



Inflation Report

2006:1

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■ Foreword

The objective of the Riksbank's monetary policy is to keep inflation at 2 per cent, with a tolerance for deviations from this level of +/- 1 percentage point. The Riksbank gives its collective view of the inflation outlook in the Inflation Report. The Executive Board's monetary policy decisions and discussions are presented in separate press releases. Executive Board members may differ in their opinions on inflation prospects. The Board members' assessments and individual stances on monetary policy decisions are presented in the minutes of the Executive Board's monetary policy meetings. Any differences in opinion regarding the inflation outlook will thus be recorded in the separate minutes of the Board meeting on 22 February, to be published on 8 March 2006.

This Inflation Report reproduces the main features of the presentations and discussions at the Executive Board meetings on 9 February and 17 February 2006. The purpose of the Inflation Report is not merely to produce background material for monetary policy decisions, but also to spread knowledge about the Riksbank's assessments. The analyses also aim to illustrate perspectives on various economic phenomena that affect macroeconomic stability. The Bank aims to make it easier for external parties to follow, understand and assess its monetary policy.

According to Chapter 6, Article 4, of the Sveriges Riksbank Act (1988:1385), the Riksbank is to provide a written report on monetary policy to the Riksdag Committee on Finance at least twice a year. The Riksbank has chosen to use two of the year's four Inflation Reports for this purpose. This report constitutes one such account to the Riksdag.

These analyses are based on the assumption that the repo rate will develop in line with the financial markets' expectations, as reflected in implied forward rates. These forecasts extend three years ahead. It is important to point out that an interest rate path in line with forward interest rates should not be interpreted as the monetary policy assumption that the Executive Board considers most probable.

The Inflation Report begins with a summary. That is followed by a discussion of the key determinants of inflation. Finally, the Riksbank gives its collective assessment of inflation prospects in the main scenario and the key risks in this assessment. The Report also contains boxes that analyse the path of the krona and inflation, the uncertainty regarding future interest rate movements and material for assessing monetary policy 2003–2005.

Stockholm, February 2006

Stefan Ingves

GOVERNOR OF SVERIGES RIKSBANK

■ Summary

Economic activity has continued to strengthen in Sweden and abroad. GDP growth in Sweden appears to have been somewhat higher last year than the previous forecast in the Inflation Report. Growth is now also estimated to be stronger in the future than previously expected. Inflation has increased slightly during the last six months, although it remains low. In recent years, price increases in Sweden have been restrained by strong productivity growth and the benign development of import prices. The strong trend productivity growth is expected to continue to affect development in the years to come. Nevertheless, inflation is expected to rise as a result of an increase in resource utilisation and production costs, and to be close to the target a couple of years ahead. Compared with the previous report, the inflation forecast has been revised downwards somewhat. This assessment is based on a gradual increase in the repo rate.

■■ Several years of global high growth and low inflation.

Growth in the world economy has generally been both high and stable in recent years. Globalisation and increased trade have contributed to a rise in economic activity at the same time as stiffening international competition has curbed the price impulses that often occur in upturns. Oil and raw material prices have risen rapidly in the past few years. However, consumer prices have not risen as much as in previous episodes of sharp increases in raw material prices. This is a consequence of lower price increases or price cuts for products other than energy. International long-term interest rates have also been relatively low bearing in mind the economic climate, which partly reflects low inflation expectations.

The international upturn has also made an imprint on the development of the Swedish economy, which has benefited from the strong upswing in world trade. With the exception of a minor downturn at the end of 2004 and the beginning of 2005, growth in Sweden has been high in recent years while inflation has remained low. A high level of demand has been combined with strong productivity growth, weak cost pressures and low inflation. At the same time, the long-term interest rates have fallen and the repo rate has been lowered up until the beginning of the year.

■■ Stable development of international economic activity expected.

Preliminary statistics for GDP growth in the United States and the euro area show a surprisingly weak development in the fourth quarter of last year. However, it would appear to be primarily attributable to temporary conditions and growth is expected to increase in the future. Other cyclical indicators concur in pointing to continued stable economic activity worldwide. However, the Riksbank, like others, makes the assessment that growth in the United States will slacken somewhat in the years to come. Expectations in the financial markets are that the Federal Reserve's successive interest rate increases are approaching an end. The common view is also that the deficits on

the US current account and the Federal Budget – which are often presented as risk factors in relation to international developments – will not lead to rapid changes in household behaviour or asset prices in the next few years.

Unlike in the United States and several Asian economies, growth in the euro area was relatively weak in 2004 and at the beginning of 2005. During last year, however, there were signs that the economy was picking up. Growth in the fourth quarter was weak but other indicators support the picture of a slow improvement in economic activity. According to the market participants, the European Central Bank (ECB) is expected to increase the instrumental rate in the years to come.

Stable development of international economic activity is forecast in the future. Global GDP is expected to increase by around 4 per cent per year during the forecast period and a weak increase in international resource utilisation is expected. The growth forecast has been adjusted upwards slightly compared with the assessment in the last Inflation Report as a result of a revised estimate for firmer GDP growth in Asia. For the same reasons, forecast growth in Swedish export markets has been adjusted upwards slightly.

■ ■ Moderate international price pressure forecast.

As a result of higher demand in the wake of increased activity in the global economy, the crude oil price in dollars has approximately doubled in the past two years. After falling back during the autumn, the oil price rose again, to over 60 dollars per barrel at the beginning of February. In the coming years the oil price is estimated to exceed 60 dollars per barrel. The average crude oil price is now expected to be higher during the forecast period than stated in the last Inflation Report, which is also in line with the rise in forward prices. The price increases for oil and other raw materials such as metals have also contributed to driving up international producer prices although the rate of increase of producer prices is expected to slacken somewhat in the years to come. Abroad, both producer and consumer prices are expected to show relatively stable development in the future and increase by an average rate of approximately 2 per cent per year.

■ ■ Future monetary policy in Sweden expected to be less expansive.

In Sweden, monetary policy has become more and more expansive in the past two years. The box "Material for assessing monetary policy 2003–2005" in this report contains a discussion on the development of inflation and the policy conducted in 2003 and 2004. In January this year, the Executive Board of the Riksbank decided to increase the key policy rate by 0.25 percentage points. The assessment in this Inflation Report is based on an assumption that the repo rate will continue to increase in the future, in line with market expectations,

as they are reflected in the implied forward rates (see Figure 1). It is assumed that the future repo rate will rise slightly compared with the previous Inflation Report.

■ ■ Krona expected to strengthen during the forecast period.

Since 2002, the krona's value has gradually risen in relation to a competition-weighted basket (TCW) of currencies. This trend was reversed last year. The krona weakened sharply in connection with a temporary slackening of economic activity and a shift to more expansive monetary policy. Since the last report, the krona has strengthened approximately in line with the forecast. Since growth in Sweden, in relation to that in other countries, is now expected to be higher, the exchange rate is expected to be slightly stronger in the forecast period compared with the previous forecast.

■ ■ Substantial increase in household and corporate borrowing.

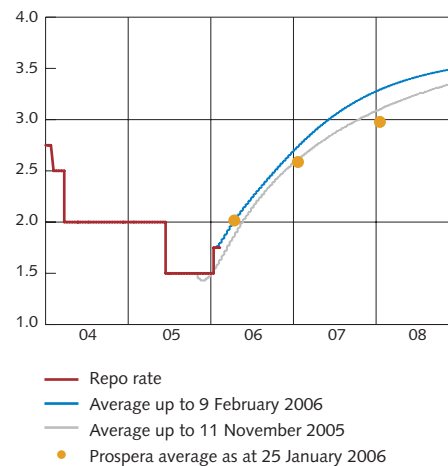
At the same time as both the long-term and short-term interest rates in Sweden have decreased, lending to households has steadily increased. The fast growth of credit has also coincided with a rapid increase in house prices. It seems as if the major part of household borrowing in recent years has been used to finance increasingly expensive housing. Lending to companies has also been increasing for over a year now. This has taken place at the same time as investment activity in the economy has increased.

■ ■ Long period of high GDP and productivity growth.

On average, Sweden's GDP has increased by almost 3 per cent per year in the last decade. The economy has thus grown considerably faster than, for instance, during the 1980s. This is primarily attributable to strong productivity growth. Furthermore, the demographic composition of the population has led to a steady inflow of labour. There are a number of explanations for the high productivity growth in the past decade. Stiffer competition has been a contributory factor as were major investments in information technology at the end of the 1990s. A changed stabilisation policy regime with price stability and balanced public finances has probably also played an important role for the relatively high growth in Sweden.

The strong productivity growth is expected to continue. GDP growth is therefore forecast as being relatively high in the years to come. A demand-side perspective also provides a case for strong future development. Increasing real and financial wealth and rising levels of real disposable income suggest a clear increase in consumption. It is expected that a combination of very low interest rates initially, relatively good corporate profits and a fast expansion of credit will lead to a sharp increase in investments. Strong economic development in other countries is expected to stimulate exports.

Figure 1. Implied forward rates (15-day average) and repo rate expectations according to Prospera's latest survey.
Per cent



Sources: Prospera Research AB and the Riksbank.

■ ■ Unexpectedly high growth in Sweden in 2005.

After a slowdown around the end of 2004, growth in the Swedish economy picked up again in 2005. The National Accounts for the third quarter reveal that there has been a rapid increase in household consumption. Export of goods and services also rose greatly although the increase in public consumption was surprisingly weak.

Different cyclical indicators reinforce the view of continued expansion of the economy. Towards the end of last year, for instance, retail trade turnover reported the highest rates of increase since 2000. The National Institute of Economic Research's Business Tendency Survey, Statistics Sweden's activity index and the purchasing managers' index all indicate a continued upturn in the immediate future. The indicator models used by the Riksbank also suggest continued high growth in the economy.

However, there is some uncertainty about the development of public consumption. For some time, the development of local government consumption has been surprisingly weak. However, the reinforcement of local government finances in recent years suggests a relatively strong increase in consumption this year. The proposals made by the government should have a similar impact.

Overall, the new statistics warrant an upward revision of the GDP growth forecast this year. Average GDP growth during the forecast period is also being adjusted upwards slightly, since most indications are that the relatively fast productivity growth noted in recent years will continue in the years to come. In particular, household consumption is expected to increase more quickly than assumed in December. GDP growth is now forecast at 3.5 per cent this year to subsequently slacken off and reach 2.4 per cent in 2008. The assumed upswing in interest rates is contributing to the slowdown.

■ ■ Labour market improvement.

Employment increased rather more than expected towards the end of last year and there is a lot to indicate that this trend will continue. The number of new job vacancies continued to rise at the same time as there was a slight fall in the number of redundancy notices. Following an upward adjustment, GDP growth is expected to lead to a greater increase in employment than forecast in December. Furthermore, labour supply normally increases more rapidly in periods of rapid expansion of employment. The forecast for the number of persons in the workforce has therefore been adjusted upwards. The forecast for unemployment is accordingly the same as in the last report. The rate of wage increases is expected to rise slowly over the next few years as the number of employed rises and unemployment falls. Productivity is expected to increase at about the same rate as the average for the past decade. This is slightly higher than assumed in the previous Inflation Report, and a slightly lower increase in unit labour costs is therefore expected.

The view of resource utilisation is largely the same as in December. Output and demand are rising at a faster pace while productivity growth and labour supply are expected to be higher.

■■ Inflation is approaching the target at a moderate pace.

Inflation has been low in recent years. The prices of mainly imported goods, excluding oil, have fallen in recent years and domestic prices have only increased slowly. Weak cost pressures due to high productivity growth, moderate wage increases and low resource utilisation have contributed to the low level of inflation. The delayed effects of the earlier strengthening of the krona have very probably also played a part.

Last year, the rate of price increases has risen slightly and different measures of the underlying inflation rate suggest that this rise is taking place on a relatively broad basis. In January, inflation amounted to 0.9 per cent measured using UND1X and to 0.6 per cent using CPI, which was lower than expected.

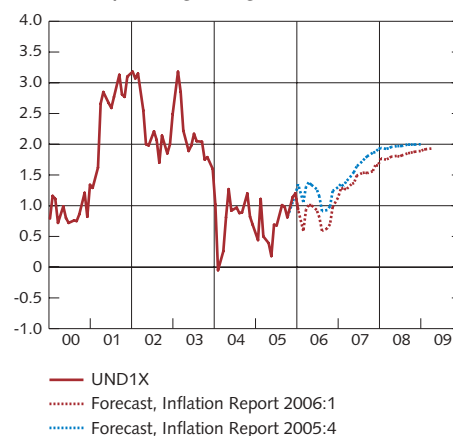
Inflation is expected to rise in the future. For some time, producer prices have risen rapidly and these are eventually expected to affect consumer prices as well. The rate of inflation has been curbed in recent years by low cost increases, among other things. In 2004, unit labour costs fell by approximately one per cent. Last year, costs increased instead by approximately one per cent. The increasing cost pressures are expected, after a lag, to lead to higher consumer prices. Costs and consumer prices are, however, expected to increase at a relatively moderate pace since the factors that have hitherto contributed to low inflation will continue to affect the future rate of price increases. Productivity growth, for instance, is expected to remain relatively high accompanied by moderate international price pressure. Furthermore, the forecast is based on the assumption that economic policy will be decreasingly expansive. Inflation is expected to rise in the future, albeit at a moderate pace, and approach the target in two years.

Compared with the previous report, the inflation forecast measured using UND1X has been revised downwards (see Figure 2). This is partly due to the low outcome for January, but also to a more positive view on productivity growth.

■■ Balanced risks forecast.

As in the previous Inflation Report, there is uncertainty about the oil price, productivity, competitive pressure and their effects on inflation, even after the revisions of the forecasts in this report. As in December, the future development of growth, savings and the current account in the United States is a source of great uncertainty. There are also risks associated with the rapid increase in borrowing and the rising prices of housing in Sweden. The rapid increase in demand in the Swedish economy also raises a number of new issues, for instance what will happen to price and wage developments when the situation in the

Figure 2. UND1X.
Annual percentage change



Sources: Statistics Sweden and the Riksbank.

labour market improves. The overall assessment is that the probability of inflation being lower than in the main scenario is about as high as the probability of it being higher.

**Table 1. Inflation forecast in the main scenario.
Annual percentage change**

	Annual average				12-month rate			
	2005	2006	2007	2008	Mar. 06	Mar. 07	Mar. 08	Mar. 09
CPI	0.5 (0.4)	1.1 (1.4)	2.1 (2.1)	2.2 (2.3)	0.8 (1.1)	2.1 (2.0)	2.3 (2.3)	2.3
UND1X	0.8 (0.8)	0.9 (1.2)	1.5 (1.6)	1.8 (2.0)	0.9 (1.3)	1.3 (1.4)	1.8 (1.9)	1.9
UNDINHX	1.0 (1.0)	1.4 (1.4)	2.0 (2.3)	2.5 (2.7)	1.2 (1.3)	1.8 (1.9)	2.4 (2.7)	2.7
UNDIMPX	0.2 (0.2)	-0.4 (0.7)	0.2 (0.3)	0.3 (0.3)	0.3 (1.4)	0.0 (0.2)	0.4 (0.4)	0.3

Note. The figures in parentheses are the forecasts in the previous Inflation Report. UND1X is CPI excluding household mortgage interest expenditure and the direct effects of changed indirect taxes and subsidies. UNDINHX refers to prices of mainly domestically produced goods and services in UND1X. UNDIMPX refers to prices of mainly imported goods and services in UND1X.

Sources: Statistics Sweden and the Riksbank.

**Table 2. Key figures.
Per cent and annual percentage change**

Key figures	2004	2005	2006	2007	2008
GDP OECD 19	3.1	2.5 (2.5)	2.5 (2.4)	2.5 (2.5)	2.6 (2.6)
CPI OECD 19	2.0	2.4 (2.4)	2.1 (2.4)	2.1 (2.1)	2.1 (2.1)
Crude oil price Brent, USD/barrel, annual average	38	54 (54)	63 (54)	62 (53)	60 (52)
Market growth for Swedish exports	8.1	5.9 (4.6)	6.1 (5.6)	5.9 (5.7)	5.9 (5.7)
Exchange rate, TCW index, annual average	126.0	128.3 (128.5)	127.4 (128.9)	124.5 (125.4)	122.9 (123.5)
Repo rate, implied forward rate, annual average	2.1	1.7 (1.7)	2.2 (2.1)	3.0 (2.8)	3.4 (3.2)
10-year interest rate	4.4	3.4 (3.4)	3.7 (3.7)	4.3 (4.3)	4.7 (4.7)
GDP	3.7	2.7 (2.4)	3.5 (3.2)	2.8 (2.5)	2.4 (2.2)
Persons in employment	-0.5	0.7 (0.6)	1.5 (1.1)	0.6 (0.6)	0.2 (0.2)
Open unemployment, per cent of labour force	5.9	5.9 (5.9)	5.0 (5.0)	4.8 (4.6)	4.6 (4.6)
Hourly wage in economy as a whole (KL)	3.3	3.3 (3.3)	3.6 (3.6)	3.9 (3.9)	4.1 (4.1)
Unit labour costs in business sector	-1.1	0.9 (1.0)	1.0 (1.1)	1.7 (1.8)	2.0 (2.1)
Public financial saving, percentage of GDP	1.5	2.0 (1.6)	1.5 (1.1)	1.0 (0.7)	1.2 (1.2)

Note. The figures in parentheses are the forecasts in the previous Inflation Report.

Sources: Intercontinental Exchange, National Mediation Office, OECD, Statistics Sweden and the Riksbank.

■ Determinants of inflation

The financial markets

Since the previous inflation report, the krona has strengthened and Swedish and international long-term interest rates have remained largely unchanged. Expectations on the future repo rate, as reflected in the implied forward rates, are somewhat higher than in the previous Inflation Report. The krona is now assessed to be rather stronger, primarily due to improved growth prospects in Sweden in relation to other countries. House prices and household borrowing continue to grow relatively quickly. In recent years, this development has taken place in tandem with a falling real interest rate.

■ ■ The repo rate is expected to be higher.

As in the previous Inflation Report, the forecasts have been based on the repo rate developing in line with the implied forward rates. A 15-day average up to 9 February has been used in this report. The present forward rate is almost 0.2 percentage points higher, seen as an average over the whole of the forecast period compared with the previous report. The implied forward rates are approximately 2.75 per cent at the end of 2006 and around 3.5 per year at the end of the forecast period (see Figure 1).

In the United States, the Federal Reserve has continued to increase the key policy rate, which is now 4.5 per cent. Pricing in the money market reflects expectations that the period of increases which began in June 2004 is nearing its end (see Figure 3). In the euro area, the ECB has increased the key policy rate after having kept it unchanged since summer 2003. Since the former inflation report, the financial markets' view of the ECB's monetary policy has only changed marginally while the Federal Reserve is now expected to pursue a somewhat tighter monetary policy (see Figure 3).

■ ■ A gradual increase in long-term rates expected.

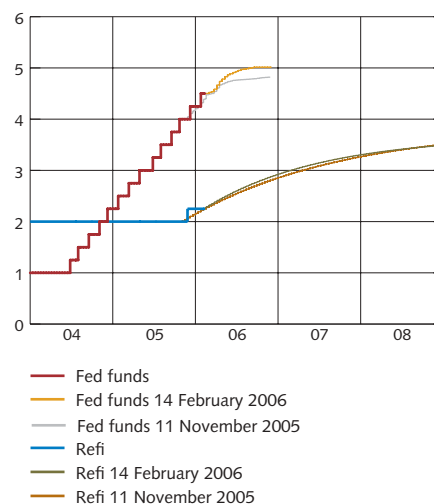
Since the bottom levels in September, the 10-year interest rates in Sweden and the euro area have increased by 0.5 and 0.4 percentage points respectively. Compared with the beginning of December, when the last inflation report was published, interest rates are largely unchanged, however (see Figure 4). The 10-year bond rate in the United States has followed a very similar pattern.

As previously, the assessment is that long-term interest rates will rise successively during the forecast period. This assessment is based on expectations of a rising repo rate and that some normalisation will take place of the currently low risk premiums.

■ ■ Flat yield curve in the United States.

The successive increases of the key policy rate in the United States have not coincided with any marked rise in long-term bond rates. At

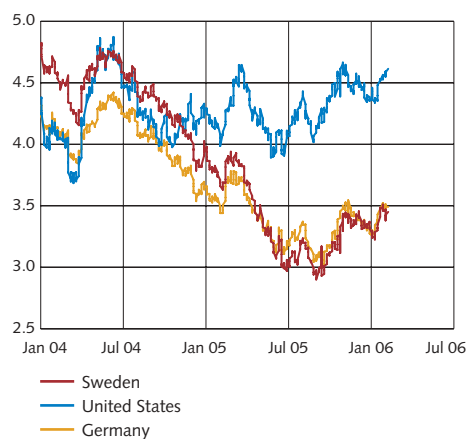
Figure 3. Monetary policy expectations in the euro area and the United States according to implied forward rates and Fed funds contracts. Per cent



Note. Fed funds futures are priced in terms of an average key policy rate in the respective month.

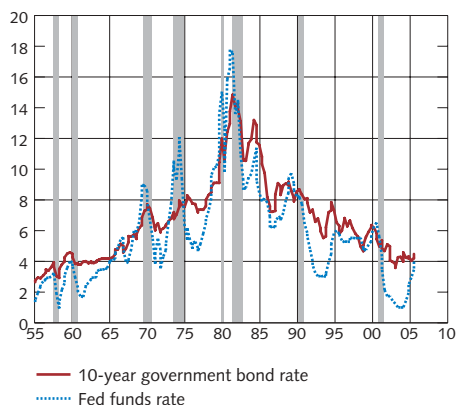
Source: The Riksbank.

Figure 4. Government bond rates with 10-year maturities in Sweden, Germany and the United States. Per cent



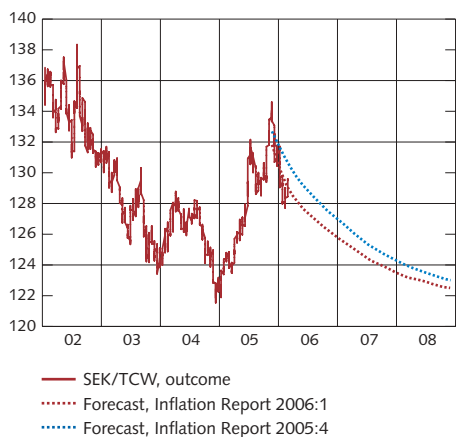
Source: The Riksbank.

Figure 5. Fed funds rate and 10-year government bond rate in the United States, 1955-2005.
Per cent



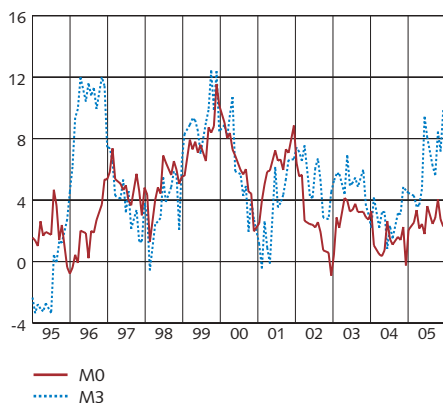
Note. Shaded fields state periods of recession according to the National Bureau of Economic Research (NBER). The Fed funds rate is measured as realised interest.
Sources: Federal Reserve, National Bureau of Economic Research and the Riksbank.

Figure 6. Competition-weighted exchange rate, TCW Index, 18 Nov 1992 = 100



Note. The outcomes are the day rates and forecasts refer to quarterly averages.
Source: The Riksbank.

Figure 7. Quantity of money measured as M0 and M3. Annual percentage change



Source: Statistics Sweden.

present, the US yield curve is accordingly flat. Recessions in the US economy have often been preceded by a negative sloping yield curve (see Figure 5), but there are also examples of episodes where the difference between long-term and short-term interest rates has been very little, although economic activity has still developed well, for instance, in 1995.

The past 50 years' development in the United States shows that the key policy rate and the long-term bond rates have followed each other over longer periods although there has been greater variation in the key policy rate (see Figure 5). Since the start of the 1980s, both the key policy rate and government bond rates have decreased. During this period, actual inflation and long-term inflation expectations in the United States have sharply decreased. This means that both the long-term interest rates and the inflation rate have recently been at approximately the same level as in the 1960s. This would suggest that the currently very low long-term bond rates rather reflect an increased belief in low inflation than a pessimistic outlook on economic activity. It can also be noted that the long-term interest rates gradually decreased during the sustained upturn during the 1990s. In addition to inflation-related factors, there are naturally other reasons for the low long-term interest rates in recent years, for instance, the high level of global saving, not least in Asia, which has resulted in increased demand for US long-term government bonds.

■ ■ **As expected, the krona has strengthened.**

In 2005, it was considered that the krona would strengthen. Instead, the krona weakened which seems to have been partly due to expectations of a somewhat greater interest gap in relation to other countries. Recently, the krona has strengthened. To some extent, this can be linked with changed expectations about future monetary policy. Just as before, the krona is expected to strengthen in the future. Fundamental factors such as Sweden's current account surplus and our good growth prospects in relation to other countries indicate a strengthening of the real exchange rate. Together with the forecasts for inflation in Sweden and other countries, this means that the nominal exchange rate is also expected to strengthen.

In relation to the former inflation report, the competition-weighted exchange rate, the TCW index, is expected to be somewhat stronger. This is primarily due to improved growth prospects in Sweden in relation to other countries. The pace at which the krona is expected to strengthen over the forecast horizon is approximately the same as in the previous assessment (see Figure 6 and Table 2).

■ ■ **Uneven stock market development so far this year.**

After the strong development in the fourth quarter of 2005, development has been more uneven recently. Since the bottom levels at the beginning of 2003, share prices in Sweden according to the OMX index have risen by approximately 125 per cent. This means

that the OMX index has risen in the past three-year period by an average annual rate of approximately 30 per cent. The profits of listed companies from 2003–2005 have increased at the same rate as share prices, and the P/E ratios have accordingly not changed markedly during these years. They remain under the average for the past 10 years.

■ ■ Rapid increase in the quantity of money.

The rate of growth of the quantity of money has increased in the past year (see Figure 7). Since 1995, the annual growth rate of the quantity of money, as measured by M0 and M3, has been around 3-4 percentage points above inflation. Compared with previous periods, this is a great difference in the rates of increase: From 1965 to 1995, the growth rate of the quantity of money was only marginally higher than inflation and in the 1980s, the growth rate was lower than inflation. Accordingly, the past 10 years has been a period with a higher rate of increase in the real quantity of money, viewed from a historical perspective.

■ ■ Borrowing is increasing on a broad basis.

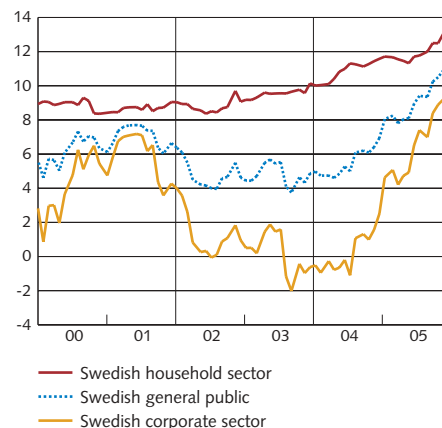
House prices continued to increase at a rapid rate. In the third quarter, they were approximately 10 per cent higher than in the corresponding quarter last year. At the same time, borrowing is increasing sharply and on a broad basis. Both household and corporate borrowing rose by more than 10 per cent in December compared with the same month last year (see Figure 8). This can be compared with the average since 1996, which corresponds to an annual rate of approximately 7.5 per cent for household borrowing. House prices have shown a similar average rate of increase since 1996. At present then both household borrowing and house prices are rising relatively sharply (see Figure 9). Household debt has, however, not been increasing more quickly than financial assets, which means that there has been an increase in financial net wealth.

■ ■ Expansive financial conditions.

The krona has strengthened both in real and nominal terms in the recent period but is still considerably weaker in real terms than for instance, the average level in 2003–2004 (see Figure 10). The weakening of the trade-weighted krona exchange rate has been larger in real terms than in nominal terms in recent years, which is related to Sweden having had lower inflation than other countries.

Although some increase in nominal interest rates has taken place very recently, the real interest rate is still low (see Figure 10). The low real interest rate is a driving force underlying the high rate of increase of household borrowing and house prices in Sweden (see Figures 9 and 10). In this Inflation Report, it is assumed that the repo rate will be raised successively. The Riksbank's assessment is that the long nominal interest rates will also increase during the forecast period. A

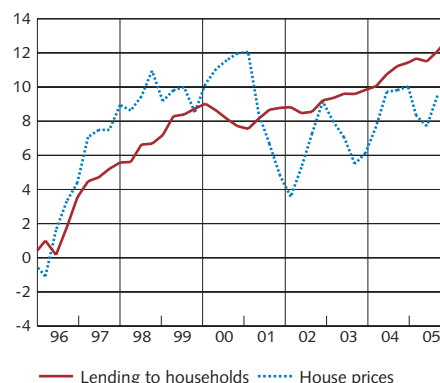
Figure 8. Lending by all credit institutions to the Swedish public, by sector. Annual percentage change



Note. Changes in reporting data have led to some adjustments in Statistics Sweden's data.

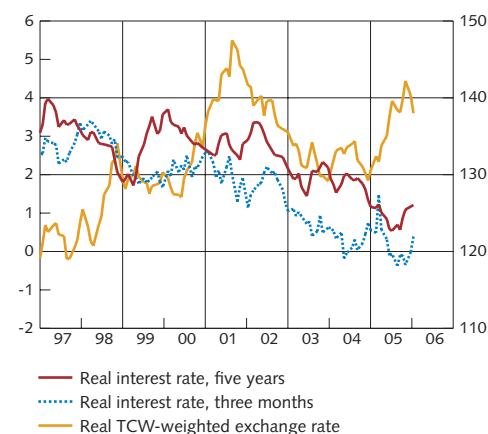
Source: Statistics Sweden and the Riksbank.

Figure 9. House prices and total lending to Swedish households. Annual percentage change



Source: National Land Survey, Statistics Sweden and the Riksbank.

Figure 10. Real interest rate with five-year and three-month maturities and real TCW-weighted exchange rate. Per cent Index 18 November 1992=100



Note. When calculating real interest rates, inflation expectations have been used from the National Institute of Economic Research's HIP survey for the three-month interest rate and from Prospera's survey for the five-year rate. Interest rates refer to T-bills with three-month maturities and government bonds with five-year maturities.

Sources: National Institute of Economic Research, Prospera Research AB and the Riksbank.

development towards historically more normal interest rate levels, in real terms as well, is expected to slow down rising house prices and household borrowing.

Overall, financial conditions in Sweden can be described as continuing to be very expansive. Historically, the increase in corporate and household borrowing is high, the quantity of money is increasing quickly, the real interest rates are low and the exchange rate is weak. This is partly a result of the expansive monetary policy and suggests a strong growth in demand.

Revised forecasts since the previous Inflation Report

- The implied forward rates are on average almost 0.2 percentage points higher during the forecast period.
- The forecast for SEK/TCW has been revised in a stronger direction.

International developments

International economic activity continues to strengthen. As before, continued stable development of international economic activity is forecast for the future. Consumer price increases have remained relatively moderate, despite rising oil and raw material prices. The forecast for international GDP growth and the assessment of market growth for Swedish export goods have been revised upwards somewhat for the forecast period.

■ ■ International growth trends remain positive.

Most indicators suggest that international growth trends will remain positive (see Figure 11). Global GDP growth in 2005 was an estimated 4.2 per cent. This year growth in Asia and the United States is expected to slacken somewhat, but nevertheless remain strong. Growth in the euro area is also expected to be relatively firm (see Figure 12). Overall, global growth is expected to continue to show stable development and amount to about 4 per cent this year and during the coming two years and global resource utilisation is expected to rise slightly. The international upturn in prices is expected to be moderate, partly because stiffer competition will contribute to continued global price pressure. Consumer and producer prices are expected to rise by an average of 2 per cent per year.

■ ■ Oil price rises again.

The oil price has become higher than expected since the previous Inflation Report. Forward prices for oil have also risen since December (see Figure 13). This upturn is the result of disruptions to production, seasonal factors and international unease. The oil price is now expected to be, on average, about 15 per cent higher during the forecast period compared with the assessment in the previous Inflation Report.

■ ■ US growth slackens somewhat.

According to preliminary figures, GDP growth in the United States was, in annualised terms, only 1.1 per cent between Q3 and Q4. This was much lower than that forecast by most analysts, including the Riksbank. Growth in both the private and public sectors was surprisingly slow. The decline in household consumption during the autumn is also reflected in the monthly statistics for the retail trade,

Figure 11. PMI in manufacturing: United States, Japan, United Kingdom and euro area.
Diffusion index

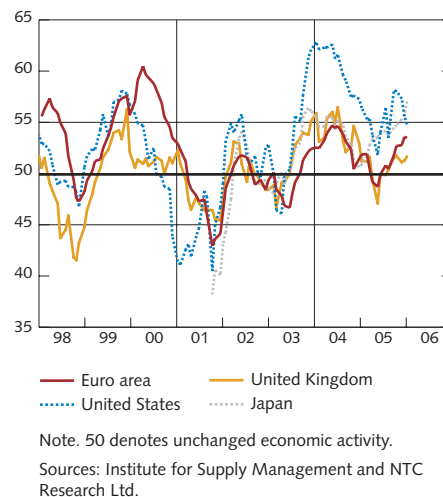


Figure 12. GDP in euro area and United States.
Percentage change, seasonally adjusted data

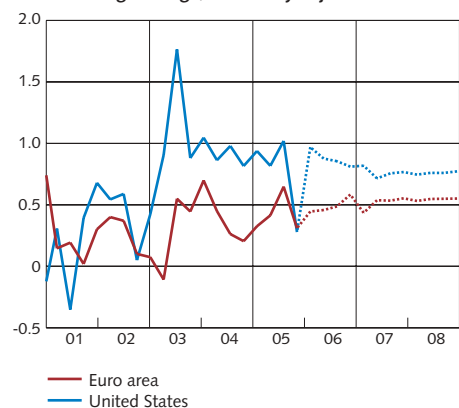


Figure 13. Oil price, Brent crude.
USD per barrel

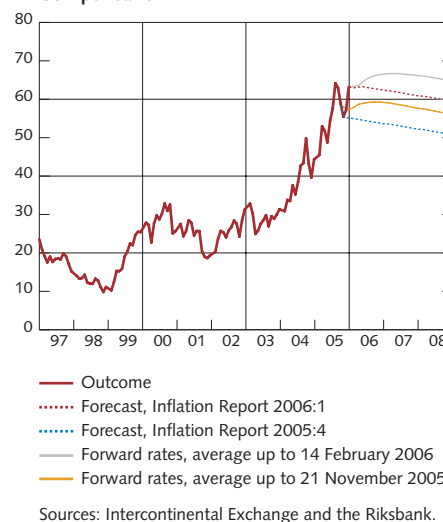
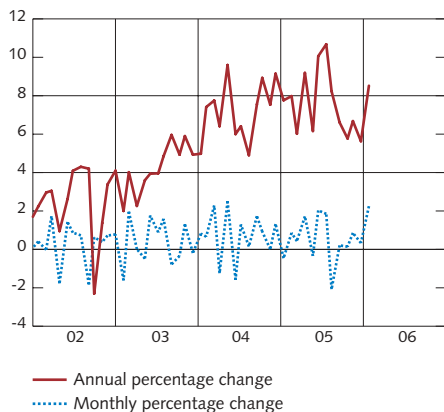
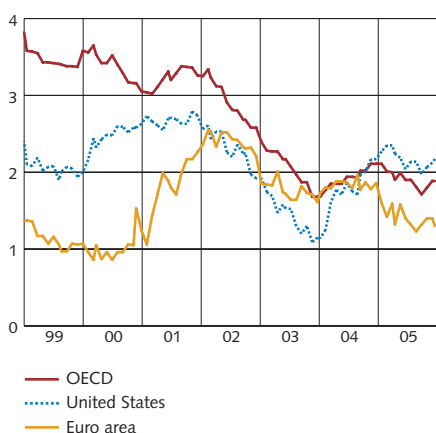


Figure 14. Retail trade turnover in the United States. Monthly and annual changes in per cent, seasonally adjusted data



Source: US Department of Commerce.

Figure 15. CPI inflation excluding energy and food in the United States, the euro area and the OECD. Annual percentage change



Source: OECD.

among others, but there has since been a recovery (see Figure 14). The weak outcome in public consumption during Q4 may, for example, have been affected by when deliveries of defence equipment have been reported. It is therefore too early to draw the conclusion that there has been a pronounced slowdown in the US economy.

Overall, GDP growth in the US economy was strong in 2005. Despite hurricanes and a high oil price, GDP grew 3.5 per cent during the year according to preliminary figures. The high propensity to consume among US households could be linked to the fact that they appear to be expecting a continued favourable development in employment. In January, 1.6 per cent more persons were employed than in the corresponding month last year. Rising house prices have also contributed to sustaining household consumption, but recently, the housing market has started to weaken. The number of houses sold as a proportion of the total stock of properties on the market has declined and the rate of price increase has been subdued.

The strong labour market, in combination with continued high profits in the business sector and rising prices in the assets markets, is expected to have a positive effect on domestic demand in the future, even if the propensity to consume is gradually weakening. Investment growth, which was strong in 2005, is also expected to taper off somewhat during the forecast period. The continued strong development of domestic demand and rising employment will mean that productivity, which was subdued somewhat in 2005, will slow further in the coming years. The US economy is expected to grow at a rate of just over 3 per cent per year during the coming three years.

Inflation in the United States, as measured in the consumer price index (CPI), has fallen back somewhat in recent months. This can largely be attributed to the decline in the oil price at the end of last year. Measures of underlying inflation are considerably more stable and indicate that prices did not continue to accelerate in 2005 (see Figure 15).

■■ Improved growth prospects for Asia.

In Asia, economic growth has remained in line with earlier forecasts. In Japan, GDP grew by an average of one per cent per quarter in the first three quarters of 2005, which is a considerable improvement compared with 2004. Growth in household consumption has risen at the same time as public consumption has continued to grow at a moderate rate. At the same time, export growth has been dampened. Restructuring and cost reductions in Japanese companies have contributed to higher company profits and stronger balance sheets. Investments have risen this year and growth is expected to be relatively high during the coming years. This year the Japanese economy is expected to grow by 2.1 per cent. Labour market conditions have improved gradually since 2002 and unemployment is now at its lowest since 1998. As the economic recovery continues, it is expected that the prolonged period of deflation will be interrupted.

During the course of the year, market analysts have gradually revised up their assessment of growth in Asia for 2006 (see Figure 16). Economic growth in China is high and production has risen by 9-10 per cent per year since 2003. The economic expansion continued at the same high rate during the final quarter of last year and production rose by almost 10 per cent compared with the corresponding quarter last year. The recovery in the Japanese economy and the strong economic expansion in China have contributed to high growth in several other Asian countries despite higher costs for oil and other intermediate goods.

■ ■ Economic activity in the Euro area growing stronger.

Growth in the euro area was relatively strong in the third quarter of last year, although, according to preliminary figures, it subsequently slackened again during the final quarter. Most factors suggest that temporary factors contributed to driving growth during the third quarter and a certain softening in growth was therefore not unexpected. The outcome for GDP growth for the full year 2005 was in line with the assessment in the previous Inflation Report.

During the winter, business tendency surveys and household surveys indicated rising growth in the euro area. Confidence indicators for the manufacturing industry have consistently moved in a positive direction (see Figure 17). Confidence indicators for households have also risen and the improvement among German households was particularly striking.

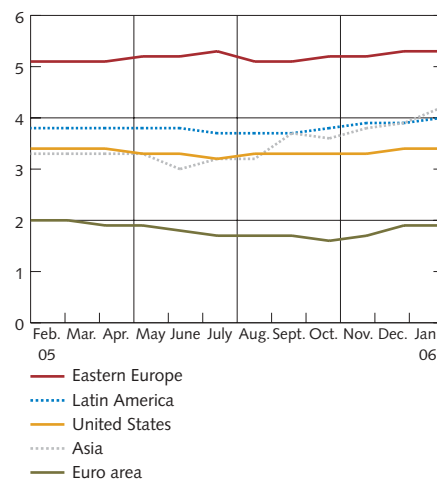
Although growth in the euro area tapered off slightly at the end of last year, the prospects for a continued recovery are considered to be good. Monetary policy is considered to be expansive and only slow changes in a less expansionary direction are assumed. The increase in value added tax announced in Germany is expected to lead to German households bringing forward some capital goods purchases. This will boost growth in Germany and the area as a whole at the end of 2006, but have a dampening effect on growth in 2007 (see Figure 12). However, the increase in VAT is not assumed to break the positive trend.

■ ■ Recovery with some doubts in the United Kingdom.

According to initial calculations, GDP growth in the United Kingdom was 1.8 per cent last year. This outcome is in line with the assessment in the previous Inflation Report. The service industry accounted for this growth between Q3 and Q4, whereas manufacturing output fell.

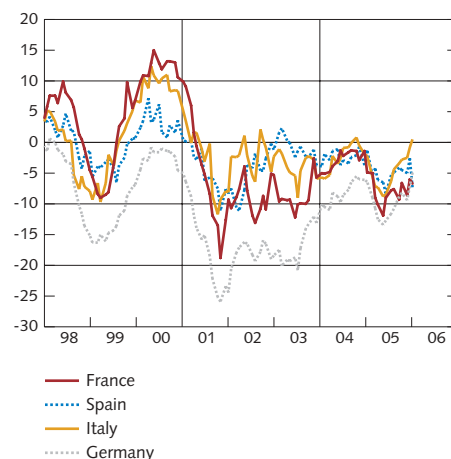
The purchasing managers index and the confidence indicator for the manufacturing industry fell slightly last autumn. The same applied to the household confidence indicator. At the same time, retail trade turnover, which was subdued during the summer and early autumn, rose at a faster rate during the last two months of last year. The assessment, as in the previous Inflation Report, is that growth will increase in the future.

Figure 16. Consensus Forecasts for different regions: GDP growth 2006. Annual percentage change



Source: Consensus Economics Inc.

Figure 17. Confidence indicators for the manufacturing industry in Germany, France, Italy and Spain. Net balance



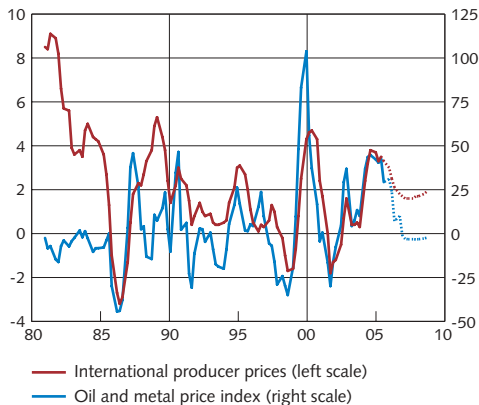
Source: Directorate General for Economic and Financial Affairs, EU Commission.

Figure 18. Swedish export market growth.
Annual percentage change



Note. Aggregate of real goods imports in the countries that comprise Sweden's export market.
Sources: National sources and the Riksbank.

Figure 19. International producer prices of manufactured products and oil and metal price index.
Annual per cent change



Note. The broken lines represent the Riksbank's forecast and forward rates for the metal price index.
Sources: Intercontinental Exchange, London Metal Exchange, OECD and the Riksbank.

■ ■ Strong economic activity in the Nordic countries.

Economic development in Norway would so far appear to in line with the assessment in the previous Inflation Report. In Finland, growth was higher than expected during the third quarter of last year and a slight upward adjustment of the forecast for 2005 and 2006 is therefore warranted. Generally, however, the picture remains unchanged. In Denmark, consumption growth has remained strong. At the same time, there was a reverse in the trend for net exports, which had a positive effect on growth in demand. The outcome up to the third quarter and indications in business tendency data of continued strong growth suggest that growth in 2005 was higher than stated in the earlier assessment.

■ ■ Improved market growth for Swedish exports.

The December Inflation Report stated that growth in Swedish export markets for goods had been relatively weak at the beginning of last year. Revised National Accounts data now show that imports of goods in the recipient countries that account for the majority of Swedish exports levelled out and turned upwards. This change conceals quite extensive revisions to the data for the second quarter last year regarding the growth of imports in the Nordic countries and the United Kingdom. In most markets, import growth was moreover higher during the third quarter than during the second quarter.

Market growth for Swedish exports is expected to be around 6 per cent per year during the forecast period. This rate of growth is in line with the average for the period 1985-2004 (see Figure 18).

■ ■ Rising inflation in producer prices.

Underlying inflation developed at a stable rate in the OECD area in 2005 at the same time as international producer prices rose sharply in the wake of increased oil and raw material prices. However, the high rate of producer price increases is expected to fall back during the forecast period, since oil and metal prices are expected to decline in the future according to the market's forward pricing (see Figure 19). The oil price is expected to be higher on average in the coming years, compared with the December forecast, and consequently, so is the rate of increase for international producer prices. Consumer prices, however, are expected to be somewhat lower this year, as the rate of inflation fell back faster than expected towards the end of 2005.

Table 4. International conditions.
Annual percentage change

GDP	2004	2005	2006	2007	2008
United States	4.2	3.5 (3.6)	3.2 (3.2)	3.2 (3.2)	3.1 (3.1)
Japan	2.3	2.5	2.1	1.6	1.6
Euro area	2.0	1.3 (1.3)	1.9 (1.8)	2.1 (2.2)	2.2 (2.3)
OECD 19	3.1	2.5 (2.5)	2.5 (2.4)	2.5 (2.5)	2.6 (2.6)
World	5.0	4.2 (3.9)	4.0 (3.7)	3.8 (3.5)	3.8 (3.5)

CPI	2004	2005	2006	2007	2008
United States	2.7	3.4 (3.4)	2.8 (3.1)	2.5 (2.5)	2.5 (2.5)
Euro area	2.1	2.2 (2.2)	2.1 (2.4)	2.2 (2.0)	1.8 (2.0)
OECD 19	2.0	2.4 (2.4)	2.1 (2.4)	2.1 (2.1)	2.1 (2.1)

	2004	2005	2006	2007	2008
Swedish export market growth	8.1	5.9 (4.6)	6.1 (5.6)	5.9 (5.7)	5.9 (5.7)
Global PPI	2.4	3.4 (3.4)	2.4 (2.2)	1.6 (1.4)	1.8 (1.5)
Crude oil price, USD/barrel Brent	38	54 (54)	63 (54)	62 (53)	60 (52)

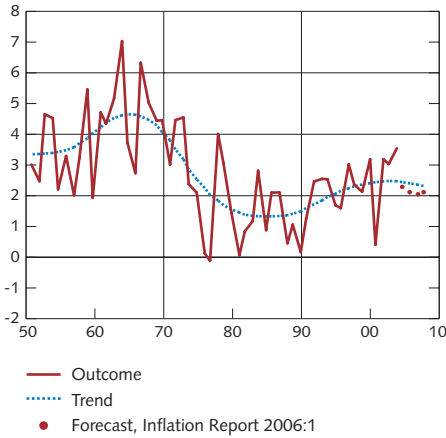
Note. The figures in parentheses are the forecasts in the previous Inflation Report. CPI refers to HIKP for the euro area. OECD 19 includes Belgium, Denmark, Finland, France, Greece, Ireland, Italy, Japan, Canada, the Netherlands, Norway, Portugal, Switzerland, Spain, the United Kingdom, Sweden, Germany, the United States and Austria. Swedish export market growth refers to growth in imports of goods for around 70 per cent of the countries that are recipients of Swedish exports. The forecast is weighed together on the basis of each country's share of total Swedish exports in 2002–2003. International producer prices in national currencies refer to the aggregate of national PPI series for processed goods. This weighted average includes eleven countries and is arrived at using TCW weights. The countries included are the United States, Germany, the United Kingdom, Norway, Finland, Denmark, Belgium, Japan, Canada, France and the Netherlands. These together comprise approximately 85 per cent of the total TCW weighting.

Sources: Intercontinental Exchange, OECD and the Riksbank.

Revised forecasts since the previous Inflation Report

- The oil price has been revised upwards by an average of 15 per cent for the forecast period as the result of high outcomes and an upward adjustment of forward prices.
- Growth in Asia has been revised upwards for the entire forecast period.
- Export market growth has been revised upwards to an average 6 per cent per year for the forecast period, mainly a result of improved growth prospects for Asia.

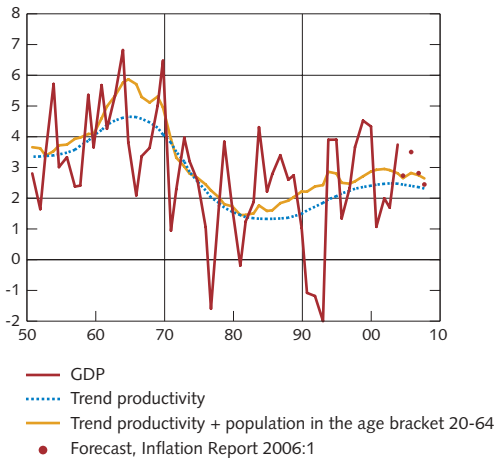
Figure 20. Productivity for the economy as a whole. Annual percentage change



Note. The trend has been calculated using a Hodrick-Prescott filter on actual productivity growth up to 2004 which has then been extended with the Riksbank's forecast up to 2008 and thereafter projected with 2.2 per cent growth up to 2015.

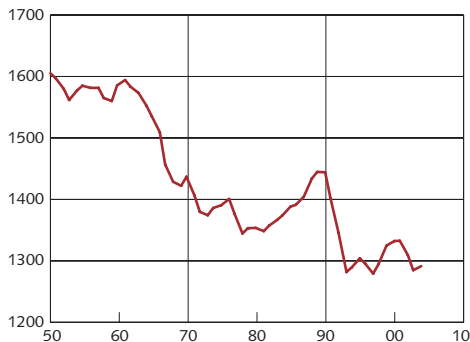
Sources: Statistics Sweden and the Riksbank.

Figure 21. GDP and trend productivity. Annual percentage change



Sources: Statistics Sweden and the Riksbank.

Figure 22. Average hours worked by inhabitants in the age bracket 20-64. Hours per year



Source: Statistics Sweden.

Economic developments in Sweden

National Accounts data and other economic indicators suggest that the economic upswing is somewhat stronger than the assessment in the previous Inflation Report. The rapid increases in productivity growth witnessed in recent years also continued during the third quarter. Even if productivity growth has declined somewhat from the high rates noted in recent years, it is nevertheless expected to be relatively high during the coming years. The forecast for GDP growth has therefore been revised upwards somewhat. Employment is now expected to pick up somewhat more than in the previous forecast, but the labour supply is also expected to rise more rapidly. The combination of faster growth in productivity and a larger labour supply has meant that the view with regard to resource utilisation has remained largely unchanged since the previous Inflation Report.

■ ■ Trend GDP growth in Sweden has risen over the past decade.

Productivity growth, measured as GDP per hour worked, rose during the 1990s after a decline during the preceding decades (see Figure 20). Since the economic crisis at the beginning of the 1990s, productivity growth during the recent ten-year period has averaged 2.4 per cent per year. A similar acceleration has also been noted in the United States and Finland, whilst in many central European countries, the trend has almost been the reverse. The rapid developments in information and communication technology have been an important factor for underlying productivity growth in Sweden, although stiffer competition and deregulated markets have also contributed.¹

Growth in productivity is important for assessing the trend growth of GDP. Productivity is forecast to grow at approximately the same rate as the average for the last decade, which is somewhat more than assumed in the previous report. Besides productivity, GDP growth is also affected by the labour supply. A rough estimate of the latter can be obtained by studying population growth. The population of working age in the age bracket 20-64 increased by an average of 0.4 per cent per year during the period 1995-2004. In the next few years, the labour supply is expected to continue to grow steadily before declining towards the end of the decade. One measure of trend GDP growth is the combined total of trend productivity growth and population growth (see Figure 21). Measured in this way, trend GDP growth has been between 2.5 and 3.0 per cent since 1994.

An important element of trend growth is also how many persons are employed and how many hours each employed person works, i.e. developments in the average number of working hours. Viewed over a longer period of time, the average number of hours worked per inhabitant has declined (see Figure 22). During the post-war period,

1 See also "The "new economy" and Swedish productivity in the 2000s" Andersson B. and M. Ådahl, Sveriges Riksbank Economic Review 2005:1.

the number of working hours has declined, but this trend has tapered off. In the 1970s and 1980s, the expansion of the public sector coupled with a rising employment ratio for women contributed to an increase in the average number of hours worked. During the crisis years at the beginning of the 1990s, the average number of working hours declined and has since then remained virtually unchanged.

The question is how the average number of hours worked will develop in the future. The rising average length of life and improved economic incentives to postpone retirement can lead to an increase in the number of hours worked per inhabitant in the age bracket 20-64 (average number of hours worked) in the next few years. It appears that the reorganisation of the pension system has already affected labour force participation among older inhabitants. Conversely, there is the fact that the proportion in the 55-64 age bracket (people born in the 1940s) with lower labour force participation is increasing as a proportion of the population in the 20-64 age bracket. Overall it is assumed that the trend in average working hours will remain virtually unchanged in the next few years.

In the last ten years, GDP growth has averaged almost 3 per cent per year. Based on the above reasoning regarding population growth and on the assumption regarding developments in trend productivity, a reasonable estimate of GDP growth for the next few years would be between 2.5 and 3.0 per cent.

■ ■ GDP growth in Sweden higher than expected.

The new figures for the National Accounts show that GDP growth last year was slightly higher than predicted in the previous report. Labour productivity also rose more than expected during the first three quarters of 2005.

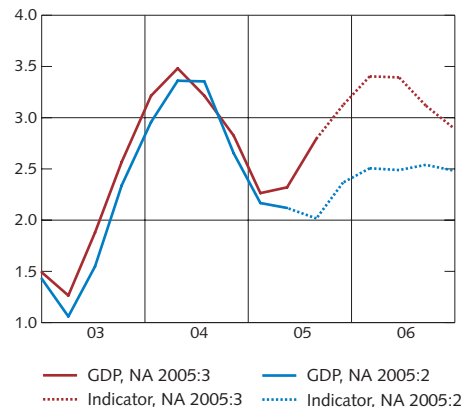
In order to be able to estimate GDP growth in the short term, the Riksbank uses indicator models that take a large number of indicators into account. According to these models, GDP growth is expected to continue to rise rapidly during the fourth quarter (see Figure 23).

National Account statistics show that the growth in household consumption is continuing to produce positive surprises. Available indicators, such as retail sales, suggest that growth in consumption will remain high during the fourth quarter (see Figure 24). The National Institute of Economic Research's (NIER) Consumer Survey also indicates this. According to the survey, households became noticeably more optimistic in January compared with December.

Investments also continued to rise at a healthy rate during the third quarter (see Figure 25). It is above all housing investments and business sector investments that have showed strong growth, whereas public sector investment has remained more or less unchanged. The growth in imports and exports was also unexpectedly strong. The strong export growth can in part be explained by the fact that the

Figure 23. GDP: outcome and forecast according to indicator models.

Annual percentage change, seasonally adjusted data

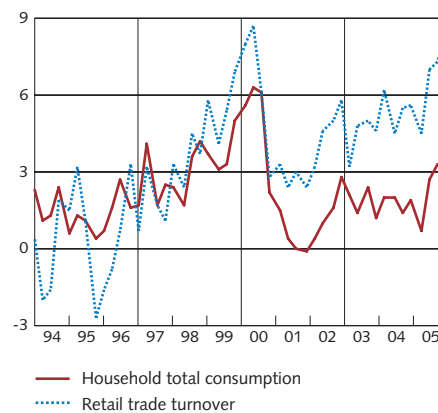


Note. The figure shows GDP according to the National Accounts 2005:2 and the mean values from those indicator forecasts described and presented in Figure R1 in the box entitled "GDP indicators" in Inflation Report 2005:3. The figure also includes current GDP according to the National Accounts and corresponding averages for the current indicator forecasts.

Sources: Statistics Sweden and the Riksbank.

Figure 24. Retail sales and household consumption.

Annual percentage change



Note. Non-calendar-adjusted data.

Source: Statistics Sweden.

Figure 25. Gross fixed capital formation: broken down by sectors.

Annual percentage change



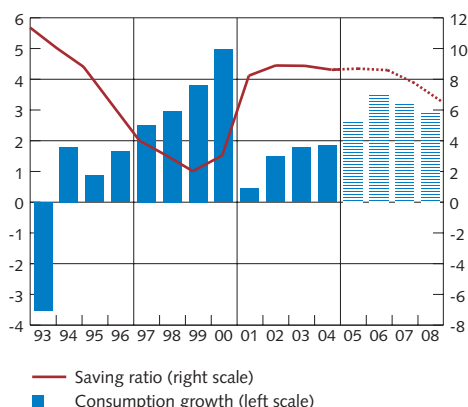
Source: Statistics Sweden.

Figure 26. Goods exports according to monthly data and new export orders.
Annual percentage change and balance



Sources: The National Institute of Economic Research and Statistics Sweden.

Figure 27. Household consumption and saving ratio.
Annual percentage change and percentage of disposable income



Note. The broken lines and bars represent the Riksbank's forecasts.

Sources: Statistics Sweden and the Riksbank.

Swedish export market has grown at a faster rate than expected. At the end of 2005, export growth slackened but other indicators such as the export order inflow indicate that this is a temporary slowdown (see Figure 26). However, the developments in public consumption for the first three quarters of 2005 indicate that the rate of increase for 2005 will be lower than earlier forecasts (see Table 5).

Table 5. GDP by expenditure.
Annual percentage change

	2004	2005	2006	2007	2008
Private consumption	1.8	2.7 (2.2)	3.7 (2.9)	3.2 (2.9)	2.9 (2.5)
Public consumption	0.1	0.0 (0.5)	1.6 (1.8)	0.7 (0.7)	0.6 (0.5)
Gross fixed capital formation	5.1	9.9 (7.3)	5.7 (5.5)	4.6 (4.8)	3.0 (3.0)
Inventory investment, contribution	-0.2	-0.2 (-0.1)	0.1 (0.1)	0.1 (0.0)	0.0 (0.0)
Exports	10.8	5.4 (3.7)	6.3 (5.7)	5.8 (5.7)	5.8 (5.6)
Imports	6.4	6.3 (4.0)	7.1 (6.0)	6.5 (6.5)	6.2 (6.0)
GDP	3.7	2.7 (2.4)	3.5 (3.2)	2.8 (2.5)	2.4 (2.2)
GDP, calendar-adjusted	3.2	2.7 (2.4)	3.8 (3.5)	2.9 (2.7)	2.3 (2.1)

Note. The figures in parentheses are the forecasts in the previous Inflation Report. The data show actual growth rates unless otherwise stated.

Sources: Statistics Sweden and the Riksbank.

■ ■ Strong domestic demand growth throughout the forecast period.

Several factors suggest that household consumption could continue to rise rapidly throughout the forecast period. In 2006, consumption will be stimulated by measures such as tax cuts and increases in child allowance. Moreover, in recent years, households have increased their saving sharply and the saving ratio is now comparatively high (see Figure 27). After favourable stock market growth and rapidly rising property prices, household wealth is strong, even though indebtedness has also been rising rapidly. Net wealth (financial assets plus holdings of houses and apartments minus debts) has risen significantly. As the labour market climate improves, the incentives for precautionary saving diminish. All these factors, coupled with continued relatively low interest rates, suggest that the savings ratio will decline in the future. Moreover, real disposable income is expected to grow at a healthy rate when employment picks up. Overall, consumption is therefore expected to grow at a rapid rate in the next few years (see Table 5).

Investments have continued to rise during the forecast period, albeit at a slightly slower rate than last year. There are several factors that point towards strong investment growth: low interest rates, relatively good profitability for businesses and increasing public sector investment. Housing investment is estimated to have risen by almost 20 per cent last year, but the rate of growth has been subdued since the end of 2004 (see Figure 25). Seen from the longer term perspective, the level of housing investment is still low, which suggests that investments will continue to rise. However, the rate of increase is expected to be lower than last year, partly because

production and employment in the construction industry are not expected to be able to match the pace of growth in the future. As companies in the business sector become increasingly satisfied with production capacity levels, the need to increase investment will be subdued. Combined with rising interest rates and a slightly slower rate of increase for public sector investment, the rate of increase for total gross fixed capital formation is expected to be subdued during the forecast period (see Table 5).

Consistently stable growth for the world economy over the coming years will lay the foundations for relatively strong export growth during the forecast period. The gradual strengthening of the krona that is anticipated will, however, later dampen export growth somewhat. As consumption and investment rise, imports will also pick up relatively quickly this year. The Riksbank judges that import growth will gradually decline during the forecast period as demand is subdued.

Recent statistics and different economic indicators warrant a revision upwards of GDP growth for 2005 and 2006 compared with the previous forecast. Average GDP growth during the forecast period will also be revised upwards slightly, since most indications suggest that the relatively rapid growth in productivity over the past decade can be expected to continue in the coming years. In 2005, GDP growth was an estimated 2.7 per cent. This year, GDP is expected to grow by 3.5 per cent and thereafter by 2.8 and 2.4 per cent per year (see Table 5). GDP growth is thus expected to slow down with time (see Figure 28). The assumed increase in interest rates is one factor that contributes to a slowdown.

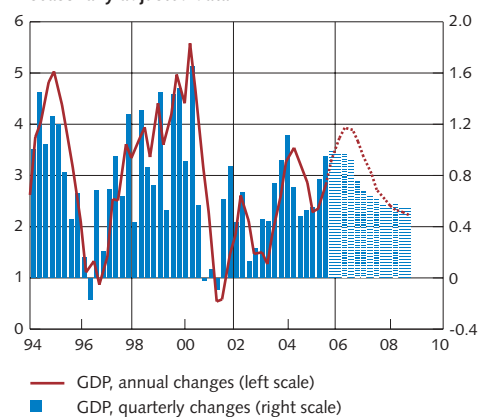
■ ■ Reduction in general government net lending.

The government's fiscal policy is expected to follow a relatively expansive approach this year and next year. As in its previous forecast, the Riksbank estimates that public consumption will rise sharply this year as the result of measures previously announced by the government (see Table 5).

Local government consumption did not rise in 2005, despite favourable financial conditions. This could be related to the fact that an increasing number of county councils and municipalities have held back their increases in expenditure to comply with the balanced budget requirement for local governments. Recommendations issued by the *Swedish Association of Local Authorities and Regions* for sound finances in the future, with the aim, among others, of meeting increased pension costs in the future, may, however, play a significant part in the time to come. If this recommendation is followed, it could dampen growth in consumption in the years to come.

Overall, the surplus in general government net lending is expected to diminish this year and next year before rising once again in 2008 (see Figure 29). The surplus in general government net lending is expected to be somewhat higher in 2006-2007 than the

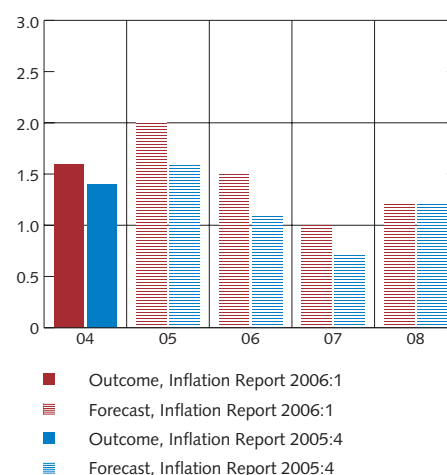
Figure 28. GDP.
Quarterly and annual changes in per cent,
seasonally adjusted data



Note. The broken lines and bars represent the Riksbank's forecasts.

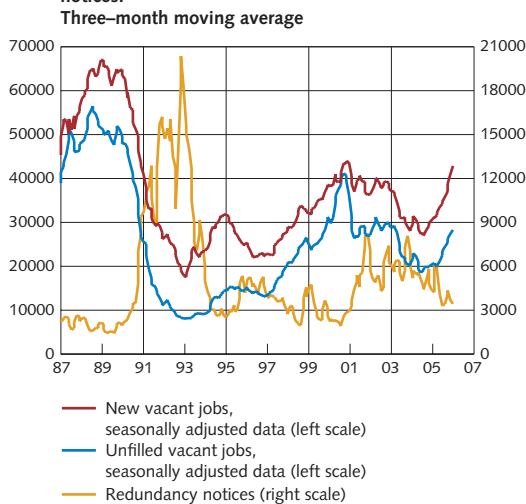
Sources: Statistics Sweden and the Riksbank.

Figure 29. General government net lending, outcome and forecast.
Per cent of GDP



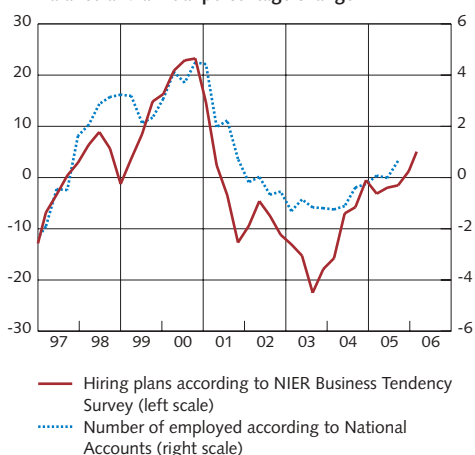
Sources: Statistics Sweden and the Riksbank.

Figure 30. New and unfilled vacant jobs with a duration of more than 10 days and redundancy notices.



Source: National Labour Market Board.

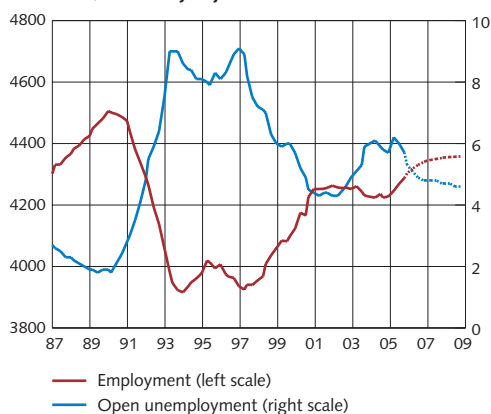
Figure 31. Hiring plans and number of employed in the business sector.
Balance and annual percentage change



Note. Hiring plans weighted by the Riksbank.

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

Figure 32. Employment and open unemployment.
1000s of people and percentage of the labour force, seasonally adjusted data



Note. The historical series have been spliced by the Riksbank. The broken lines represent the Riksbank's forecasts.

Sources: Statistics Sweden and the Riksbank.

assumption made in December. This is a consequence of revisions in the outcome of the National Accounts, stronger government finances than expected in 2005 and a revision upwards of GDP growth.

■ ■ **Employment and labour force expected to rise at a faster rate.**

According to National Accounts data, the number of hours worked rose weakly during the first three quarters of 2005. During the same period, employment rose slightly more than expected. Last year, the number of people in employment and the number of people in the labour force rose by just over 0.7 per cent compared with 2004. As expected, open unemployment declined during the fourth quarter and averaged 5.9 per cent in 2005 according to the monthly statistics available.

However, the major change in methods in the Labour Force Survey makes recent developments in the labour market difficult to interpret. Employment is judged to have risen somewhat last year, which is supported by short-term employment statistics from Statistics Sweden although the size of the increase is uncertain.

The development of different indicators of the labour market situation, such as the number of new job vacancies and redundancy notices, points to an upturn in the demand for labour (see Figure 30). NIER's latest Business Tendency Survey also showed continued positive hiring plans for the first quarter of the year in construction and in parts of the private services sector (see Figure 31).

Employment figures, expressed in terms of both hours and people, are expected to rise in the future as the result of an increase in production and extended labour market programmes aimed at reducing unemployment. At the same time, productivity growth is expected to develop at a relatively smooth pace during the rest of the forecast period. Overall, a somewhat higher demand for labour than stated in the previous Inflation Report is expected to result in a somewhat stronger rise in hours and employment in the business sector this year.

As employment is now expected to rise slightly more than in the previous forecast, labour force participation is also expected to rise at a slightly faster rate. Open unemployment is expected to decline during the forecast period as the result of a rise in the demand for labour and relatively extensive labour market programmes (see Figure 32). Developments in total unemployment figures will not be as positive, however, as the number of participants in labour market programmes will pick up in 2006. Overall, the labour supply is expected to rise in pace with the increased demand for labour.

Table 6. Labour market forecast.
Annual percentage change

	2004	2005	2006	2007	2008
Number of hours worked, NA*	-0.3	0.4 (0.6)	1.7 (1.6)	0.9 (0.7)	0.2 (0.2)
Number of employed	-0.5	0.7 (0.6)	1.5 (1.1)	0.6 (0.6)	0.2 (0.2)
Labour force	0.2	0.7 (0.6)	0.5 (0.1)	0.3 (0.3)	0.1 (0.1)
Open unemployment, per cent of labour force	5.9	5.9 (5.9)	5.0 (5.0)	4.8 (4.6)	4.6 (4.6)
Labour market policy programmes, per cent of labour force	2.4	2.7 (2.7)	3.3 (3.6)	3.1 (3.3)	2.6 (3.0)

* Calendar-adjusted data. NA is the National Accounts.

Note. The figures in parentheses are the forecasts in the previous Inflation Report.

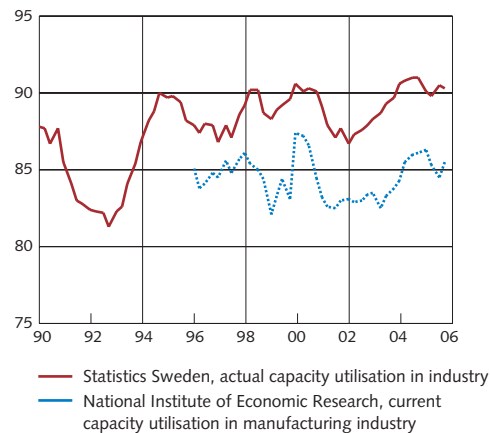
Sources: Statistics Sweden and the Riksbank.

Resource utilisation expected to rise in future.

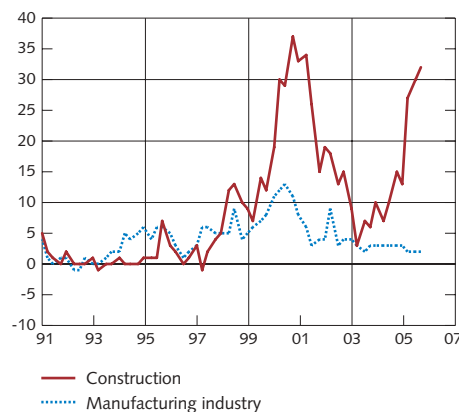
In the business sector, employment has risen and the shortage of labour has increased slightly according to the Business Tendency Survey. Employment levels in industry have continued to fall. Despite this trend, capacity utilisation in industry was relatively high around the turn of the year (see Figure 33). At the same time, only a few companies have reported a shortage of labour (see Figure 34). The high capacity utilisation is not therefore attributable to a labour shortage, but rather to the utilisation of plant and machinery. In the future, employment growth trends in industry are expected to remain weak and as a result, no clear shortage of labour is foreseen. In some of the service sectors, the labour shortage has been rising since the end of 2004, albeit from low levels (see Figure 35). It is only in the construction sector that the labour shortage is starting to reach high levels.

The total resource utilisation of the production factors work and capital is expected to rise during the forecast period. The main limitation to the production potential of the service sectors is probably the supply of labour. The public sector, which to a certain extent is in competition with the private service sectors for the same labour, is expected to show a relatively weak employment growth after 2006.

At present, the labour shortage in the construction sector is comparatively high. A continued high GDP growth that includes a growing resource utilisation has kept investments in construction at a sustained high level. Coupled with the continued rapid pace of housing construction, this is expected to result in a certain shortage of construction labour. As in the service sectors, the capital stock is not a major obstacle in the construction sector. Greater integration within the EU and the enlargement with ten new Member States will make it possible for foreign construction workers and construction companies to meet the rising demand in Sweden. As the shortage of labour has nevertheless increased, it is uncertain how much this intensified competition will affect prices and wages in Sweden, but it should restrain cost growth.

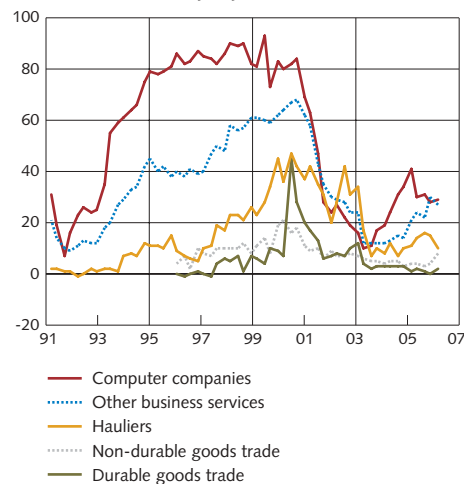
Figure 33. Capacity utilisation in industry.
Per cent, seasonally adjusted data

Sources: The National Institute of Economic Research and Statistics Sweden.

Figure 34. Proportion of firms reporting a shortage of labour.
Per cent, seasonally adjusted data

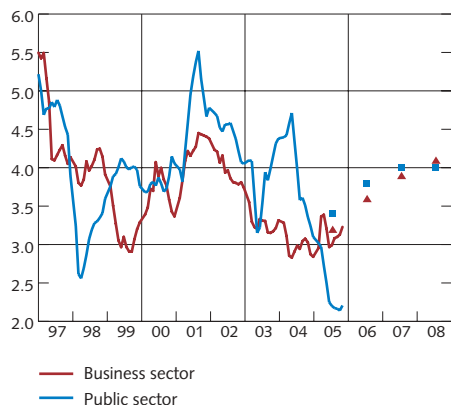
Note. Shortage data refers to the proportion of firms that have quoted labour supply as their main obstacle to increased production.

Source: National Institute of Economic Research.

Figure 35. Proportion of firms reporting a shortage of labour.
Per cent, seasonally adjusted data

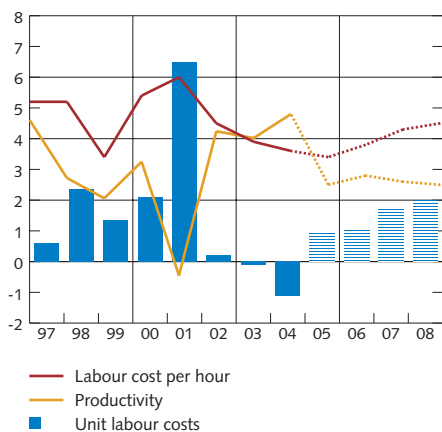
Source: National Institute of Economic Research.

Figure 36. Nominal hourly wages.
Annual percentage change, three-month moving average



Note. Definitive outcomes up to November 2004. The dots represent the Riksbank's forecast.
Sources: National Mediation Office and the Riksbank.

Figure 37. Unit labour costs in the business sector.
Annual percentage change, calendar-adjusted data



Note. The broken lines and bars represent the Riksbank's forecasts.
Sources: Statistics Sweden and the Riksbank.

Overall, the increase in production is expected to lead to greater resource utilisation, but there is no question of a labour shortage, except possibly in certain sectors. Resource utilisation is estimated to follow a similar pattern to that noted in the previous report. Higher GDP growth is possible without placing any further strain on resource utilisation, since both productivity growth and the labour supply are expected to be higher than in the previous assessment.

■ ■ **Slow rise in the rate of wage increases.**

The weak labour market climate in recent years has curbed the rate of wage increases in the business sector. However, it would appear that the rate of wage increase bottomed out in 2004 and began to rise slowly during last year. Since the December Inflation Report, preliminary short-term wage statistics for September to November 2005 have been published. These statistics indicate that the rate of wage increase in the economy during the period January to November 2005 averaged 2.9 per cent compared with the corresponding period last year (see Figure 36). Wages in the business sector rose by 3.2 per cent during this period, while the corresponding figure for the public sector was only 2.4 per cent. However, the low rate of wage increase measured in the public sector is due to a delay in local negotiations. Once retroactive wages have been paid, the rate of wage increase in the public sector will probably be revised upwards.

The high GDP growth forecast is expected to contribute to a rise, albeit only moderate, in the demand for labour. The rate of wage increase is therefore expected to rise gradually during the forecast period (see Table 7 and Figure 36).

■ ■ **High productivity generates low but rising cost pressure.**

Growth in unit labour costs has been sluggish since 2002 (see Figure 37). In 2003 and 2004, they fell as the result of strong productivity growth and a moderate development of labour costs. As the economic climate grows stronger and the rate of wage increase rises, unit labour costs are expected to increase again. Owing to somewhat higher average productivity growth, however, unit labour costs are expected to increase at a slightly slower rate compared with the assessment made in the previous Inflation Report (see Table 7).

Table 7. Wages and unit labour costs in the business sector.
Annual percentage change, calendar-adjusted data

	2004	2005	2006	2007	2008
Wages, NMO	3.0	3.2 (3.2)	3.6 (3.5)	3.9 (3.9)	4.1 (4.1)
Labour costs, NA	3.6	3.4 (3.4)	3.8 (3.8)	4.3 (4.3)	4.5 (4.5)
Productivity	4.8	2.5 (2.3)	2.8 (2.7)	2.6 (2.5)	2.5 (2.3)
Unit labour costs	-1.1	0.9 (1.0)	1.0 (1.1)	1.7 (1.8)	2.0 (2.1)

Note. NMO is the National Mediation Office's short-term wage statistics and NA is the National Accounts. Productivity has been calculated on the basis of employees' hours worked. The figures in parentheses are the forecasts in the previous Inflation Report.

Sources: National Mediation Office, Statistics Sweden and the Riksbank.

Inflation expectations

The Riksbank takes into account the expectations that businesses and households have with regard to consumer price trends since they have direct consequences for actual inflation through price and wage formation. These expectations in turn are affected by a host of different factors, such as the current rate of price increase, the Riksbank's actions and communication, as well as the general economic situation. Inflation expectations can also be perceived as an indicator of the credibility of monetary policy.

■ ■ Inflation expectations largely unchanged.

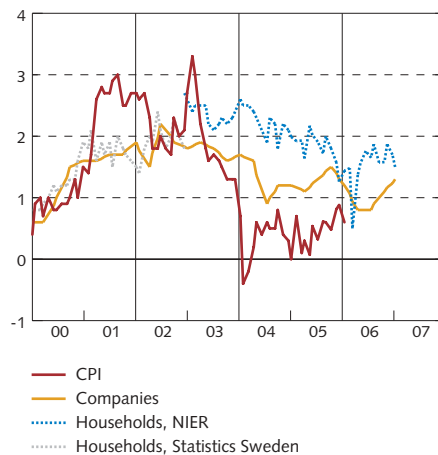
Households' inflation expectations one year ahead, according to the latest survey by the National Institute of Economic Research (NIER), was 1.5 per cent (see Figure 38 and Table 8). This was broadly the same as in October 2005.

Companies' expectations for the rate of price increase have risen somewhat since the last Inflation Report but still remain lower than household expectations. According to the NIER's survey in January, inflation is expected to be 1.3 per cent in one year, which is 0.2 percentage points higher than in the previous survey in October.

Prospera's survey of inflation expectations from the beginning of February indicates that average inflation expectations have remained more or less unchanged since the previous survey. Inflation is expected to average 1.7 per cent one year ahead, 1.9 per cent two years ahead and 2.0 per cent five years ahead.

The average expectations have remained more or less unchanged in recent times, but there have been certain shifts between the different groups interviewed. The employer organisations have adjusted their expectations upwards for the longer term (two and five years) by 0.2 and 0.1 percentage points, while employee organisations have revised their expectations downwards compared with the survey in November (see Table 8). Even money market agents and purchasing managers in the business sector are now anticipating marginally lower inflation in the longer term compared with their expectations at the time of the previous survey. On the whole, inflation expectations are fairly consistent with the Riksbank's forecasts.

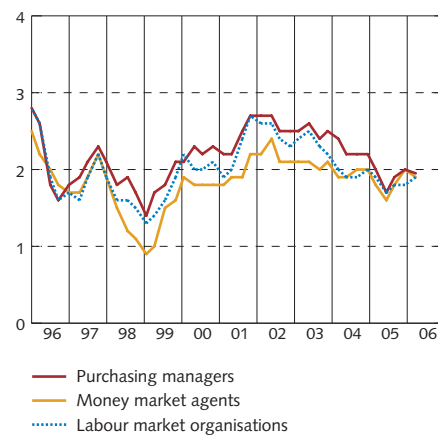
Figure 38. Actual CPI inflation and households' and companies' expectations of inflation one year ahead. Annual percentage change



Note. The curves have been shifted ahead 12 months to coincide with the CPI outcomes to which the expectations refer. The horizontal lines at 2, 1 and 3 per cent, respectively, are the Riksbank's inflation target and the tolerance limits for the annual rate of increase in the CPI.

Sources: The National Institute of Economic Research and Statistics Sweden.

Figure 39. Different agents' expectations of inflation two years ahead. Annual percentage change



Note. The horizontal lines at 2, 1 and 3 per cent, respectively, are the Riksbank's inflation target and the tolerance limits for the annual rate of increase in the CPI.

Source: Prospera Research AB.

**Table 8. Inflation expectations according to Prospera's survey in February 2006, unless otherwise specified.
Per cent, average**

Expected inflation rate in	1 year	2 years	5 years
Money market agents	1.6 (1.6)	1.9 (2.0)	1.9 (2.0)
Employer organisations	1.6 (1.6)	2.0 (1.8)	2.2 (2.1)
Employee organisations	1.5 (1.5)	1.7 (1.8)	1.9 (2.0)
Purchasing managers, trade	1.8 (1.7)	1.9 (1.9)	2.1 (2.1)
Purchasing managers, manufacturing	1.9 (1.9)	2.0 (2.1)	2.1 (2.2)
Households (HIP) in January (October)	1.5 (1.6)		
Firms (Business Tendency Survey) in January (October)	1.3 (1.1)		

Note. Results from the previous survey in November 2005 are given in parentheses unless otherwise stated.

Sources: NIER and Prospera Research AB.

Revised forecasts since the previous Inflation Report

- The GDP forecast has been revised upwards for the entire forecast period as a result of the outcome from the National Accounts and trend productivity growth, which is now assumed to be higher.
- Household consumption has been revised upwards for the entire forecast period, as a result of the strong outcome, rising disposable incomes and a reduction in precautionary saving.
- Investments have been revised upwards for the short term.
- Somewhat stronger growth prospects and a rise in employment that exceeded expectations have resulted in an upward revision of the employment forecast. A further increase of the workforce is expected due to a higher demand for labour.
- Unit labour costs have been revised downwards due to an assumption of somewhat faster productivity growth.

■ Inflation assessment

The inflation rate fell from 2002 up to mid-2005 and, since then, has risen somewhat. Most factors suggest that the upturn in inflation is relatively broad-based and affects many product groups. Looking ahead, inflation is expected to rise somewhat as resource utilisation and cost pressures increase. Compared with the assessment made in December, the inflation forecast has been adjusted downwards somewhat.

■■ Inflation somewhat below forecast.

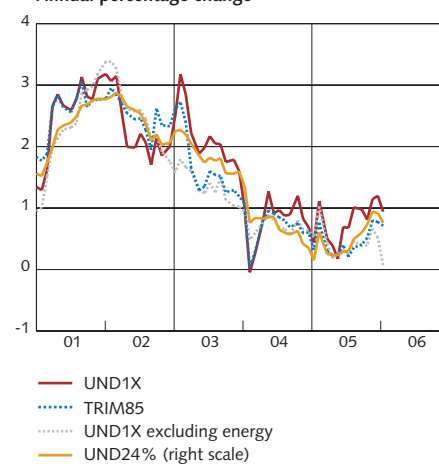
Since the forecast in December, three sets of new inflation figures have been published. The underlying inflation using the UND1X measure, where interest expenditure and changes in indirect taxes and subsidies have been excluded from the consumer price index (CPI), was 0.9 per cent in January. This was lower than the Riksbank's forecast in December. Imported inflation in particular was unexpectedly low.

Even if the inflation rate has risen somewhat over the past year, it remains low. Several factors have contributed to this. In recent years, an increasing proportion of imports have originated from low-cost countries, and this has contributed to a lower rate of price increase on consumer goods. Stiffer competition in the food industry has also resulted in lower food prices. Meanwhile, resource utilisation has been relatively low and unit labour costs have fallen as the result of productivity improvements and moderate wage increases. The krona exchange rate strengthened gradually between 2002 and 2004, which is also assumed to have dampened inflation with some time lag.

■■ Slightly higher underlying inflation rate.

In order to analyse developments in inflation excluding various temporary factors, the Riksbank studies different measures of underlying inflation. Underlying inflation can be measured in different ways, but the purpose is to try to separate the common trend component for all prices that together comprise CPI. One common method is to exclude the effects of certain goods and services, such as oil-related products, electricity and vegetables, whose prices often fluctuate sharply as the result of temporary factors. It is also common to calculate underlying inflation by using various statistical methods that eliminate or reduce the significance of certain categories of goods and services whose prices fluctuate considerably. Figure 40 presents different measures of underlying inflation. All of these indicate that the price increases began to rise during the second half of 2005 after having fallen since the beginning of 2002. It would therefore appear that the rise in inflation is not only related to price increases for a few isolated product groups, but is in fact more broad-based. However, so far, inflation has only risen slightly and from a low level. As regards forecasting inflation in the future, it is a matter of determining how

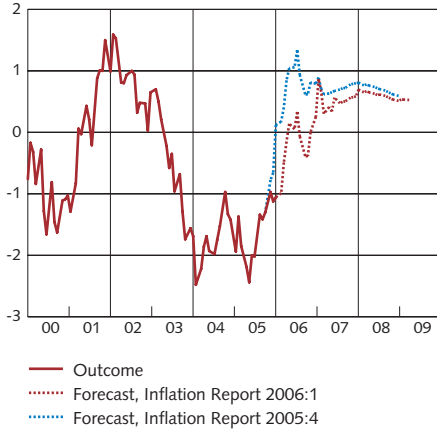
Figure 40. Different measures of underlying inflation. Annual percentage change



Note. The alternative measures are calculated on the basis of CPI divided into around 70 subgroups. UND24 is aggregated using weights adjusted for the historical standard deviation for the deviation between the annual rate of increase in the total CPI and the respective subgroup over the past 24 months. In TRIM85, the 7.5 per cent most positive and negative annual price changes each month have been excluded.

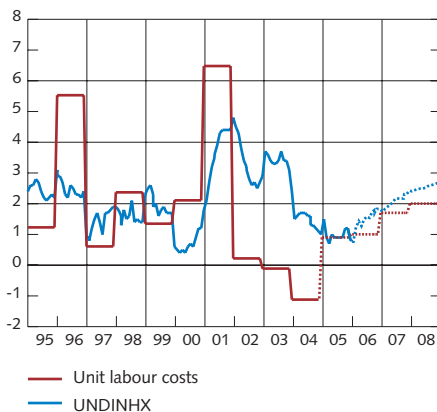
Sources: Statistics Sweden and the Riksbank.

Figure 41. UNDIMPX excluding oil products. Annual percentage change



Sources: Statistics Sweden and the Riksbank.

Figure 42. UNDINHX and unit labour costs in the business sector. Annual percentage change



Note. The broken lines represent the Riksbank's forecasts.

Sources: Statistics Sweden and the Riksbank.

much of the total quantity of price increases is temporary and how much is related to longer term changes.

■ ■ Higher energy prices during the forecast period.

Since the last Inflation Report, the oil price has been higher than expected. In line with the pricing in the futures market, the Riksbank makes the assessment that the oil price will remain high during the forecast period. The high oil price is expected to lead to rises in the price of petrol and fuel oil during the year. In 2007 and 2008, the oil price is expected to fall back somewhat at the same time as the krona strengthens against the dollar. This will have a dampening effect on the price of oil-related consumer products. In addition to these direct effects, changes in the oil price will also have an indirect effect on consumer prices through higher intermediate goods prices in production. Moreover, secondary effects may arise through inflation expectations, wage-setting behaviour, etc. At present, there are no indications of increases in inflation as the result of such trends and the Riksbank judges that the contagion effects will also be limited in the future. The higher oil price will therefore only contribute marginally more to inflation towards the end of the forecast period compared with the assessment in the previous Inflation Report.

Electricity prices on the Nordic power exchange have risen gradually in recent months and consumer prices for electricity have risen at a faster rate than expected. Forward rates on electricity have also risen and electricity prices are no longer expected to fall back as fast as in the previous forecast. Over the next few months, electricity price trends are expected to contribute to a slightly higher inflation rate compared with the assessment in the latest Inflation Report.

■ ■ Higher domestic cost pressures.

Strong growth in domestic demand in the coming years is expected to contribute to an increase in employment. When the labour market gradually improves, the rate of wage increases is expected to rise and productivity is expected to grow at a slightly slower rate. As a result of this, companies' production costs are expected to rise gradually in the period ahead. Prices of domestically produced goods and services, measured using the UNDINHX price index, are expected to rise in line with increases in cost pressures and resource utilisation (see Figure 42).

The outcomes of rent negotiations announced so far indicate that rent increases will be relatively low in 2006. This will contribute to curbing domestic inflation in 2006 slightly more than was assumed in the previous report. Overall, domestic inflation is expected to rise from 0.7 per cent in January 2006 to 2.7 per cent in three years.

■ ■ Imported inflation rises rapidly from low levels.

Adjusted for oil products, imported underlying inflation, UNDIMPX, has been negative for more than two years (see Figure 43). Several

factors indicate that prices will not be as low in the future as they have been over the past two years. Recently, the rate of price increase on imported goods in the producer sector has begun to rise noticeably, and this is expected to lead to an increase in consumer prices in the coming years, in line with earlier patterns (see Figure 43). Apace with increases in resource utilisation and cost pressures in Sweden, the prices of imported consumer goods are also expected to be forced upwards by processing and distribution costs.

Imported inflation is expected to be held back during the rest of the forecast period as well, as the result of an increasing proportion of imports from low-cost countries. All in all, imported inflation, excluding oil, is expected to rise during 2006 when the effect of price cuts made in 2005 dissipates and no longer affects the inflation rate. In 2007 and 2008, the rate of price increase is expected to taper off slightly and imported inflation, excluding oil, is expected to reach just over 0.5 per cent towards the end of the forecast period.

■ ■ Continued low but rising inflation.

Assuming that the repo rate develops in line with implied forward rates, inflation is expected to rise slowly in the future as resource utilisation and cost pressures rise (see Figure 44). For most of the forecast period inflation is expected to be below 2 per cent. The reason inflation does not rise at a faster rate, despite strong GDP growth, is that the factors that have hitherto kept inflation down are expected to continue to have a dampening effect on inflation. Imports from low-cost countries are expected to continue to rise. Productivity, meanwhile, is expected to continue rising at a high rate while competition in the domestic market is expected to remain stiff.

Compared with the assessment made in December, the inflation forecast has been revised downwards somewhat. This is due to the low outcome in January and the assumption that productivity growth will be somewhat higher and companies' costs will accordingly be somewhat lower.

■ ■ CPI inflation expected to exceed UND1X inflation.

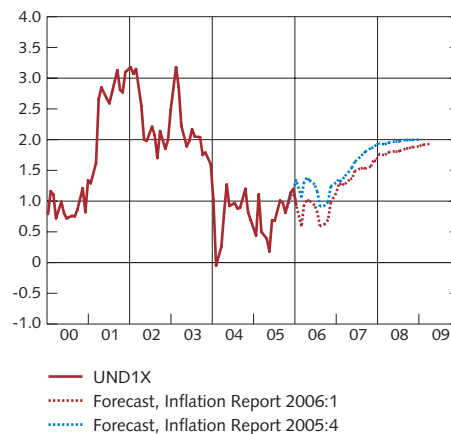
During the past two years, CPI inflation has been lower than UND1X inflation. This is because falling interest rates have resulted in lower interest expenditure for homeowners, which affects CPI inflation but not UND1X inflation. The interest rate cost index in CPI depends partly on how mortgage interest rates develop, partly on price movements in the housing stock which the loans are used to finance. Over the past two years, the effects of declining interest rates have more than compensated for the effects of the rising value of the housing stock, resulting in lower mortgage costs for households. This effect is expected to prevail in the short term. However, during the forecast period, it is anticipated that high interest rates, coupled with the increase in energy taxes, will contribute to CPI inflation rising above UND1X inflation slightly (see Table 9).

Figure 43. Producer and consumer import prices. Annual percentage change



Note. The broken lines represent the Riksbank's forecasts. Sources: Statistics Sweden and the Riksbank.

Figure 44. UND1X. Annual percentage change



Sources: Statistics Sweden and the Riksbank.

**Table 9. Inflation forecasts in the main scenario.
Annual percentage change**

	Annual average				12-month rate			
	2005	2006	2007	2008	Mar. 06	Mar. 07	Mar. 08	Mar. 09
KPI	0.5 (0.4)	1.1 (1.4)	2.1 (2.1)	2.2 (2.3)	0.8 (1.1)	2.1 (2.0)	2.3 (2.3)	2.3
UND1X	0.8 (0.8)	0.9 (1.2)	1.5 (1.6)	1.8 (2.0)	0.9 (1.3)	1.3 (1.4)	1.8 (1.9)	1.9
UNDINHX	1.0 (1.0)	1.4 (1.4)	2.0 (2.3)	2.5 (2.7)	1.2 (1.3)	1.8 (1.9)	2.4 (2.7)	2.7
UNDIMPX	0.2 (0.2)	-0.4 (0.7)	0.2 (0.3)	0.3 (0.3)	0.3 (1.4)	0.0 (0.2)	0.4 (0.4)	0.3

Note. The figures in parentheses are the forecasts in the previous Inflation Report. UND1X is CPI inflation excluding household mortgage interest expenditure and the direct effects of changes in indirect taxes and subsidies. UNDINHX refers to prices of mainly domestically produced goods and services in UND1X. UNDIMPX refers to prices of mainly imported goods and services in UND1X.

Sources: Statistics Sweden and the Riksbank.

**Table 10. Change in the CPI compared with UND1X.
Annual percentage change and percentage points**

	2005	2006	2007	2008
UND1X	0.8	0.9	1.5	1.8
Effekter av förändrade räntekostnader	-0.4	0.1	0.6	0.3
Effekter av förändrade indirekta skatter och subventioner	0.2	0.2	0.2	0.2
=KPI	0.5	1.1	2.1	2.2

Note. The contributions may not sum up due to rounding.

Sources: Statistics Sweden and the Riksbank.

Revised forecasts since the previous Inflation Report

- Energy prices are expected to be higher during the forecast period.
- Rents are not expected to rise at such a fast rate this year compared to the previous forecast.
- Inflation has been revised downwards as the result of an unexpectedly weak outcome in January and the assessment that cost pressures will be lower.

Risk assessment

The overall assessment this time is that the probability of lower inflation is more or less as great as the probability of higher inflation.

The main scenario of the Inflation Report describes the path of inflation assessed by the Riksbank to be the most likely if the repo rate develops in line with implied forward rates, which reflect the financial markets' expectations of the repo rate. The forecasts are uncertain, however. When formulating monetary policy, the Riksbank also takes into account the risk that inflation can deviate from the main scenario.

The December Inflation Report drew attention to substantially the same risks that have left their imprint on inflation assessments in the past year. The high oil price and the consequences for growth and inflation were one risk factor. The deficit in the United States' current account (and corresponding surpluses in certain Asian and oil-exporting countries) and the implications of adjustment to long-term equilibrium were underlined as another risk factor. Productivity development in Sweden and increased competition, internationally and in the domestic market, have also made inflation forecasts uncertain for a long time. Particular weight was placed in the December Inflation Report on the risks of delay in the strengthening of the krona, since it unexpectedly weakened in 2005. It was primarily uncertainty about the krona that led to the conclusion that the risk of higher inflation in the main scenario was greater than the risks of lower inflation.

Since the previous Inflation Report, the krona has strengthened more or less in line with the Riksbank's forecasts and there is now less risk of inflation impulses from this quarter. Even with the revised forecasts made in this report, uncertainty remains regarding the oil price, productivity, competitive pressure and their effects on inflation. The development of growth, savings and the current account in the United States continues to be a source of uncertainty.

In addition, there are risks associated with the rapid increase in borrowing and rising house prices in Sweden, which the Riksbank has also taken into account in the formulation of monetary policy in the past year. The strong increase in demand in the Swedish economy also poses a number of new questions, for instance, regarding the effect on price and wages of an improved situation in the labour market.

■ ■ Risks of reduced demand in the United States and the global economy.

As far as developments in the global economy are concerned, geopolitical unrest has again increased somewhat. The greatest macroeconomic risks seem, however, to be associated with the

savings deficit in the United States and corresponding surpluses in certain Asian and oil-producing countries. There is reason to believe that these imbalances will be corrected in the future. However, uncertainty about when this will take place, the size of the necessary changes in interest rates and exchange rates and the speed of adjustment, are a source of uncertainty for growth prospects internationally and in Sweden. The deficits will sooner or later compel an increase in saving in the United States and reduced savings in the countries with a surplus. If this adjustment takes place abruptly, it could dampen demand in the whole of the world economy. For example, a rapid fall in the dollar exchange rate could squeeze the competitiveness of European businesses and brake growth in the euro area and in Sweden. This would in turn lead to lower inflation than expected.

The dollar has not weakened to the extent that many forecasters expected in the light of the United States' current account deficit. In 2005, the dollar has, on the contrary, strengthened in relation to the euro. At the same time, there have been some recent signals that could indicate that an adjustment may have started in the direction of increased saving in the United States. The development of house prices, new construction and the turnover of housing indicates that there has been some slackening of the housing market and a number of economic indicators have been rather weaker than expected. This has still not warranted any revised forecasts as there are many indications of continued strong development of the US economy. Uncertainty remains as to when the turn towards increased saving and a reduction in the deficit on current account in the United States will take place, as well as how interest rates and exchange rates will be affected.

■ ■ Uncertainty about price and wage movements in Sweden.

The good economic outlook in the main scenario is expected to entail a continued increase in demand for labour and a slow rise in the rate of price and wage increases. Changed statistical methods in the Swedish Labour Force Survey can admittedly give an exaggeratedly positive picture of employment and the state of the labour market in Sweden. Nevertheless, there is a lot to indicate that employment has risen unexpectedly quickly and indicators of vacancies and redundancy notices also point to increased demand for labour. However, the supply of labour is also increasing and the level of unemployment is thus more or less as expected.

The wages forecast is essentially based on no bottlenecks developing in the labour market over the next few years and that the pattern of wage formation will remain unchanged. However, there is a risk of both faster and slower wage increases than in the main

scenario. It is, for example, possible that the relatively weak state of the labour market at present in combination with a potentially increased mobility of labour from low-wage countries within the EU, will lead to lower wage increases than in previous upturns.

■ ■ A new-old economy?

In the main scenario, economic growth is high in Sweden, around 3 per cent per year on average between 2004 and 2008. At the same time, inflation is expected to continue to be low and only slowly approach the 2 per cent target (provided that the repo rate is raised gradually). This is a very uncommon macroeconomic situation in a historical perspective. A similar development occurred in the latter half of the 1990s, when a discussion also took place – both in Sweden and internationally – as to whether we had a "new economy". One has to go back the 1960s to find a period which approaches such a high level of economic growth in combination with low inflation.

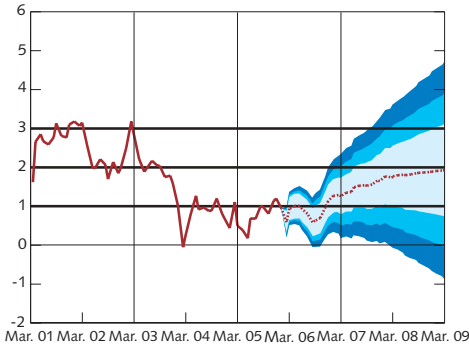
The assessment of the Riksbank is that the high level of growth and low inflation are partly the result of positive changes in the supply side of the economy (high productivity growth and slow movement of import prices) and that these changes are sufficiently persistent to continue to restrain inflation in the next few years.

However, there is a risk that the sharp rise in demand and the increasing resource utilisation in Sweden and internationally will lead to higher price and wage increases than expected, in particular within a time frame of couple of years. Inflation is unusually low in Sweden not only in a historical perspective but also in an international comparison. Producer prices have risen relatively quickly recently throughout the world and consumer prices are increasing more quickly in most other countries. Rising income, a rapid increase in lending and a fast increase in household consumption in Sweden in combination with high retail turnover entail a risk of faster price increases than in the main scenario. The impact of producer prices on consumer prices could then be greater, just as the good years of the "new economy" in 1994 – 2000 were followed by rapid price and cost increases in 2001 followed by a slowdown in economic activity. Overall, there are risks for both higher and lower prices than in the main scenario.

■ ■ Risks of the rise in borrowing and house prices.

The increase in lending and in the quantity of money are at a historically high level. The same applies to house prices. At the same time, both nominal and real interest rates are low. This development is to a great extent a result of an expansive monetary policy. A gradual increase in the general interest rate situation, which is expected to dampen the rate of increase of house prices and lending. However,

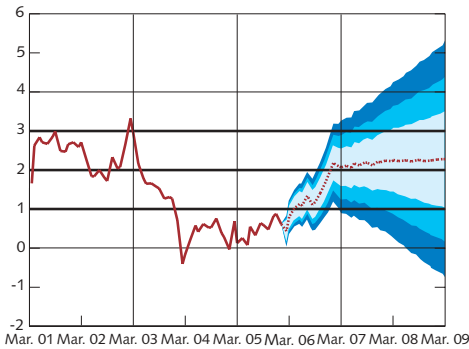
Diagram 45. UND1X inflation with uncertainty bands.
Annual percentage change



Note. The uncertainty band shows the 50, 75 and 90 per cent probability of the underlying inflation, UND1X, being within the respective range. The broken line shows the forecast in the main scenario. The horizontal lines at 2, 1 and 3 per cent, respectively, are the Riksbank's inflation target and the tolerance limits for the annual change in the CPI.

Sources: Statistics Sweden and the Riksbank.

Diagram 46. CPI inflation with uncertainty bands.
Annual percentage change



Note. The uncertainty interval shows the 50, 75 and 90 per cent probability of inflation being within the respective range. The broken line shows the forecast in the main scenario. The horizontal lines at 2, 1 and 3 per cent, respectively, are the Riksbank's inflation target and the tolerance limits for the annual change in the CPI.

Sources: Statistics Sweden and the Riksbank.

there is a risk, to the extent that demand for loans and housing are affected by overoptimistic expectations that the rise will continue at a fast rate, with accompanying effects on demand and inflation.

This could also eventually lead to a situation later on where a sudden downward adjustment of house prices and expectations takes place. Households can then find their debt burden to be excessive and therefore increase their saving. This concerns risks that are very difficult to quantify in forecasts and to set a date for but which could none the less entail a risk for macroeconomic stability. Previous experiences from Sweden and other countries indicate that a fall in house prices can be associated with long-term weaker development of private consumption, output, employment and inflation.

Table 11. Inflation forecast taking into account the risk scenario.
Annual percentage change

	Annual average				12-month figures		
	2005	2006	2007	2008	Mar. 07	Mar. 08	Mar. 09
CPI	0.5 (0.5)	1.1 (1.5)	2.1 (2.2)	2.2 (2.4)	2.1 (2.1)	2.3 (2.4)	2.3
UND1X	0.8 (0.8)	0.9 (1.2)	1.5 (1.7)	1.8 (2.1)	1.3 (1.5)	1.8 (2.0)	1.9

Note. The assessment from the previous Inflation Report is shown in parentheses.

Sources: Statistics Sweden and the Riksbank.

The path of the krona and inflation

In the main scenario it is assumed that the krona, measured in TCW terms, will strengthen by just below 4 per cent in the next two years. This box presents and discusses different estimates of the effects on inflation of a weaker krona development than that assumed in the main scenario, namely that the krona, instead of strengthening, will remain at present levels. Swedish inflation can be expected to increase by between 0.2 and 0.5 percentage points, depending on how persistent this alternative development of the exchange rate is expected to be and on the conduct of monetary policy.

What are the consequences for the inflation rate in Sweden of a strengthening or weakening of the krona? This is a question which arises from time to time given that the Swedish krona is a freely floating currency and that it, at times, can fluctuate sharply in a short time. By way of example, it is worth mentioning that, during 2005, the value of the krona weakened by around 6 per cent in relation to a TCW-weighted basket of foreign currencies (see Figure 6 in the main text).

Assessments of the future path of the krona are made in the course of producing the Riksbank's inflation forecast. The risk assessment also takes into consideration the likely effects on the inflation forecast of other exchange rate developments than those anticipated in the main scenario. To assess the effects that an alternative development of the krona exchange rate would have on inflation, it is necessary to take a position on how persistent this development is likely to be and the underlying reasons. The persistence of the change in the exchange rate is important because exporters and importers and other companies which have reason to let the krona exchange rate affect their prices are normally inclined to even out their price changes over time. Thus movements in

the krona exchange rate which are considered to be temporary should have minor effects on inflation.²

In order to assess the effects on inflation of changes in the exchange rate, the underlying causes of the movements in the krona exchange rate must be taken into account. Is a weakening of the krona, for example, associated with a more general change in the appraisal of the future economic outlook? Often, it is asked what would happen with the rate of inflation if the krona changed "all else equal" i.e. the change in the value of the krona is seen as a more isolated occurrence. However, this conceptual experiment is not without complications, since exchange rate movements normally are not independent of all other factors that affect inflation. The answer to the question regarding the effects of the krona exchange rate changes will thus depend on the other disturbances that the economy is exposed to at the same time and on the disturbances that underlie the exchange rate movement.

This box discusses a type of disturbance, or shock, to the exchange rate which comes very close to the conceptual experiment of "all else equal". An unexpected change in investors' demand for assets denominated in different currencies is assumed to take place. This is a type of disturbance which has probably been of considerable practical importance, since exchange rates often change without any obvious changes in other "fundamental" variables. The box presents model-based estimates of the effects on inflation of hypothetical krona exchange rate movements attributable to changes in portfolio managers' demand for krona assets under different assumptions regarding the conduct of monetary policy. The latter illustrates the difficulty of maintaining "all else equal". The monetary policy reaction to a change in the exchange rate is decisive for the impact on inflation. The

² See also the box entitled "The exchange rate and imported inflation" in Inflation Report 2004:2.

estimates of pass-through to the price level and inflation in the short and long term are discussed.

A change in the demand for krona assets

When the demand for the krona falls without any other fundamental changes in the economy, the value of the krona will naturally fall. But the size and persistence of the exchange rate movement will depend on how monetary policy responds.

The demand for assets (e.g. bonds) denominated in different currencies is governed by the yield (the interest rate) from the different assets but also by expectations regarding exchange rate movements. Portfolio managers and international investors may be prepared to accept a lower interest rate on assets in kronor if the krona is expected to increase in value during the investment horizon. However, assets in different currencies are not normally regarded as perfect substitutes and accordingly, investors demand different types of premia (excess returns) for holding different assets. A sudden change in the krona exchange rate could then depend on a sudden change in the demand for krona assets, or in other words a change in the required excess return.³

All other things being equal, what will be the consequences for inflation of a weakening of the exchange rate caused by a reduction in the demand for krona assets? Figures R1–R3 (the dashed lines) present the effects of an increase in the risk premium on krona assets (i.e. reduced demand for the krona in relation to assets in other currencies) on the krona exchange rate, the level of interest rates and the price level. Table 1 shows the effects on the inflation rate. These effects have been computed with the aid of a general equilibrium model with sticky wages and prices.⁴ In the experiment, the risk premium is assumed to increase so much that the krona is approximately 6 per cent weaker at the end of 2007 ("year 2") than it would

have been otherwise (see Figure B1). It is then assumed that the risk premium (the demand for krona assets) reverts to its normal pattern. The exchange rate forecast in the main scenario entails a strengthening of almost 6 per cent (measured by the TCW index) between the fourth quarter of 2005 and the fourth quarter of 2007 and this alternative computation therefore means a marginal weakening of the krona from its present level.

In this experiment, it should be noted that the change in the demand for krona assets gives rise to interest rate changes.⁵ It is assumed in the model that monetary policy follows a version of the "Taylor rule", meaning that the interest rate is set taking into consideration the deviation of inflation from the inflation target and the level of resource utilisation. The Riksbank thus reacts to events in the economy, which in this scenario means that the repo rate is raised, partly because the weakening of the exchange rate gives rise to increased inflationary tendencies. It is furthermore assumed that the Riksbank will normally implement interest rate changes in many small steps rather than a few large ones ("interest-rate smoothing") with the result that the interest rate will be above the level that would otherwise have applied for a long period (see Figure B2, dashed line).

This tightening of monetary policy will help curb inflation, i.e. the increase in the price level will be very moderate (see Figure B3, dashed line). The effects on inflation are illustrated in the first two columns in Table B1. During the first year, when the krona is on average 2.6 per cent weaker than in the main scenario, inflation will be 0.1 percentage points higher. During year 2, when the krona is on average 5.6 per cent weaker, inflation will be 0.2 percentage points higher. During year 3, when the krona starts to strengthen again, inflation will also be 0.2 percentage points higher than it would have been in the case where the krona does not weaken.

3 However, the sign that the premium should have is not self-evident; sometimes krona assets can be in such great demand that the interest rate can be maintained at a lower level than abroad while at other times the converse applies.

4 The model used is a variant of the model presented in Adolfson, M., S. Laséen, J. Lindé and M. Villani, "Bayesian Estimation of an Open Economy DSGE Model with Incomplete Pass-Through", Sveriges Riksbank Working Paper Series No. 179, 2005, estimated on Swedish data.

5 The assumption of "all else equal" means that one wishes to study the effects of an exchange rate weakening given that all agents in the economy – households, businesses and also the central bank – abide by their normal pattern of behavior.

6 The real exchange rate is defined as the ratio between the foreign price level converted into Swedish kronor and the Swedish price level.

These are relatively small effects on inflation, which depend partly on the increase in the repo rate and partly on the weakening of the exchange rate not being persistent, i.e. the krona strengthens again from the beginning of 2008 (see Figure B1). Why does the exchange rate strengthen after the assumed weakening? This is not by assumption in the experiment but follows from basic economic principles present in the macro model. Above all, it depends on the long-term path of the real exchange rate (alternatively, "competitiveness") not being affected by temporary movements in risk premia. In time, therefore, the change in the price level will be matched by an equally large change in the nominal exchange rate.⁶ Thus the pass-through of the exchange rate change to the price level will be complete in the long run. In this scenario, which ultimately only produces a slight increase in the price level, the final level of the exchange rate must be close to the initial level. The small effect on the price level is in turn due the tightening of monetary policy following the weakening of the exchange rate. The experiment thus entails a temporary weakening of the exchange rate. This then also affects the impact on inflation in the short term, i.e. during the first two years when the exchange rate weakens, given that businesses that wish to have stable price development in their customers' currency refrain from changing their prices in response to exchange rate movements that they perceive as temporary.

A change in demand for krona assets in combination with no monetary policy reaction

With other assumptions regarding the response of monetary policy, a larger share of the weakening of the exchange rate can be permanent, which in turn will produce other short-term effects on inflation.

This can be illustrated in a hypothetical scenario in which it assumed that the central bank refrains from reacting to increasing inflation following in the wake of a weakening

exchange rate. Note that in this hypothetical scenario the central bank is actually departing from its normal conduct, and that "all else" is not "equal" in the analysis. The effects on the exchange rate, the interest rate level and the price level respectively, are shown in the solid lines in Figures R1-R3. In this hypothetical scenario, inflation and the price level increase more than in the previous scenario. The effects on the exchange rate and inflation are shown in the third and fourth columns in Table B1. During the first year, when the currency is on average 2.6 per cent weaker than in the main scenario, inflation will be 0.1 percentage points higher. During year 2, when the currency is 5.6 per cent weaker, inflation is 0.5 percentage points higher. During years 3 and 4, when the exchange rate strengthens, inflation continues to exceed the base scenario.

Why are the effects on inflation larger and more persistent in this case than in the scenario above? The weakening of the exchange rate in this hypothetical scenario is partly permanent (see Figure B1), which gives firms reason to pass on the effects of exchange rate movements in the form of price increases directly from year 1 and year 2. And why is a larger part of the weakening of the currency permanent in this case? The same mechanisms are at play here as above, i.e. the path of the real exchange rate is not affected in the long term by the type of disturbances that in this experiment caused the change in the nominal exchange rate. However, the price level increases more than in the previous scenario, which is completely natural since the central bank in this hypothetical scenario does not act to counteract the rise in inflation. As there is a long-term increase in the price level, the nominal exchange rate must finally be at a level that is weaker than the original rate.

Conclusions on the krona exchange rate's impact on inflation

These two experiments show that there is no fixed relation between a given weakening of

⁶ The real exchange rate is defined as the ratio between the foreign price level converted into Swedish kronor and the Swedish price level.

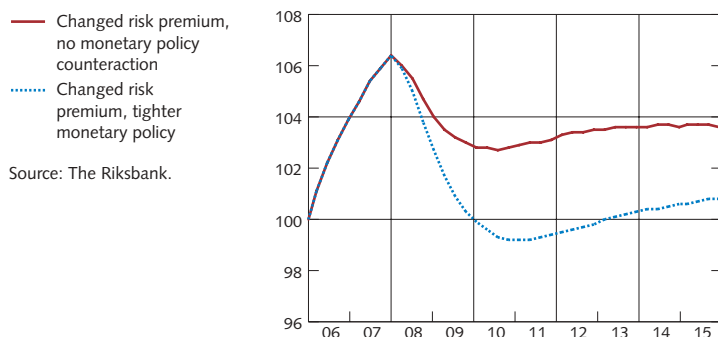
**Table B1. Exchange rate depreciation and inflation effects (UND1X).
Deviation from baseline scenario. Per cent (exchange rate) and percentage points (inflation)**

Year	Case 1: Changed risk premium, Tighter monetary policy		Case 2: Changed risk premium, No monetary policy counteraction	
	Exchange rate	Inflation	Exchange rate	Inflation
1	2.6	0.1	2.6	0.1
2	5.6	0.2	5.6	0.5
3	4.4	0.2	5.0	0.7
4	0.7	0.1	3.1	0.6

Note: Positive values in the exchange rate column mean a weaker currency than in the baseline scenario.

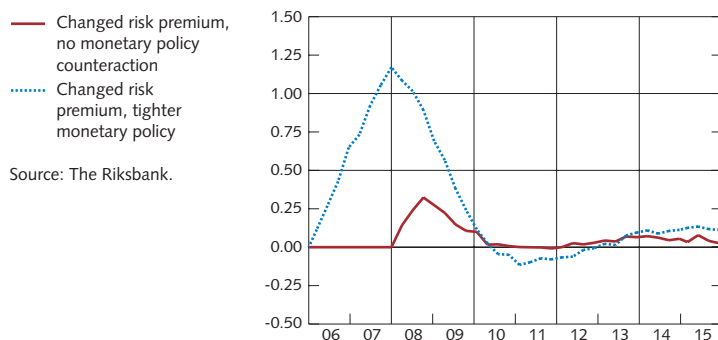
Source: The Riksbank.

**Figure B1. The path of the exchange rate.
Index, deviation from baseline scenario**



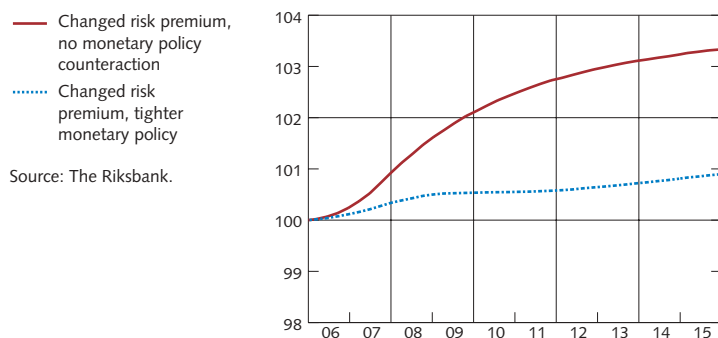
Source: The Riksbank.

**Figure B2. The development of the repo rate.
Percentage points, deviation from baseline scenario**



Source: The Riksbank.

**Figure B3. The development of the price level.
Index, deviation from baseline scenario**



Source: The Riksbank.

the exchange rate and inflation. Monetary policy is of crucial importance for the short-term pass-through of exchange rate movements to inflation. This is not only due to the more "direct" inflation-dampening effects of increases in the repo rate but also because monetary policy determines the final level of the price level and the nominal exchange rate after disturbances to the nominal exchange rate, i.e. the extent to which the weakening of the exchange rate is permanent. In the first scenario, when the repo rate is raised to dampen the increase in inflation, the long-term rise in the price level is small and the nominal weakening of the exchange rate is temporary. The short-term pass-through to inflation is therefore also relatively low. In the second, more hypothetical scenario, where monetary policy does not react to the rise in inflation, the final increase in the price level and the exchange rate is greater, i.e. a larger share of the weakening of the exchange rate is permanent.⁷ This also affects the pass-through to inflation in the short term.

In both experiments, the exchange rate weakens approximately 6 per cent over two years. However, the pass-through to inflation during these two years differs depending on the response of monetary policy and on how permanent the weakening of the exchange rate proves to be. The more permanent a weakening of the exchange rate is judged to be, the greater the short-term pass-through to inflation.

⁷ In both cases, it is thus disturbances to the risk premium that cause the weakening of the exchange rate. The difference between the scenarios is that monetary policy deviates from its normal pattern of conduct (i.e. is subject to disturbances) in scenario 2. In principle, a scenario is conceivable where monetary policy disturbances alone cause the weakening of the exchange rate. In these cases, the weakening of the exchange rate persists (i.e. the exchange rate is 6 per cent below the original level in the long term as well), and the price level increases as much as the exchange rate is weakened. The short-term effects on inflation will be considerably greater, in line with the reasoning in this box.

Uncertainty regarding future interest rate movements

This box presents methods to illustrate the uncertainty of interest rate movements based on implied forward rates. An important conclusion is that, even if the Riksbank at a particular point in time were to judge that the implied forward rate curve used as the basis for the forecasts in its Inflation Reports broadly speaking reflected a reasonable future development of the repo rate, there is considerable uncertainty regarding economic development, which may cause the actual repo rate path to deviate from the expected path.

In the past, the Riksbank based its forecasts in the main scenario on the assumption that the repo rate would remain unchanged throughout the forecast period. Since the October Inflation Report last year, the forecasts are instead based on the assumption that the repo rate develops in line with market expectations regarding the future repo rate, as expressed in the implied forward rates.

Monetary policy has a direct effect on the shortest interest rates in the economy. Consequently, expectations regarding future monetary policy also affect expectations regarding future short-term interest rates. It is these expectations that are captured in the implied forward rates. The implied forward rates can, in other words, be interpreted as the financial markets' forecast regarding the future repo rate. The Riksbank derives the implied forward rates from the interest rates for government securities with different maturities.⁸ If, for example, the annual yield on interest-bearing government securities is higher for long maturities than it is for short maturities, this could be interpreted as meaning that the market is expecting the repo rate to be raised.

Implied forward rates normally include premiums for maturity, credit risk and liquidity. Accordingly, they do not represent an exact measure of the market's expectations regarding the repo rate. Since the Riksbank estimates implied forward rates on the basis of the interest

rates for government securities, the premiums for liquidity and credit risk should, however, be negligible. In the following outline, term premiums have, for the sake of simplicity, also been disregarded, but it is important to remember that these can sometimes arise.

In the long term, the implied forward rates normally provide a more reasonable assessment of future interest rate movements than the assumption that the repo rate remains unchanged. This improves the conditions for making forecasts as well as the possibilities for evaluating them.

Another effect of the new interest rate assumption is that it to a certain extent makes it easier for businesses, consumers and other market participants to form a reasonable opinion of future interest rate movements on the one hand, and the link between interest rate movements and the Riksbank's forecasts regarding inflation, GDP, etc. on the other. The Riksbank can, by being clear about its view on economic development, including the monetary policy associated with such a development, affect the general public's expectations regarding future interest rate movements. At the same time, it is important to point out that there is significant uncertainty regarding future economic developments and accordingly interest rate movements. This uncertainty means that the Riksbank cannot in advance tie its monetary policy to a particular interest rate path, that is then slavishly followed. Even if the implied forward rates at the time of a decision are felt to reflect a reasonable future development of the repo rate based on the information available at the time, the economic development – and accordingly also the interest rate path – could be different to that expected. It is important that the Riksbank clarifies this in various ways.

Several different methods may be used to illustrate the uncertainty regarding future interest rate movements. In the following section, two different methods have been used to calculate uncertainty intervals regarding the implied forward rate curve on which the forecasts in

⁸ The implied forward rate curve used refers to a 15-day average and has been derived from interest rates on T-bills and government bonds.

the Inflation Report have been based. Firstly, uncertainty is estimated on the basis of historical deviations between the repo rate and implied forward rates. Secondly, it is estimated with the help of option prices. Both methods serve to illustrate the uncertainty regarding future interest rate movements, but it is important to note that they do not measure uncertainty in exactly the same way.⁹ The methods also have their respective advantages and disadvantages. The methods and applications selected here are intended to serve as illustrative examples.

Uncertainty regarding the implied forward rate curve based on historical outcomes

One method for illustrating uncertainty is to calculate implied forward rate curves for different points in time in the past and to then study how well they have predicted the actual

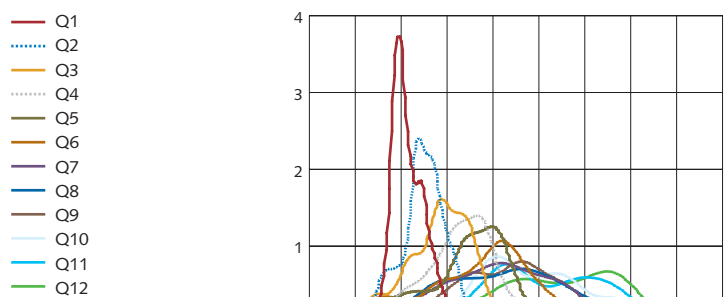
outcome for the repo rate. Based on interest-bearing government securities with varying maturities, the daily implied forward rates have

been calculated for time horizons ranging from 1 to 12 quarters for the period 1998–2005. Then, for each of the respective time horizons, the differences between the implied forward rates and the (actual) repo rate have been calculated. Table B2 illustrates the average deviations between the implied forward rate and the repo rate as well as the standard deviations for different time horizons. Figure B4 shows the distribution of these individual deviations when centred around the average deviation for each of the respective time horizons.¹⁰ For example, the red curve shows the difference between what the market at various points in the past has believed the repo rate would be one quarter into the future and the actual outcome. The broken blue curve shows the corresponding information for two quarters into the future, etc.

The longer the forecast horizon, the greater on average the deviations between the implied forward rate and the actual outcome of the repo rate are (see Table B2 and Figure B4). The average deviation is 0.2 percentage points for "forecasts" one quarter into the future. For "forecasts" 12 quarters into the future, the average deviation is 2.1 percentage points. In other words, the implied forward rates do not contain so much useful information about the future development of the key policy rate in the longer term.

The spread (standard deviation) also increases for longer time horizons. This illustrates that the probability of unexpected disturbances arising in the economy and provoking monetary policy reactions becomes greater the longer the forecast horizon. The economy is constantly exposed to unexpected disturbances with the

Figure B4. Deviations between the implied forward rate and the repo rate for different time horizons during the period 1998-2005. Per cent



Note. Deviations between implied forward rates and the repo rate on the horizontal axis (percentage points). Frequency on the vertical axis (per cent). Source: The Riksbank.

outcome for the repo rate. Based on interest-bearing government securities with varying maturities, the daily implied forward rates have

Table B2. Average deviation between the implied forward rate and the repo rate and standard deviations for different time horizons during the period 1998 to 2005. Percentage points

	Time horizon (quarters)											
	1	2	3	4	5	6	7	8	9	10	11	12
Average	0.2	0.4	0.6	0.9	1.0	1.2	1.4	1.5	1.7	1.8	2.0	2.1
Standard deviation	0.2	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.0	1.0	1.0	1.1

Source: The Riksbank.

⁹ See the box "Uncertainty surrounding future interest rate developments", in *Inflation Report 3/2005*, Norges Bank, for a similar study.

¹⁰ The distribution's histogram has been evened out using "kernel estimation".

result that the actual repo rate will deviate from the expected repo rate.

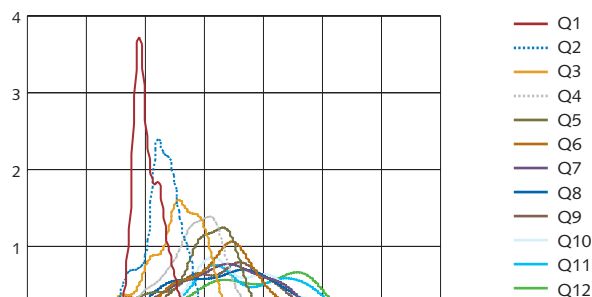
Historical deviations between implied forward rates and the repo rate during 1998–2005, as illustrated in Figure B4, thus show that the repo rate can deviate significantly from market expectations. This illustrates that there is considerable uncertainty regarding interest rate movements.

If certain conditions are met, the historical deviations may also be used to make an estimate today of the probability that the repo rate will fall within a certain interval at a certain point in time in the future. Firstly, the deviations between the implied forward rate and the repo rate during the period 1998–2005 must be deemed to be representative, even for future deviations. Secondly, it requires that the term premiums are zero. In practice, term premiums are not zero. Moreover, it is difficult to separate term premiums from other factors that also contribute to systematic deviations between the implied forward rates and the repo rate.¹¹ The probability distributions calculated under such conditions should therefore be interpreted with caution. On the other hand, the uncertainty that arises as the result of these problems should be relatively slight in relation to the uncertainty regarding interest rate movements that the probability distributions aim to illustrate.

The probability distributions calculated are illustrated in Figure B5. The figure shows exactly the same distributions as Figure B4, with the only difference being that they are now centred around the average implied forward rates and not around the average historical “forecasting errors”. For example the red distribution in Figure B5 illustrates the probability of the repo rate falling within a certain interval one quarter into the future. The broken blue distribution shows the probability of the repo rate falling within a certain interval two quarters into the future, etc.

On the basis of these distributions, for each of the time horizons, a 25, 50 and 75 per

Figure B5. Probability distributions for the repo rate based on historical deviations between the implied forward rate and the repo rate. Per cent



Note. The area under each of the curves shows the probability of the repo rate falling within a certain interval.

Source: The Riksbank.

cent uncertainty interval has been calculated for the implied forward rate curve (see Figure B6). It is clear that the market, with 75 per cent probability, expects the repo rate to fall somewhere within the interval 1.75–3.5 per cent one year into the future. The probability is 50 per cent that the repo rate within one year will be somewhere in the interval 2.25–3.25 and 25 per cent that it will be 2.5–3.0 per cent. As is also shown, the uncertainty interval increases sharply if the time horizon is extended to three years. This shows that there is considerable uncertainty in the implied forward rates.

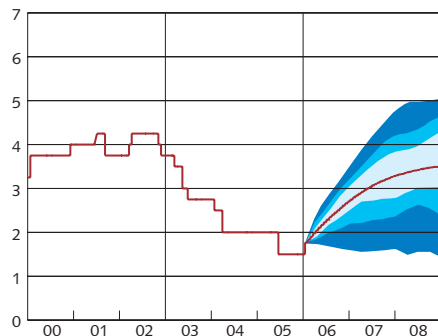
One can naturally question how historical deviations between implied forward rates and the repo rate during a given period are representative for the future. If one has access to data over a very long period of time, the method should work reasonably well, since unusual (period-specific) deviations between the implied forward rate and the repo rate in such cases are lightly weighted. The calculations here have, however, been based on a relatively short period of time. The reason is that the shift in stabilisation policy regime and other examples of major turbulence in the first half of the 1990s mean that a longer period of time would risk generating misleading results. This is one more reason why the calculations presented should be interpreted with some caution.

¹¹ See Alsterlind, J. & Dillén, H., “Monetary policy expectations and forward premia”, *Sveriges Riksbank Economic Review* 2, 2005, for a description of methods on how the size of term premiums can be estimated.

Note. The widest interval (dark blue field) shows the 75 per cent uncertainty interval. The narrowest interval (light blue field) shows the 25 per cent uncertainty interval and the field in between (medium blue field) shows the 50 per cent uncertainty interval.

Source: The Riksbank.

Figure B6. Uncertainty intervals regarding the implied forward rate curve based on historical deviations between the implied forward rate and the repo rate. Per cent



Uncertainty regarding the implied forward rate curve based on option prices

Trade in interest rate derivatives also provides an opportunity to highlight the uncertainty regarding future interest rate movements. There are several types of interest rate derivative, for example forward contracts, swaps and interest rate options. An interest rate option grants a right to buy or sell a certain interest-bearing asset at some point in the future, for example a government bond, at a predetermined exercise price. The exercise price is determined by the market's perception of uncertainty in the future price (or returns). At any given point in time, the exercise price of similar interest rate derivatives can vary. This variation in the exercise price reflects the market's assessment of the uncertainty in the future price of the interest rate derivative's underlying asset. By observing this variation, different methods can be used to estimate an implied probability distribution that constitutes an appreciation of the market's assessment of the probability that the price will fall within a certain interval at a certain point in time in the future.¹² From this estimate of the probability distribution, it is possible to construct an uncertainty interval which illustrates the uncertainty regarding the implied forward rate curve.

One advantage of an uncertainty interval based on option prices compared with those that are based on historical deviations between the implied forward rate and the actual outcome of the repo rate is that they immediately show the market's assessment of the uncertainty in future interest rate movements. Another advantage is that they are not in the same way dependent on economic developments during a certain period in the past. However, these uncertainty intervals could reasonably be affected by historical developments, albeit more indirectly.

The Riksbank uses government securities with different maturities to arrive at the implied forward rate curve in the Inflation Report. Unfortunately, the statistical basis regarding interest rate derivatives with government securities as an underlying asset is not sufficiently broad to offer a viable basis for calculating the uncertainty interval, and this is one clear disadvantage of this method. To illustrate how interest rate derivatives can be used to estimate uncertainty intervals regarding implied forward rates, these intervals have instead been derived from UK price statistics for Swedish interest rate caps using three-month bank securities as the underlying asset.¹³ The interest rate cap is an interest rate derivative that is used by market players looking to fix a certain maximum interest paid. If the market rate exceeds a certain limit, one is guaranteed, or has the right, to pay only a certain predetermined maximum interest. This type of interest rate derivative can accordingly be regarded as an interest rate option. A number of Swedish mortgage institutions already offer customers variable rates with an interest rate cap, for which they charge a certain premium on the interest rate during the contractual period.

Figure B7 shows the probability distributions based on option prices (i.e. the corresponding data for the distributions shown in Figure B5). For example, the red distribution

¹² See for example Aguilar, J. & Hördahl, P., "Option prices and market expectations", *Sveriges Riksbank Economic Review*, No. 1, 1999, for a more technical description of how to proceed in principle when estimating such probability distributions.

¹³ The calculations have been derived from the prices of Swedish interest rate caps set by ICAP, a brokers' firm based in London, and are based on the average volatility ("flat volatility") for the relevant period of maturity (in this case 90 days).

(subject to the effect of term premiums) shows the market's assessment of the probability that the repo rate will fall within a certain interval two quarters into the future (*on average* during the second quarter).¹⁴

These distributions, in a similar fashion as in the distributions shown in Figure B5, have subsequently been converted to uncertainty intervals that illustrate the uncertainty regarding the future interest rate path as perceived by the market (see Figure B8). It should be pointed out that this information primarily reflects the image which those market players who enter into such agreements have regarding uncertainty about future interest rate movements. It is thus not necessarily representative of the market as a whole.

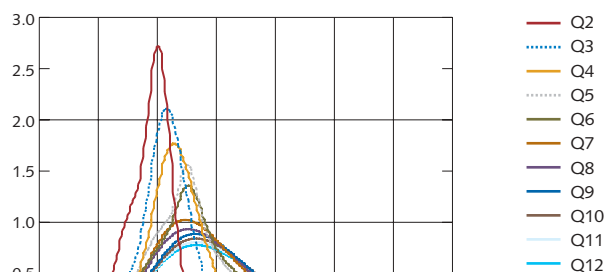
When uncertainty regarding the implied forward rate curve has been calculated in this way, it is clear that the market, with 75 per cent probability, expects the repo rate to fall somewhere within the interval 2.0–3.5 per cent one year into the future. The 50 per cent interval has the range 2.25–3.25 per cent, while the 25 per cent interval is 2.5–3.0 per cent.¹⁵

The uncertainty interval regarding the implied forward rate curve from a one-year perspective, estimated with the help of interest rate options, is broadly the same size as those intervals derived from historical deviations between implied forward rates and the repo rate. The uncertainty intervals for two years and three years are also broadly the same.

Summary

An important message in this box is that even if the Riksbank at a particular point in time were to judge that the implied forward rate curve used as the basis for the forecasts in the Inflation Report broadly speaking reflected a reasonable future development of the repo rate, there is still considerable uncertainty regarding economic development which means that actual

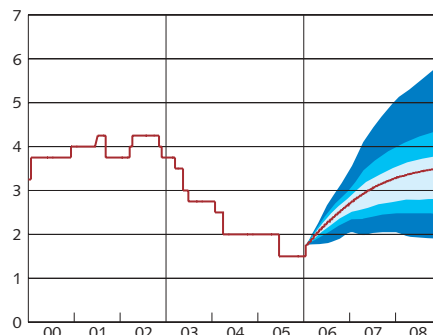
Figure B7. Probability distributions for the repo rate based on option prices.
Per cent



Note. The area under each of the curves shows the probability of the repo rate falling within a certain interval.

Source: The Riksbank.

Figure B8. Uncertainty interval regarding the implied forward rate curve based on option prices.
Per cent



Note. The widest interval (dark blue field) shows the 75 per cent uncertainty interval. The narrowest interval (light blue field) shows the 25 per cent uncertainty interval and the field in between (medium blue field) shows the 50 per cent uncertainty interval.

Source: The Riksbank.

developments in the repo rate could deviate from expectations. This box presents two different methods that attempt to quantify how uncertain future interest rate movements are.

The uncertainty interval regarding the implied forward rate curve used as the basis for the inflation forecast has in this Inflation Report been derived with the help of historical deviations between implied forward rates and the repo rate on the one hand, and option prices on the other. Both methods paint a similar picture; the uncertainty is already considerable for a time horizon ("forecast") of one year. For example, those uncertainty intervals based on option prices indicate that the market believes that the repo rate, with 50 per cent probability, will be somewhere in the interval 2.25–3.25 per cent one year into the future. The uncertainty interval rises noticeably as the time horizon increases.

¹⁴ As these estimates have been made on the basis of three-month interest rates, the spot rate for the first quarter is known.

¹⁵ It is important to remember that these uncertainty intervals, unlike the implied forward rate curve, have been derived from interest rates on bank securities and not government securities and that they moreover apply to three-month rates and not the overnight rate. However, these discrepancies should not have any material bearing on what the uncertainty intervals serve to illustrate here.

This box analyses inflation in 2005 and the monetary policy decisions taken during the period 2003–2004. Its purpose is to provide a basis for the Riksdag Committee on Finance's annual assessment of the Riksbank's monetary policy. The Riksbank's Annual Report 2005 contains similar material. Inflation was unexpectedly low in 2005 despite low interest rates and good economic growth – it was overestimated in the Riksbank's forecasts until the beginning of 2005. The unexpectedly low inflation can be linked to supply factors that have restrained inflationary pressure in the economy to a surprisingly large extent, in particular through high productivity growth and low import prices. The effects of structural changes of this kind are difficult to capture at an early stage in forecasting as evidenced by the fact that most forecasters overestimated inflation in 2005.

The objective of monetary policy

The Sveriges Riksbank Act states that the Riksbank's objective is to maintain price stability. The Riksbank has defined this objective as keeping inflation at 2 per cent a year, with a tolerance for deviations of ± 1 percentage point. The inflation target is defined in terms of the change in the consumer price index (CPI). Monetary policy is also sometimes guided by measures of underlying inflation, which are considered to provide a better picture of cyclical inflationary pressure. The measure most often used is the change in UND1X which excludes household mortgage interest expenditure and direct effects of changed indirect taxes and subsidies.

One purpose of the inflation target's tolerance range is to clarify that deviations from target are likely and that it is not a realistic ambition to keep inflation at exactly 2 per cent the whole time. The range also provides scope for temporary deviations from the target which can be justified taking into account

developments in growth and employment. This is in line with the preparatory legal documents for the Sveriges Riksbank Act in which it is assumed that the Riksbank, without prejudicing the price stability target, should support the general objectives of economic policy with a view to achieving sustainable growth and high employment.¹⁶

However, the tolerance range is also intended to underline that excessive deviations from the inflation target are not acceptable and that the Riksbank aims to limit these deviations. A guiding principle of monetary policy is that the Riksbank normally endeavours to bring inflation back to the target within two years in the event of a deviation. The repo rate is thus normally set in such a way that the inflation target is expected to be achieved within a two-year period.¹⁷

In certain situations, the Riksbank may consider that there is reason to depart from the principle of restoring inflation to the target within two years. In the first place, inflation can be affected by factors which, while they entail that price movements deviate from the target for a relatively long period of time, are none the less not considered to have any lasting impact on inflation. The Riksbank can then decide not to counteract this disturbance. Secondly, disturbances can have taken place that have led to inflation deviating sharply from the inflation target. In this case, the Riksbank can decide to let it take slightly longer to bring inflation back to the target to avoid excessively large fluctuations in economic activity.

Outcome and deviation from target in 2005

Inflation was below the target in 2005 even though interest rates have been low and economic growth good. Inflation was 0.8 per cent according to the UND1X measure and 0.5 per cent according to CPI on average for the year (see Table B3). Differences between these measures of inflation depend partly

¹⁶ See, for example, the Government Bill 1997/98:40, "Riksbankens ställning".

¹⁷ See Heikensten, L, "The Riksbank's inflation target – clarifications and evaluations", *Sveriges Riksbank Quarterly Review*, 1, 1999, and the box "The Riksbank's monetary policy – targets and indicators", Inflation Report 2003:3 for a more detailed discussion.

on household mortgage interest expenditure being excluded in UND1X inflation. Changes in interest expenditure in CPI are due partly to changes in mortgage rates and partly to changes in house prices. In 2005, the effects of interest rate reductions dominated the effects of rising house prices. Inflation was therefore lower when measured by CPI than by UND1X. The Riksbank does not generally want to counteract this temporary effect on CPI by monetary policy. Policy has therefore been guided mainly by the inflation trend as measured by UND1X in recent years.

During the year, prices increases on imported goods contributed to a large extent to the low inflation outcome. UNDIMPX, which shows the price of mainly imported goods and services, increased by 0.2 per cent on average while UNDINH, which measures the price of domestically produced goods and services, increased by 1.0 per cent. Imported inflation would have been even lower had it not been held up by steep price rises for oil products. Excluding oil products, prices of imported consumer goods fell by 1.7 per cent. This was the third consecutive year that these import prices fell. Admittedly, it is common for imported inflation to be lower than domestic inflation on average, since import prices mainly refer to goods while domestic prices refer to services to a greater extent. Productivity growth is normally higher in manufacturing sectors than in service sectors. However, imported inflation has also been considerably lower than price increases on domestic goods.

To bring into perspective last year's deviation from the target, Table B3 also shows

average inflation from 1995, when monetary policy officially started to be guided by the inflation target, to 2004. Inflation according to UND1X (calculated by the method used until 1 January 2005) has been 1.9 per cent on average, i.e. in principle on target. The fact that inflation according to CPI has been a half percentage point lower than UND1X inflation on average is primarily a result of the sharp fall in interest rates in general during the period, which is partly due to the success of the inflation target policy in ensuring low inflation.

Why was inflation so low in 2005?

The most important causes of low inflation in 2005 are various supply factors which have entailed low producer price increases, which also restrained price mark-ups in the distribution sector.

Although the prices of consumer goods for producers increased in autumn 2005, these had previously been substantially unchanged since 2003. A breakdown shows that this is partly explained by the relatively low price increases on domestically produced goods but above all by the reduced prices of imported goods during most of the last three-year period (see Figure B9). In the latter half of 2005, import prices started to rise, however, which also led to a slight increase in prices of consumer goods for producers.

The price of imported goods paid by importers is determined by the prices in foreign currency in the import countries and by the path of the exchange rate. The krona strengthened more or less continuously from 2002 until the

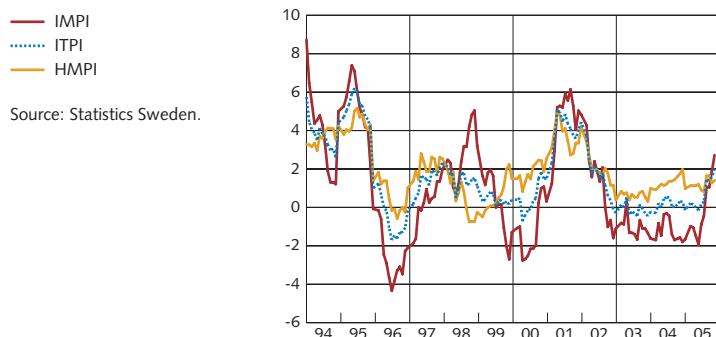
Table B3. Comparison of different inflation measures. Annual percentage change

	Annual average			Standard deviation		
	2005	1995–2004	1995–2004*	2005	1995–2004	1995–2004*
CPI	0.5	1.2	1.4	0.3	1.1	1.1
UND1X	0.8	1.6	1.9	0.3	0.8	0.8
UNDIMPX	0.2	0.3	0.6	0.8	1.4	1.4
UNDIMPX excl. oil products	-1.7	0.1		0.5	1.5	
UNDINH	1.0	2.2	2.4	0.2	1.0	1.0

Note. *Inflation measure calculated according to the method used until 1 January 2005.

Sources: Statistics Sweden and the Riksbank.

Figure B9. Producer prices for consumer goods according to the home market price index (HMPI), the import price index (IMPI) and a weighted average, the price index for domestic supply (ITPI). Annual percentage change



end of 2004, although this trend reversed in 2005. Exchange rate movements are normally assumed to affect pricing in Swedish kronor with some time lag.¹⁸ This suggests that the previous strengthening of the exchange rate probably contributed to the low imported goods prices at the beginning of the year and also that the weakening of the krona in 2005 contributed to the rise in import prices in the latter half of the year.

An important reason for the fall in import prices in recent years seems to be a changed pattern of imports, where imports from countries with relatively high prices have been increasingly replaced by imports from countries where prices are relatively low. This shifting of imports to lower cost countries has contributed to reducing the prices paid by Swedish importers.¹⁹ The abolition of import quotas on clothing and textiles by the EU at the beginning of 2005 can have contributed to a further reduction in import prices. While the re-introduction of limits on Chinese clothing exports should have had a countervailing effect in the latter half of the year, the overall trend towards an increased share of imports from countries with a low price level is considered to have been an important cause of the continued fall in imported inflation excluding oil products in 2005.

It should also be pointed out that the low imported inflation could at least partly be an effect of the transition to the new method of calculation for the rate of inflation introduced by Statistics Sweden in January 2005.²⁰ Under the previous method, somewhat simplified, inflation was calculated as the price increase on an unchanged basket of goods. The new method also takes into consideration the changes in the pattern of consumption that usually occur when the relative prices of goods change. The new calculation method tends to reduce the rate of inflation by an average of 0.2 percentage points viewed over a longer period of time, although the effect can be larger in particular years.

Calculations have shown that, imported inflation especially can be considerably lower in particular years applying the new calculation method. Goods accounted for a relatively larger proportion of imports and since the substitution between goods is larger than between services, the substitution effect will be greater for imported inflation. As discussed above, the share of imports from low-cost countries has increased. It is therefore conceivable that the low increases in import prices are partly an effect of the change in method. However, increases in import prices have been weak for a long time, which suggests that it is not only the changed calculation method that has restrained imported inflation in 2005.

Another of the main factors underlying low inflation in recent years is productivity growth, which has kept down cost pressure in the economy. Wages are one of the largest cost items for most businesses. The impact that wage increases have on unit labour costs and thus ultimately on the price of the product depends to a large extent on productivity. In recent years, productivity growth has been remarkably high, which has led to a low cost pressure for businesses. In 2003 and 2004, unit labour costs even decreased in the corporate

18 See the box "The exchange rate and imported inflation" in Inflation Report 2004:2.

19 See the box "Why are Swedish import prices so low?" in Inflation Report 2005:2.

20 For a detailed description of the change in method, see the press release of 5 May 2004, "Comments regarding Statistics Sweden's changed methods for computing the consumer price index and the inflation rate from January 2005", Statistics Sweden and the box "Changes in calculation methods for the exchange rate" in Inflation Report 2004:2.

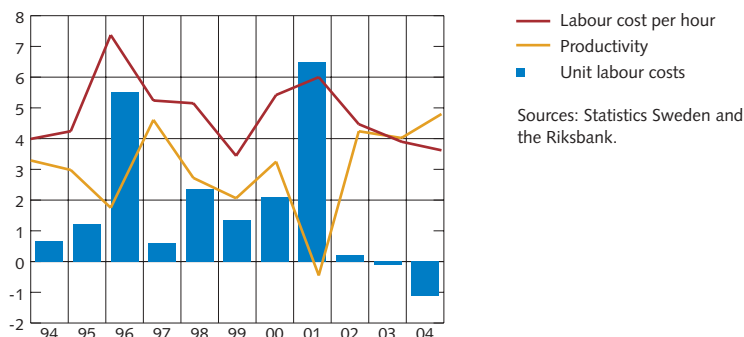
sector (see Figure B10). High productivity growth, in combination with relatively low wage increases, has not only restrained price rises on domestically produced goods and services but has contributed to low imported inflation. Imported goods are processed and distributed in Sweden before being sold to consumers. Accordingly, productivity growth is also relevant to the rate of price increase of imported goods.

The causes of the rapid improvements in productivity have not been wholly clarified. There is probably a certain cyclical component in this development. At the beginning of an upswing, there is normally a period when output increases more quickly due to a more intensive use of existing labour, which leads to higher productivity growth. However, the increase in productivity has been strong, even taking effects of this kind into account. There are therefore probably also more durable explanations. One possibility is that the extensive investments made in information technology in many sectors at the end of the 1990s have started to produce results.²¹

The high productivity growth should probably also be viewed in the light of increased domestic and international competition. Among other things, this has led to rationalisation in many sectors. Coupled with the relocation of certain activities to low-wage countries, this can have made it possible to improve productivity at a faster pace than previously. The stiffening competition has probably also been a driving force behind the shift of imports with an increasingly high level of imports from low-cost countries.

Stiffening competition should in itself also have contributed to restraining the rate of price increases by reducing businesses' mark-up on costs. In 2005, the focus has to a large extent been on developments in the food industry and the price pressure entailed by the increased establishment of low-price chains. Food prices fell during the year, although not by as much

Figure B10. Unit labour costs, labour productivity and labour cost in the corporate sector.
Annual percentage change, calendar-adjusted data



— Labour cost per hour
— Productivity
■ Unit labour costs

Sources: Statistics Sweden and the Riksbank.

as many had expected, not least players within the food industry. However, food accounts for a relatively large proportion of the consumption basket in UNDINH, so this still contributed to some reduction of domestic inflation during the year.

The ability of businesses to raise prices is also affected by the state of demand. When demand is low in relation to production capacity, companies can choose to reduce their profit margins. A low utilisation of available labour also restrains wage demands. The rapid productivity growth has contributed to keeping down the demand for labour. The low inflation should therefore be seen in the light of there being abundant resources in the economy.

Why inflation was so low in 2005 – an analysis made using the Riksbank's macroeconomic model

During the past year, the Riksbank has used a new macroeconomic model for forecasting and in monetary policy analysis. The model has been used in the work of interpreting why actual inflation has differed from the development expected by the Riksbank.²²

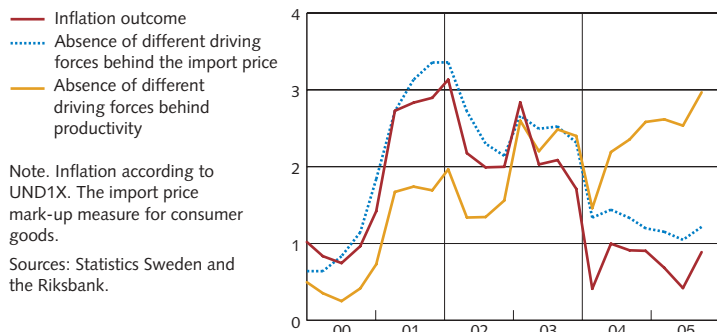
The model belongs to a new generation of dynamic general equilibrium models.²³ These describe the development of the economy at the macro level – i.e. in the aggregate economy – at the same time as they are explicitly based

21 See Andersson, B. and M. Ådahl, "The new economy and productivity in Sweden in the 2000s", *Sveriges Riksbank Economic Review* 1, 2005.

22 For a more detailed description of the model, see Adolfson, M., Laseén, S., Lindé, J. and M. Villani, "Bayesian Estimation of an Open Economy DSGE Model with Incomplete Pass-Through", *Sveriges Riksbank Working Paper Series No. 179*, 2005.

23 These models are often referred to as DSGE (Dynamic Stochastic General Equilibrium) models.

Figure B11. Inflation outcome and inflation in the absence of different driving forces according to the Riksbank's macroeconomic model.
Annual percentage change



Note. Inflation according to UND1X. The import price mark-up measure for consumer goods.

Sources: Statistics Sweden and the Riksbank.

on microeconomic theory, i.e. theories on how firms and individuals make decisions on output, investments, consumption, etc. This type of economic model is now used by an increasing number of central banks.

The Riksbank's model describes the development of a dozen observable economic variables such as GDP, consumption, investments, hours worked and inflation. The parameters in the model are determined by an econometric method to obtain the best possible description of the historical development of the Swedish economy. Besides the observable variables, the model also contains a number of non-observable variables calculated by the econometric method, such as measures of technological development and firms' price mark-up on production costs.

The model can be used to study why inflation has been so low in recent years. This can be analysed by the various non-observable quantities – the driving forces in the model – first being generated by the econometric analysis. Subsequently, consumption, investments, GDP growth, inflation, etc. are calculated assuming that a particular driving force is excluded. This experiment accordingly answers the question of what inflation would have been in the absence of a particular driving force. By making this analysis for each of the various driving forces and comparing the inflation outcome in each

experiment, it is possible to obtain an idea of which driving force/s has/have been most important for the low inflation outcome.

An analysis of this kind shows that it is primarily greatly reduced import price mark-ups and high productivity growth due to rapid technological development that have been the causes of low inflation in recent years, according to the model. Figure B11 shows the actual inflation outcome and what inflation would have been, according to the model, in the absence of the driving forces underlying productivity growth and mark-ups respectively. From having contributed to holding up inflation, productivity improvements, according to the model, have contributed to keeping inflation down from mid-2003 and onwards (inflation would have been higher without these changes) and this effect has been especially great since 2004.²⁴ Reduced import price mark-ups have contributed to low inflation for a relatively long time, although the effect has been particularly noticeable in recent years.

The result of this model analysis is accordingly well in line with the conclusions from the discussion in the last section, i.e. productivity improvements and low import price mark-ups have contributed to keeping down inflation in 2005. The model places greater weight on the effect of depressed import mark-ups than the effect of low international prices as such. However, this result should not be over-interpreted given that the measure of international prices used in the model probably does not capture the shift of imports to low-cost countries discussed above. This shift may imply that the reduction of price mark-ups has been overemphasised.

Forecasts for the development in 2005 made in 2003–2005

How well did the Riksbank succeed with its forecasts for development in 2005? Monetary policy takes effect with a time lag and it must

²⁴ The exact size of the effects in Figure 11 should not be over-interpreted since, among other things, the model contains a certain element of statistical uncertainty. It is moreover important to note that the model is an abstraction of the actual economy.

Table B4. The Riksbank's forecasts and outcome in 2005 for selected variables.
Annual average

	IR 03:1	IR 03:2	IR 03:3	IR 03:4	IR 04:1	IR 04:2	IR 04:3	IR 04:4	IR 05:1	IR 05:2	IR 05:2 IT	IR 05:3 IT	IR 05:3	IR 05:4 IT	IR 05:4	Outcome	
GDP growth 2004	2.4	2.4	2.4	2.4	2.8	2.9	3.6	3.6								3.7	
GDP growth 2005	2.4	2.4	2.5	2.5	2.6	2.8	3.2	3.0	3.2	1.9	1.9	2.3	2.3	2.4			
GDP growth 2006					2.8	3.1	3.2	3.2	3.2	2.7	2.6	3.0	3.3	3.2			
GDP OECD 19 2004	2.7	2.5	2.8	2.9	3.2	3.3	3.5	3.4								3.2	
GDP OECD 19 2005	2.6	2.6	2.6	2.7	2.8	2.8	2.8	2.6	2.6	2.5		2.4		2.5			
TCW 2005	123.7	124.0	123.7	123.7	123.7	123.7	124.7	123.8	123.6	125.4		127.6		128.5		128.0	
oil price USD 2005	20.7	20.7	22.8	22.8	28.2	29.4	38.4	40.3	43.3	48		55		54.0		54.5	
Productivity in the business sector 2004	2.3	2.3	2.1	2.2	2.7	3.2	3.5	3.4	3.6	3.6						3.9	
Productivity in the business sector 2005	2.2	2.2	2.1	2.1	2.4	2.5	2.7	2.7	2.8	2.6		2.3		2.3			
Wages in the business sector (nominal wage) 2005	3.8	3.6	3.7	3.6	3.5	3.5	3.5	3.4	3.3	3.3		3.3		3.3			
Unit labour costs in the business sector 2005	1.7	1.5	1.7	1.6	1.3	1.2	1.0	0.9	0.7	0.6		1.1		1.0			
Open unemployment 2005	4.3	4.5	4.5	4.6	4.9	5.2	5.1	5.2	5.1	5.2		5.9a		5.9a			
International producer prices 2005	2.1b	1.8b	1.9b	1.9b	1.6	1.6	2.1	2.3	2.3	2.5		3.1		3.4			
UNDINHX 2005	2.5c	2.3c	2.2	2.3	1.9	1.6	1.6	1.7	0.9	1.1		1.0		1.0		1.0	
UNDIMPX 2005	0.2c	0.3c	0.4	0.3	0.0	0.1	0.5	0.5	-1.3	-0.8		0.2		0.2		0.2	
UND1X 2005	1.8c	1.6c	1.6	1.6	1.2	1.1	1.2	1.3	0.2	0.5		0.3	0.8	0.8	0.8	0.8	
UNDIMPX 2005, excluding oil				0.7	0.3	0.3	0.5	0.6	-1.6	-2.2		-1.8		-1.6		-1.7	
CPI 2005	2.0c	1.9c	1.9	1.9	1.5	1.2	1.3	1.2	0.1	0.3		0.5	0.5	0.5	0.4	0.4	0.5

Note. a = forecasts refer to unemployment according to a new definition (this is estimated to entail 0.4 percentage points higher unemployment compared with the previous definition), b = average export prices in national currency, c = twelve-month figures, KL = cyclical wage statistics, IT = forecasts conditional on implied forward rates. The forecasts in the first and second Inflation Reports in 2005 were based on the assumption on implied forward rates in boxes and then only forecasts for GDP growth and inflation. In the third and fourth Inflation Reports for 2005, the forecasts were based on the main scenario for implied forward rates and an inflation forecast based on a constant repo rate was published separately in a boxes.

Sources: Intercontinental Exchange, OECD, Statistics Sweden and the Riksbank.

therefore be forward-looking. Therefore, it is primarily the forecasts made, and the interest rate decisions taken in 2003 and 2004 that are relevant in the evaluation of monetary policy in 2005. Table B4 presents the forecasts for different measures of inflation in 2005 and forecasts of some variables that are particularly important for the inflation forecast.

One difficulty in the analysis of the accuracy of the Riksbank's forecasts is that until the second Inflation Report in 2005, they were based on the assumption that the repo rate would remain unchanged for two years. Since the repo rate is normally changed during the

forecast period, and thus affects the outcome for inflation and other economic quantities, it is difficult to obtain a good idea of the accuracy of the forecast. From the third Inflation Report in 2005, forecasts have instead been based on the assumption that the repo rate follows market expectations as reflected in the implied forward rates.²⁵ This new assumption for monetary policy facilitates an evaluation of the forecasts since it is normally more realistic.²⁶

GDP growth in 2004, which can be assumed to have affected the inflation outcome in 2005, was in relative terms, greatly underestimated in the forecasts made in 2003

25 For a description of the new prerequisites for the Riksbank's forecasts, see the box "Changes in the Riksbank's forecasting methods" in Inflation Report 2005:1.

26 However, it should be noted that it is not possible with the implied interest assumption either to obtain an exact idea of the accuracy of the forecast since the interest rate movements expected by the market are not necessarily the development that the Riksbank considers most probable.

and at the beginning of 2004. Despite this, all the forecasts made in 2003 overestimated the outcome for inflation in 2005. The assessment was that the level of economic activity, stimulated by a more expansive monetary policy, would improve in future years and that inflationary pressure would at the same increase in line with a traditional cyclical pattern.

However, while economic activity improved, inflation remained lower than expected. A gradual reappraisal of international and domestic cost pressures took place at the end of 2003 and the beginning of 2004. The increase in the rate of inflation was now expected to be slower and the forecasts for both imported and domestic inflation were therefore revised downwards.

This reappraisal was partly attributable to low import prices. The forecast for imported inflation, excluding oil products, had been successively adjusted downwards during the latter half of 2003 while the outcome, despite this, was considerably lower than expected. This affected the assessment of international price pressure and it was noted that increased trade and stiffening competition, in particular from countries with very low costs, could have contributed to greater international price pressure than previously estimated. To some extent, the reappraisal was also a result of a more optimistic view of productivity growth. The labour market had also been weaker than expected and there was therefore reason to be slightly more pessimistic about future employment and also to expect rather more subdued wage increases. Overall, this contributed to a reappraisal of the view on domestic cost pressures.

In May 2004, Statistics Sweden decided, as previously mentioned, to make certain changes to the methods used to calculate the inflation rate and announced that these new methods would start to apply from January 2005. For the Riksbank, this meant that forecasts for inflation in 2005 according to CPI and the underlying measures (calculated with effect from the second Inflation Report in 2004) would be adjusted

downwards slightly.²⁷ Calculations showed that the difference between the old and new measure historically had varied greatly from year to year and the difference in general would have been greater for imported inflation than for domestic inflation. On average, however, CPI inflation had only been 0.2 percentage points lower on average per year with the new calculation method. The forecasts were therefore reduced slightly.

After the summer of 2004, the growth forecast was adjusted upwards to a level in line with the final outcome since new statistics showed that Swedish exports had developed better than expected during the year due to a slightly stronger economic upturn. The more optimistic view of the economic outlook led to the forecast for GDP growth in 2005 also being increased. It was considered that domestic demand, as a result of higher growth and an expansive fiscal and monetary policy would gradually take over and become the driving force behind the economic upturn.

Despite the fact that growth for 2004 and 2005 was adjusted upwards, the inflation forecasts were not changed a great deal. The analyses indicated that inflationary impulses from stronger growth and a higher oil price would be counteracted by favourable cost conditions due to a further increase in productivity growth and spare production capacity initially. The forecasts for domestic and underlying inflation were therefore only marginally increased. The forecast for imported inflation was, however, adjusted upwards slightly, partly as a result of an increase in the oil price forecast.

In the first Inflation Report of 2005, the inflation forecast was adjusted downwards quite substantially. This was not due to any decisive reappraisal of the economic outlook, but rather to a number of specific factors that were considered to affect inflation prospects to a greater extent than previously foreseen. The prices of, for instance, food and clothing had shown unusually weak growth and had even

27 In the table, the forecasts from the second Inflation Report for 2004 are thus not directly comparable with previous forecasts.

fallen in the past year. Stiffening competition in the food industry was considered to be one cause of the falling food prices. The abolition of EU import quotas on clothing and textiles at the beginning of the year had probably contributed to keeping down the rate of increase of clothing prices. The prices of imported consumer goods, excluding oil products, had moreover in general continued to fall unexpectedly sharply, which indicated that the effects of increased imports from low-cost countries had previously been underestimated. Both forecasts for imported and domestic inflation were therefore revised downwards.

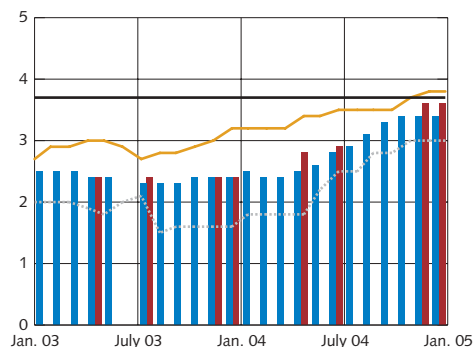
After this downward adjustment, the forecast for domestic inflation would appear to be in line with the final outcome for 2005, while forecasts for CPI and UND1X underestimated inflation. The short-term development of these inflation measures was adjusted upwards slightly in the two subsequent Inflation Reports, among other things due to a higher oil price which drove up imported inflation.

Comparison with other forecasters

Figure B12 shows a comparison between some twenty economic analysts' forecasts of growth in 2004 at different times. Judging from the figure, the strong growth of 3.7 per cent in 2004 surprised most forecasters. The estimate of growth in 2004 was in the range of 2–3 per cent at the beginning of 2003 and even after the Riksbank's interest rate cuts in the first half of the year, the forecasts, on average, remained at about 2.5 per cent, as did the Riksbank's forecasts.

The Riksbank, together with some other forecasters, revised the GDP forecast upwards in the spring of 2004 and the average of the forecasts average was also increased with some time lag. However, it is remarkable to note that growth in 2004 was underestimated by over 0.5 percentage points as late as in June 2004 by both the Riksbank and the average of

Figure B12. Forecasts of GDP growth in 2004 at various times: the Riksbank and an average of other forecasters.
Annual average

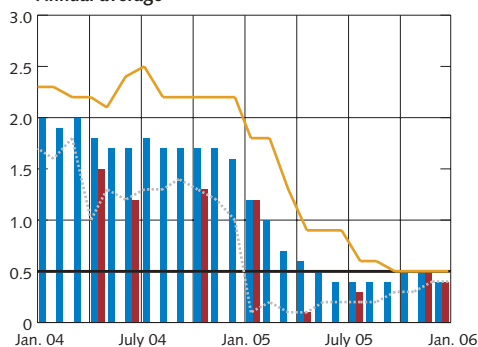


— Outcome
— Highest forecast
..... Lowest forecast
■ Average excl. the Riksbank
■ The Riksbank

Note. The forecasts have been obtained from Consensus' summary of Swedish and international forecasters. The summary has been complemented with forecasts by LO and forecasts from the Spring Fiscal Policy Bills and Budget Bill. The dating of these forecasts follows Consensus' presentation, which may differ from the actual date of publication by a month or so.

Sources: Consensus Inc., Ministry of Finance, LO and Statistics Sweden.

Figure B13. Forecasts of inflation in 2005 at various times: the Riksbank and an average of other forecasters.
Annual average



— Outcome
— Highest forecast
..... Lowest forecast
■ Average excl. the Riksbank
■ The Riksbank

Note. The forecasts have been obtained from Consensus' summary of Swedish and international forecasters. The summary has been complemented with forecasts by LO and forecasts from the Spring Fiscal Policy Bills and Budget Bill. The dating of these forecasts follows Consensus' presentation, which may differ from the actual date of publication by a month or so.

Sources: Consensus Inc., Ministry of Finance, LO and Statistics Sweden.

other analysts. The upward adjustment of the Riksbank's forecast in the autumn was largely due to new statistics on exports during the year showing higher growth than previously estimated. The evolution of the forecasts by other analysts demonstrates that this strong increase in exports surprised most analysts.

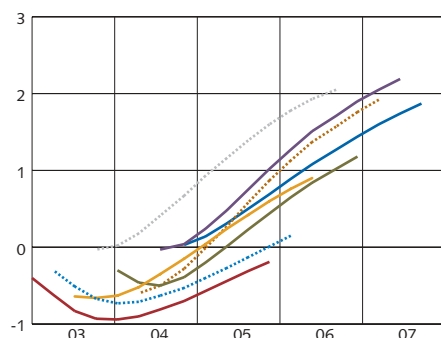
Figure B13 shows that the underestimation of GDP growth was not accompanied by a similar underestimation of inflationary pressure. On the contrary, inflation was overestimated in 2005 by practically all economic analysts. As shown by last year's forecast evaluation, inflation in 2004 was overestimated in a similar way. It is accordingly a reasonable interpretation that the factors restraining international price increases and domestic cost increases have been greater and had a more long-term effect than



Note. The implied forward rates apply to a 15-day average. The repo rate is the rate that applied at the time of the forecast, i.e. the preceding quarter.

Source: The Riksbank.

Figure B14. The difference between implied forward rates and a constant repo rate at the time of different forecasts.



most analysts expected. Most economic analysts gradually adjusted their inflation forecasts downwards in line with the final outcome of 0.5 per cent at the beginning of 2005 apace with the growing insight into these effects and due to the temporary slackening of economic activity at the beginning of the year.

While the Riksbank's assessment of growth in 2004 was roughly on the same level as the average forecast, the assessment of inflation in 2005 was consistently lower than the average and often among the lowest forecasts. This can be interpreted as if the Riksbank was among the forecasters that began to take into consideration the effects that, at a comparatively early date, dampened underlying inflationary pressure in the economy.

However, the comparison with other forecasters is slightly misleading, since the repo rate was lowered during the period, while the Riksbank's forecasts were based on an assumption that the rate would not change. As previously mentioned, this assumption was changed in 2005 to an assumption that the interest rate would come into line with market expectations in accordance with the implied forward rates. Figure B14 shows the difference between the implied forward rates during the period and the constant interest rate used for the forecasts. Except on a few occasions, the implied forward rates shown in the figure suggest a more expansive monetary policy (the difference is negative) than the assumption of a constant interest rate would entail.²⁹ Thus, if the

Riksbank's forecasts for 2003–2004 had been based on implied forward rates, the forecasts both for growth in 2004 and inflation in 2005 would probably have been higher than those shown in Figures R12 and R13. It is, however, not possible after the event to say exactly what the forecasts would have been in this case.

The Executive Board's monetary policy decisions in 2003–2004

Since inflation in 2005 was primarily affected by the monetary policy pursued in 2003 and 2004, an analysis of monetary policy must first and foremost be focused on the assessments made and the repo rate decisions taken during these years.

At the end of 2002, the Riksbank cut the repo rate in two steps to 3.75 per cent. In 2003, the Riksbank continued to shift monetary policy in a more expansive direction and the repo rate was cut in March, June and July by a total of 1 percentage point to 2.75 per cent. These cuts were implemented in the light of the gradual deterioration of the economic outlook in Sweden and abroad and the anticipated recovery was delayed. Developments seemed to confirm the concerns that there would be a lengthy period of adjustment after the dramatic stock market decline since 2000 and that consumption and investments would be dampened for a relatively long time. At the beginning of the year, geopolitical unrest in connection with the war in Iraq also contributed to expectations of weaker performance.

After the cut in July, no further changes in the repo rate took place in 2003. The Executive Board of the Riksbank was of the view that the recovery that had been held back for a period had now started, supported by the cuts in the repo rate that had taken place. Inflation, excluding energy prices, was slightly lower than anticipated in the autumn, which was partly an effect of an unexpectedly weak imported inflation and domestic cost pressures. Nevertheless, overall inflation developed in

²⁹ The repo rate was in fact cut at the beginning of 2003 and 2004.

REPO RATE DECISIONS 2003

6 February: The repo rate was left unchanged at 3.75 per cent.

17 March: The repo rate was lowered by 0.25 percentage points to 3.5 per cent.

24 April: The repo rate was left unchanged at 3.5 per cent. Lars Nyberg and Kristina Persson entered a reservation against the decision, favouring instead a rate cut of 0.25 percentage points. Mr Nyberg and Ms Persson argued that resource utilisation and inflation were expected to be lower than in the recent assessment and that the Riksbank's normal approach argued in favour of a rate cut. Moreover, the international downside risks to inflation could be assumed to be greater than the domestic upside risks.

4 June: The repo rate was cut by 0.5 percentage points to 3.0 per cent.

3 July: The repo rate was cut by 0.25 percentage points to 2.75 per cent.

15 October: The repo rate was left unchanged at 2.75 per cent. Kristina Persson entered a reservation against the decision proposing that the repo rate be cut by 0.25 percentage points, partly in reference to the continued weakness of the labour market and the fact that it would be another while before firms started to recruit and the economic upturn stabilised. Since Ms Persson regarded the domestic upside risks to inflation as negligible, she considered that a further cut in the repo rate was appropriate.

4 December: The repo rate was left unchanged at 2.75 per cent. Villy Bergström and Kristina Persson entered a reservation against the decision and considered that the repo rate should be cut by 0.25 percentage points in the light of the risk of a poorer development of economic activity in Sweden than the assessment made in the Inflation Report. The two deputy governors considered that the weak development of the labour market to date pointed in this direction.

REPO RATE DECISIONS 2004

5 February: The repo rate was cut by 0.25 percentage points to 2.5 per cent. Kristina Persson entered a reservation against the decision and considered that the repo rate should be cut by 0.5 percentage points. Ms Persson argued that the inflation forecast as early as December last year indicated that there was scope for a rate cut and that subsequent developments indicated an even weaker price pressure, partly due to a continued improvement in productivity growth.

31 March: The repo rate was cut by 0.5 percentage points to 2.0 per cent. Villy Bergström and Eva Srejber entered a reservation against the decision and considered that the repo rate should be cut by only 0.25 percentage points. The two deputy governors advocated greater caution with monetary policy stimulation, partly so as not to encourage households to increase their indebtedness. Another reason was uncertainty about the strength and persistence of the productivity growth and growing international competition which had kept inflation down despite an expansive policy in several parts of the world.

28 April: The repo rate was left unchanged at 2.0 per cent.

27 May: The repo rate was left unchanged at 2.0 per cent.

23 June: The repo rate was left unchanged at 2.0 per cent.

19 August: The repo rate was left unchanged at 2.0 per cent.

13 October: The repo rate was left unchanged at 2.0 per cent.

8 December: The repo rate was left unchanged at 2.0 per cent.

line with the forecasts. It was expected that future inflation would develop in paths that could normally be expected during an economic upturn. The weak development of the labour market was a cause for concern in this context and its relative importance for the risk scenario, weighted against systemic effects of high electricity prices in the coming round of wage negotiations, was discussed by the Executive Board.

Inflation then decreased at the beginning of 2004. This was anticipated to some extent and could be explained by previous electricity price increases, but the reduction in inflation was again larger than expected. This confirmed the Riksbank's view that the underlying inflationary pressure (despite an increasingly clear international and domestic economic upturn) was lower than previously predicted. Lower import prices combined with a weaker labour market and higher productivity than previously forecast suggested lower wage and price pressures. The repo rate was therefore cut in February and March 2004 by an additional 0.75 percentage points to 2 per cent.

No further changes in the repo rate were made for the remainder of 2004. The view of the Swedish economic outlook became more optimistic during the summer and autumn, when new information indicated an increasingly strong international and domestic development. Towards the end of the year, the growth prospects looked rather more subdued although there were still reasons to assume that the inflationary pressure would gradually increase and that monetary policy would sooner or later have to be shifted in a less expansive direction. Inflation was expected to continue to increase apace with increasing resource utilisation, but at the same time favourable cost conditions, including continued high productivity growth, were considered to contribute to the increased inflation being moderate and in line with the target in a time horizon of a couple of years.

Alternative monetary policy stances

As shown above, the Riksbank overestimated inflation in 2005, in particular in the forecasts made in 2003. In early 2004, it was anticipated that inflation would be below target in 2005, although in retrospect, it is evident that inflation was even lower than forecast then. A natural question to ask in this context is whether it would have been possible, given the information available, to better predict the low inflation in 2005. A related question is the extent to which another monetary policy stance might have been more appropriate had the forecasts been accurate.

In order to predict the low inflation pressure in 2005, it would have been necessary for the Riksbank to have made a correct analysis early on of the structural changes that were taking place in the economy and which were important for inflation, including the high productivity growth. Changes of a structural nature are, however, difficult to capture at the early stages of forecasting, since they are difficult to identify. It takes time before it is possible to draw reliable conclusions that unexpected economic events actually reflect structural changes and are not just the result of temporary factors. Assessments of the strength and persistence of the effects of the structural events on inflation are also very uncertain since the historical correlations that the forecast methods utilise no longer apply.

An indication that the low inflation in 2005 was a consequence of structural changes which were difficult to foresee is that it was overestimated by most forecasters, despite growth in 2004 being considerably stronger than expected. In other words, the economic outlook and inflation prospects of other forecasters did not differ in any crucial respects from those of the Riksbank. While certain analysts have been somewhat more optimistic at periods in their view of productivity growth, their view of the

inflation prospects has still not been particularly different.

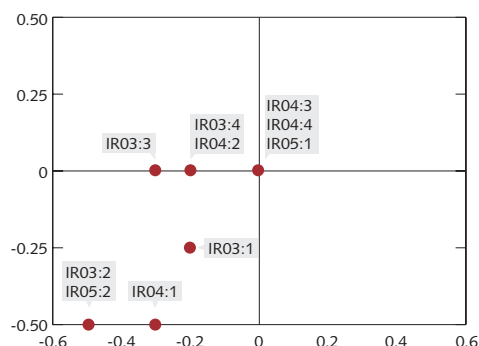
In connection with growing insight at the beginning of 2004 into the strength of the inflation-dampening effects, the inflation forecasts were revised downwards and it was anticipated that it would take a couple of years for inflation to be in line with the target and it would accordingly be below target in 2005. However, inflation was even lower in 2005 than these forecasts indicated, suggesting that monetary policy could have been even more expansive in 2004. Inflation would then, partly through the exchange rate channel, probably have moved closer to the target in 2005.

However, it is doubtful whether it would have been appropriate to lower the repo rate much more than the cuts actually made in 2004, which totalled 0.75 percentage points, bearing in mind factors such as the rapid increase in household lending and prices in the housing market. Furthermore, it may be worth noting that the effects on domestic demand and in the labour market of an even more expansive monetary policy than that actually conducted would probably have been small since there was nevertheless a firm growth in demand. In spite of this, the changes on the supply side of the economy have meant that the development of the labour market has been weak. With the benefit of hindsight, there is probably therefore no crucial difference between the monetary policy actually conducted during the period and the policy that would have been chosen if it had been possible to better anticipate the effects of the supply disturbances on the economy. Viewed over the entire period during which the repo rate was lowered, starting from the end of 2002, the cuts could possibly have started slightly earlier and been implemented slightly more quickly.

Relationship between interest rate decisions and forecasts

A requirement which can be made on monetary policy is that it should appear reasonable and consistent given the prerequisites that apply at

Figure B15. The relationship between interest-rate decisions and forecasts, repo rate changes on the vertical axis and forecast deviation from target on the horizontal axis.



Note. The forecasts refer to risk-adjusted UND1X in a two-year time horizon assuming that the repo rate is unchanged.

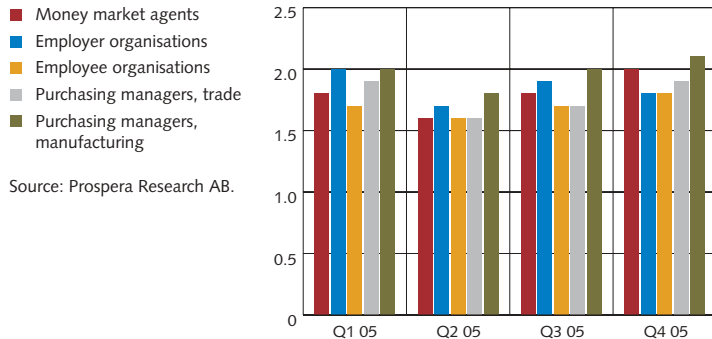
Source: The Riksbank.

the time of the different decisions. One way of investigating if this has been the case is to try to answer the question of whether the Riksbank's repo rate changes have been easy to understand given the forecasts made. In line with the Riksbank's strategy of normally restoring inflation to target within two years in the event of deviations, the repo rate should normally have been increased in those cases when the inflation forecast (assuming a constant repo rate during the forecast period) exceeded the target while inflation forecasts below the target should normally have led to a cut in the repo rate.

However, it is important to bear in mind that there is no hard and fast rule that says that the repo rate must always be changed when the UND1X forecast deviates sufficiently from the inflation target in a two-year time horizon. Situations may arise, for instance, when the economy is affected by a disturbance whose effect on inflation is temporary but which still does not fully abate within two years. It may also be the case that a major disturbance to inflation would make a return to the target in a two-year time horizon considered to be associated with excessively large undesirable effects on the real economy. Considerations of this kind limit the expected strength of the correlation between changes in the repo rate and UND1X-forecasts in a two-year time horizon.

According to Figure B15, which shows the forecast deviation from the target and repo rate decisions at the times of various forecasts

Figure B16. Different economic agents' expectations of inflation for 2007 in 2005.
Per cent



Source: Prospera Research AB.

between 2003–2005, there is still on average a positive correlation between expected deviation from the target in a two-year time horizon and repo rate decisions. The figure also shows, as expected, that small forecast deviations from the target have not always led to a change in the repo rate.³⁰ Furthermore, it is evident that deviations from the target must normally be quite large for the repo rate to change by more than 0.25 percentage points. It should be noted that repo rate decisions up to and including Inflation Report 2005:2 have been included in the figure. After this report, the assumption of a constant repo rate is no longer used, as previously mentioned. Instead, the forecasts have been based on the assumption that the interest rate during the forecast period changes according to the implied forward rates. With an assumption of this kind, the illustration in the figure is no longer as informative, since the inflation forecast, as well as repo rate decisions on the forecast date, depend on the series of repo rate changes assumed during the forecast period.

Inflation expectations

Inflation expectations can be regarded as a measure of the public's confidence in the Riksbank to attain its target. A high level of confidence in the inflation target provides greater opportunity in the formulation of

monetary policy to take into consideration certain other factors besides inflation, such as growth and employment. Figure B16 shows inflation expectations for 2007 of the money market agents, employer and employee organisations and purchasing managers in trade and industry. Although inflation in 2005 was clearly below target, there would seem to be widespread confidence in the inflation target. In the course of a couple of years, all agents expect that inflation will be at or close to 2 per cent.

Conclusions

In conclusion, it is clear that the Riksbank's forecasts overestimated inflation by a relatively large amount up to the beginning of 2005. This was not due to an overestimation of the economic upturn. GDP growth in 2004, which can be assumed to have affected the inflation outcome in 2005, proved to be considerably stronger than forecasts indicated. The strength of international economic activity was also underestimated, in particular during 2003. The overestimate of inflation cannot be linked to exchange rate considerations since the krona was weaker in 2005 than the forecasts in 2003–2004 indicated.

The fact that the Riksbank's forecasts in 2003 and 2004 overestimated the inflation outcome in 2005 can instead be linked to supply factors that restrained the inflationary and cost pressures in the economy to a surprisingly great extent despite increasing demand. One of the foremost factors is the surprisingly strong productivity growth (particularly in 2004) which has kept down the cost pressure in the economy. This high productivity growth can be explained partly by the companies in a historical comparison waiting for an unusually long time before recruiting employees in this upturn, but it is probably also due to durable factors, for instance, effects of earlier investments in information technology and a stiffer competition in many sectors.

³⁰ See the respective inflation report and press release for detailed justifications of the different repo rate decisions shown in the figure.

Greater domestic and international competition can also explain the low price increases on imported goods. It was predicted in 2003 and 2004 that imported inflation would be low. The precision of the UNDIMPX forecasts is, however, to some extent illusory. The development of UNDIMPX has to a great extent been driven by the rise in oil prices and oil price forecasts, particularly in 2004-2005, have been sharply revised upwards. If oil products are excluded from UNDIMPX, the prices of imported goods and services would actually have fallen by 1.7 per cent on average in 2005, which is a considerably greater reduction than the Riksbank forecast in 2003–2004.

A contributory factor to the overestimation of import prices is probably the shift of the pattern of imports towards more and more imports from low-cost countries in recent years. It is difficult to obtain a clear picture of the extent of this, although it is probable that the measures used in forecasting the development of international prices in international currency do not completely capture the effects of this shift. This may explain why the forecasts did not succeed in capturing the reduction of import prices. As in the case with domestic inflation, the price-dampening effects of the increased competition can have been underestimated.

It is accordingly clear that structural changes in the economy are largely the cause of the inflation overestimate. An indication that

low inflation in 2005 was a consequence of structural changes is that it was overestimated by most forecasters despite growth in 2004 being considerably stronger than expected.

Changes of a structural nature are difficult to capture in forecasting at an early stage. At the same time, it is important when it has become evident that structural changes have affected the ordinary correlations, to seek increased understanding of their causes and their importance for inflation outlooks. To this end, the Riksbank has in recent years carried out in-depth studies of, among other things, low import prices and high productivity growth. These studies have been published in boxes in earlier Inflation Reports.³¹

At the beginning of 2004, the Riksbank predicted that inflation would be below target in 2005. It was considered that inflation would be in line with the target only within a time horizon of a couple of years. In retrospect, it is clear that inflation in 2005 was even lower than the forecasts made in 2004, which could have been an argument in favour of a rather more expansive monetary policy during this period. However, it is doubtful, even with perfect forecasts, whether it would have been appropriate to reduce the repo rate by much more, bearing in mind the fact that demand was still strong and the fact that household debt and high house prices also warranted a cautious policy.

31 See the boxes "Why are Swedish import prices so low?" in *Inflation Report* 2005:2 and "How persistent is the recent rise in productivity?" in *Inflation Report* 2004:1.