluding energy being so low was the relatively low rate of increase in unit labour costs, which was primarily due to weak development in labour costs per hour. A further reason was that the krona strengthened up to the beginning of 2011, which gradually had an impact on Swedish import prices. The strengthening of the krona also contributed to a moderate increase in food prices over the year, despite a large increase in world market prices during the second half of 2010 and first half of 2011.

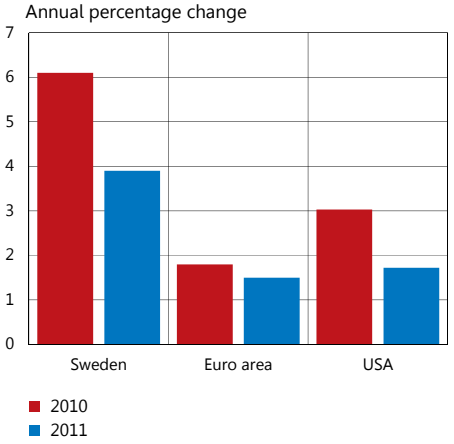
CPIF inflation was 0.4 percentage points higher than CPIF inflation excluding energy prices in 2011. The oil price rose substantially at the end of 2010 and continued to rise at the beginning of 2011. Although the oil price then fell slightly over the rest of the year, it was still at a much higher level than in 2010. Electricity prices also rose substantially at the end of 2010, but then they fell rapidly during the second half of 2011

to lower levels than those prevailing in 2010. This means that electricity prices did not have such a large effect on average inflation in 2011.

■ High CPI inflation due to rising mortgage rates

If one finally compares inflation outcomes for the CPIF and CPI in 2011, one sees that rising mortgage rates meant that CPI inflation was on average 1.6 percentage points higher than CPIF inflation. Since increases in the repo rate began in July 2010, the average mortgage rate for households' new loan contracts has increased by around 2 percentage points. In addition to mortgage rates being affected by the Riksbank's repo rate, they are also affected by the banks' costs for funding mortgages and by the banks' profit margins on mortgages.[17] During 2011 variable mortgage rates increased by more than 1.4 percentage points, which is more than is justified by the increases in the repo rate. The repo rate was increased by only 0.75 percentage points in 2011, prior to being cut by 0.25 percentage points in December.

Figure 3:2. GDP growth in Sweden, the euro area and the USA, 2010 and 2011
Annual percentage change



Sources: Bureau of Economic Analysis, Eurostat and Statistics Sweden

The development of the real economy in 2011

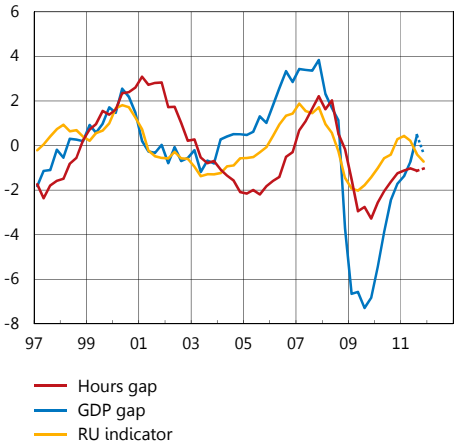
GDP increased by 3.9 per cent in 2011. This increase was less than the year before, when GDP rose by 6.1 per cent (see Table 3:2). During the first half of the year, the upturn was broad and partly due to an increase in exports and partly to strong domestic demand. Both consumption and investment rose. As in 2010, GDP growth in Sweden was stronger than in many other countries (see Figure 3:2). Sweden's relatively good public finances and the lack of fiscal policy tightening contributed to the favourable development in the real economy. Moreover, the demand for Swedish export goods was good at the same time as Sweden, unlike other countries, did not suffer negative effects from a falling housing market.

During the second half of the year economic activity was, however, adversely affected by the poorer growth abroad resulting from the sovereign debt problems in the euro area and the United States. Household confidence in economic developments fell and consumption was weak. During the latter part of the year growth slowed down, partly because the demand for Swedish export goods declined.

The labour market continued to develop strongly during the first half of the year. The number of jobs Sweden lost during the crisis had been more than recovered at the beginning of 2011. The demand for labour was good and both the number of persons employed and the number of persons in the labour force increased. Unemployment continued to decline. The weaker economic performance at the end of the year meant, however, that the improvement in the labour market ground to a halt (see Figure 2:20).

[17] See the article "The relationship between the repo rate and interest rates for households and companies" in the *Monetary Policy Report*, February 2012.

Figure 3:3. GDP gap, hours gap and RU-indicator
Per cent and standard deviation



Note. The calculations are taken from the *Monetary Policy Report*, February 2012. Broken lines refer to the Riksbank's forecast in February 2012. 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 1.

Sources: Statistics Sweden and the Riksbank

Table 3:2. Production and measures of employment 2009-2011, annual average
Annual percentage change

	2009	2010	2011
GDP	-5.0	6.1	3.9
Employed, aged 15-74	-2.1	1.0	2.1
Hours worked	-2.9	3.2	2.3
Unemployment, aged 15-74*	8.3	8.4	7.5

* Per cent of the labour force

Source: Statistics Sweden

■ Resource utilisation lower than normal

A resource utilisation measurement is often used as an overall measurement of the development of the real economy. However, there is no clear-cut way to measure this, and the Riksbank uses a number of different indicators to assess resource utilisation. Examples of such measures include the GDP gap, the hours worked gap and the RU indicator (see Figure 3:3). The GDP gap and the hours worked gap measure the percentage deviations from their respective long-run trends, while the RU indicator is a comprehensive measure of resource utilisation based on a large number of variables taken from surveys and labour market statistics. If each measure is 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 measurements are negative.

According to the RU indicator, resource utilisation was slightly above the normal level during the first half of 2011, but it appears to have been below normal during the latter part of the year. The percentage of companies stating a shortage of labour during the first and second half of the year respectively supports the picture of resource utilisation first rising and then falling (see Figure 2:5). The GDP gap indicates a level of resource utilisation slightly above the normal in the middle of 2011, and then falling to below normal at the end of the year. According to the hours worked gap, resource utilisation was lower than normal in 2011. Figure 3:3 shows the Riksbank's calculations of this measure of resource utilisation prior to the monetary policy meeting in February. The National Account figures published at the end of February entail substantial revisions with regard to the number of hours worked and to GDP growth in 2010 and 2011. The new statistics point to the GDP and hours worked gaps being less negative in 2011 than is indicated by an analysis based on statistics published earlier. However, the statistics on unemployment, which are another measure of resource utilisation, have not been revised. At all of the monetary policy meetings in 2011 the Riksbank's overall assessment was that resource utilisation was still below or slightly below the normal level, based on the statistics available at that time.

Why did inflation deviate from the target?

A natural first step in the assessment of target fulfilment is to analyse the causes of the deviations from the inflation target.

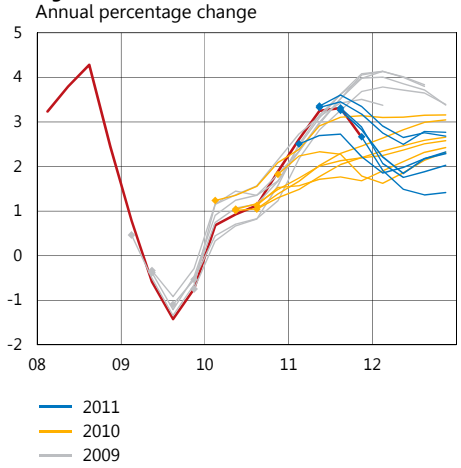
Figure 3:4 shows the actual development of the CPI and the Riksbank's forecasts for the CPI during the period 2009-2011. The development of the CPIF and the Riksbank's forecasts for the CPIF are shown in a corresponding manner in Figure 3:5. The red line in the figures shows the actual development, while the thin grey, yellow and blue lines show the forecasts the Riksbank made in each Monetary Policy Report and Update in the period 2009-2011. The forecasts made in 2009 are shown with grey lines, those in 2010 with yellow lines and those in 2011 with blue lines. The first forecast is thus the one presented in the Monetary Policy Report in February 2009, and it applies to developments from the first quarter of 2009 until the first quarter of 2012, that is to say three years ahead.

■ The Riksbank expected high CPI inflation

Figure 3:4 shows that the Riksbank was assuming in 2009 that CPI inflation would significantly overshoot the inflation target in 2011 and 2012. At the end of 2011, the forecast was that inflation would be close to 4 per cent. One important reason for this assessment was that mortgage rates were expected to increase as the repo rate was gradually raised from the very low level to which it had been cut in 2009. The increases in the repo rate would therefore temporarily push up the rate of inflation in the same way that the rate of inflation was temporarily pushed down when the repo rate was cut substantially during the financial crisis (see Figure 2:6). The CPIF inflation rate, where the effects of changes in mortgage rates are excluded, was expected to be close to 2 per cent in 2011 (see Figure 3:5).

During 2010 the Riksbank revised down its forecasts for both CPI and CPIF inflation. The assessment was instead that CPI inflation would not be as high in 2011 but would overshoot the target further ahead. The factors behind the changed assessment included the fact that the krona had strengthened substantially in 2010 and that it was expected to continue to be stronger than the Riksbank had earlier assumed (see Figure 3:6). This would entail lower import prices when translated into Swedish krona. The downward revision to the inflation outlook was also due to an unexpectedly high productivity growth holding back domestic cost increases.

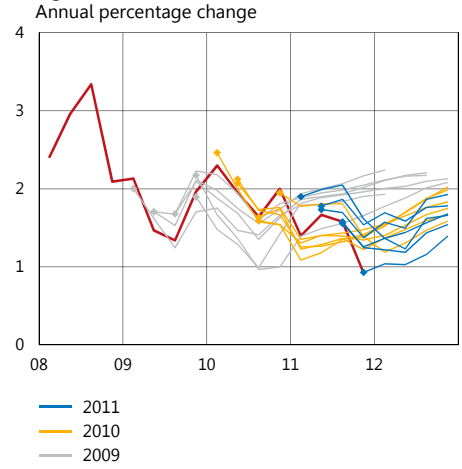
Figure 3:4. CPI, outcome and forecasts
Annual percentage change



Note. Quarterly data. The thin lines represent the Riksbank's forecasts 2009-2011. The marks indicate the starting points for the respective forecasts.

Sources: Statistics Sweden and the Riksbank

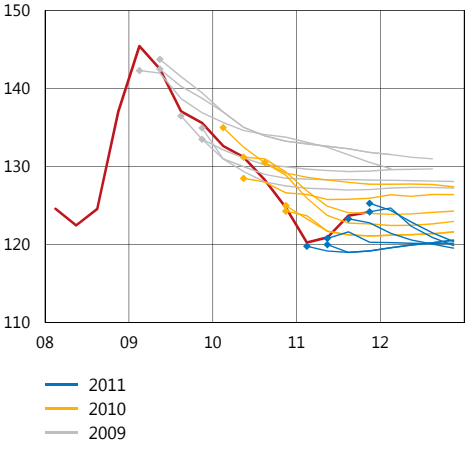
Figure 3:5. CPIF, outcome and forecasts
Annual percentage change



Note. Quarterly data. The thin lines represent the Riksbank's forecasts 2009-2011. The marks indicate the starting points for the respective forecasts.

Sources: Statistics Sweden and the Riksbank

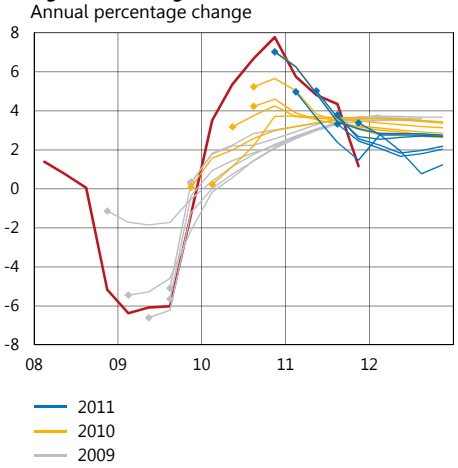
Figure 3:6. TCW-weighted nominal exchange rate, outcomes and forecasts
Index, 18 November 1992 = 100



Note. Quarterly data. TCW refers to a weighting of Sweden's most important trading partners. The thin lines represent the Riksbank's forecasts 2009-2011. The marks indicate the starting points for the respective forecasts.

Source: The Riksbank

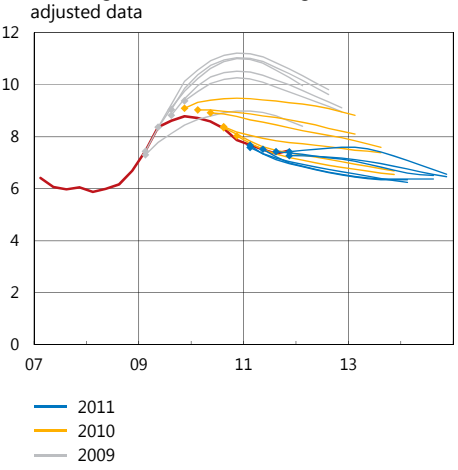
Figure 3:7. GDP growth, outcome and forecasts
Annual percentage change



Note. Quarterly data. The thin lines represent the Riksbank's forecasts 2009-2011. The marks indicate the starting points for the respective forecasts.

Sources: Statistics Sweden and the Riksbank

Figure 3:8. Unemployment, outcome and forecasts
Percentage of the labour force, aged 15-74, seasonally-adjusted data



Note. Quarterly data. The thin lines represent the Riksbank's forecasts 2009-2011. The marks indicate the starting points for the respective forecasts.

Sources: Statistics Sweden and the Riksbank

In July 2010 the Riksbank began to increase the repo rate from the level of 0.25 per cent where it had been since the middle of 2009 (see Figure 2:6). The recovery in the Swedish economy was unexpectedly strong and the Riksbank made the assessment that the repo rate needed to be raised gradually to stabilise inflation close to 2 per cent in the long run and at the same time have a stable development of the real economy. Figure 3:7 shows how the forecast for GDP growth was gradually revised up, while Figure 3:8 shows how the forecast for unemployment was gradually revised down. A gradually increased repo rate level was also expected to contribute to slower growth in household borrowing and to reduce the risk of imbalances building up in the Swedish economy.

The Riksbank assumed that the increases in the repo rate would contribute to pushing up CPI inflation in 2011 via the effect on mortgage rates and that CPI inflation would be around 2 per cent. CPIF inflation was expected to be around 1.5 per cent in 2011.

■ Unexpectedly large share of loans at variable rates and the banks' larger interest rate margins meant that CPI inflation rose more than expected

As mentioned above, the outcome for CPIF inflation was 1.4 per cent in 2011, that is, on average close to the forecasts made in 2010. However, CPI inflation in 2011 was above 2 per cent. The fact that CPI inflation was higher than CPIF inflation was thus partly expected by the Riksbank. However, mortgage rates were increased more in 2011 than can be justified by the increases in the repo rate. This was partly because the banks' funding costs had increased, and partly because the banks had increased their margins on mortgages to households. The fact that the percentage of households with interest rates fixed at short periods increased probably also contributed to the impact of rising short-term interest rates on the CPI being greater in 2011 than the Riksbank had expected when the repo rate was raised.[18]

To summarise, one can say that the deviation in inflation from the inflation target during 2011 was partly predicted. The Riksbank assumed that the adjustments to the repo rate would have a major impact on the outcome for CPI inflation and possibly, as in the forecasts in 2009, push up inflation beyond the target. However, compared with the Riksbank's forecasts in 2010, the effect of the mortgage rates was even greater in 2011. The outcome for inflation, adjusted for the effect of mortgage rates, that is, CPIF inflation, was largely in line with the Riksbank's forecasts in 2010. According to these forecasts, CPIF inflation would be close to 2 per cent at the end of the forecast period, at the same time as resource utilisation would be close to normal.

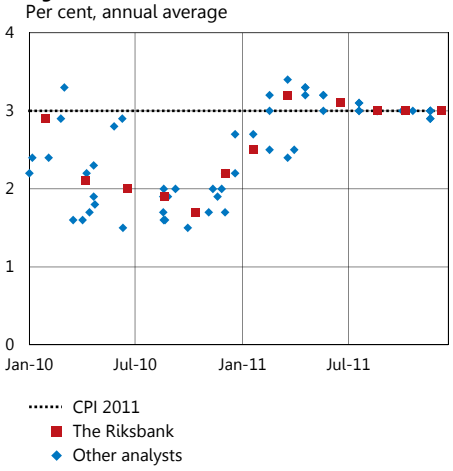
[18] In its forecasts for the CPI in 2011, the Riksbank, like other analysts, based its assumption on the lower weights for short-term mortgage rates applying in 2010. The Riksbank makes forecasts for future weights for mortgage rates in the CPI as of the end of 2011.

Did the Riksbank's forecasts for the CPI differ from those of other analysts?

Figure 3:9 shows the forecasts for CPI inflation in 2011 made by various forecasters in 2010 and 2011. Each mark in the figure represents a particular CPI forecast. The red marks show the Riksbank's forecasts, while the blue marks show the forecasts made by a number of other analysts. It is possible to see how high a CPI inflation 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 CPI inflation in 2011.

The figure shows that in 2010 most analysts underestimated CPI inflation in 2011. At the beginning of autumn 2010, all analysts believed that CPI inflation would be at or below 2 per cent in 2011. At the end of 2010 and in early 2011 the inflation forecasts were revised up. The CPI forecasts made by the various analysts during the first half of 2011 differed widely, however, and were both higher and lower than the 3 per cent that proved to be the actual outcome for 2011. According to this comparison between forecasts for CPI inflation in 2011, other analysts did not have access to information that the Riksbank would have been able to use to better predict the course of inflation. The comparison also indicates that the deviation in CPI inflation from the target in 2011 was largely the result of a shock that neither the Riksbank nor any other analyst predicted in 2010.

Figure 3:9. Forecasts of CPI inflation 2011
Per cent, annual average



Note. Other analysts 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 and Swedbank.

Sources: Respective analysts, Statistics Sweden and the Riksbank

What unforeseen shocks have affected CPIF inflation? A model analysis

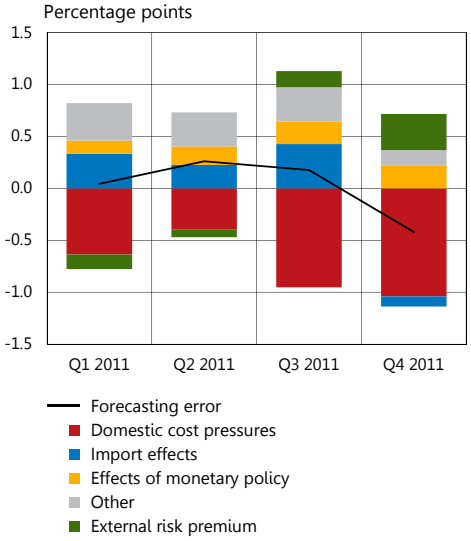
Measured in terms of the CPIF, inflation has been line with most of the forecasts for the year 2011 as a whole published by the Riksbank in 2010.[19] Although prices thus increased in total more or less as expected, a closer comparison shows that energy prices rose more rapidly than expected, while prices of other goods and services included in the CPIF increased at a slower rate.

One tool that can be used to understand what the differences between outcomes and forecasts are due to is the general equilibrium model of the Swedish economy, Ramses used in the work on producing material on which the Riksbank's forecasts and monetary policy decisions are based.[20] The model tries to explain developments and the interplay in the entire economy and not just a particular part. In this section we analyse the differences between the outcomes for CPIF inflation and the Riksbank's forecasts with the aid of the model.

The black line in Figure 3:10 shows the difference between the outcomes and the forecasts, the forecasting errors, for each quarter in the assessment of CPIF inflation made by the Riksbank in July 2010. CPIF inflation is shown as an annual percentage change. For example, the Riksbank assessed that CPIF inflation would be 1.4 per cent during the second quarter of 2011. In actual fact, CPIF inflation was 1.7 per cent,

[19] The exception is the forecast from December 2010 that predicted an increase in the CPIF of 1.7 per cent in 2011.
[20] For a description of the model, see Christiano, Lawrence J., Trabandt, Mathias and Walentin, Karl (2011), Introducing financial frictions and unemployment into a small open economy model. *Journal of Economic Dynamics and Control*, 44 (12), pp. 1999-2041.

Figure 3:10. CPIF inflation 2011: forecasting error and effects of unforeseen shocks
Percentage points



Note. The forecasting error refers to deviation between outcome and forecast in July 2010.

Source: The Riksbank

when measured as an annual percentage change. The difference between outcome and forecast for this quarter was thus 0.3 per cent.

■ Unexpectedly low labour force costs meant low cost pressures

The model interprets changes in CPIF inflation on the basis of around twenty different shocks. In Figure 3:10 these shocks have been grouped to provide an overall explanation for the differences between outcome and forecast that arose during the different quarters in 2011.

During the whole of 2011, an unexpectedly low domestic cost pressure contributes to holding back the rate of price increase (red area). Domestic cost pressures are determined by, for instance, general developments in productivity, the rate of wage increase and by other, more temporary effects that influence companies' costs. In 2010 the total labour costs per hour increased at a much slower rate than the Riksbank forecast in July 2010. The most important component in these costs for labour is wages. As labour productivity in 2010 was more in line with the Riksbank's forecast, the average unit labour cost for 2010 was much lower than expected.[21] The model supports the interpretation that the relatively low costs for labour, together with other factors affecting domestic cost pressures, have strongly contributed to holding back inflation in 2011.

■ High import prices pushed up inflation

While low domestic cost pressures clearly dampened inflation, other factors have contributed to holding up inflation during 2011. These include unexpectedly large price increases on imported goods and services. During the first three quarters of 2011 these import effects tended to hold CPIF inflation above the level forecast by the Riksbank in July 2010 (blue area). The reason is probably the relatively rapid price increases on various commodities, including oil, which contributed to rising energy prices during the second half of 2010 and beginning of 2011. The cold weather in winter 2010/2011 contributed via substantially increasing electricity prices to higher energy prices, which was probably partly interpreted as import effects in the model.[22]

Of course, inflation is also affected by the Riksbank's repo-rate decisions. In the model the repo-rate decisions are interpreted in the light of the way the Riksbank has tended to act since 1995 and onwards, that is, during the period that the inflation target of 2 per cent has applied. Resource utilisation on the labour market has developed better than expected, when looking at the forecast made in July 2010. Unemployment is lower and the number of hours worked is much greater. Given the Riksbank's historical pattern of behaviour, this type of development would normally lead to an upward revision of the repo-rate path. The fact that the Riksbank refrained from revising up the repo rate, despite resource utilisation on the labour market developing better than expected, is interpreted in the model as monetary policy becoming more

[21] Unit labour cost refers to the ratio between the total nominal costs for labour in the economy and real GDP. In other words, unit labour cost is a measure of the average, nominal cost for labour per unit produced.
[22] In the model domestic inflation is measured as changes in the GDP deflator. When higher prices for electricity have a greater impact on CPIF inflation than on inflation measured by the GDP deflator, the model has to interpret them as increased import prices. The GDP deflator is a price index that covers all goods and services included in GDP, unlike the CPI, which refers to the prices in a sample of consumer goods.

expansionary in relation to the historical pattern of behaviour.[23] In this way, monetary policy thus contributed to upholding cost pressures and inflation (yellow area).

■ Risk premiums and the krona exchange rate

During the second half of 2010 and the first quarter of 2011 the krona exchange rate strengthened faster than the Riksbank predicted in July 2010. However, this trend came to a halt during the second quarter of 2011, and the krona began to weaken again. This took place at the same time as concerns grew regarding the European debt crisis. Changes in the krona exchange rate affect Swedish inflation through several different channels. Put simply, a stronger exchange rate normally leads to lower import prices calculated in Swedish krona and to lower demand for Swedish goods and services. This has a restraining effect on inflation. Correspondingly, a weakening of the exchange rate tends to raise prices of imported goods and services and to increase demand for Swedish products.

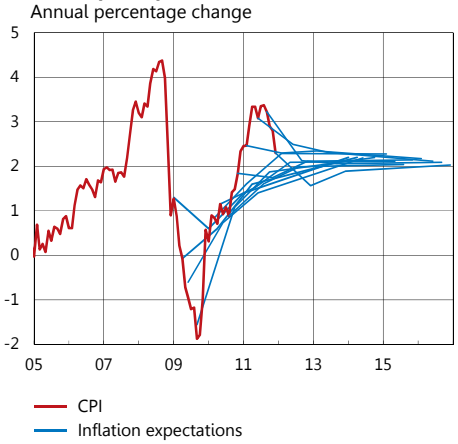
In the model, the level of the exchange rate is explained partly by the difference between the interest rate abroad and the interest rate in Sweden and by a risk premium on investments in Swedish krona. During 2011 it was primarily unexpected changes in the risk premium that meant that the impact of the exchange rate on inflation was not what was forecast in July 2010. The difference between the interest rate abroad and the interest rate in Sweden had a small effect, however. [24] Figure 3:10 shows the effects of the risk premium on inflation as a green area. At the beginning of the year, falling risk premiums on investments in Swedish krona contributed to strengthening the exchange rate and dampening inflation. However, later in the year there was a turnaround: the risk premium rose and the krona weakened, which in turn contributed to a higher rate of price increase.

The conclusion from the model analysis is thus, in summary, that the most important surprises in relation to the forecast from July 2010 have been rapid increases in import prices (towards the end of 2010) and relatively weak domestic cost pressures. These two factors have had counteracting effects on inflation, which has led to relatively minor forecasting errors during the first three quarters of the year. Towards the end of 2011, however, the inflationary effects of imports disappear and the low domestic cost pressures have an impact on CPIF inflation, which is then lower than was assessed in July 2010.

[23] Resource utilisation is measured as the hours worked gap in the model, and this has been much stronger than anticipated in the July forecast. However, the Riksbank takes several measures of resource utilisation into account in its repo-rate decisions. The Riksbank's overall assessment of resource utilisation may thus differ from that of the model.

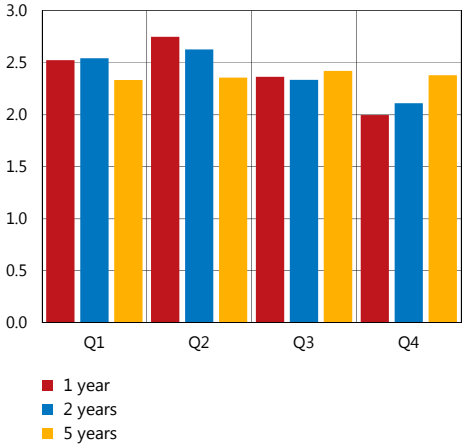
[24] Two assumptions are particularly important for the conclusions regarding the exchange rate presented here. The first concerns the Riksbank's assessment of the krona's real equilibrium exchange rate, which affects the model's interpretation of fluctuations in the actual, real exchange rate. A different assessment of the krona's real equilibrium exchange rate than that used by the Riksbank can lead to a different interpretation of the exchange rate's impact on inflation. A second important assumption concerns the private sector's expectations of future differences between interest rates in Sweden and interest rates abroad. In the analysis presented here, these expectations with regard to developments after 2011 are determined by the model's own forecasts.

Figure 3:11. Inflation expectations among money market participants
Annual percentage change



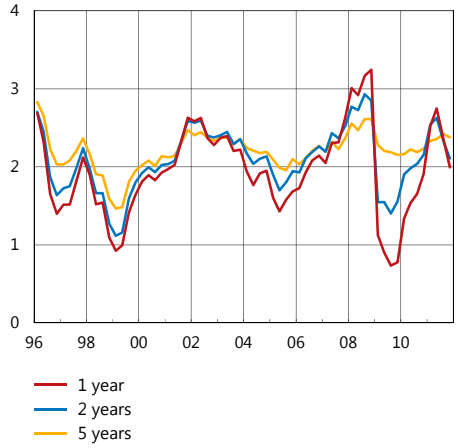
Sources: Statistics Sweden and TNS Sifo Prospera

Figure 3:12. Inflation expectations in 2011, 1, 2 and 5 years ahead, all participants
Per cent



Source: TNS Sifo Prospera

Figure 3:13. Inflation expectations, 1, 2 and 5 years ahead, all participants
Per cent



Source: TNS Sifo Prospera

Inflation expectations 2011

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.

■ Inflation expectations stable around 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 3:11 shows average expectations regarding CPI inflation during 2009-2011 for one, two and five years ahead among money market participants in the Prospera survey.[25] Inflation expectations five years ahead were also close to 2 per cent, which shows that the public has confidence in the Riksbank's inflation target (see Figure 3:12). As can be seen in Figure 3:13, inflation expectations five years ahead have been relatively well-anchored around the inflation target for quite a long time.

However, 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.[26] CPI inflation was high at the beginning of 2011, peaking at 3.4 per cent in August, and then fell back towards the end of the year, to 2.3 per cent. Short-term inflation expectations adjusted to inflation, and rose at the beginning of the year and fell at the end of the year (see Figure 3:13).

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 3:14 shows the Riksbank's inflation forecasts and inflation expectations among money market participants two years ahead as they developed during 2011. The figure shows that inflation expectations were slightly below the Riksbank's CPI forecasts for 2013. Inflation expectations for 2013 averaged 2.2 per cent, while the Riksbank's CPI forecasts were at 2.6 per cent.

[25] 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.
[26] See Jonsson, Thomas and Österholm, Pär (2009) "The Properties of Survey-Based Inflation Expectations in Sweden", *Working Paper* no. 114, 2009, National Institute of Economic Research.

■ Different views of GDP growth in Sweden and abroad

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

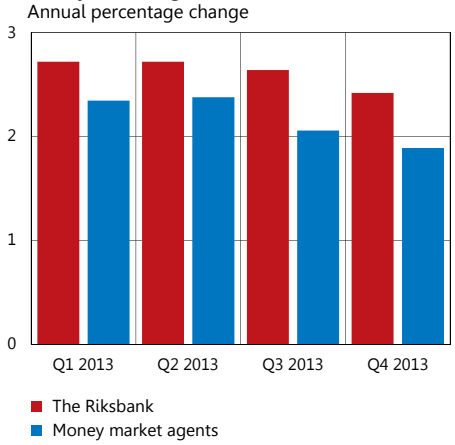
So how do market expectations of GDP in Sweden and abroad compare with the Riksbank's forecasts? Figure 3:15 shows that money market agents' expectations of domestic GDP growth in 2011 two years ahead were slightly higher than the Riksbank's GDP forecasts at the beginning of the year, but during the second half of the year the situation was the reverse, and money market agents expected weaker GDP growth in Sweden than the Riksbank. Figure 3:16 shows GDP forecasts for 2013 for the euro area made in 2011 by various analysts and by the Riksbank.[27] The figure shows that the various forecasters expected lower GDP growth for the euro area in 2013 than the Riksbank. All in all, it is therefore reasonable to conclude that the Riksbank and the market had different views of GDP growth in Sweden, particularly at the end of the year, and abroad, which may have led to differences in inflation expectations during 2011.

Comparison with other inflation-targeting countries

It may also be interesting to compare how inflation has developed in relation to the inflation target during this period in several other countries that conduct inflation targeting. The comparison is shown in Table 3:3. One general problem is that these countries may have been exposed to various shocks, which a simple comparison of target fulfilment cannot take into account. There are also differences between the countries' calculations of the measures of inflation that need to be taken into account. This applies in particular to mortgage interest costs for homeowners, which are included in the calculation of the Swedish CPI. In other countries, the CPI measure does not include such effects. A comparison of CPIF inflation in Sweden with inflation in other countries thus provides a fairer view.

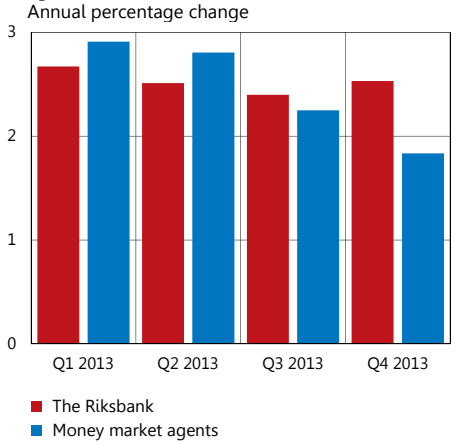
Such a comparison shows that inflation excluding mortgage interest costs in Norway – as in Sweden - has declined in 2011 compared with 2010. Inflation in Norway has become lower than was forecast by Norges Bank, and this is primarily due to lower electricity prices and lower prices for domestically-produced goods and services than was expected. In the United Kingdom and New Zealand, inflation has instead increased in relation to 2010. In both of these countries the central banks refer to higher indirect taxes temporarily raising the rate of inflation.[28]

Figure 3:14. The Riksbank's inflation forecasts and inflation expectations (CPI) two years ahead among money market agents 2011
Annual percentage change



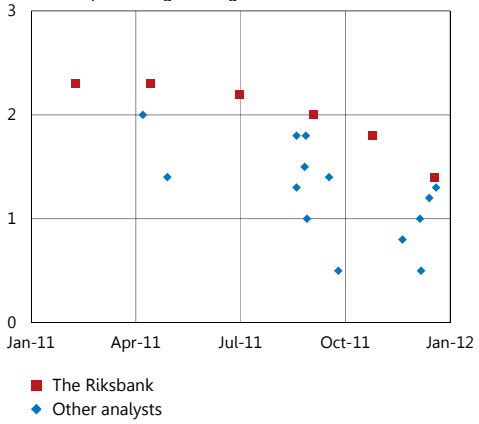
Note. The Riksbank's forecasts refer to the most recent forecasts that had been published at the time of Prospera's survey.
Sources: TNS Sifo Prospera and the Riksbank

Figure 3:15. The Riksbank's GDP forecasts and GDP expectations two years ahead among money market agents 2011
Annual percentage change



Note. The Riksbank's forecasts refer to the most recent forecasts that had been published at the time of Prospera's survey.
Sources: TNS Sifo Prospera and the Riksbank

Figure 3:16. GDP forecasts for the euro area, 2013
Annual percentage change



Note. Other analysts refer to those listed in footnote 27.
Sources: Respective analysts and the Riksbank.

[27] The surveys by TNS Sifo Prospera do not contain questions on the prospects for the economy abroad. These expectations have thus been gathered from another source and do not solely refer to the expectations of money market agents. The forecasters included are: the Swedish Ministry of Finance, Svenska Handelsbanken, the National Institute of Economic Research, the Swedish Trade Union Confederation (LO), Nordea, SBAB, SEB, the Confederation of Swedish Enterprise and Swedbank.
[28] For a comparison of inflation in different inflation-targeting countries during the period 2005-2010, see Goodhart, Charles and Rochet, Jean-Charles (2010), Assessment of the Riksbank's monetary policy and work with financial stability 2005-2010, *Reports from the Riksdag* 2010/11:RFR5, Riksdag Committee on Finance.

Table 3:3. Comparison of inflation and inflation targets in some countries, annual average
Annual percentage change

	Sweden		Norway	New Zealand	United Kingdom
Inflation target	2		Close to 2.5	Between 1 and 3	2
	CPI	CPIF	CPI	CPI	CPI
2009	-0.5	1.7	2.2	2.1	2.2
2010	1.2	2.0	2.4	2.3	3.3
2011	3.0	1.4	1.3	4.0	4.5

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, New Zealand and the United Kingdom are not impacted by the direct effects of changes of the policy rate through mortgage costs, as is the case in Sweden.

Sources: Reuters EcoWin and Statistics Sweden

CHAPTER 4 – Forecasting performance

As monetary policy needs to be forward-looking it is based on forecasts. It is therefore important that the Riksbank's forecasts are relatively accurate. One practical way of assessing whether the Riksbank's forecasts are good enough is to compare them with the forecasts of other analysts. However, relatively long periods of examination are required 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.

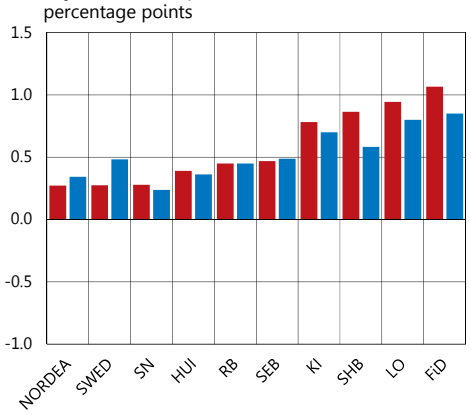
Summary of Chapter 4

- All forecasters underestimated CPI inflation in 2011. While most analysts also underestimated GDP growth, the Riksbank's forecasts were on average above the outcome in 2011. All analysts overestimated unemployment in 2011 and the level of the repo rate at the end of the year.
- A comparison between the analysts shows that the Riksbank was among the better forecasters of GDP growth in 2011, while the Riksbank's forecasts for the repo rate at the end of the year were poorer than those of most analysts. Generally speaking, however, there were not particularly large differences in the accuracy of the various analysts' forecasts of outcomes in 2011.
- It is not possible to draw any conclusions about general forecasting performance on the basis of a single year. One must study a longer period of time to get a more stable picture of accuracy. An analysis of the forecasts made in the period 1999-2011 shows that the Riksbank and most other analysts have tended to overestimate GDP growth somewhat. However, the forecasts for CPI inflation and unemployment have on average been close to the actual outcomes. The differences between the forecasting performances of the analysts are generally limited.
- All analysts tended to overestimate the year-end level of the repo rate in the period 2007-2011. However, it is difficult to draw general conclusions about forecasting performance with regard to the repo rate as the assessment period is so short.

Measuring the accuracy of forecasts

One means of obtaining a comprehensive measure of an analyst's forecasting performance is to calculate the average forecasting error (the mean error), that is, to calculate how much the forecasts have on average deviated from the outcome. The forecasts can either be forecasts of the outcome for a specific year (for example forecasts of the inflation outcome in 2011) or forecasts of the outcome over a certain time horizon (for example forecasts of the inflation outcome four quarters ahead). However, the mean error provides only limited information about the size of the forecasting error as forecasts that have been too high in relation to the final outcome are cancelled out by forecasts that have been too low. It is therefore common to also calculate the average squared forecasting error (the mean squared error) or the average

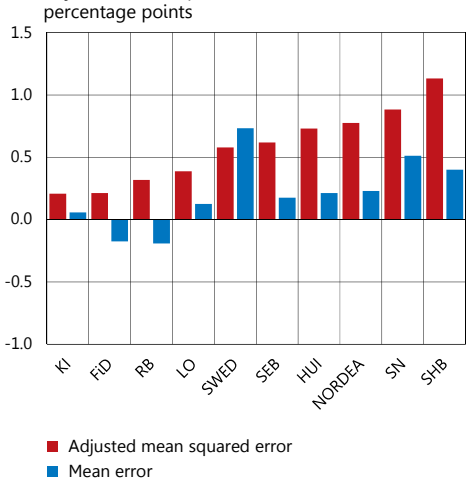
Figure 4:1. Forecasting errors of various forecasters for CPI inflation 2011
Adjusted mean squared error and mean error in percentage points



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

Sources: Respective analysts and the Riksbank

Figure 4:2. Forecasting errors of various forecasters for GDP growth 2011
Adjusted mean squared error and mean error in percentage points



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

Sources: Respective analysts and the Riksbank

absolute forecasting error (the mean absolute error).[29] These comprehensive measures can then be used to compare different forecasters. This chapter presents an analysis of the forecasts of the Riksbank and other analysts for outcomes in 2011.

One difficulty when comparing different forecasters is that they 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 recently-published statistics for GDP or the CPI in their forecasts. A forecaster that systematically 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.[30]

The Riksbank has worked out a method that takes into account the fact that different forecasters have had access to different amounts of information when making their forecasts of an outcome in a certain year.[31]. This method is based on the assumption that part of a forecaster's average squared or absolute forecasting error can be explained by 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 could therefore be misleading.

The method involves calculating how much of the squared or absolute forecasting error of each forecaster can be explained by the forecast horizon. The remainder is then a measure that can be used to for a fairer comparison between different analysts (see the Appendix for a technical description of the method).[32]

In the next section, this method is used to provide a measure of forecasting performance in 2011. As random factors may have a significant impact in individual years one must study a longer period of time to get a more systematic picture of the performance of different forecasters. The final section of the chapter presents such an analysis.

[29] The term forecasting error refers to the difference between outcome and forecast. When calculating the absolute forecasting error one disregards whether the forecasting error is positive or negative. Alternatively, the forecasting error can be multiplied by itself, which thus gives a squared forecasting error. Squared errors "punish" large forecasting errors more than absolute errors do. When assessing forecasts it is more common to use squared errors than absolute errors, but neither of these measures is more correct than the other. This is because what is the correct assessment measure depends on the forecaster's loss function – that is how damaging a forecaster perceives a forecasting error to be – and in practice this is seldom known. An assessment based on squared forecasting errors is, however, implicitly or explicitly based on the assumption that the forecasters have a squared loss function. Similarly, an assessment based on absolute errors entails assuming that there is a linear symmetrical loss function. For further discussion, see Wallis, Kenneth F. (1998), Asymmetric density forecasts of inflation and the Bank of England's fan chart, *National Institute Economic Review* 167, 106-112.

[30] 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 predicts GDP growth in the fourth quarter of the same year, then the forecast horizon is one quarter.

[31] Andersson, Michael and Aranki, Ted (2009), Forecasters' performance – what do we usually assess and what would we like to assess? *Sveriges Riksbank Economic Review*, 2009:3, Sveriges Riksbank.

[32] 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.

Forecasting errors for outcomes in 2011

Figures 4:1-4:4 illustrate the various analysts' forecasting errors with regard to the forecasts made in 2010-2011 for outcomes in 2011.[33] The red bars show the adjusted mean squared error, that is the measure of accuracy described above – the squared forecasting error adjusted for differences in forecast horizons. The shorter the bar, the smaller the forecasting error and the higher the accuracy of the forecasts. The blue bars show the mean error, that is the average forecasting error. This measure shows whether there are tendencies towards overestimation or underestimation in the forecasts of the various analysts.[34] The forecasting error is defined as the actual outcome minus the forecast. If the blue bar is above zero then this means that the forecasts on average *underestimate* the outcomes. A negative blue bar indicates that on average the forecasts *overestimate* the outcomes.

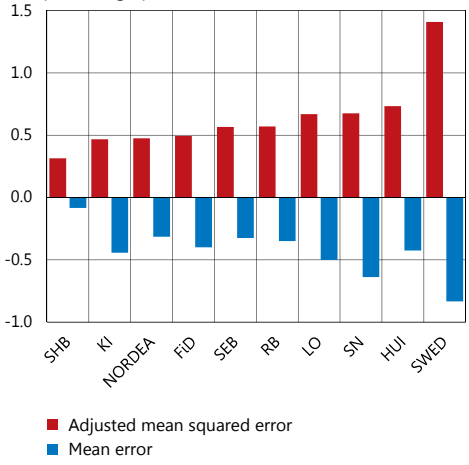
■ Underestimation of CPI inflation in 2011 and overestimation of the year-end level of the repo rate

In the case of CPI inflation, all of the forecasters underestimated the outcome in 2011 (see Figure 4:1 and also 3:9). Most forecasters also underestimated GDP growth in 2011 (see Figure 4:2). The exceptions were the Riksbank and the Ministry of Finance, which instead overestimated growth. However, all analysts overestimated unemployment in 2011 and the level of the repo rate at the end of the year (see Figures 4:3 and 4:4).[35]

■ No major differences in accuracy in the forecasts for 2011

A comparison between analysts shows that there were generally limited differences in the accuracy of the forecasts for unemployment in 2011. There were slightly larger differences in the accuracy of forecasts for inflation, growth and the repo rate, but here too the differences were not particularly significant. The Riksbank was among the better forecasters with regard to forecasts of GDP growth, while the Riksbank's forecasts for the repo rate were poorer than those of most other analysts.

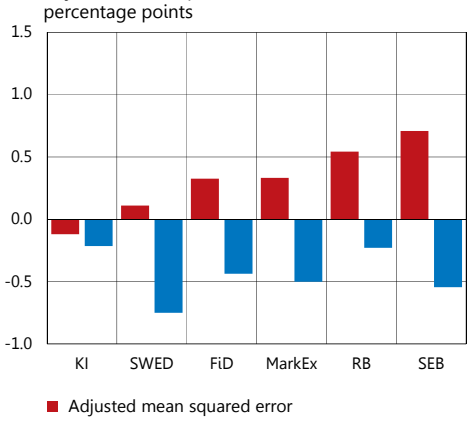
Figure 4:3. Forecasting errors of various forecasters for unemployment 2011
Adjusted mean squared error and mean error in percentage points



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

Sources: Respective analysts and the Riksbank

Figure 4:4. Forecasting errors of various forecasters for the repo rate at year-end 2011
Adjusted mean squared error and mean error in percentage points

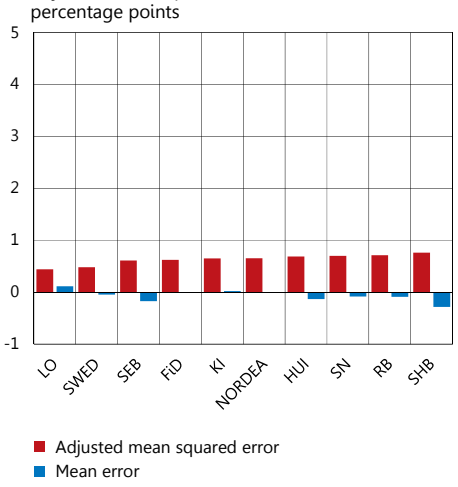


Note. FiD = Ministry of Finance, KI = National Institute of Economic Research, MarkEx = Market expectations, RB = the Riksbank and SWED = Swedbank. While other analysts present their repo rate forecasts as a value at the end of the year, the Riksbank presents its forecasts as quarterly average values. In order to make the comparison possible, the Riksbank's quarterly values have been interpolated to daily values.

Sources: Respective analysts and the Riksbank

[33] In contrast to issues of the Material for Assessing Monetary Policy in previous years, the assessment of forecasting performance in this report is based on squared forecasting errors rather than on absolute errors. This change is an adjustment to the fact that squared errors are the measure mostly commonly used in forecast assessments. The corresponding result when the method is applied to absolute forecasting errors is discussed in the Appendix.
[34] If there is systematic overestimation or underestimation it is often said that the forecasts have a *bias*.
[35] The analysis of forecasting performance for the repo rate includes the analysts' expectations 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 *Material for assessing monetary policy 2010* for a description of the calculations). The expectations included in this analysis are those that prevail on the day before a decision on the repo rate is made.

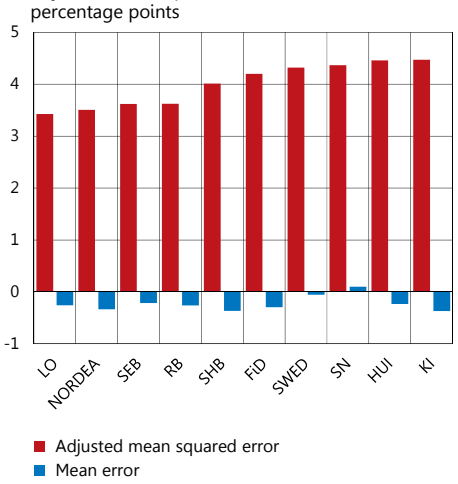
Figure 4:5. Accuracy of the forecasts of various forecasters for CPI inflation 1999-2011
Adjusted mean squared error and mean error in percentage points



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

Sources: Respective analysts, National Institute of Economic Research and the Riksbank

Figure 4:6. Accuracy of the forecasts of various forecasters for GDP growth 1999-2011
Adjusted mean squared error and mean error in percentage points



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

Sources: Respective analysts, National Institute of Economic Research and the Riksbank

It is worth noting that the assessment of the forecasts for the repo rate applies to the forecasts of the level at the end of the year. Otherwise it may be difficult to reconcile the result above with the fact that the changes in the repo rate during most of 2011 were relatively well in line with the forecasts made by the Riksbank in 2010. The reason why the assessment of the repo-rate forecasts applies to the year-end level of the repo rate, in this case at the end of 2011, and not to the mean level during 2011 is that practically all the analysts except the Riksbank forecast what the level of the repo-rate will be at year-end. The Riksbank, however, only publishes forecasts for the quarterly mean value of the repo rate.[36]

The accuracy of the forecasts for the period 1999-2011

Figures 4:5-4:7 show the mean error and the adjusted mean squared error for the period 1999-2011 for CPI inflation, GDP growth and unemployment. 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, which of course for the most part was not a realistic assumption.[37]

■ Relatively small differences in accuracy between the forecasters

Even given this longer assessment period there is still a relatively high level of uncertainty and there are seldom any statistically-significant differences between the forecasters. This is not surprising however, given that the forecasts of different analysts tend to follow each other relatively closely.

All in all, the blue bars in Figures 4:5-4:7 show that the majority of the analysts, including the Riksbank, have tended to overestimate GDP growth somewhat, while the forecast for CPI inflation and unemployment have mean errors that are almost zero. The red bars show that the accuracy of the forecasts for GDP growth is generally lower than that of the forecasts for inflation, unemployment and the repo rate. It is also clear that the forecasting performance of the analysts was rather similar in this period.

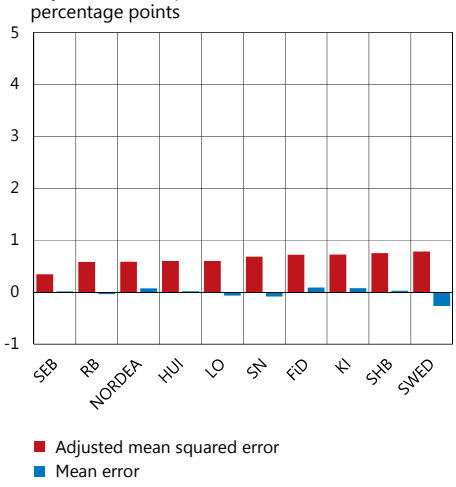
[36] In the assessment above, the Riksbank's quarterly forecasts have therefore been interpolated to daily data where the mean value for the created daily observations corresponds to the quarterly forecasts. Although a forecast for the year-end repo rate can thus be produced, this is problematic in the assessment of forecasting as the Riksbank's forecast is not strictly comparable with the other analysts' forecasts for the repo rate.
[37] In 2007 the Inflation Report was renamed the Monetary Policy Report.

In the case of forecasts of the repo rate it is more difficult to assess the performance of the Riksbank, partly due to the difficulty in comparing the Riksbank's forecasts with those of others (see above) and partly because the Riksbank only began publishing repo-rate forecasts five years ago. As the assessment period is shorter than for other variables, random factors have a greater impact on the results. Figure 4:8 nevertheless shows the accuracy of the forecasts for the repo rate in the period 2007-2011 for those analysts that publish such a forecast.

On average for the five years, all of the forecasters have tended to overestimate the repo rate, but the Riksbank has the largest adjusted mean squared error of the six forecasters. The primary contribution to the Riksbank's relatively large forecasting error during the period is made by the overestimates in the forecasts for the repo rate (and CPI inflation) produced in July and September 2008. 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. The Riksbank's assessment was therefore that a number of additional repo-rate increases would be necessary before it became possible to lower the repo rate somewhat. What actually happened, however, was that the crisis on the financial markets became acute at the end of 2008 and to counteract the effects of this crisis the repo rate was cut to a record-low level.

To sum up, the analysis in this chapter indicates that there are some differences in the forecasting performance of the various analysts. Generally speaking, however, these differences are relatively small.

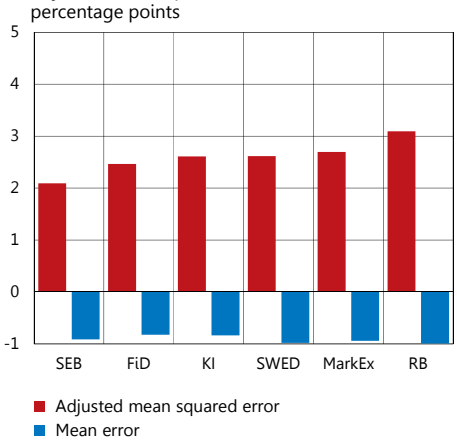
Figure 4:7. Accuracy of the forecasts of various forecasters for unemployment 1999-2011
Adjusted mean squared error and mean error in percentage points



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

Sources: Respective analysts, National Institute of Economic Research and the Riksbank

Figure 4:8. Accuracy of the forecasts of various forecasters for the year-end repo rate 2007-2011
Adjusted mean squared error and mean error in percentage points



Note. Prior to 2007, the Riksbank did not publish forecasts for the repo rate. See the note to Figure 4:4 for an explanation of the abbreviations.

Sources: Respective analysts and the Riksbank

CHAPTER 5 – Predictability and monetary policy expectation

If monetary policy is predictable, market participants will be able to predict how new information on the economy will impact the Riksbank's rate setting. Market rates can thus adjust before the Riksbank has even made a decision on the repo rate. This can contribute towards the achievement by monetary policy of a more rapid impact than would otherwise have been the case. The Riksbank also publishes a forecast for the repo rate in connection with every monetary policy meeting. These forecasts make it easier for the Executive board of the Riksbank to explain its views on future monetary policy. Another purpose is to influence the expectations of future monetary policy. In this way, the Riksbank can influence the interest rates with longer maturities, which are important to the economic decisions made by households and companies. This chapter presents an account of whether the repo-rate decisions were expected, as well as how closely different measures of repo-rate expectations have corresponded with the Riksbank's own repo-rate forecast. The reasons for and implications of differences between repo-rate expectations and the Riksbank's repo-rate forecast are also discussed.

Summary of Chapter 5

- Repo-rate decisions in 2011 were accurately predicted by market participants.
- Surveys indicate that, during the second half of the year, market participants expected a lower repo rate in the coming years than the Riksbank had forecast.
- Expectations of monetary policy derived from pricing on the money market give the same picture. However, the calculation of repo-rate expectations derived from pricing on the financial markets has been complicated by the financial unease.

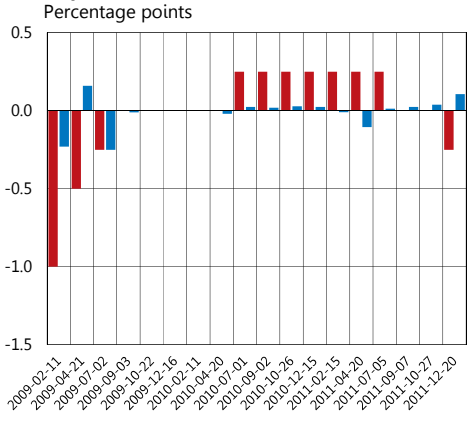
The Riksbank's repo-rate decisions were predictable

This section compares the Riksbank's repo-rate decisions in 2011 with the market participants' expectations ahead of each monetary policy decision.

Figure 5:1 shows changes in the repo rate and a measure of the extent to which repo-rate decisions were expected by the market participants.[38] The red bars indicate the extent of the changes in the repo rate, and their direction. The blue bars indicate the difference between the actual change of the repo rate and the change expected by the market. If the blue bar is at almost zero, this means that the market was not surprised by the interest rate decision. A positive blue bar means that market rates increased after the interest rate decision was published. When the repo rate is increased, a positive blue bar thus means that the Riksbank increased the repo rate above the market's expectations. The opposite is true when the 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 bar is negative.

[38] Surprise in the market is calculated on the basis of the change in the 1-month interest rate between the day of announcement and the previous day (the Riksbank uses the 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, when the new repo rate level has an impact.

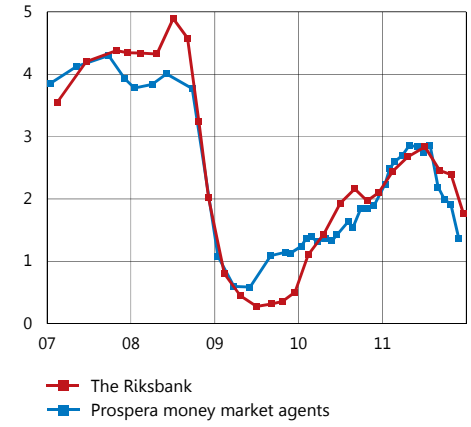
Figure 5:1. Change in the repo rate and market surprise
Percentage points



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

Source: The Riksbank

Figure 5:2. The Riksbank's forecast of the repo rate and repo-rate expectations according to surveys, one year ahead
Per cent



Sources: TNS Sifo Prospera and the Riksbank

At the first three monetary policy meetings of 2011, the repo rate was increased by 0.25 percentage points on each occasion. As can be seen in Figure 5:1, the increases in February and July were expected by the participants in the financial markets. A certain degree of surprise surrounded the interest rate decision when the repo rate was raised in April 2011. The negative blue bar at this point shows that the market expectations were for a smaller increase of the repo rate than was announced. But the change in market pricing after the announcement of the interest rate decision was relatively small.

At the monetary policy meetings in September and October 2011, the repo rate was unchanged. Neither did these interest rate decisions entail any surprise for the market participants.

In December 2011, the repo rate was decreased by 0.25 percentage points. The lowering of the repo rate was in line with the market's expectations. But the change in the market's pricing shows that there were market participants who had expected a greater decrease. However, the element of surprise was minor, as illustrated by the low blue bar in Figure 5:1. All in all, the market participants seem to have been able to accurately predict the Riksbank's repo rate decisions in 2011.

The Riksbank's repo-rate forecasts and various agents' expectations of the future repo rate

This section describes how well the Riksbank's forecasts of the repo rate have corresponded with the repo-rate expectations of agents on the financial markets and in other areas of the economy. The implications of the differences that have been observed are discussed at the end of the section.

■ Interest rate expectations according to surveys

One way of measuring expectations of future monetary policy is to study surveys. Chapter 3 describes how TNS Sifo Prospera regularly measures inflation expectations among various participants in the economy on behalf of the Riksbank. These investigations also measure expectations of future monetary policy. In monthly investigations, the money market participants are asked about their expectations of the development of the repo rate.

Figure 5:2 shows the Riksbank's forecast of the repo rate in one year, and corresponding expectations for the repo rate according to money market agents' responses to the Prospera survey. The first blue dot in the figure thus shows what the market agents expected the repo rate to be in one year according to the first survey in 2007. In the same way, the first red dot shows the Riksbank's forecast of the repo rate in one year in the first Monetary Policy Report for 2007. It should be noted that the date of the survey and the Riksbank's forecast date do not correspond exactly. This can be seen in the figure, where the red dots (the Riksbank's interest rate forecasts) and the blue dots (the survey responses) do not lie at the same point on the time axis. This means that new information received between the date of the survey response and the monetary policy decision may provide an explanation for the difference between interest rate expectations according to the survey responses and the Riksbank's interest rate forecast.

As can be seen in the figure, the survey responses received in the first six months of 2011 indicated that the money market agents expected about the same repo rate in one year as the Riksbank had forecast.

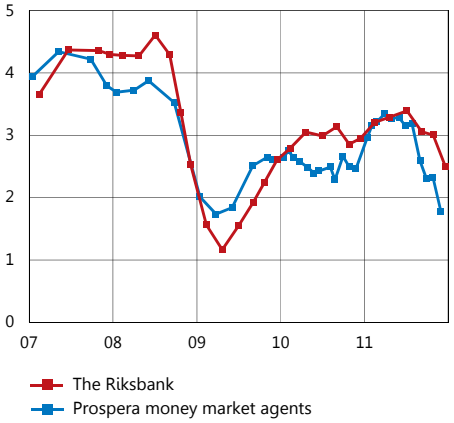
Figure 5.3 shows the corresponding forecasts for the repo rate in two years. There were also small differences between the Riksbank's forecast and the survey responses in the first six months over this forecast horizon. At this point, the Riksbank's repo-rate path indicated continued interest rate increases over the forecast period, and this view was shared by the market agents.

However, according to the survey, after the summer, the money market agents started to expect a lower repo rate than forecast by the Riksbank in the period ahead. The deviation from the Riksbank's forecasts increased over the summer, becoming larger two years ahead than one year ahead. The interest rate path published by the Riksbank in conjunction with the monetary policy meeting in December implied that the Riksbank expected the repo rate to be lowered over the following year, thus becoming lower than 2 per cent one year ahead, and then to be increased. According to the survey responses, the market participants expected slightly larger interest rate decreases one year ahead, and also that the repo rate would remain below 2 per cent two years ahead.

Other surveys can also be used to study the manifestation of repo-rate expectations in the economy. For example, since March 2010, the National Institute of Economic Research's Consumer Tendency Survey has included an investigation into household expectations of the variable mortgage rate level in one, two and five years. Figure 5:4 shows households' expectations of variable mortgage rates in December 2011 according to the National Institute of Economic Research's investigation. These expectations can provide an indirect measure of households' repo-rate expectations, as mortgage expectations should be based on the repo rate that will prevail. This indirect measure is shown by the grey interval in Figure 5:4. The interval is based on an assumption that households had expected that the variable mortgage rates would exceed the repo rate by about as much as they had, on average, over the previous two years.

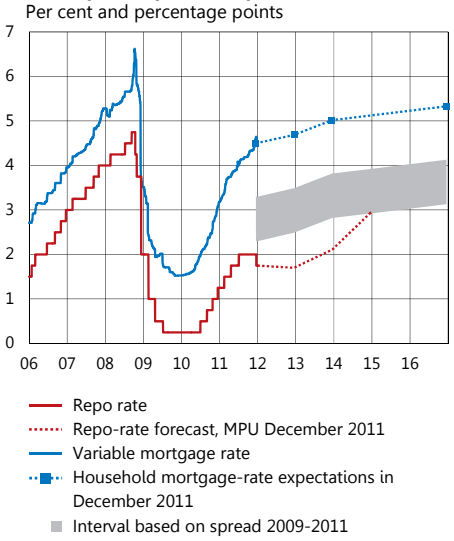
One interpretation of the interval in Figure 5:4 is that households, at the end of 2011, expected the repo rate to increase in the years ahead and that the level, both one and two years ahead, would be higher than forecast by the Riksbank. On the other hand, it is also conceivable that households expected future variable mortgage rates to exceed the repo rate by a greater degree than the average for 2009–2011. It is also thus possible that household expectations of the repo rate may have exceeded the Riksbank's repo-rate forecast by a lesser degree or not at all. When interpreting analyses based on survey data, it should also be considered that such data has shortcomings as a measure of expectations. Among these, respondents may have little incentive to provide well-considered responses.[39]

Figure 5:3. The Riksbank's forecast of the repo rate and repo-rate expectations according to surveys, two years ahead
Per cent



Sources: TNS Sifo Prospera and the Riksbank

Figure 5:4. Household mortgage-rate expectations and implied repo-rate expectations
Per cent and percentage points

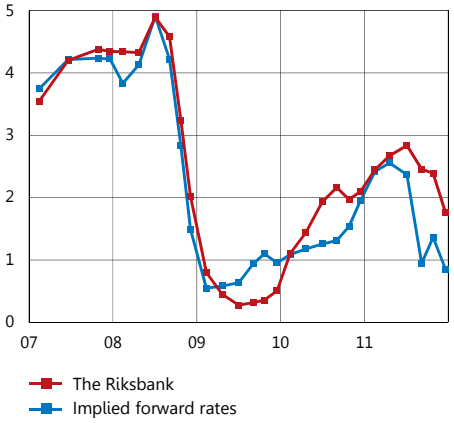


Note. The repo-rate forecast is calculated as annual averages. The variable mortgage rate is an average of the three-month variable listed mortgage rates from Nordea, SBAB, SEB and Stadshypotek. The difference between the variable mortgage rate and the repo rate was approximately 1.70 percentage points in 2009-2011. The grey interval is this gap +/- 0.50 percentage points.

Sources: National Institute of Economic Research and the Riksbank

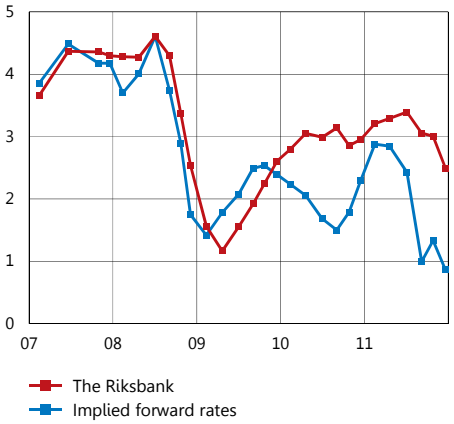
[39] In addition, the statistical sample is often quite small. However, this is not the case for the investigation of household's mortgage expectations, as this is based on 1 500 respondents.

Figure 5:5. The Riksbank's forecast of the repo rate and repo-rate expectations according to market prices, one year ahead
Per cent



Sources: Reuters EcoWin and the Riksbank

Figure 5:6. The Riksbank's forecast of the repo rate and repo-rate expectations according to market prices, two years ahead
Per cent



Sources: Reuters EcoWin and the Riksbank

■ Interest rate expectations according to market pricing

Another way of monitoring expectations of the repo rate's development is to base this on pricing on the money market. After adjustment for risk premiums, implied forward rates can be interpreted as market agents' expectations of the future repo rate. However, this measure of monetary policy expectations is not uncomplicated either. This is discussed in more depth below.[40]

Figure 5:5 shows the Riksbank's forecast for the repo rate in one year, compared with the market agents' expectations of the repo rate one year ahead as indicated by implied forward rates. Figure 5:6 shows the corresponding comparison of the Riksbank's forecasts and market expectations two years ahead. The figure shows repo-rate expectations according to market pricing on the day of publication of the Riksbank's interest rate forecast.

Figure 5:5 shows that the implied forward rates at the start of 2011 indicated largely the same expectations of the level of the repo rate in one year as the Riksbank had forecast. However, an increasing difference in the view of the future repo rate arose from the summer until the end of the year. At the end of the year, the implied forward rates indicated expectations of a repo rate below 1 per cent one year ahead. Instead, as has already been mentioned, the Riksbank's forecast in December was for a level just below 2 per cent one year ahead.

Expectations of the repo rate two years ahead have differed more from the Riksbank's forecasts. As early as 2010, market pricing indicated that market agents' expectations were lower than the Riksbank's forecast (see Figure 5:6). The deviations two years ahead have also been significantly greater than the deviations one year ahead. Market pricing in December 2011 indicated that market agents then expected that the repo rate would also be below 1 per cent two years ahead, while the Riksbank forecast that the repo rate would then again be above two per cent.

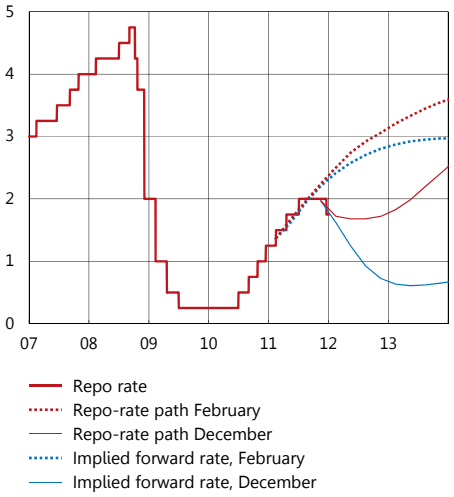
[40] For a more detailed discussion of surveys and market prices as a measure of monetary policy expectations, see, for example, the article "The repo-rate path and monetary policy expectations according to implied forward rates" in the *Monetary Policy Report*, October 2010, Sveriges Riksbank. See also Gürkaynak, Refet and Wolfers, Justin (2005) Macroeconomic derivatives: An initial analysis of market-based macro forecasts, uncertainty and risk. In Frankel, Jeffrey A. and Pissarides, Christopher A. (eds), *NBER International Seminar on Macroeconomics*. MIT Press.

Figure 5:7 shows the Riksbank's repo-rate path for the whole forecast period at two different points in time and expectations of the future repo rate according to market expectations at the same points. These points are the first and last monetary policy meetings of 2011, so the figure thus shows the repo-rate path at the start and end of 2011. It can be seen that, over the year, expectations according to market pricing were revised downwards by a significantly greater degree than the Riksbank's repo-rate forecast for the whole forecast horizon.

However, as mentioned above, calculating repo-rate expectations on the basis of market pricing is not without problems. Before interest-rate expectations can be derived from the implied forward rates, various risk premiums that influence forward rates must be filtered out. The Riksbank uses the information in various instruments on the money market and makes different assumptions to estimate the size of the risk premiums. (See the article "How does the Riksbank calculate expectations from market pricing?" in the *Material for assessing monetary policy 2010*.) However, the premiums can vary over time in a way that is hard to capture in estimates. This is particularly problematic for the term premiums that compensate for interest rate risk.

During the recent years' financial unease, it is possible that the usual methods have overestimated the term premiums. The unconventional measures implemented by central banks around the world to facilitate the supply of credit and stimulate the economy may have contributed towards pushing interest rates with longer maturities down.[41] The financial unease may also have led to increased demand for government securities and other investments considered safe. Uncertainty in the euro area, not least in 2011, may have influenced yields on government securities in various countries to a greater degree than has been captured in the normal estimates of term premiums. Interest rates in the countries whose government securities are seen as safe investments may have been pushed down more than can be justified by expectations of future policy rates. Arbitrage – utilising imbalances in pricing between different markets – may, in turn, have led to interest rates with shorter maturities and for other fixed income instruments than government securities also being pushed down.

Figure 5:7. Repo rate, repo-rate forecast and implied forward rates
Per cent



Sources: Reuters EcoWin and the Riksbank

[41] See, for example, Gagnon, Joseph, Raskin, Matthew, Remache, Julie and Sack, Brian (2010), Large-scale asset purchases by the Federal Reserve: Did they work?, *Federal Reserve Bank of New York Staff Reports* No. 441, for an empirical estimate of how the US central bank's previous purchases of securities with longer maturities have influenced the determination of interest rates.

Such problems in reading monetary policy expectations from market pricing thus make it difficult to compare the Riksbank's repo-rate forecasts with the market's expectations of the repo rate. But, even if there is reason to believe that various risk premiums have influenced market pricing more than previously, this can hardly explain the whole difference between the Riksbank's repo-rate forecasts and implied forward rates. This is also suggested by the fact that survey responses in the autumn also indicated that money market agents expected a lower repo rate than the Riksbank had forecast.

An international comparison with other central banks that also publish interest-rate forecasts also shows that the deviations between market pricing and central bank forecasts in the autumn of 2011 were not as prominent in Norway and New Zealand. (See the article "Interest rate paths and market expectations in Norway, New Zealand and Sweden" in this chapter.) The next section discusses the possible reasons for the differences between the Riksbank's repo-rate forecast and the market agents' interest-rate expectations.

■ Several explanations of the differences between the market agents' expectations of the repo rate and the Riksbank's repo-rate forecasts

One reason for the deviations between the market agents' expectations and the Riksbank's repo-rate forecasts could be that the money market agents have a different view of future economic development. During the second half of 2011, they may, for example, have seen a deepened crisis in the euro area as a more likely scenario than the Riksbank did. Another reason could be that the money market agents expected lower policy rates abroad. They may also have expected a weaker development of domestic demand and, for this reason, lower inflation than in the Riksbank's forecasts. This could call for a lower repo-rate path.

It is impossible to say exactly which assessment of the economy forms the basis for the varying repo-rate forecasts. However, by comparing survey responses from money market agents and the Riksbank's forecasts of different variables such as GDP and inflation, an idea can be gained of possible differences in views of economic development. For example, TNS Sifo Prospera's survey at the end of 2011 shows that the money market agents, on average, expected lower GDP growth and lower inflation in Sweden than the Riksbank, both one and two years ahead. (See also the section on inflation expectations in Chapter 3.)

Another reason for the differences in repo-rate expectations may be the disagreement within the Executive Board. One third of Executive Board members, considering that the repo-rate path should be lower, entered reservations against the published repo-rate path at every monetary policy meeting held in 2011. This may have led money market agents to assess it as more likely that actual monetary policy would be more expansionary than they would have done had the Executive Board expressed a unanimous view.

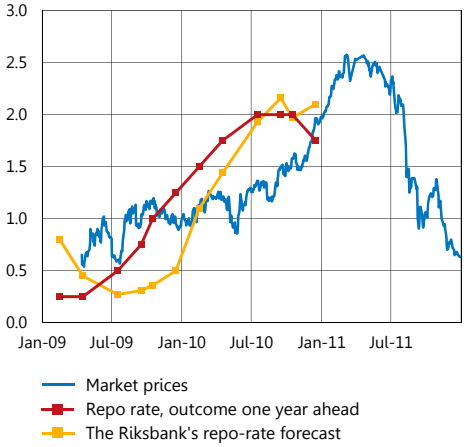
■ What do the differences between the market agents' expectations of the repo rate and the Riksbank's repo-rate forecasts mean?

If the market agents expect a lower repo rate in the future than that forecast by the Riksbank, this will mean that certain interest rates in the money and bond markets are lower than the Riksbank's forecast justifies. However, assessing how much such a difference actually stimulates the economy as a whole is not entirely straightforward. The development of other interest rates in the economy must also be considered in the assessment of how much stimulation households and companies will ultimately receive. For example, in 2011, the difference between variable mortgage rates and the repo rate increased. The low level of interest rates on the money and bond markets has thus been counteracted for households by the higher levels of other interest rates in relation to the repo rate throughout the year.

Another interpretation of the low implied forward rates that is occasionally brought up is that the market agents may have been quicker than the Riksbank to interpret new information on the economic situation. The implication is that the market agents' repo-rate expectations would adjust more rapidly to the repo-rate level that is to prevail in the future. However, it should be noted that deviations between the market and the Riksbank before the event do not say anything about the value of the information in the Riksbank's repo-rate forecasts. Figure 5:8 shows the Riksbank's forecasts for the repo rate in one year (the yellow line in the figure) and the expectations of the repo rate in one year that can be read from market prices (the solid blue line). The red line in the figure shows the actual repo rate one year later.

For example, from the figure, it can be seen that, for most of 2009, the Riksbank forecast that the repo rate one year later would continue to be very low. According to market pricing, market agents' instead expected a higher and rising repo rate. The outcome was that the repo rate increased more rapidly in 2010 than the Riksbank had forecast in 2009. The outcome was thus more in line with the market's expectations. But the figure also makes clear that the reverse of this was true in 2010, when the Riksbank forecast that the repo rate one year ahead would gradually be raised at a fairly rapid rate, while market pricing indicated significantly slower repo-rate increases. The monetary policy conducted in 2011 corresponded better with the Riksbank's forecasts than with the market's expectations. (See Chapter 4 for a more detailed assessment of the repo-rate forecasts.)

Figure 5:8. Expected repo rate in one year according to market prices, the Riksbank's repo-rate forecast and the repo-rate outcome
Per cent

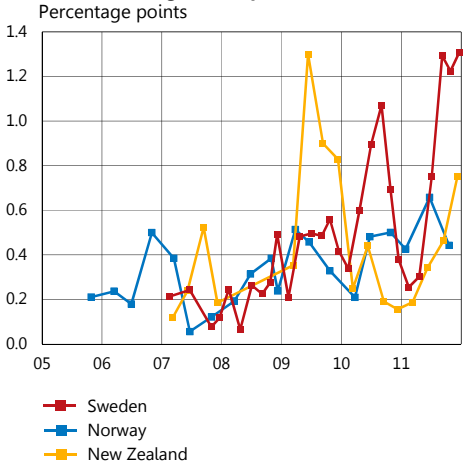


Note. The yellow dots in the figure represent the forecast for the repo rate one year ahead made by the Riksbank in conjunction with its monetary policy meetings. The yellow dots indicate the times the forecasts were made. The blue line shows expectations of the repo rate one year ahead according to the implied forward rates. The outcome of the repo rate has been moved back one year to allow comparison with forecasts and expectations at the date of forecast.

Sources: Reuters EcoWin and the Riksbank

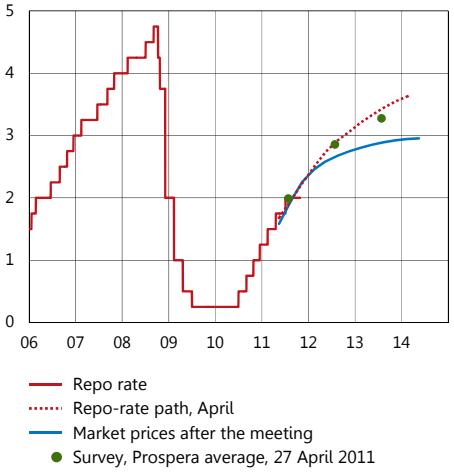
Interest rate paths and market expectations in Norway, New Zealand and Sweden

Figure 5:9. Average absolute deviations between interest-rate path and interest-rate expectations measured using market prices
Percentage points



Sources: Norges Bank, Reserve Bank of New Zealand, Reuters EcoWin and the Riksbank

Figure 5:10. Repo-rate expectations measured using market prices and surveys, April 2011
Per cent



Sources: Reuters EcoWin, TNS Sifo Prospera and the Riksbank

The Riksbank, Norges Bank and the Reserve Bank of New Zealand belong to a small but growing group of central banks that publish their own endogenous interest rate forecasts.[42] The pioneer of this group was the Reserve Bank of New Zealand, which started publishing what is known as an interest-rate path in 1997. Norges Bank published its first interest rate path at the end of 2005 and the Riksbank followed suit at the start of 2007. Consequently, it may be interesting to analyse and compare the experiences of these countries. One aspect that is particularly interesting to analyse in consideration of developments in Sweden in recent years is the difference between each central bank's interest-rate path and the markets expectations of the interest rate. Figure 5:9 summarises these differences for the three countries. Market expectations are calculated on the basis of market pricing, with the difference between the interest rate path and market expectations being given as the average absolute deviation.[43] The average absolute deviation is obtained by first calculating the absolute value of the deviation between the central bank's forecast and market expectations at each point of the forecast period. This gives an absolute deviation per quarter for the forecast in question. The mean value of these absolute deviations is then calculated.[44]

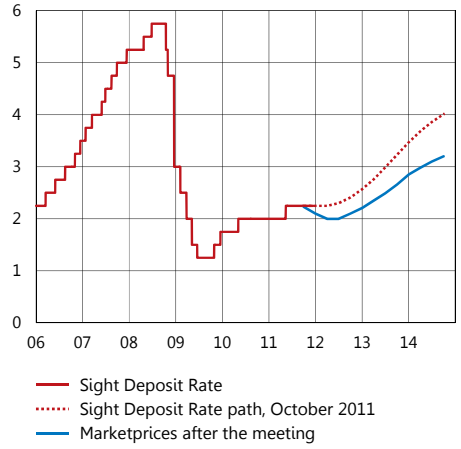
The deviation between market expectations and the central bank's forecast in all three countries has tended to vary between 0 and 0.6 percentage points over large parts of the periods under study. At times, greater deviations have occurred, for example in New Zealand during parts of 2009 – when, in the wake of the financial crisis, the Reserve Bank of New Zealand's interest-rate path was considerably lower than market expectations – and in Sweden during parts of 2010 and 2011. However, the deviation between the Riksbank's repo-rate path and market expectations in the later part of 2011 was both unusually wide and unusually prolonged. In conjunction with the three last repo-rate decisions of 2011, the average absolute deviation was 1.2 percentage points or more in all cases. As Figure 5:9 shows, these large deviations also seem to be specific to Sweden in many respects.

It is worth noting that expectations according to Prospera's surveys in 2011 have generally deviated less from the Riksbank's repo-rate path than those expectations based on market pricing studied here; one example of this is shown in Figure 5:10. This could indicate that calculations based on market pricing have led to an underestimation of the real expectations of the future repo rate, for example due to

[42] In January 2012, the United States' central bank, the Federal Reserve, started publishing the forecasts for the policy rate made by each member of the decision-making committee, the Federal Open Market Committee, for the next three years.
[43] Market expectations are calculated in different ways by the central banks of the different countries, but, in general, they are mostly based on interest derivatives. However, differences in methods and assumptions mean that comparability between countries is limited. It should also be noted that Norges Bank and the Riksbank make forecasts of their own policy rates, which is to say the sight deposit rate for Norges Bank and the repo rate for the Riksbank. For Norway and Sweden, the figure thus aims to directly illustrate deviations in monetary policy expectations. This is not the case for New Zealand, as the Reserve Bank of New Zealand makes a forecast of the interest rate for three-month bank certificates. Even though the correlation between the Reserve Bank of New Zealand's policy rate, the official cash rate, and the return on three-month bank certificates is certainly very high, using the return on bank certificates as a measure of monetary policy nevertheless introduces an extra source of error.
[44] As can be seen in Figure 5:9, the value for Sweden was 0.3 in April 2011. This reflects the average vertical difference between the red broken line and the blue line in Figure 5:10.

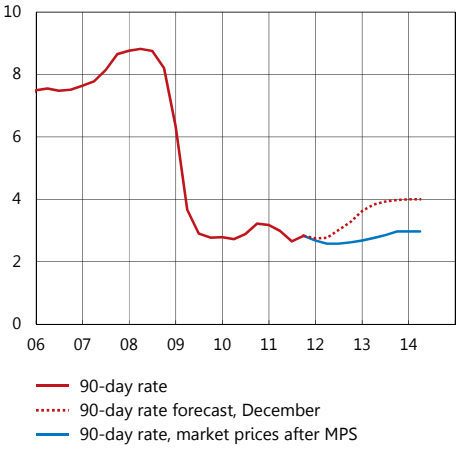
overestimated risk premiums.[45] A certain amount of support for this interpretation can also be found in the fact that expectations according to market pricing have also deviated downwards in Norway and New Zealand; examples of this are given in Figures 5:11 and 5:12. Nevertheless, it seems likely that there exists a difference between the Riksbank's repo-rate path and the future repo rate that the market expects. Towards the end of 2011, Prospera's surveys also indicated that respondents expected a significantly lower future repo rate than was communicated by the Riksbank, even if the survey-based expectations were considerably closer to the Riksbank's interest rate path than were expectations based on market pricing; this is exemplified in Figure 5:13. However, it is difficult to reach any clear conclusions regarding the causes of the deviations. (See also the discussion in Chapter 5).

Figure 5:11. Sight deposit rate expectations measured using market prices, October 2011
Per cent



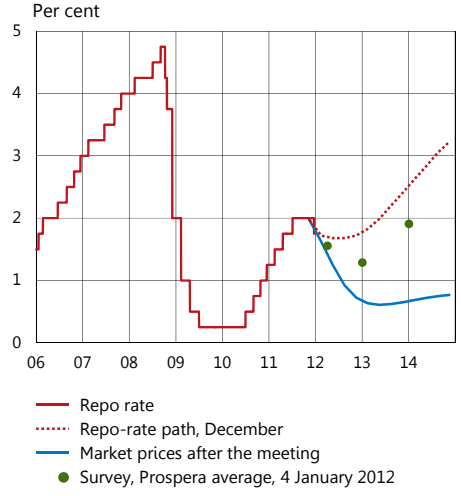
Source: Norges bank

Figure 5:12. Bank certificate expectations measured using market prices, December 2011
Per cent



Source: Reserve Bank of New Zealand

Figure 5:13. Repo-rate expectations measured using market prices and surveys, December 2011
Per cent



Sources: Reuters EcoWin, TNS Sifo Prospera and the Riksbank

[45] However, as was pointed out in Chapter 5, it should be noted that survey data also has shortcomings as a measure of market expectations.

■ Appendix

Alternative repo-rate scenarios

Alterative repo-rate scenarios in July

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 A1 to A5. 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. Figure A2 and A3 show the accompanying forecasts for CPIF and CPI inflation. The figures show that the higher repo-rate path would mean that inflation measured as the CPI would be closer to the target of 2 per cent during the forecast period than the repo-rate path in the main scenario. But it would also mean that CPIF inflation would be relatively low. A lower repo-rate path would mean the opposite. CPI inflation would be further from the target and CPIF inflation would be closer to 2 per cent.

Figures A4 and A5 show the accompanying forecasts for different measures of resource utilisation. The overall assessment in the main scenario is that resource utilisation would be slightly lower than normal in the first half of 2011. During the forecast period, resource utilisation would rise to a normal or slightly above normal level. With the lower repo-rate path, resource utilisation would be slightly higher during the forecast period. The higher repo rate would lead to a slightly lower resource utilisation measured in terms of the GDP gap, but to a relatively higher rate of unemployment.

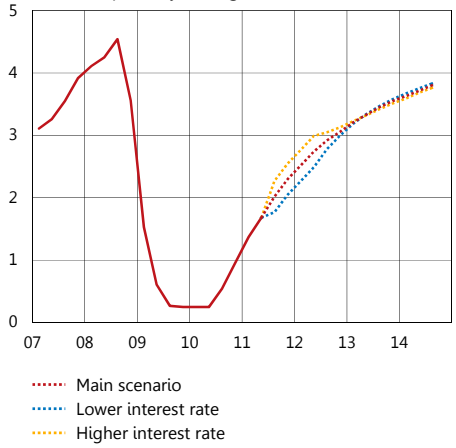
Alternative repo-rate scenarios in October

The alternative repo-rate paths and accompanying forecasts for inflation and resource utilisation published in the Monetary Policy Report in October are shown in Figures A6 to A10. 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 in Figure A6. Figures A7 and A8 show the accompanying forecasts for CPIF and CPI inflation. Figure A7 shows that the lower repo path would result in CPIF inflation reaching 2 per cent earlier than with the forecast in the main scenario. However, Figure A8 shows that it would also mean CPI inflation being further from the inflation target during the forecast period. A higher repo-rate path would mean the opposite: it would take longer for CPIF inflation to approach 2 per cent but CPI inflation would be closer to the target.

Figures A9 and A10 show different measures of resource utilisation. While the GDP gap indicated that resource utilisation was largely at a normal level, the unemployment rate indicated that there was still spare capacity in the economy. The overall assessment in the main scenario was that resource utilisation was somewhat lower than normal, but that it would be normal towards the end of the forecast period. With a lower repo-rate path, resource utilisation would be higher during the forecast period. The higher repo-rate path would instead lead to lower resource utilisation.

Arguments in favour of the lower repo-rate path were thus that CPIF inflation would approach the target of 2 per cent more rapidly and that unemployment would be lower. On the other hand, the lower repo-rate path would result in higher CPI inflation and a GDP gap that would be somewhat above its normal level during the latter part of the forecast period.

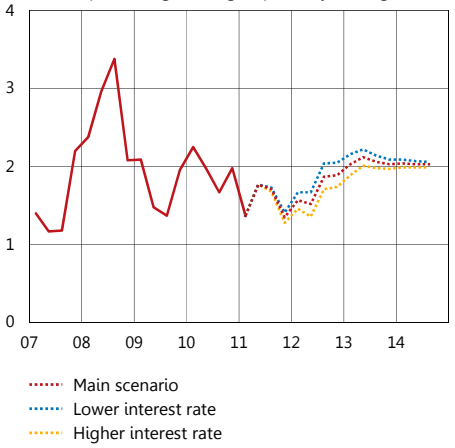
Figure A1. Repo-rate assumptions
Per cent, quarterly averages



Note. The broken line represents the Riksbank's forecast in July 2011.

Source: The Riksbank

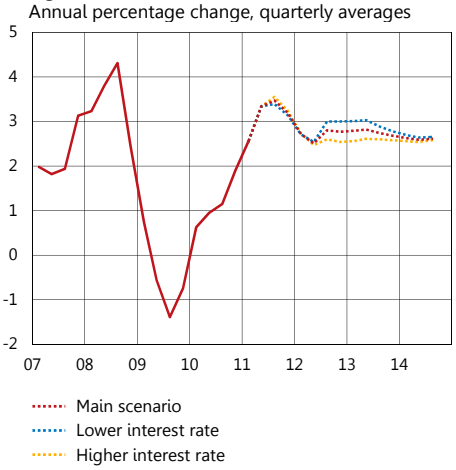
Figure A2. CPIF
Annual percentage change, quarterly averages



Note. The broken line represents the Riksbank's forecast in July 2011.

Sources: Statistics Sweden and the Riksbank

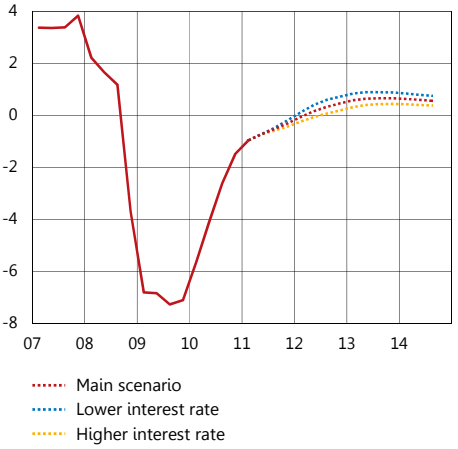
Figure A3. CPI
Annual percentage change, quarterly averages



Note. The broken line represents the Riksbank's forecast in July 2011.

Source: Statistics Sweden and the Riksbank

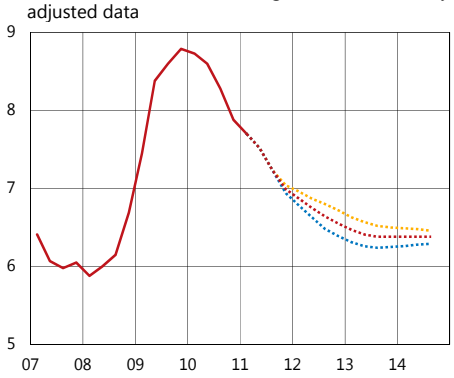
Figure A4. GDP gap
Per cent



Note. The GDP gap refers to the GDP deviation from trend, calculated using a production function. The broken line represents the Riksbank's forecast in July 2011.

Source: Statistics Sweden and the Riksbank

Figure A5. Unemployment
Per cent of the labour force, aged 15-74, seasonally-adjusted data

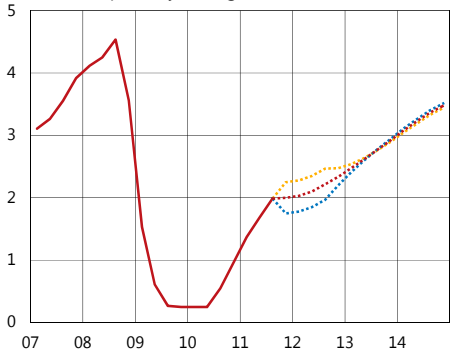


Main scenario
Lower interest rate
Higher interest rate

Note. The broken line represents the Riksbank's forecast in July 2011.

Source: Statistics Sweden and the Riksbank

Diagram A6. Repo-rate assumptions
Per cent, quarterly averages

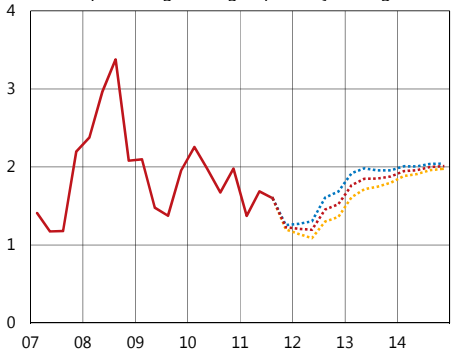


Main scenario
Lower interest rate
Higher interest rate

Note. The broken line represents the Riksbank's forecast in October 2011.

Source: The Riksbank

Diagram A7. CPIF
Annual percentage change, quarterly averages



Main scenario
Lower interest rate
Higher interest rate

Note. The broken line represents the Riksbank's forecast in October 2011.

Source: Statistics Sweden and the Riksbank

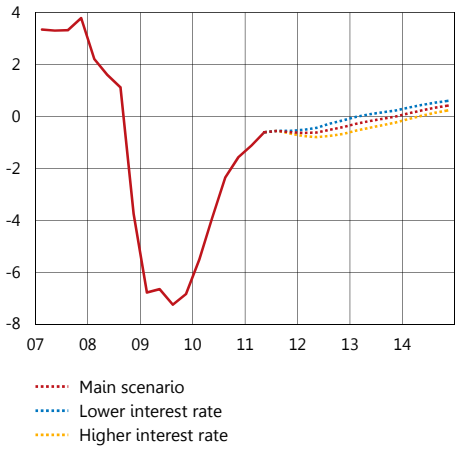
Diagram A8. CPI
Annual percentage change, quarterly averages

Main scenario
Lower interest rate
Higher interest rate

Note. The broken line represents the Riksbank's forecast in October 2011.

Source: Statistics Sweden and the Riksbank

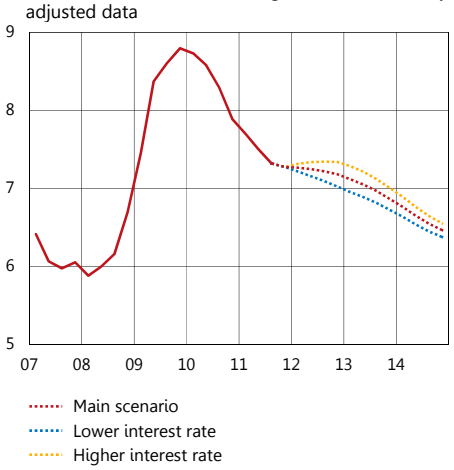
Figure A9. GDP gap
Per cent



Note. The GDP gap refers to the GDP deviation from trend, calculated using a production function. The broken line represents the Riksbank's forecast in October 2011.

Source: Statistics Sweden and the Riksbank

Diagram A10. Unemployment
Per cent of the labour force, aged 15-74, seasonally-adjusted data



Note. The broken line represents the Riksbank's forecast in October 2011.

Source: Statistics Sweden and the Riksbank

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

Let yt be the outcome for variable y year t (for example y=GDP growth and t=2009) and assume that the forecast for y is $\hat{y}(h)it$, where h specifies 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). The index i represents different analysts. Forecaster i's various forecasting errors can thus be defined as

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

The squared forecasting error is defined as

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

and the absolute forecasting error as

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

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

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

where n_i = the number of forecasts made by i. The mean squared forecasting error (MSE_i) for forecaster i is calculated as

$$MSE_i = \frac{\sum \varepsilon_{it}^2}{n_i}. \quad (5)$$

Similarly, the mean absolute error (MAE_i) for forecaster i is calculated as

$$MAE_i = \frac{\sum \varepsilon_{it}^{abs}}{n_i}. \quad (6)$$

The starting point for the Riksbank's calculation method is that the squared forecasting errors in equation (2) – or the absolute forecasting errors 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 squared forecasting errors, where it is assumed that these can be split up as follows:

$$\varepsilon_{it}^2 = \alpha h_{it} + \mu_i + \lambda_t + e_{it}. \quad (7)$$

The adjusted mean squared error presented in Chapter 4 is calculated as the forecaster's estimated performance centred around the mean squared error of all forecasts

$$AMSE_i = \hat{\mu}_i - \frac{\sum \hat{\mu}_i}{j} + MSE, \qquad (8)$$

where *j* is the number of forecasters. For the absolute error, the following equation is estimated

$$\varepsilon_{it}^{abs} = \alpha h_{it} + \mu_i + \lambda_t + e_{it} \qquad (9)$$

and the adjusted mean absolute error is calculated as

$$AMAE_i = \hat{\mu}_i - \frac{\sum \hat{\mu}_i}{j} + MAE. \qquad (10)$$

The ranking of the various forecasters is generally similar, but not identical, when squared and absolute forecasting errors are used.[46] For the outcome year 2011, for instance, the ranking of the best forecasters of GDP growth, CPI inflation, and interest rates is similar. A relatively large shift in the ranking can be noted when the unemployment forecasts in 2011 are assessed. The Riksbank, which in Chapter 4 was the sixth best forecaster, is second best when the forecasts are evaluated in terms of absolute forecasting errors. This major shift in the ranking is explained by very small differences in both adjusted mean squared errors and adjusted mean absolute errors between the forecasters.

When comparisons are made over the longer period of time (1999 to 2011), Swedbank emerges as the best forecaster for CPI inflation. This differs from the ranking in Chapter 4, where the Trade Union Confederation is ranked highest and Swedbank comes second. When the forecasts are evaluated in terms of absolute forecasting errors, the Riksbank made the best forecasts of GDP growth. This represents a relatively large shift compared to the ranking in Chapter 4 where the Trade Union Confederation is ranked highest and the Riksbank is only in fourth place. In the case of unemployment forecasts, SEB is ranked first and the Riksbank second, which is completely in line with the results in Chapter 4. Swedbank was the best forecaster with regard to repo-rate forecasts when the analysis is based on mean absolute errors. SEB, which was ranked first in Chapter 4, is only in fourth place. Once again, however, it should be noted that the differences in adjusted mean absolute errors between the various forecasters are generally very small.[47]

[46] Differences arise because large forecasting errors are "punished" more severely when they are squared than when the absolute value is used.
[47] Detailed results of the forecast evaluation based on absolute errors are available from the Riksbank on request.

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