SVERIGES RIKSBANK

Inflation Report

2006:3

26 October 2006

Contents

Foreword

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 of opinion regarding the inflation outlook will thus be recorded in the separate minutes of the Board meeting on 25 October, to be published on 15 November 2006.

This Inflation Report reproduces the main features of the presentations and discussions at the Executive Board meetings on 10 October and 19 October. 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 Riksbank aims to make it easier for external parties to follow, understand and assess its monetary policy.

The analyses in the report's main scenario 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 Box that provides an outline description of the goal and strategy of the Riksbank's monetary policy. This is followed by a summary of the report. In the subsequent sections, the Riksbank presents the key determinants of inflation and gives its collective assessment of inflation prospects in the main scenario and the key risks. The report also contains three Boxes that analyse resource utilisation in the labour market, next year's wage bargaining round and inflation indicators.

Stockholm, October 2006
Stefan Ingves
GOVERNOR OF SVERIGES RIKSBANK

Monetary policy in Sweden

This box provides a description of the goal and strategy of the Riksbank's monetary policy. The most important aim of this description is to explain how the Riksbank, when setting its interest rate, has scope to take into consideration developments in both inflation and in the real economy. A desirable monetary policy is characterised by inflation under normal circumstances being close to the inflation target in a two-year time perspective while at the same time the paths for inflation and the real economy do not exhibit excessively large fluctuations. The box is an extract from the document "Monetary policy in Sweden" which was published on 19 May 2006.[1]

- **The statutory objective of monetary policy is to maintain price stability.**
  This was established in the changes to the Sveriges Riksbank Act, which came into force in 1999. In the preparatory works for the Act, it was stated that the Riksbank, without prejudice to the price stability target, should furthermore support the goals of general economic policy with a view to maintaining a sustainable level of growth and a high rate of employment. These legislative changes also increased the independence of the Riksbank.

- **The Riksbank has specified an explicit inflation target according to which the annual change in the consumer price index (CPI) is to be 2 per cent with a tolerance interval of plus/minus 1 percentage point.**
  A relatively high level of consensus has been established internationally that an appropriate level of inflation is around 2 per cent. Countries with inflation targets have therefore often adopted targets that entail that inflation should be around 2 per cent. To emphasise that it is not within the power of monetary policy to continuously achieve the target exactly, the Riksbank has specified a tolerance interval around the target of plus/minus 1 percentage point. At the same time, this tolerance interval serves to underline that excessively large deviations are unacceptable if the target is to remain credible.

- **Monetary policy is also guided by various measures of "underlying inflation". There is no single measure of inflation that at each point in time indicates the proper stance of monetary policy.**
  A common denominator for these measures of underlying inflation is that they have been adjusted for price components that tend to fluctuate sharply but which are not judged to affect the trend rate of inflation. One such measure, UND1X, has been given a special status. In this measure the direct effects of changes in indirect taxes and subsidies as well as mortgage interest expenditure have been excluded. This measure is used because changes in indirect taxes and subsidies (due to fiscal policy) and in mortgage interest expenditure (due to monetary policy) often have effects on the CPI which should not give rise to any monetary policy response.

- **Monetary policy acts with a lag and is normally focused on achieving the inflation target within a two-year period. The two-year time horizon also provides scope for taking fluctuations in the real economy into consideration.**
  Permitting temporary deviations from the inflation target can be justified on the grounds of consideration to developments in the real economy (growth, unemployment, employment, etc.). By not aiming to restore inflation to target as quickly as possible, scope is created to conduct monetary policy in such a way as to dampen real economic fluctuations. At the same time, it is important that this flexibility does not diminish the long-term credibility of the inflation target. The two-year horizon can be interpreted as a restriction as to how much consideration can normally be given to real economic developments. In certain circumstances, deviations from the inflation target can be so large that it is reasonable to allow inflation to return to target beyond the normal two-year horizon. The Riksbank will

1 For the complete document, see http://www.riksbank.com/pagefolders/26054/Monetary_policy_in_Sweden.pdf.

make it clear in connection with the monetary policy decisions when it considers that a situation of this kind has arisen.

- **The Riksbank routinely takes into consideration changes in asset prices and other financial variables (exchange rates, house prices, share prices, household and corporate indebtedness, etc.) in monetary policy decisions.**
  This should not be interpreted as introducing targets for different asset prices or other financial quantities. However, situations may arise where the consequences for the real economy and inflation of the development of different financial variables threaten to become very unfavourable and serious without it being possible for that reason to quantify or capture this type of risk in the normal analytical and forecasting work. It may be necessary to take these risks into account in monetary policy decisions in a different way than in the normal approach, where the forecasts for inflation and the real economy for the next two years serve as the foundation. In practice, taking risks of this kind into consideration can mean that interest rate changes are made somewhat earlier or later, in relation to what would have been the most suitable according to the forecasts for inflation and the real economy. However, the aim is as always to maintain price stability and dampen fluctuations in the real economy.

- **The Riksbank's forecasts are constructed assuming the repo rate (the Riksbank's policy rate) develops in accordance with market expectations.**
  If inflation according to this interest rate assumption is expected to be close to target two years ahead, the market's expectations about future monetary policy can normally be regarded as reasonable. However, to determine this more definitely, consideration must be given to the whole future paths for inflation and the real economy. If, for instance, inflation increases very rapidly during all of the forecast period, and real growth is high, it is possible that the assumed interest rate path will not be considered reasonable, even though inflation is close to 2 per cent after two years. In this case, the assumed interest rate path probably means that monetary policy is too expansionary. This, in turn, can lead to unacceptably large fluctuations in real activity. A desirable monetary policy is characterised by inflation normally being close to the inflation target in a two-year time perspective while at the same time the paths for inflation and the real economy do not exhibit excessively large fluctuations.

- **Openness and clarity in monetary policy are prerequisites for the successful combination of credibility for the inflation target and a flexible application of the target in the short term.**
  The fact that the Riksbank has the task of specifying independently the price stability target and the considerations to be given in relation to other goals for economic policy in the short term also makes great demands on how these decisions are to be explained to the general public and to the Riksdag. The Riksbank's strategy for carrying out these tasks successfully is to be as clear and open as possible concerning the information and the considerations on which monetary policy decisions are based. The fact that the Riksbank has chosen to specify an exact target for inflation (with a certain tolerance interval) and the principle that inflation should normally be brought back to target within two years can both be justified by the aim of creating clarity and credibility for the inflation target. Explanations of and supporting data for monetary policy decisions are regularly commented on and published in Inflation Reports, minutes from monetary policy meetings, press releases, press conferences and in speeches given by members of the Executive Board. Further, the Governor of the Riksbank appears before the Riksdag Committee on Finance twice a year for a discussion on monetary policy. All this aims to facilitate reasonable expectations on future monetary policy being formed and external assessments of the Riksbank's previous monetary policy analyses and decisions.

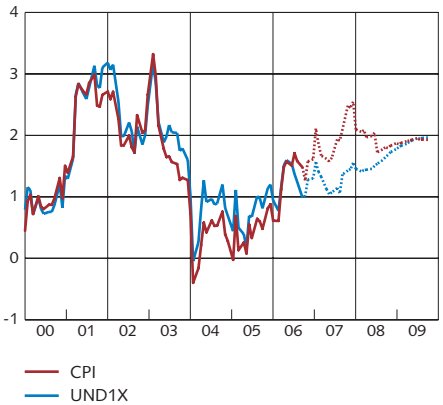
Summary

GDP growth in Sweden and abroad was high during the first six months of the year and is expected to remain high during the rest of the year. Next year, growth is also expected to be relatively strong. Subsequently, however, the economy will move into a calmer phase. There have been clear improvements in the Swedish labour market during the year and there are many indications that employment will continue to rise. Domestic cost pressure is expected to increase as productivity growth slackens and wages rise at a faster pace. This will contribute to inflation in Sweden continuing to rise gradually in future years. This forecast is based on the assumption that the repo rate is raised in the years to come.

Those factors that have had a restraining effect on the rate of price increase in recent years – a rapid increase in productivity and international price pressure – are expected to continue to have a dampening effect on inflation. In addition, the oil price is now expected to stabilise and electricity prices are expected to fall, which will also curb the rate of price increase. There are thus a series of favourable supply conditions that are expected to keep inflation at a moderate level despite positive economic growth.

Compared with the assessment made in June, the inflation forecast has been revised downwards. For 2008, this downward revision is above all a result of expectations of lower energy prices. The risk of inflation rising to a level higher than that in the main scenario is judged to be greater than the risk of lower inflation. Risk-adjusted inflation measured according to UND1X is expected to be 1.7 per cent two years ahead and 2.1 per cent three years ahead.

Figure 1. UND1X and CPI
Annual percentage change



Note. UND1X is CPI excluding household mortgage interest expenditure adjusted for direct effects of changed indirect taxes and subsidies. Broken lines represent the Riksbank's forecasts.

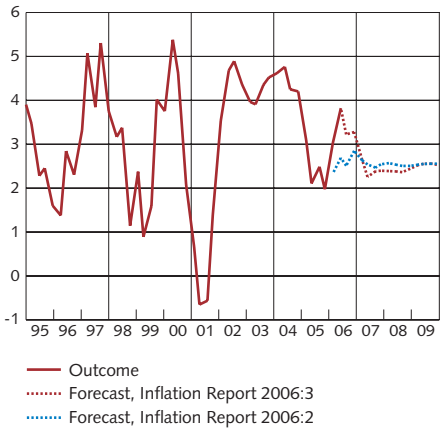
Sources: Statistics Sweden and the Riksbank

Strong growth but low inflation.

Inflation has risen gradually since the beginning of 2005 (see Figure 1). At the same time, GDP growth has been high and the oil price has risen sharply. However, inflation is still relatively low. The fact that the sharp increase in output has not resulted in higher inflationary pressure is due in part to strong productivity growth. Firms have been able to increase output without needing to employ that many more people and accordingly, there has not been any significant upward pressure on wages or prices. At the same time, import prices for consumer goods have continued to develop weakly, due in part to increased international competition.

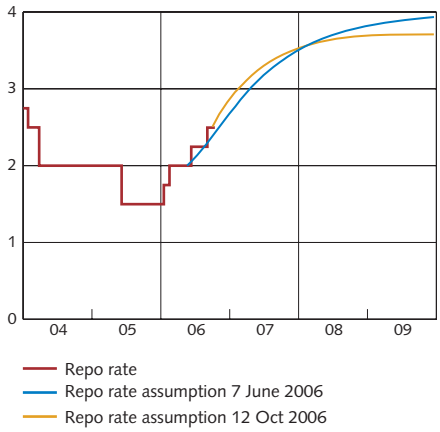
During the coming years, UND1X inflation is expected to rise slightly (see Figure 1). Two years ahead, inflation in the main scenario is expected to be 1.6 per cent and three years ahead, it is expected to be 2.0 per cent. In September this year, inflation was 1.0 per cent. The rise in inflation expected in the future is largely due to expectations that domestic production costs will rise as the economic climate improves. Productivity growth will slacken at the same time as wage increases will be higher. However, during most of the forecast

Figure 2. Labour productivity growth in the business sector
Annual percentage change



Sources: Statistics Sweden and the Riksbank

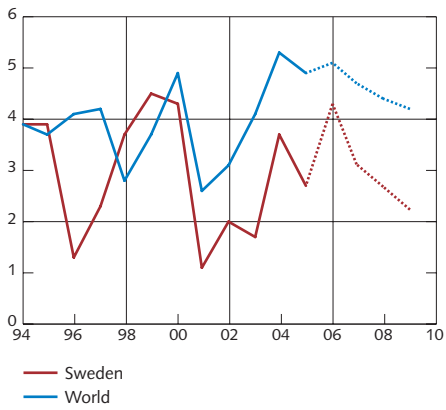
Figure 3. Implied forward rates
Per cent



Note. Implied forward rates are calculated as a 15-day average.

Source: The Riksbank

Figure 4. GDP
Annual percentage change



Note. Broken lines represent the Riksbank's forecasts.

Sources: IMF, Statistics Sweden and the Riksbank

period, inflation is expected to remain relatively low. Several factors will contribute to this. In the short term, continued high growth in productivity will keep firms' labour costs – and accordingly inflation – down. At the same time, the price pressure noted in recent years on imported consumer products is expected to continue to prevail, and this, together with a strengthening of the krona exchange rate, will contribute to lower import prices. Another important explanation for the relatively low inflation a couple of years ahead is that the contribution to inflation from energy prices is expected to fall sharply. This is a consequence of the assumption that the oil price and electricity prices will not continue to rise to the same extent as during the past year. It is assumed that the oil price will be relatively stable, while the electricity price is expected to fall, in line with the forward prices on these markets.

■■ High GDP growth in Sweden.

During the first six months of the year, the rate of growth in the Swedish economy rose. Productivity growth was strong, as were foreign and domestic demand (see Figure 2). It is expected that these factors will contribute to high GDP growth next year as well, and that economic activity will continue to strengthen. Productivity growth is expected to slacken in the future, at the same time as GDP growth in world economies becomes more subdued. It is also assumed that Swedish monetary policy will become less expansionary (see Figure 3). This will result in a gradual slowdown of GDP growth (see Figure 4).

There has been a clear improvement in the labour market during the year. Growth in employment is currently high and various indicators such as the number of new vacancies reported are rising rapidly at the same time as the number of redundancy notices is falling. At the same time as more people have entered employment, more people have also become available to the labour market; in other words the labour supply has risen. This has meant that there has only been a slight fall in open unemployment. As the economy enters a calmer phase, it is assumed that the rise in employment will taper off. Unemployment is expected to continue to fall slightly.

The fact that Sweden has a new government will affect the direction of economic policy. The assessment made by the Riksbank in this Inflation Report is that this will impact on both supply and demand in the Swedish economy. It is, of course, difficult to assess the magnitude of these effects and also when they will occur.

■■ Rising house prices and low real interest rates.

The strong economic growth in Sweden is also reflected in most financial markets. Firms and households have in recent years increased their borrowing relatively sharply seen from a historical perspective. The money supply is growing very rapidly. During the summer, share prices have recovered from the downturn noted last spring. At the same time, house prices have risen rapidly and household wealth grown further. To a certain extent, these developments are the result

of the expansionary monetary policy. However, as monetary policy becomes less expansionary and the economic upturn slows, both lending and house prices are expected to rise at a slower rate.

Since June, the 10-year rate has fallen in the euro area, the United States and in Sweden, despite rising key interest rates. It is difficult to know exactly what has driven this development. Interest rates may have been forced down by market operators who now believe there will be a more pronounced slowdown in the US economy. Another explanation for the fall in interest rates could be the rise in demand for secured securities following developments such as war in the Middle East and new terrorist threats.

■■ High GDP growth in world economies.

Growth in world economies has been positive in recent years (see Figure 4) and has been particularly strong in Asia's emerging economies. During the first six months of the year, economic activity also strengthened in the euro area. Indicators in the form of business tendency data primarily suggest that growth in the euro area will remain positive during the third quarter. In the United States, on the other hand, there are signs of a slight slowdown in growth.

During the years to come, international GDP growth is expected to remain strong, even if it slackens slightly (see Figure 4). At the same time, inflation is expected to remain moderate.

■■ Lower import prices and energy prices.

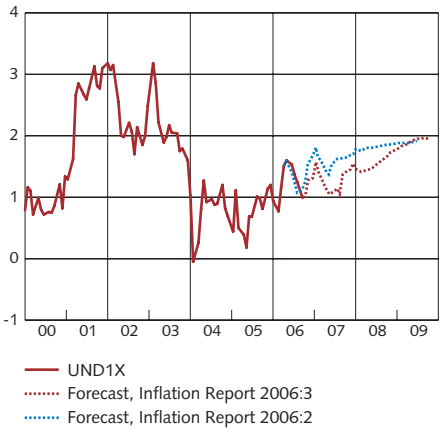
The forecasts for both GDP growth and productivity growth in Sweden, the number of employed and the labour supply have been revised upwards for this year. The reason for this is that the statistical returns submitted since June have indicated stronger growth than expected. Economic performance is also expected to improve as a result of the changes in financial policy.

Inflation has been revised downwards during the forecast period (see Figure 5 and Table 1). In the short term, the lower inflation is a consequence of factors including unexpectedly slight changes in the prices of imported goods and expectations of higher productivity. In the slightly longer term, the forecast is affected by the assumption that energy prices will restrain inflation more than was forecast in the June Inflation Report. This is a consequence of the current assumption that the oil price will be lower and that electricity prices will fall more than in the assumption made in June. The revisions of inflation excluding energy are small for a couple of years ahead (see Figure 6). There are thus a series of favourable supply conditions that are expected to keep inflation at a moderate level despite positive economic growth.

■■ Risk of higher inflation than in the main scenario.

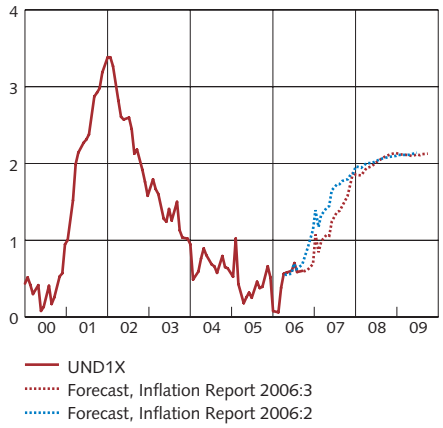
As always, forecasts are uncertain and there is a risk that the economy does not develop as in the main scenario. There is, for example, a risk that international economic activity will be weaker than expected,

Figure 5. UND1X
Annual percentage change



Sources: Statistics Sweden and the Riksbank

Figure 6. UND1X excluding energy
Annual percentage change



Source: The Riksbank

which could lead to lower inflation than in the main scenario. As usual, energy prices also constitute an uncertainty factor for the forecast. In recent years, these prices have fluctuated sharply and had a considerable impact on inflation. At the same time they are very difficult to forecast. Domestic demand and wages also represent a risk for inflation. There are also risks associated with the rapid rate of increase of loans and house prices. The domestic risks mainly suggest that inflation may be higher than in the main scenario. This time, the domestic risks slightly outweigh the international risks, which overall means that the risks of higher inflation dominate (see Tables 1 and 2).

Table 1. Inflation forecasts in the main scenario
Annual percentage change

	Annual average				12-month rate			
	2005	2006	2007	2008	Sep. 06	Sep. 07	Sep. 08	Sep. 09
CPI	0.5	1.3 (1.5)	2.0 (2.3)	1.9 (2.4)	1.5 (1.5)	2.1 (2.4)	1.8 (2.4)	1.9
UND1X	0.8	1.2 (1.3)	1.3 (1.6)	1.6 (1.8)	1.0 (1.1)	1.4 (1.6)	1.6 (1.9)	2.0

Note. The figures in parentheses are the forecasts in the June Inflation Report. UND1X is CPI excluding household mortgage interest expenditure adjusted for direct effects of changed indirect taxes and subsidies.

Sources: Statistics Sweden and the Riksbank

Table 2. Inflation forecast taking into account the balance of risks
Annual percentage change

	Annual average				12-month rate		
	2005	2006	2007	2008	Sep. 07	Sep. 08	Sep. 09
CPI	0.5	1.4 (1.5)	2.1 (2.3)	2.0 (2.4)	2.2 (2.4)	1.9 (2.4)	2.0
UND1X	0.8	1.3 (1.3)	1.4 (1.6)	1.7 (1.8)	1.5 (1.6)	1.7 (1.9)	2.1

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

Sources: Statistics Sweden and the Riksbank

Table 3. Key figures
Per cent and annual percentage change

	2005	2006	2007	2008	2009
GDP OECD	2.7	3.2 (3.1)	2.6 (2.7)	2.6 (2.7)	2.6 (2.6)
CPI OECD	2.6	2.7 (2.6)	2.4 (2.4)	2.2 (2.3)	2.1 (2.1)
Crude oil price, Brent, USD/barrel, annual average	54	65 (69)	65 (72)	66 (71)	65 (69)
Market growth for Swedish exports	6.9	11.0 (7.1)	7.0 (6.3)	6.3 (6.1)	6.0 (6.0)
Exchange rate, TCW index, annual average	128.3	127.7 (128.4)	125.4 (126.5)	124.1 (125.3)	123.1 (124.5)
Repo rate, implied forward rate, annual average	1.7	2.2 (2.1)	3.2 (3.1)	3.6 (3.7)	3.7 (3.9)
10-year rate, annual average	3.4	3.8 (3.9)	4.3 (4.5)	4.7 (4.9)	4.9 (5.1)
GDP	2.7	4.3 (3.7)	3.1 (2.8)	2.7 (2.4)	2.2 (2.2)
Numbers employed	0.7	1.9 (1.7)	1.1 (1.0)	0.8 (0.5)	0.4 (0.2)
Open unemployment, per cent of labour force	5.9	5.4 (5.5)	5.4 (5.1)	5.1 (4.9)	4.9 (4.8)
Hourly wage in economy as a whole	3.1	3.4 (3.4)	3.8 (3.9)	3.9 (4.1)	3.9 (4.1)
Unit labour costs in business sector	1.5	-0.7 (0.2)	2.9 (2.9)	1.9 (2.0)	1.9 (2.0)
Public financial balance, percentage of GDP	2.8	2.8 (2.2)	2.3 (2.0)	2.2 (2.1)	2.0 (1.9)

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

Sources: National Labour Market Board, Intercontinental Exchange, National Mediation Office, OECD, Statistics Sweden and the Riksbank

Determinants of inflation

The financial markets

Compared with the assessment made in June, the repo rate in Sweden is now expected to be higher at the beginning of the forecast period and lower at the end. Since June, long-term rates have fallen in the United States, the euro area and in Sweden. Corporate and household borrowing have continued to increase at a high rate, as have house prices. Stock prices have recovered after the fall in the spring. In TCW terms, the krona has been slightly stronger on average than forecast.

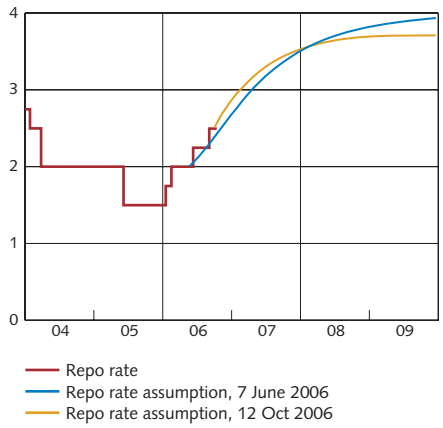
■■ Higher implied forward rate this year.

As in the June Inflation Report, the forecasts in this Inflation Report are based on the assumption that the repo rate will develop in line with implied forward rates. To reduce the impact of temporary fluctuations in pricing on the financial markets, a 15-day average is used, on this occasion until 12 October. Compared with the June Inflation Report, the implicit forward rate is now higher at the beginning of the forecast period and lower at the end. The implied forward rates are around 2.75 per cent at the end of 2006 and around 3.75 per cent at the end of 2009 (see Figure 7).

It should be emphasised that there are a number of ways to try to interpret market expectations of future monetary policy. The Inflation Report uses implied forward rates calculated on government securities. In the short-term, the implied forward rates on money market instruments issued by the banks are higher. These expectations are currently closer to survey data (see Figure 8; note that this figure shows implied forward rate curves from a particular date, 27 September, which is the day on which the survey was carried out) and suggest that the repo rate is expected to be raised by 0.5 percentage points to 3.0 per cent by the end of 2006. This fits in well with the statements made by the market participants in their official forecasts.

In the United States, the Federal Reserve raised the interest rate by a further 0.25 percentage points during the summer. In the euro area, the ECB has raised the key policy rate by 0.5 percentage points since June. Pricing in the money and bond markets shows that there are no longer any expectations of further US interest rate increases (see Figure 9). However, the fixed-income market expects the ECB

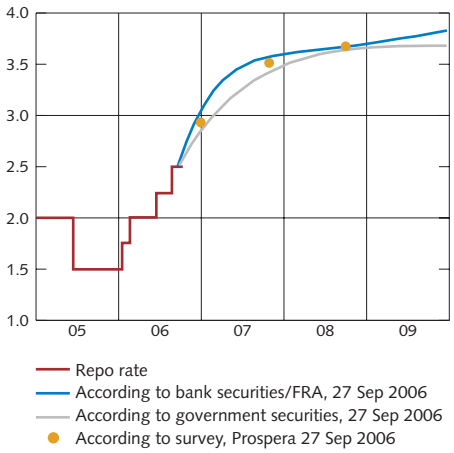
Figure 7. Implied forward rates
Per cent



Note. Implied forward rates are calculated as a 15-day average.

Source: The Riksbank

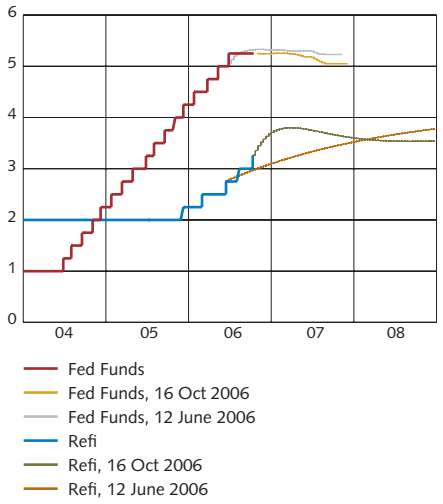
Figure 8. Implied forward rates based on bank securities and government securities and repo rate expectations
Per cent



Note. The curve for bank securities has been adjusted downwards by 10 interest points because the shortest term for bank securities (overnight rate) is listed at 10 interest points above repo. These 10 points do not reflect future monetary policy expectations.

Sources: Prospera Research AB and The Riksbank

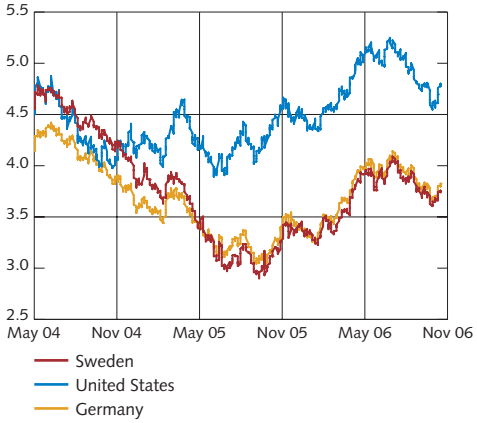
Figure 9. Monetary policy expectations in the euro area and the United States
Per cent



Note. Expectations calculated according to implied forward rates for the euro area and Fed Funds contracts for the United States.

Source: The Riksbank

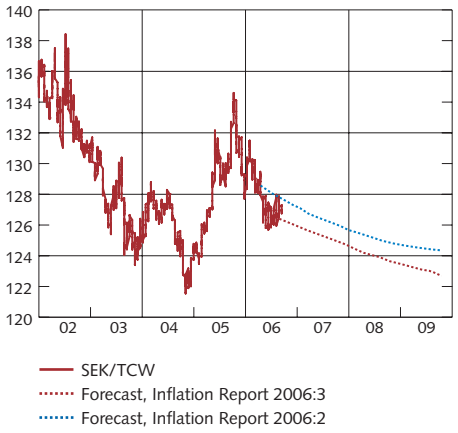
Figure 10. Long-term interest rates
Per cent



Note. Yields on government bonds with approximately 10 years to maturity .

Source: The Riksbank

Figure 11. Competition weighted TCW exchange rate Index, 18 November 1992 = 100



Note. SEK/TCW represents daily rates and forecasts refer to quarterly averages.

Source: The Riksbank

to raise the refi rate rather more than was previously assumed. Surprisingly positive economic statistics in the euro area and monetary policy signals have led to an increase in short-term interest rates. At least one more rise in the refi rate is expected by the end of the year (see Figure 9).

■■ Long-term rates fall again.

Longer-term interest rates have declined overall in both the United States and the euro area since the June Inflation Report. It is possible that long-term interest rates have been affected by changing expectations about economic prospects and monetary policy in the United States. The market participants probably expect a more pronounced US slackening now than previously. Another explanation for the fall in interest rates could be that there has been a rise in demand for secured securities following developments such as war in the Middle East and terrorist threats. Swedish long-term interest rates have largely moved in step with their US and German equivalents. The long-term interest rate forecast for Sweden has been adjusted downwards by about 0.2 percentage points for each of the years 2007-2009 (see Table 3).

■■ The krona and the euro stronger against the dollar.

The dollar rate against the euro remains at more or less the same level as in the June Inflation Report. Initially the dollar weakened, which is considered to be linked to the somewhat weak figures for the US economy and expectations that the Federal Reserve will pursue a less contractionary monetary policy. Expectations of tighter monetary policy in the euro area also helped to strengthen the euro. However, more recently the dollar has again strengthened. The value of the krona expressed in dollars or euros is at roughly the same level as in the June Inflation Report.

In terms of the trade-weighted TCW index, the krona has strengthened slightly more than forecast in the June Inflation Report. The general view on the real future development of the krona has remained unchanged since June, i.e. the real exchange rate is expected to strengthen during coming years. In order to retain this view of the competitive strength and purchasing power of the krona, despite a downward revision of the inflation forecast, the nominal exchange rate forecast in TCW terms is slightly stronger in the longer term (see Figure 11). During 2006-2009 the TCW index is estimated to be around one per cent stronger than in the assessment in the June Inflation Report. By the end of 2009, the TCW is expected to strengthen by around 3 per cent compared with the present level.

■■ Recovery on the stock exchanges.

During the spring, there was a relatively sharp fall in prices on several of the world's stock exchanges. During the summer and early autumn, they then rose more or less continuously (see Figure 12). Share prices have been affected by high profit growth during the second quarter. The healthy development of profits has also led to profit expectations for 2006-2007 being revised upwards.

■■ Continued sharp increase in borrowing in Sweden.

Borrowing by the general public continues to increase rapidly. In August, the annual rate of increase was over 12 per cent. Household borrowing is still increasing somewhat more quickly than corporate borrowing. In August, household borrowing increased by almost 13 per cent. In the second quarter, house prices continued to rise at an annual rate of 13 per cent, which is as almost as rapid as in the first quarter (see Figure 13).

Continued high borrowing among households is an indication of strong demand growth. To some extent, this development is a result of monetary policy continuing to be expansionary from a historical perspective.

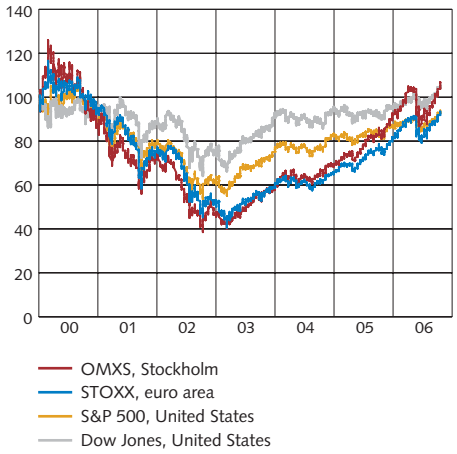
The money supply, measured as M3, is still increasing quickly (see Figure 14). In August, the rate of increase was 19 per cent annually, which can mainly be explained by an increase in spot deposits by the general public. Certain other components have also increased sharply. For instance, holdings by the public of repos and MFI instruments (securities issued by banks and other financial institutions) have increased rapidly. The M2 measure, which is more reminiscent of the old definition of M3, also indicates a rising rate of increase. Holdings of banknotes and coins (M0) are growing slowly, however.

■■ Rising real interest rates and a stronger real exchange rate ahead.

Since June the nominal long-term rates have fallen. Inflation expectations in the long term have remained relatively stable for several years at around two per cent although they have increased slightly recently. Long-term real interest rates have thus fallen slightly recently, while short-term real interest rates have risen due to repo rate increases.

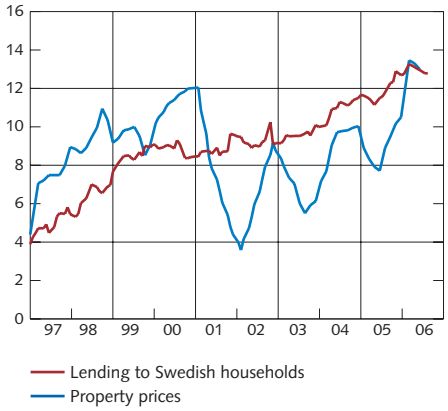
The interest rate assumption in this Inflation Report means that the repo rate will continue to be raised gradually. The Riksbank's assessment is also that the long-term nominal rates will also rise during the forecast period. The forecast also means less expansionary conditions in the sense that real interest rates will rise and the real exchange rate strengthen. Rising interest rates can be expected to lead to a dampening effect on rising house prices and household borrowing.

Figure 12. Share index in Sweden, the United States, and the euro area
Index, 1 January 2000 = 100



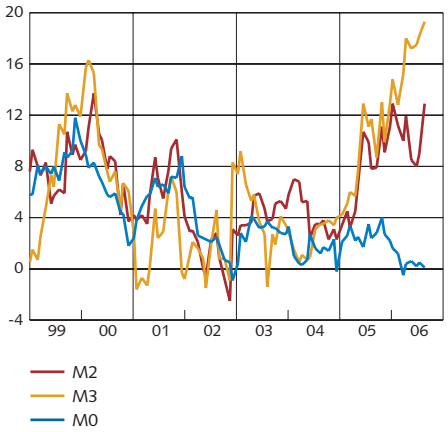
Source: Reuters EcoWin

Figure 13. House prices and total lending to Swedish households
Annual percentage change



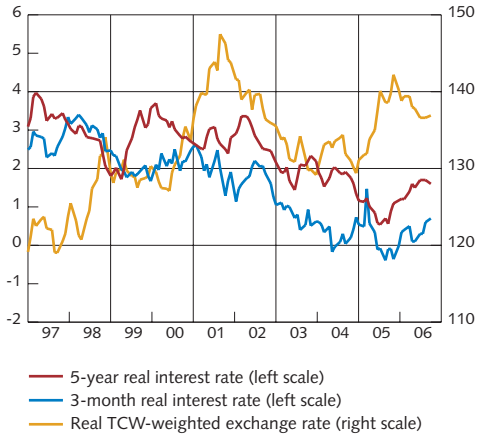
Sources: Statistics Sweden and the Riksbank

Figure 14. The money supply
Annual percentage change



Sources: Statistics Sweden and the Riksbank

Figure 15. Real interest rates and real TCW-weighted exchange rates
Per cent and index



Note. When calculating real interest rates, inflation expectations have been taken from the National Institute of Economic Research's HIP surveys for the 3-month rate, and from Prospera for the 5-year rate. The interest rates refer to treasury bills with 3 months to maturity and government bonds with 5 years to maturity. The real exchange rate is calculated as a nominal TCW (index: 18 November 1992 = 100) multiplied by the ratio of price levels in a TCW-weighted international economy and Sweden.

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

Revised forecasts since the previous Inflation Report

- Implied forward rates are higher at the beginning of the forecast period and lower at the end.
- The forecast for the Swedish long-term rate has been revised downwards by about 0.2 percentage points for 2007-2009.
- The nominal exchange rate in TCW terms is expected to strengthen by just under one per cent during the forecast period compared with the assumption in the previous Inflation Report.

International developments

In recent years, world economic growth has been higher than during the 1980s and 1990s. Growth was also strong during the first six months of this year. In the years to come, growth is expected to slacken somewhat, but will nevertheless remain relatively high. It is assumed that the oil price will stabilise after falling back since the summer. Inflation in international economies is expected to remain at relatively moderate levels.

■■ Continued positive growth in world economies.

Growth in world economies has been positive in recent years. The rise in output has been particularly strong in the developing economies in Asia, but Russia and countries in Eastern Europe, the Middle East, South America and Africa have also shown high rates of growth. Even in the United States, economic growth has been slightly stronger than the historical average. There are now signs that growth will slacken somewhat. In the euro area, growth has been subdued for several years, but the economy has strengthened in 2006.

Strong growth in the world economy has led to a rapid increase in the demand for oil and other raw materials, driving prices upwards. The oil price has also been affected by various supply shocks, including political unrest in the Middle East.

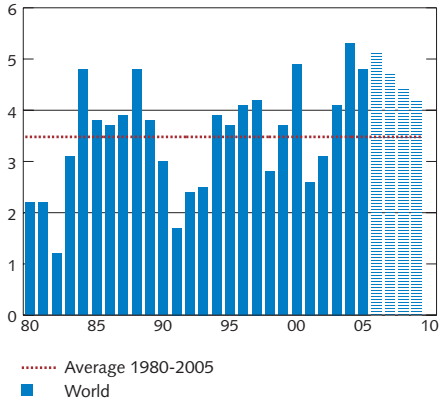
World economic growth is expected to be somewhat lower in the years to come, but still remain higher than the historical average (see Figure 16). In China and other developing economies, growth is expected to remain high, despite considerable uncertainty regarding the growth potential of these fast-growing economies. Domestic demand in Asia's developing economies is expected to continue to grow at a rapid pace.

The financial conditions on the international stage are on the whole favourable for continued growth. Although interest rates have risen and are expected to continue to rise further during the forecast period, they will remain relatively low, seen from a historical perspective.

■■ Growth slowing down in the United States.

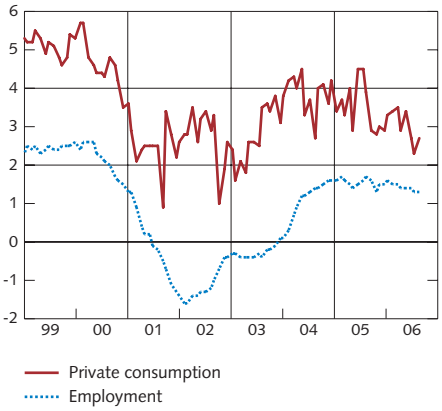
During the first six months of the year, GDP growth in the United States was slightly higher than had been expected in the June Inflation Report. Since June, however, there have been increasing indications to suggest that growth in the US economy is slackening. Household consumption, for example, has been rising at a slower rate (see Figure 17). This slackening could be related to the weaker

Figure 16. World GDP
Annual percentage change



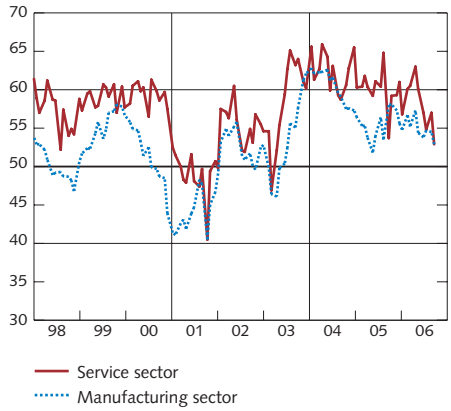
Note. Light blue bars represent the Riksbank's forecast.
Sources: IMF and the Riksbank

Figure 17. Employment and private consumption in the United States
Annual percentage change



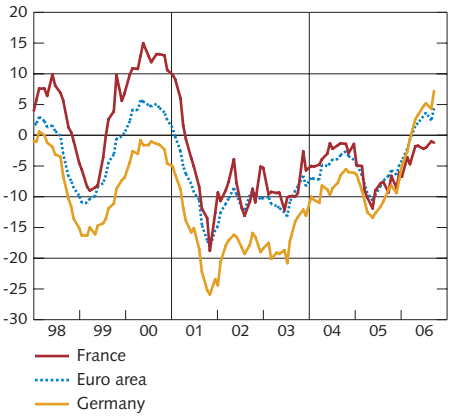
Note: Employment according to employer survey (non-farm payrolls).
Sources: Bureau of Labor Statistics and the Department of Commerce

Figure 18. Purchasing Manager Index in the United States
Index, unchanged activity = 50



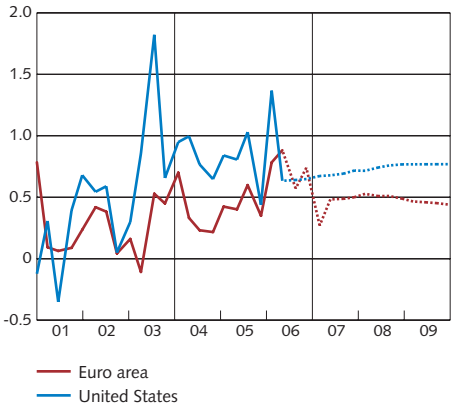
Source: Institute for Supply Management

Figure 19. Confidence indicators for the manufacturing industry in the euro area, Germany and France
Net figures



Source: DG ECFIN - Directorate General for Economic and Financial Affairs

Figure 20. GDP
Quarterly changes in per cent, seasonally adjusted data



Note. Broken lines represent the Riksbank's forecast.

Sources: Bureau of Economic Analysis, Eurostat and the Riksbank

housing market. The rate of price increase on housing has slackened and there has been a fall in the production of new housing. Support for the assumption of a slowdown is also provided by a number of other indicators, including survey data (see Figure 18), which indicate moderate GDP growth by US standards during the third quarter. Overall, US economic growth for 2006 is expected to be in line with the assessment in the June Inflation Report. However, compared to the assessment in June, quarterly GDP growth is expected to be somewhat weaker during the second half of this year up to the beginning of 2008. US economic growth is nevertheless still expected to be relatively strong in the future.

■■ Weak growth in Japan during the second quarter.

In Japan, GDP rose by a mere 0.2 per cent between the first and second quarter. This was weaker growth than expected and there was a decline in net exports, for instance, while the recovery in domestic demand continued. The September Tankan Survey suggests, however, that there have been continuing improvements in both manufacturing activity and elsewhere in the business sector. In 2006, the Japanese economy is expected to grow by 2.8 per cent. In 2007 and beyond, this growth is expected to slow, due in part to a more subdued growth demand growth in world economies.

■■ High rate of growth in the euro area during the first six months of the year.

GDP growth in the euro area was relatively strong during the first six months of the year. Growth was somewhat higher than expected. In both geographical terms and in terms of the different components of demand, growth was widespread. During the first six months of the year, employment in the euro area grew at a rate of 0.3 per cent per quarter. Even earlier, when economic growth has been weaker, growth in employment has been generally positive. This reflects the relatively weak productivity growth in the euro area compared to the United States and Sweden, for instance.

Indicators, primarily in the form of survey data, (see Figure 19) indicate continued positive growth in the euro area during the third quarter. At the turn of the year, value added tax in Germany is being raised in order to improve public finances. This is expected to result in a relatively sharp increase in consumption before the turn of the year, after which it will become subdued. In the longer term, growth in the euro area is expected to continue at a rate of around 2 per cent per year (see Figure 20). Weak productivity growth is one restraining factor.

In terms of productivity growth during the past ten years, Finland is a positive exception in the euro area and its GDP has also developed more strongly than in the euro area as a whole. GDP growth in the Finnish economy during the first six months of this year was particularly strong compared to the corresponding period last year. In view of the labour market dispute last spring this difference was to be expected, but even adjusted for this, growth exceeded expectations.

In Norway, annualised growth was around 4 per cent during the first six months of the year. In the UK, economic growth has picked up after a dip last year.

■■ Rapid increase in import demand in the rest of the world.

Market growth for Swedish exports, in other words international imports of goods aggregated with Swedish export weights, was unexpectedly strong during the first six months of the year. Imports have risen sharply in above all the UK, the Nordic countries and Germany. In the future, international import demand growth is expected to fall and approach the historical average rate of growth.

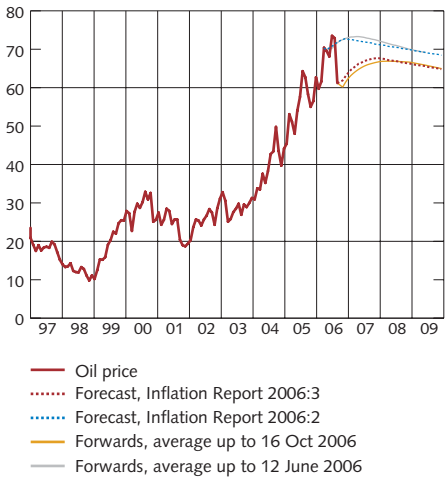
■■ Oil price lower than expected.

The oil price has fluctuated substantially since the June Inflation Report. In August, it had risen to around USD 73 per barrel. Since then, it has fallen to around USD 60 per barrel (see Figure 21). Expectations regarding future oil prices have also fluctuated sharply, which is reflected in the forward prices. The price of oil to be delivered in two to three years is now around USD 5 per barrel lower than it was in June (see Figure 21). Compared to the June Inflation Report, oil price assumptions have therefore been revised downwards.

Producer prices for manufactured goods in Sweden's most important trading partners have risen more than was assumed in June. The increase is widespread and cannot be attributed to any particular country. The annual rate of increase in international producer prices is expected to average around 4 per cent in 2006. During the forecast period, the rate of increase is expected to slow. This is because oil prices and the prices of other raw materials are not expected to continue to rise at the same rapid pace as they have over the past two years (see Table 4).

The rate of increase in consumer prices in countries including the United States and in the euro area has declined in the last few months (see Figure 22). In the United States, however, different measures of underlying inflation have risen. This may be related to the rapid increase in unit labour costs (see Figure 23).

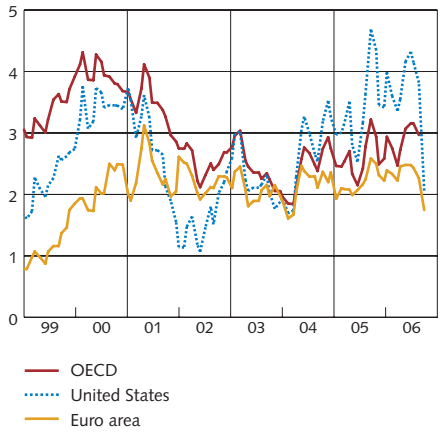
Figure 21. Oil price, Brent crude
USD per barrel



Note: Forward prices calculated as 15-day averages.

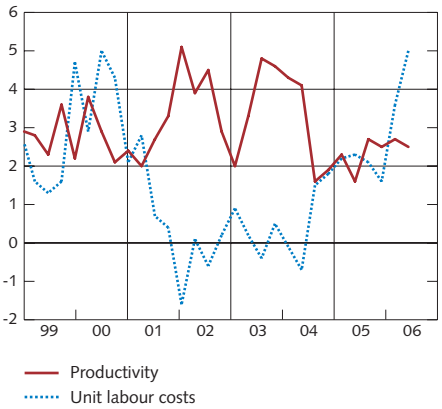
Sources: International Petroleum Exchange and the Riksbank

Figure 22. CPI
Annual percentage change



Source: OECD

Figure 23. Productivity and unit labour costs in the United States
Annual percentage change



Source: Bureau of Labor Statistics

Table 4. International conditions
Annual percentage change

GDP	2005	2006	2007	2008	2009
United States	3.2	3.4 (3.4)	2.7 (3.0)	2.9 (3.1)	3.1 (3.1)
Japan	2.6	2.8 (2.9)	2.2 (2.2)	1.8 (1.8)	1.5 (1.5)
Euro area	1.4	2.6 (2.1)	2.0 (1.9)	2.0 (2.0)	1.9 (1.9)
OECD	2.7	3.2 (3.1)	2.6 (2.7)	2.6 (2.7)	2.6 (2.6)
World	4.9	5.1 (4.8)	4.7 (4.5)	4.4 (4.4)	4.2 (4.2)

CPI	2005	2006	2007	2008	2009
United States	3.4	3.5 (3.1)	2.6 (2.6)	2.5 (2.5)	2.5 (2.5)
Euro area	2.2	2.3 (2.3)	2.2 (2.1)	1.9 (1.9)	1.9 (1.9)
OECD	2.6	2.7 (2.6)	2.4 (2.4)	2.2 (2.3)	2.1 (2.1)

	2005	2006	2007	2008	2009
Market growth for Swedish exports	6.9	11.0 (7.1)	7.0 (6.3)	6.3 (6.1)	6.0 (6.0)
International PPI	3.4	4.0 (2.6)	3.4 (1.7)	2.2 (1.9)	2.0 (2.0)
Crude oil price, annual average (USD/barrel Brent Blend)	54	65 (69)	65 (72)	66 (71)	65 (69)

Note. The figures in parentheses are the forecasts in the June Inflation Report. CPI refers to HICP for Germany, the United Kingdom, Denmark, Finland and the euro area. In Norway, GDP refers to the mainland economy. Swedish export market growth refers to growth in imports of goods for around 70 per cent of the countries that are recipients of Sweden's exports. The forecast is weighted on the basis of each country's share of all Swedish exports of goods in 2005. 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: IMF, International Petroleum Exchange, OECD and the Riksbank

Revised forecasts since the previous Inflation Report

- Growth in the United States is being revised downwards somewhat for 2007 and 2008 due to signs of subdued growth.
- Growth in the euro area is being revised upwards for 2006 due to outcome.
- World economic growth is expected to be somewhat higher, partly as a result of the revision upwards of the forecast for Asia.
- Market growth for Swedish exports is being revised upwards due to the strong outcome in the first six months of 2006.
- It is assumed that the oil price will be lower in line with the expectations in the forward market.
- International producer prices have risen more than expected and the forecast has been revised upwards, above all for 2006 and 2007.
- Inflation in the United States is being revised upwards this year due to the high outcomes during the summer months.

Economic developments in Sweden

Sweden is currently showing strong economic growth. Various cyclical indicators point to a continuation of this positive development in the coming period. Productivity growth was very high in the first half of the year but is expected to taper off in the future. After some years of relatively high economic growth, it is assumed that it will gradually slacken as the increase in productivity and export demand slows down. Investment is expected to peak this year. At present, development in the labour market is healthy and wages are expected to rise more rapidly as demand for labour grows. Cost pressure will therefore rise in the coming year but will subsequently dampen due to the rate of wage increase being restrained by increased labour supply. The Riksbank takes the view that the effects of the new government's policies will contribute to increased labour supply and employment as well as economic growth in the years to come, although these effects are difficult to estimate and therefore uncertain. The interest rate path on which the forecast is based entails a somewhat higher repo rate in the short term but lower in the long term than in the June Inflation Report.

DEVELOPMENTS IN 2006

■■ High growth in the first half of 2006.

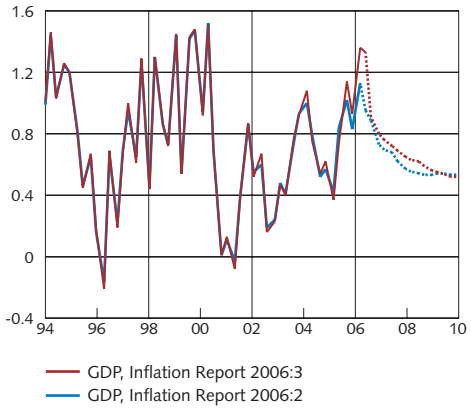
Growth was high in the first six months of the year and GDP grew by 4.5 per cent compared with the corresponding period last year. The outcome for the second quarter was considerably stronger than expected in the June Inflation Report (see Figure 24). At the same time, productivity increased sharply in the first and, in particular, the second quarter of the year (see Figure 25).

Household consumption was surprisingly high in the second quarter (see Figure 26) and, in particular, consumption of retail goods rose sharply. The outcome for investment was also higher in the first six months of the year than forecast in the June Inflation Report. Housing construction is increasing sharply at present (see Figure 27). However, statistics for new apartment starts indicate that housing investment will be calmer in the future. Exports grew in the first half of the year at about the expected rate. However, imports grew more than in the forecast which is consistent with the generally higher demand in the Swedish economy. Public sector consumption was also higher than forecast by the Riksbank. Despite this, the public sector financial balance increased more than expected. This is primarily due to increased tax revenues.

■■ Subdued but persistent high growth for the rest of the year.

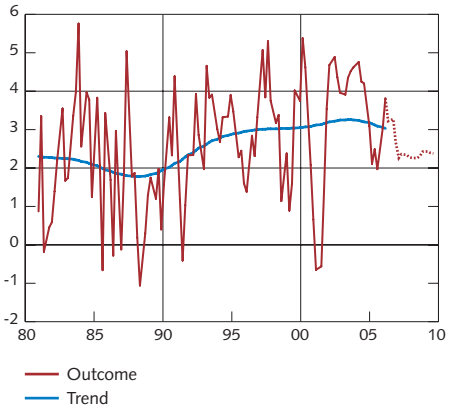
To be able to assess the development of GDP in the short term, the Riksbank, uses analytical tools such as indicator models that take a

Figure 24. GDP
Quarterly changes in per cent, seasonally adjusted data



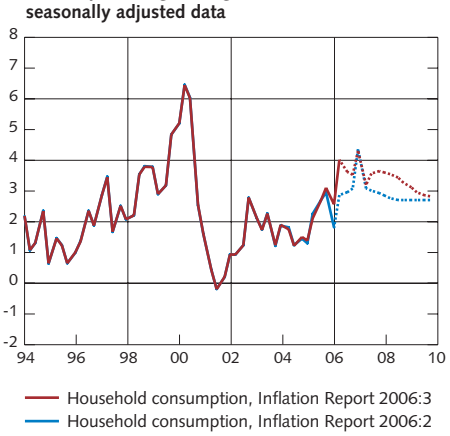
Note. Broken lines represent the Riksbank's forecast.
Sources: Statistics Sweden and the Riksbank

Figure 25. Actual and trend growth in labour productivity in the business sector
Annual percentage change, seasonally adjusted data



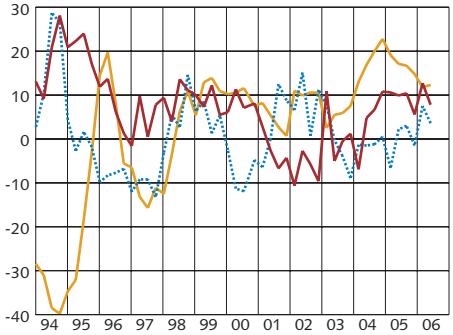
Note. Trend calculated using a Hodrick-Prescott filter. Broken lines represent the Riksbank's forecast.
Sources: Statistics Sweden and the Riksbank

Figure 26. Household consumption
Annual percentage change, seasonally adjusted data



Note. Broken lines represent the Riksbank's forecast.
Sources: Statistics Sweden and the Riksbank

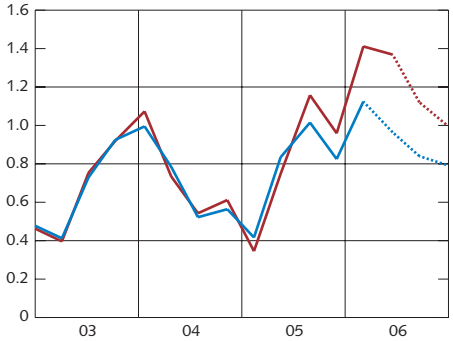
Figure 27. Gross fixed capital formation
Annual percentage change



Business sector excluding properties
Public authorities
Properties

Source: Statistics Sweden

Figure 28. GDP, outcome and forecasts according to indicator models
Quarterly changes in per cent, seasonally adjusted data

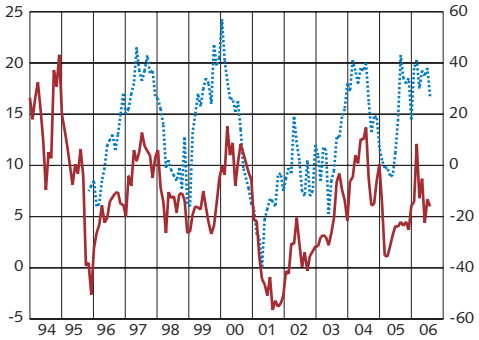


GDP, according to NA 2006:2
Indicator, Inflation Report 2006:3
GDP, according to NA 2006:1
Indicator, Inflation Report 2006:2

Note. The figure illustrates the mean value of the indicator forecasts described in the box "GDP-indicators" in Inflation Report 2005:3.

Sources: Statistics Sweden and the Riksbank

Figure 29. Goods exports at fixed prices according to monthly data and new export orders
Annual percentage change and net figures



Goods exports, monthly data (left scale)
New export orders (right scale)

Note. Goods exports according to monthly data expressed as a three-month moving average. Export order inflow for the manufacturing industry.

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

large number of indicators into consideration. According to these models, growth is expected to decline slightly but none the less remain high in the third and fourth quarters of this year (see Figure 28). The monthly statistics for industrial output and turnover in the retail trade as well as survey data also indicate a positive but falling growth rate during the third quarter.

The slackening of GDP growth in the third quarter is also related to lower growth in household consumption and investment. The strong growth of investment in the second quarter increases the level of investment in the economy (see Table 5). Available statistics for retail trade turnover indicate a somewhat weaker development in July and August than during the second quarter. The National Institute of Economic Research's most recent Business Tendency Survey in September points to rather more cautious expectations in the retail trade than during the first six months. Moreover, tax refunds in August were approximately SEK 3 billion less this year than in 2005, which is equivalent to approximately one per cent of disposable income during the third quarter. This is expected to dampen consumption growth compared with the same quarter of 2005.

Exports of goods developed relatively strongly at the beginning of the third quarter (see Figure 29). The inflow of export orders has also developed favourably recently and this indicates that the volume of exports will continue to develop strongly. Together with more favourable prospects for the export market, this contributes to an upward adjustment of the forecast for exports for the latter half of the year. Imports are also expected to be higher during the same period.

Overall, stronger growth is expected in 2006 compared with the forecast in the June Inflation Report (see Table 5). This increase in output is expected to take place without a corresponding increased use of labour since labour productivity is expected to increase at the same time.

Table 5. GDP by expenditure
Annual percentage change

	2005	2006	2007	2008	2009
Household consumption	2.4	3.3 (2.6)	3.6 (3.3)	3.5 (2.8)	2.9 (2.7)
Public consumption	0.7	1.8 (1.5)	1.4 (1.2)	0.8 (0.6)	0.6 (0.6)
Gross fixed capital formation	8.5	8.6 (6.2)	3.6 (3.5)	3.3 (2.8)	2.2 (2.0)
Inventory investment, contribution	-0.2	-0.3 (-0.4)	0.3 (0.3)	0.1 (0.1)	0.0 (0.0)
Exports	6.4	8.2 (7.9)	6.5 (6.0)	6.0 (6.0)	5.5 (5.5)
Imports	7.3	7.1 (6.0)	7.5 (7.0)	6.9 (6.5)	6.0 (5.9)
GDP	2.7	4.3 (3.7)	3.1 (2.8)	2.7 (2.4)	2.2 (2.2)
GDP, calendar-adjusted	2.7	4.5 (3.9)	3.2 (2.9)	2.6 (2.3)	2.2 (2.2)
Public sector financial balance	2.8	2.8 (2.2)	2.3 (2.0)	2.2 (2.1)	2.0 (1.9)

*Percentage of GDP

Sources: Statistics Sweden and the Riksbank

■■ Rapid increase in employment during the rest of the year.

Employment started to rise at the beginning of 2005, after having developed rather weakly for a number of years (see Figure 30). The number of employees has increased rapidly this year. During the

second quarter, employment increased by 1.5 per cent and the labour force by 0.9 per cent compared with the corresponding quarter last year. The monthly figures for the Labour Force Survey (LFS) for July and August show a rapid increase in employment during the third quarter of this year. The development of different indicators such as the number of newly reported vacancies and redundancies shows that the state of the labour market has continued to improve during the autumn (see Figure 31). However, according to the National Institute of Economic Research's Business Tendency Survey, firms' hiring plans indicate that this rise in employment will be curbed somewhat during the fourth quarter (see Figure 32).

Productivity growth was very strong in the first six months of the year but it is not expected to rise at the same rate in the future. Indicators for output and employment during the third quarter indicate that productivity growth is slackening.

■■ Increasing resource utilisation in the coming quarters.

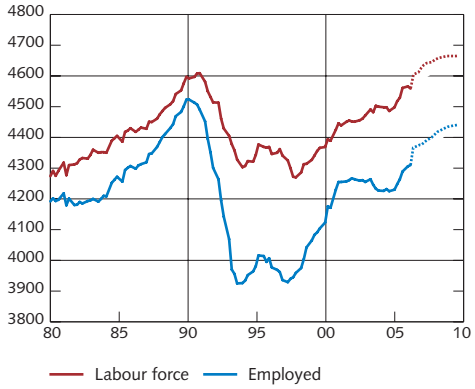
The strong growth means that resource utilisation is currently rising relatively quickly. It is important to have an idea of how much unutilised capacity there is at present to be able to assess what economic development is sustainable in the future. Different indicators and econometric estimates can produce different responses depending on the part of the economy described.

One measure of resource utilisation is capacity utilisation in industry which, however, only constitutes around 20 per cent of the economy. Capacity utilisation in the manufacturing industry is high (see Figure 33). However, manufacturing companies are still not experiencing any shortage of labour (see Figure 34). The proportion of firms in service industries with a shortage of labour continued to increase during the second quarter (see Figure 34). There is a great shortage of labour in the construction industry.

Another way to assess the degree of resource utilisation in Sweden is to examine to what extent different measures of output and resource consumption deviate from the trend. These deviations or "gaps", are greatly affected by the method used to calculate the trend. Common to all of them is that the estimates are uncertain, especially at the end of the period, which is the most interesting to analyse. Figure 35 shows that resource utilisation measured with three different GDP gaps seems to be close to a normal position. The estimates of the GDP gap indicate a somewhat lower resource utilisation in the economy as a whole than industry's view of capacity utilisation. Gaps calculated for employment and hours worked show a certain amount of unutilised resources in the labour market at present (see Figure 36).

The conclusion is that the Swedish economy, despite relatively high growth in recent years, still has a certain quantity of unutilised resources in the labour market according to various measures of scarcity. This qualitative conclusion is also shown by the Box

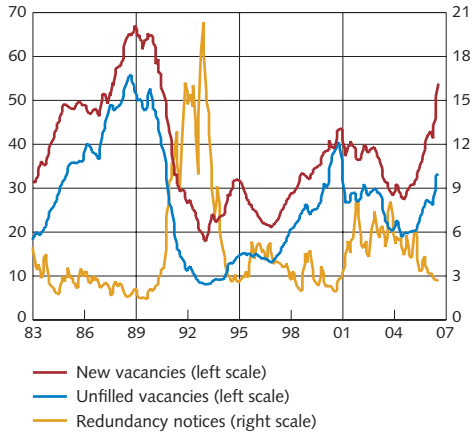
Figure 30. Employment and labour force
Thousands, seasonally adjusted data



Note. Broken lines represent the Riksbank's forecast.

Sources: Statistics Sweden and the Riksbank

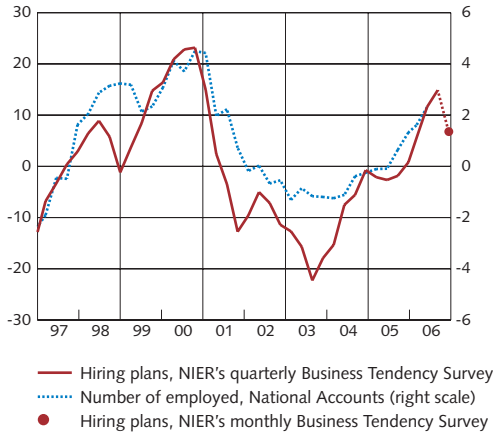
Figure 31. New and unfilled vacant jobs and redundancy notices
Thousands, seasonally adjusted data



Note. Three-month moving average. Unfilled vacancies refer to positions that remain vacant for a period of more than ten days.

Source: National Labour Market Board

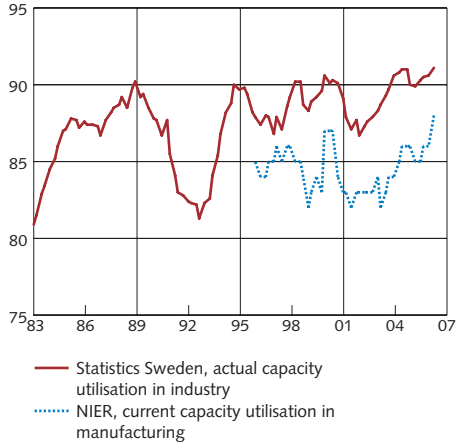
Figure 32. Hiring plans and number of employed in the business sector
Net figures and annual percentage change



Note. Employment plans weighted by the Riksbank. The balance is defined as the difference between the proportion of companies which have expressed a desire to increase the number of employees and the proportion which have expressed a desire to reduce the number of employees. The last observation regarding hiring plans is based on NIER's monthly Business Tendency Survey and refers to expectations up to November.

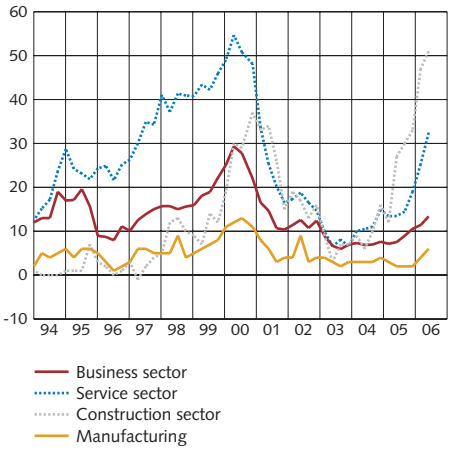
Sources: National Institute of Economic Research, Statistics Sweden and the Riksbank

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



Sources: National Institute of Economic Research and Statistics Sweden

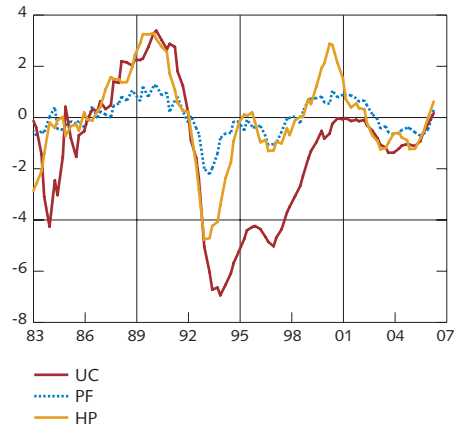
Figure 34. Proportion of firms reporting a shortage of labour
Per cent, seasonally adjusted data



Note. The shortage rates show the proportion of firms reporting a shortage of labour as the foremost barrier to increased output. Shortage rates for the retail and service industries aggregated by the Riksbank.

Source: National Institute of Economic Research

Figure 35. Estimates of the output gap
Percentage deviation from trend



Note. HP refers to the Hodrick-Prescott filter, UC to the Unobserved Components method and PF to the production function approach. When calculating the HP gap, the forecast for GDP has been included.

Sources: Statistics Sweden and the Riksbank

"Perspectives on the quantity of unutilised resources in the labour market" in this report. However, measures of resource utilisation estimated as deviations from the trend indicate that the state of the economy is approximately normal.

■■ Wage increases in line with the forecast.

According to the short-term wage statistics received to date, the rate of wage increase in the business sector is slightly higher this year than last year. During the first half of this year, wages have increased by 3.0 per cent in the business sector. New outcomes and coming retroactive payments will probably lead to the rate of wage increase being revised upwards slightly. Overall, wages in the business sector are forecast to rise by 3.4 per cent this year, which is in line with the assessment in the June Inflation Report. According to the National Accounts, wages in the business sector have risen by 3.3 per cent in the first six months of this year, which means that the forecast for wage development according to these statistics has been revised downwards slightly.

FORECAST IN THE LONGER TERM

■■ The present high growth rate is expected to decline.

Growth in demand in the coming years is above all driven by expectations of sustained household consumption. Contributory factors to this are an improvement in the state of the labour market and fiscal policy measures that increase disposable income. The lower oil price is also making a positive contribution to real household income and consumption. However, the GDP growth rate will also decrease in step with the slackening of the strong productivity growth in the economy at the same time as demand is not expected to increase as quickly as in the past.

The interest rate path on which the forecast is based entails a somewhat higher interest rate in the short term but lower in the long term than in the June Inflation Report. A gradual rise in interest rates will also lead to growth slowing down. Resource utilisation is expected to increase rather rapidly initially and then stabilise.

Economic growth is expected to be stronger during the forecast period than anticipated in the June Inflation Report (Table 5). This is initially mainly related to increased demand in Swedish export markets and higher consumption growth. In the longer term, the fiscal policy proposals presented in the Budget Bill are expected to stimulate economic growth and employment.

■■ Increase in household consumption.

The sharp increase in property prices has led to an increase in household property wealth in recent years. Financial assets have also grown significantly (see Figure 37).

However, in recent years household indebtedness has also increased rapidly. Accordingly, debts are at a high level in relation to disposable income (see Figure 37). At the same time, the low interest rate level means that household interest expenditure as a proportion of disposable income is low. The increase in household indebtedness has taken place in tandem with rapidly increasing prices in the housing market. In the past two years, housing prices have risen by an average of 10 per cent per year and the increase in lending to households has been even higher (see Figure 13). House prices and lending are expected to continue to rise in the future but at a calmer pace.

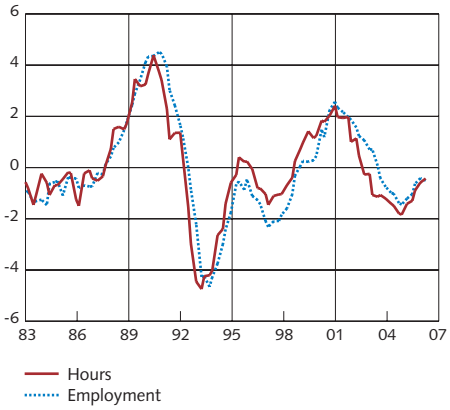
The positive development of employment and the new fiscal policy measures mean that there will be a relatively large increase in household disposable income in the coming year (see Figure 38). Household disposable income is estimated to rise by over 4 per cent next year. The rate of increase will subsequently taper off during 2008 and 2009 as employment growth slows down. Households' assessments of their own finances and of the Swedish economy as measured by the confidence indicator have gradually become more optimistic in the past year (see Figure 39). The greatest change is noticeable, however, in households' perception of the labour market, which has brightened considerably. It is in particular this strengthening that has led to the mood of households now being considered to be more optimistic than in recent years. This is also expected to lead to households reducing their precautionary saving in the coming period. It is also assumed that the saving ratio will decrease slightly during the forecast period (see Figure 38).

Overall, a favourable development of household disposable income coupled with a positive perception of the labour market and a favourable wealth situation will lead to expectations of strong growth of household consumption in the next few years (see Table 5). The new government's proposals, which are expected to increase real household income, contribute to consumption growth now being estimated to be higher than in the previous forecast.

■■ Investment growth peaks.

In the past two upturns in the mid and late-1990s respectively, the level of investment increased for around two and a half years by a total of 20-25 per cent on each occasion (see Figure 40). Since the end of 2003, investment has risen by a total of around 25 per cent. According to the most recent investment survey in May, firms anticipate a slower expansion in the business sector compared with the high growth rates of recent years. The rate of investment is expected to gradually slacken as interest rates increase. In the light of this, investment is considered to have passed its growth peak.

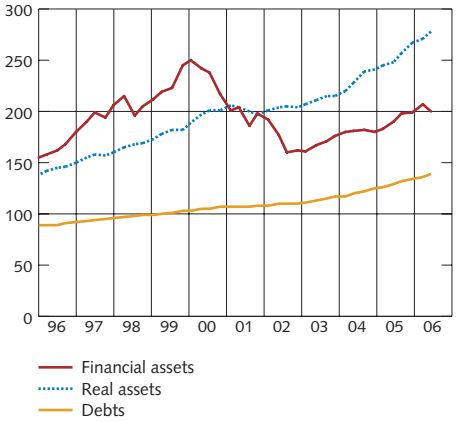
Figure 36. Estimated gap for employment and hours worked
Percentage deviation from trend



Note. The trends are calculated using the Hodrick-Prescott filter. Forecasts have been included in these calculations

Sources: Statistics Sweden and the Riksbank

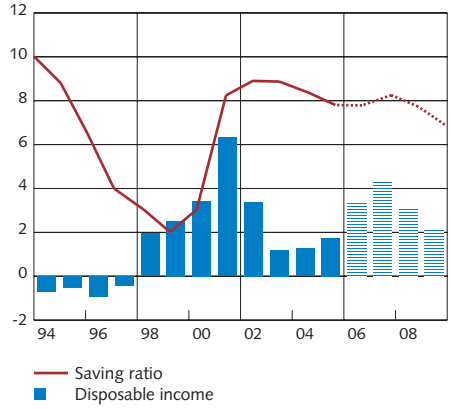
Figure 37. Households' wealth
Percentage of disposable income



Note. Financial assets excluding tenant-owned apartments and group insurance schemes. Real assets refers to houses and tenant-owned apartments.

Sources: Statistics Sweden and the Riksbank

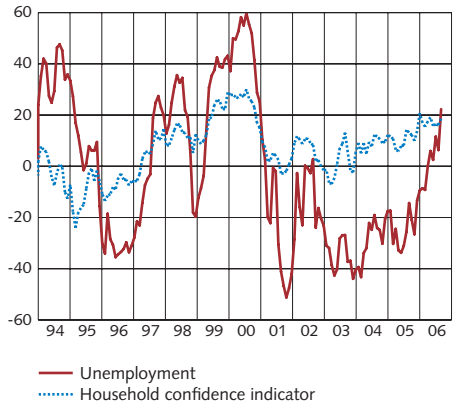
Figure 38. Households' disposable income and saving ratio
Annual percentage change and percentage of disposable income



Note Broken lines and light blue bars represent the Riksbank's forecast

Sources: Statistics Sweden and the Riksbank

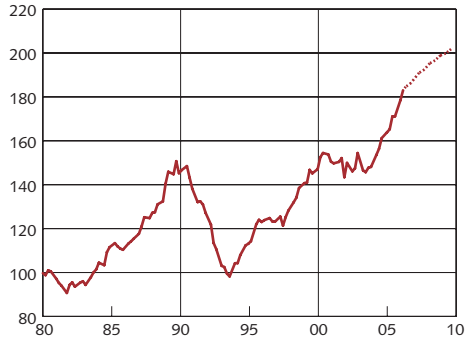
Figure 39. Households' expectations of the future
Net figures



Note. The proportion of households (in percentages) who believe that unemployment will decline minus the proportion who believe it will rise.

Source: National Institute of Economic Research

Figure 40. Investments
Volume index, 1980 = 100, seasonally adjusted data



Note. Broken lines represent the Riksbank's forecast.

Sources: Statistics Sweden and the Riksbank

Public sector investment has again started to increase after some years of relatively slow growth. This is expected to continue during the forecast period due to increased central government infrastructure investment and increased scope for local government investment. Overall, however, the rate of increase for total gross fixed capital formation is expected to slacken gradually in the years to come.

■■ Continued strong growth of foreign trade.

A continued buoyant international economic climate in the years ahead will lay the foundations for relatively strong export growth during the forecast period. Increasing resource utilisation and a slower increase in export market growth will, however, lead to a gradual slowdown of the rate of increase (see Figure 41). Import growth is expected to remain at a high level next year and to taper off gradually when demand in the economy grows more slowly.

FISCAL POLICY ASSUMPTIONS

The Riksbank makes forecasts for public sector income, expenditure and financial balance. These variables depend on cyclical fluctuations in different ways. This is most visible in the forecast for the financial balance which shows a cyclical correlation; the financial balance tends to be higher in upturns and lower in downturns. This pattern is due to the design of the tax and transfer systems.

In addition to the cyclical effects of the financial balance, discretionary decisions or "fiscal policy measures" also have an effect. A number of new proposals are presented in every Spring Fiscal Policy Bill and Budget Bill which affect the public sector balance as well as the state of supply and demand in the economy. The effects on the economy of the new proposals depend on how they are designed.

The new government has presented proposals for tax cuts in the Budget Bill (mostly in the form of job deductions) which are mainly financed. The government has also announced major changes in the sphere of labour market policy. Together, the new proposals are expected to have effects on both supply and demand conditions in the economy. However, it is difficult to estimate the size of these effects and when they will occur.

The Riksbank had already anticipated in the June forecast that fiscal policy would be more expansionary than the effects of existing decisions. Accordingly, the change of government only entails relatively minor revisions of the forecasts for public finances. However, it is estimated that the new government's fiscal policy still means that the economy will be stimulated to a slightly greater extent than assumed in the June Inflation Report. It is considered that the public sector financial balance will weaken since the new

measures are not fully financed. As in the previous forecast, it is assumed that public sector consumption will rise relatively sharply this year and subsequently grow more slowly during the rest of the forecast period. The increase over the entire period is now expected to be slightly higher compared with the previous forecast.

Despite the new fiscal policy measures entailing higher expenditure and lower income, the balance is expected to be higher this year and next year compared with the previous forecast. This is because the public sector financial balance was considerably higher than expected in the first half of this year which led to the forecast being revised upwards. Towards the end of the forecast period, the public sector surplus is expected to be around 2 per cent of GDP.

The effects on the economy of the new government's fiscal policy are expected to differ to some extent from those assumed in the previous forecast. The changed focus of labour market policy, as well as other proposals which affect the overall labour supply, are expected to have effects on labour supply, employment and wages. A substantial reduction of labour market policy programmes will lead to a rapid increase in labour supply in the coming years. This will in turn mean that open unemployment will only fall slowly despite employment rising at a good rate at the same time. The increased supply of labour together with changes in the design of the unemployment benefit scheme mean that the rate of wage increase is not now estimated to be as fast as in the previous forecast. Together, the new proposals are expected to lead to an increased supply of labour which will increase employment and dampen the rate of wage increase slightly.

The tax cuts for households that have now been announced increase disposable income even if part of the increase in income is counteracted by reduced benefits from social insurance schemes and increased unemployment insurance contributions. The combined effect of the new proposals is expected to lead to an increase in the number in regular employment which should also have a positive effect on household consumption. Overall, consumption is now expected to be higher than in the previous report. Together with increased employment, this will lead to increased output and growth in the next few years compared with the previous forecast.

Figure 41. Total Swedish exports and export market growth
Annual percentage change

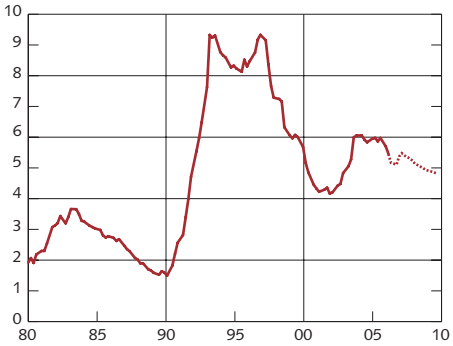
Note. Broken lines represent the Riksbank's forecast.
Sources: Statistics Sweden and the Riksbank

■■ A substantial reduction in labour market policy programmes.

The rate of increase of employment, both in terms of hours worked and numbers employed, is expected to remain high in 2007 and then slacken slightly as the growth slows.

The policies of the new government are expected to affect both the supply of and demand for labour. Major changes are taking place in labour market policy. A reduction of the number of

Figure 42. Open unemployment
Percentage of labour force, seasonally adjusted data



Note. Broken lines represent the Riksbank's forecast.
Sources: Statistics Sweden and the Riksbank

labour market policy programme measures, which includes abolition of the sabbatical year and the "plus job" scheme will reduce the number of individuals in labour market policy programme measures but also registered employment since these measures are included in employment. The proposals of the new government for "new start" jobs, which entail waiving the employers' contribution for individuals who have been unemployed for a year, will, however, increase employment. This is due to new start jobs not being regarded as labour market policy programme measures.[2] The net effect of these measures is assumed to be that total employment will only be affected to a small extent while at the same time there will be an increase in regular employment (see Table 6).

The number of individuals in the labour force is expected to increase rapidly, especially during the coming year, as a direct consequence of the changes in labour market policy. Despite an expected continued increase in employment, the proportion of openly unemployed will not fall next year due to the increased labour supply. In the longer term, both the supply of and the demand for labour will be stimulated by the strengthened incentives to work. The forecast for employment and the labour force is therefore revised upwards in 2008. During the latter part of the forecast period, open unemployment will fall as the number of employed increases at the same time as the labour supply dampens (see Figure 30). Compared with the June Inflation Report, the forecast for unemployment is higher during most of the forecast period (see Table 6).

Table 6. Labour market forecast
Annual percentage change unless otherwise stated

	2005	2006	2007	2008	2009
Number of hours worked, NA*	0.5	1.8 (1.8)	1.3 (1.0)	0.6 (0.2)	0.3 (0.1)
Number of employed	0.7	1.9 (1.7)	1.1 (1.0)	0.8 (0.5)	0.4 (0.2)
Labour force in regular employment	0.4	1.6 (1.3)	1.5 (1.1)	1.2 (0.8)	0.4 (0.3)
Labour force	0.7	1.3 (1.1)	1.1 (0.6)	0.5 (0.3)	0.1 (0.1)
Open unemployment	5.9	5.4 (5.5)	5.4 (5.1)	5.1 (4.9)	4.9 (4.8)
Labour market policy programmes	2.7	3.1 (3.2)	2.2 (2.9)	1.6 (2.5)	1.6 (2.4)

* Calendar-adjusted data.
Sources: Statistics Sweden and the Riksbank

■■ Productivity growth recedes.

Productivity growth in the business sector has been high in recent years (see Figure 25). One explanation is that productivity growth is usually high at the beginning of an upturn. Structural factors such as increased international and domestic competition and greater use of information and communication technology also contribute to the high rate of increasing trend productivity. Historical correlations between the state of the economy, employment and productivity indicate that productivity growth will taper off in the future.

2 This is a new proposal and it has not yet been decided whether the new start jobs will be registered in the official statistics as a labour market policy programme measure. In this report, it has been assumed that this will not be the case.

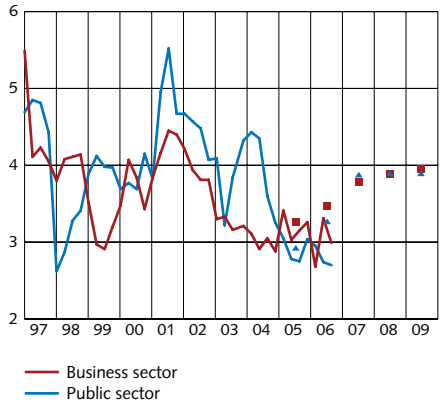
GDP growth is also expected to be relatively high this year and next year. This also affects the outlook on resource utilisation, of course, which is expected to increase. During 2008 and 2009, the rate of growth will be lower and resource utilisation will stabilise. It is assumed that unutilised resources in the labour market will gradually diminish during the forecast period. However, this is not expected to lead to any serious problems with bottlenecks in the labour market.

■■ The rate of wage increase rises.

During the period 2007-2009, the rate of wage increase in the business sector is expected to increase approximately in line with previous upturns (see Figure 43). In 2007, collective agreements for 80 per cent of all employees, approximately 2.8 million, will be renegotiated.[3] During the previous agreement period 2004-2006, wages rose in the whole economy by an average of approximately 3.3 per cent. In 2007-2009, the rate of wage increase is expected to rise. There are a number of explanations for this. Resource utilisation in the labour market is expected to be higher during next year's bargaining round than during the 2004 bargaining round. This increases the probability of a higher rate of wage increase. According to the most recent survey of inflation expectations, the employers' and employee organisations expect wage increases averaging 3.3 per cent during the next three years, which is slightly higher than they expected at the start of the last wage bargaining round. According to the National Institute of Economic Research's Business Tendency Survey, firms' profitability estimates are also more positive this year than at the beginning of 2004. The rising rate of wage increase in the business sector during the forecast period is mainly explained by the gradual improvement in the state of the labour market.

It is assumed that the new government's policies will curb the development of wages slightly in coming years. The cuts in income tax on earned income, the "job deduction", will make it more profitable to work which argues in favour of an increased labour supply. An increase in supply means increased competition for jobs which in turn can have a restraining effect on wages. An increased component of self-finance in the unemployment insurance scheme and the reduced level of unemployment insurance benefits can also have a dampening effect on wage demands since the alternative compensation to work is reduced. In addition, there is competition from abroad which can lead to an inflow of labour and to Swedish firms having to continue to exert further pressure on costs. Overall, the rate of wage increase is expected to rise relatively quickly next year due to high demand for labour in a situation where new collective agreements are being made for large parts of the labour market. However, the wage forecast is being revised downwards slightly for the entire forecast period compared with the June Inflation

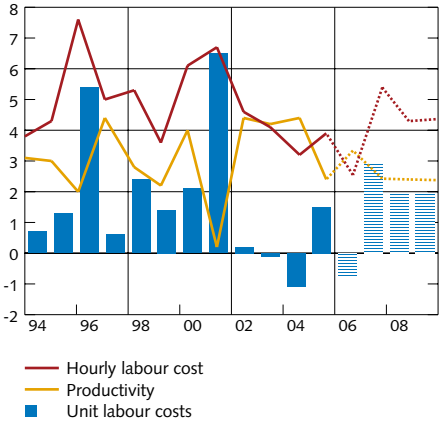
Figure 43. Nominal hourly wages
Annual percentage change



Note. 3-month moving average. Preliminary outcomes up to and including August 2005. The dots represent the Riksbank's forecast.

Sources: National Mediation Office and the Riksbank

Figure 44. Unit labour costs in the business sector
Annual percentage change, seasonally adjusted data



Note. Broken lines and light blue bars represent the Riksbank's forecast.

Sources: Statistics Sweden and the Riksbank

3 See the Box entitled "The 2007 wage bargaining round" in this Inflation Report.

Report. This is mainly explained by an increased labour supply and changes in the design of the unemployment benefit scheme which are expected to lead to increased competition for vacancies. These effects are expected to restrain the rate of wage increase slightly.

■■ Temporary effects keep unit labour costs down.

According to the National Accounts, unit labour costs in the business sector rose by 1.5 per cent during 2005. In 2006, it is expected that unit labour costs will fall, due mainly to the introduction of a temporary discount on certain elements of the business sector's collective contributions (see Figure 44). This discount is expected to affect unit labour costs by approximately 1.2 percentage points in 2006. Next year, the rate of increase of unit labour costs will be temporarily higher again due to the removal of this discount. Apart from these temporary effects, unit labour costs are expected to increase in the years ahead in parity with continuing improvements in economic performance and an increasing rate of wage increase (see Table 7). During the forecast period, the increase in unit labour costs in the business sector is expected to be slightly lower than the assessment in the June Inflation Report, since wages are not now expected to rise as quickly.

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

	2005	2006	2007	2008	2009
Hourly wage, NMO	3.2	3.4 (3.4)	3.8 (3.9)	3.9 (4.1)	4.0 (4.2)
Hourly wage, NA	3.9	3.8 (4.0)	4.2 (4.3)	4.3 (4.5)	4.4 (4.6)
Employers' social security contributions	0.0	-1.2 (-1.2)	1.2 (1.2)	0.0 (0.1)	0.0 (0.0)
Hourly labour costs, NA	3.9	2.6 (2.8)	5.4 (5.5)	4.3 (4.6)	4.4 (4.6)
Productivity	2.4	3.3 (2.6)	2.4 (2.5)	2.4 (2.5)	2.4 (2.5)
Unit labour costs	1.5	-0.7 (0.2)	2.9 (2.9)	1.9 (2.0)	1.9 (2.0)

Note. NMO is the National Mediation Office's short-term wage statistics and NA is the National Accounts. The hourly wage cost is defined as the sum of actual wages, collective charges and wage taxes divided by the seasonally adjusted total number of hours worked. The unit labour cost is defined as labour cost divided by the seasonally adjusted value added in fixed prices.

Sources: National Mediation Office, Statistics Sweden and the Riksbank

Revised forecasts since the previous Inflation Report

- Revisions of the real development during the forecast period are mainly due to new statistics that show a stronger economic performance than in the previous assessment and to the fiscal policy measures presented in the Budget Bill.

- Export market growth has also been adjusted upwards for both 2006 and 2007, which is expected to entail higher exports in both years.

- Household consumption has been adjusted upwards in 2007-2009 due to a strong labour market and higher disposable income.

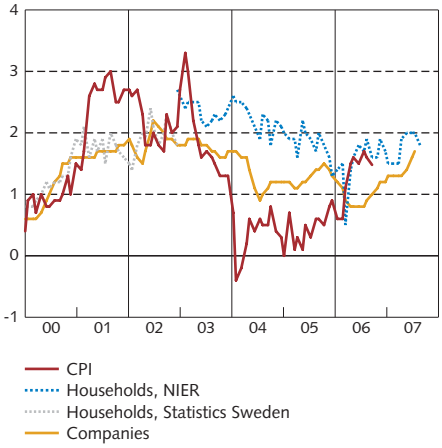
- Both the number of employed and the number of individuals in the labour force are expected to increase during 2006 due to new outcomes and strong indicators.

- Employment and the number of hours have been revised upwards for 2007-2009 as a result of stronger GDP growth and increased incentives to work due to the policies of the new government. The labour supply is also expected to be higher.

- The extent of the labour market policy programme measures has been reduced as a result of a change of direction in labour market policy. A higher labour supply means that the forecast for open unemployment is also higher during the entire forecast period.

- Unit labour costs have been revised downwards this year due to the high productivity growth. In the years to come, costs are slightly lower due to the assumption that wages will rise slightly more slowly.

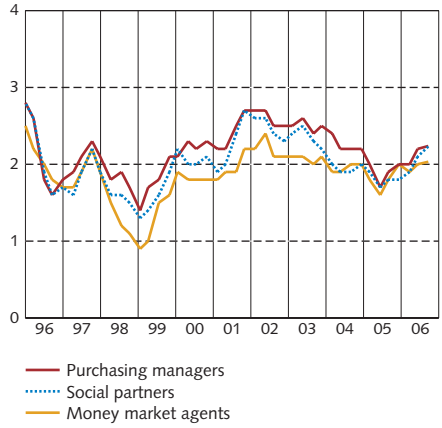
Figure 45. Actual inflation (CPI) and households' and companies' expectations of inflation one year ahead
Annual percentage change



Note. The curves for inflation expectations have been shifted ahead 12 months to coincide with the point in time to which the expectations refer. The horizontal broken 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: National Institute of Economic Research and Statistics Sweden

Figure 46. Different agents' expectations two years ahead
Annual percentage change



Note. The horizontal broken 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.

Source: Prospera Research AB

Inflation expectations

As part of its economic analysis the Riksbank takes account of firms' and households' expectations of consumer price developments since they influence actual inflation through price and wage formation. These expectations are in turn affected by a host of different factors, such as current price pressures, the Riksbank's actions and communication, as well as the general economic outlook.

■■ Inflation expectations have risen slightly.

Households' and firms' inflation expectations one year ahead have taken a slightly different course of development according to surveys carried out by the National Institute of Economic Research (NIER). Households' inflation expectations have fallen from 2.0 per cent in May to 1.8 per cent (see Figure 45).

Firms' expectations of the rate of price increase have continued to rise. According to NIER's Business Tendency Survey in July, inflation one year ahead is expected to be 1.7 per cent. The difference between firms' and households' expectations has thus become smaller.

According to Prospera's latest survey on inflation expectations among the social partners, purchasing managers and money market agents in October, these have risen slightly compared with the previous survey in May. Money market agents expect inflation to match the target two and five years ahead. Among other groups of respondents, expectations have shifted slightly upwards. The greatest change has been noted among the social partners (see Figure 46 and Table 8).

Table 8. Inflation expectations according to different surveys
Per cent, average

Expected inflation rate in	1 year	2 years	5 years
Money market agents	1.9 (1.8)	2.0 (2.0)	2.0 (2.0)
Employer organisations	2.0 (2.0)	2.3 (2.2)	2.4 (2.2)
Employee organisations	2.0 (1.7)	2.2 (1.9)	2.2 (2.0)
Purchasing managers, trade	2.1 (1.9)	2.2 (2.0)	2.2 (2.1)
Purchasing managers, manufacturing	2.2 (2.1)	2.3 (2.3)	2.3 (2.2)
Households (Consumer Survey) in September (May)	1.8 (2.0)		
Firms (Business Tendency Survey) in July (April)	1.7 (1.3)		

Note. The results from the previous survey in May 2006 are given in parentheses unless otherwise stated.

Sources: National Institute of Economic Research and Prospera Research AB.

Inflation assessment

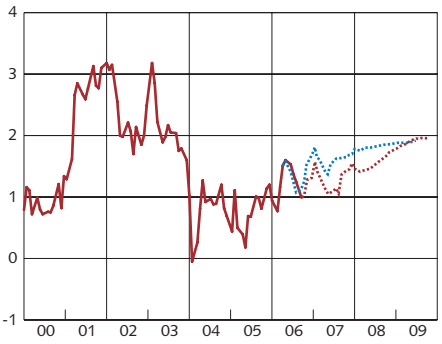
Different measures of underlying inflation have risen since the summer of 2005. In the future, inflation is expected to rise slowly as resource utilisation and both domestic and international cost pressures rise. Compared with the June Inflation Report, the inflation forecast has been revised downwards for 2007 and 2008, largely as a consequence of lower outcomes than expected for imported inflation and lower inflationary impulses from energy prices. High productivity growth in 2006 is also expected to have a dampening effect on inflation.

■■ Inflation in line with previous forecast.

Since the June Inflation Report, new inflation figures for June to September have been published. The annual rate of increase for consumer prices, measured using the Consumer Price Index (CPI), was 1.5 per cent in September. Underlying inflation, using the UND1X measure, where interest expenditure and the effects of changes in indirect taxes and subsidies have been excluded from the CPI, was 1.0 per cent. Overall inflation has been in line with the Riksbank's forecast, but its composition has been somewhat different to that expected. The rate of price increase on mainly domestically produced goods and services, using the UNDINHX measure, was 2.4 per cent in September, which was higher than expected. The deviation can be explained by higher electricity prices. Imported inflation, measured using UNDIMPX, has, on the other hand, been lower than expected.

Cost pressures in the economy have been low for several years due to moderate wage increases and strong productivity growth. In recent years, an increasing proportion of imports have originated from low-cost countries, and this has contributed to lower prices for consumer goods. The krona exchange rate, which strengthened gradually between 2002 and 2004, is also assumed to have dampened inflation with some time lag. Stiffer competition in certain sectors, such as the food industry, has also had a dampening effect on price developments.

Figure 47. UND1X
Annual percentage change



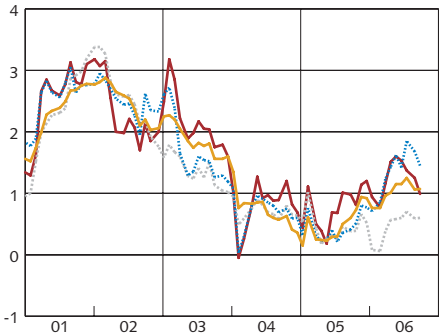
UND1X
Forecast, Inflation Report 2006:3
Forecast, Inflation Report 2006:2

Sources: Statistics Sweden and the Riksbank

■■ Higher rate of underlying inflation since mid-2005.

In order to analyse developments in inflation excluding various temporary effects, the Riksbank studies different measures of underlying inflation. The aim of the different measures is to try and distinguish the common trend change in the general level of prices. 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 those categories of goods and services whose prices vary the most. Figure 48 presents different measures of underlying inflation. Even if several measures of inflation have fallen back slightly in recent months, the

Figure 48. Different measures of underlying inflation
Annual percentage change

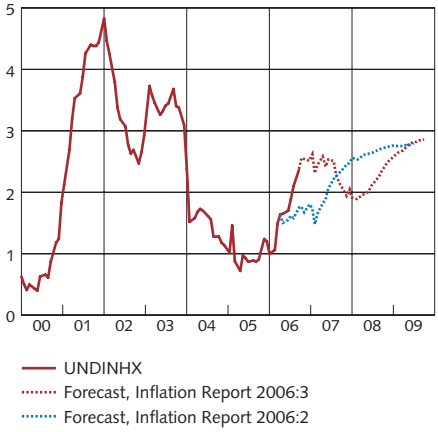


UND1X
TRIM85
UND1X excluding energy
UND24%

Note. The alternative measures are calculated on the basis of CPI divided into 70 different subgroups. UND24 is aggregated using weights adjusted for the historical standard deviation. In TRIM85 the 7.5 per cent most positive and negative yearly price changes each month have been excluded.

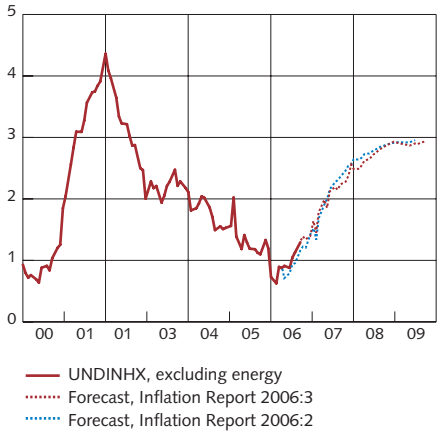
Sources: Statistics Sweden and the Riksbank

Figure 49. Domestic inflation (UNDINHX)
Annual percentage change



Sources: Statistics Sweden and the Riksbank

Figure 50. UNDINHX excluding energy
Annual percentage change



Source: The Riksbank

trend has remained upward - albeit only slightly - since the latter half of 2005. This is partly linked to rising resource utilisation.

■■ Energy prices contribute to lower inflation in the future.

The movements in inflation noted in recent years have not only been a result of general economic developments. Various types of specific shocks, not least in energy markets, have also played a significant part. Since the June Inflation Report, electricity prices in inflation have been higher than expected and the rate of increase in September was almost 18 per cent measured as an annual rate. The rise in electricity prices is partly structural, partly more temporary in nature. The internationalisation of the electricity market has contributed to the gradual adjustment of Swedish electricity prices to a higher international price level. The higher electricity prices noted most recently, however, are believed to be due to temporary factors. A dry summer has resulted in low quantities of water in the Nordic reservoirs, which has caused electricity prices on the Nordpool power exchange to rise in the summer. Furthermore, a rising price for emission rights contributed to the rapid increase in prices in the spring. Electricity prices in 2007 are expected to be lower than in the autumn of 2006, which is reflected in the setting of forward prices on Nordpool. This affects the electricity price index in CPI with some time lag, which means that falling electricity prices will contribute to keeping inflation down in 2008 and the beginning of 2009.

The world market price for oil has fallen recently from the high levels noted during the summer of 2006. The oil price was around USD 61 per barrel in September, which is the lowest level since the end of 2005. During October, the oil price has fallen back further. This development has resulted in a fall in the prices of oil products (petrol, diesel and domestic heating oil) for consumers recently. According to forward prices, however, oil prices are expected to rise again slightly in the year to come. Despite this, developments in the prices of oil products will contribute to dampening the annual inflation rate during the first six months of next year as the effects of the price increases in the spring of 2006 peter out. Compared with the assessment in the June Inflation Report, energy prices are now expected to exert downward pressure on inflation. Lower oil prices will have a dampening effect on inflation in 2006 and 2007 while electricity prices will have a counteracting effect during the same period, but will contribute to dampening inflation in 2008 (see Figure 49).

■■ Slightly higher domestic cost pressure.

Continued strong growth of domestic demand in the years to come is expected to contribute to an increase in the number of employed and the number of hours worked. The improved state of the labour market is expected to lead to a rising rate of wage increase. At the same time, productivity is expected to rise at a slightly slower rate than in recent years, which will lead to firms' production costs

gradually increasing at a slightly faster rate. The rate of price increase for domestically produced goods and services, excluding electricity, measured using the UNDINHX price index, is expected to rise in line with increases in cost pressures and resource utilisation. Rents, which account for approximately 20 per cent of UNDINHX, are expected to rise by just under 1 per cent this year, which will have a restraining effect on domestic inflation. The rate of rent increase is expected to rise again in 2007 and 2008, due in part to higher rents.

The forecast for domestic inflation excluding electricity is approximately the same as in the June Inflation Report. Higher productivity this year has warranted some downward revision from around mid-2007 and one year ahead. When the effects of fluctuations in energy prices have subsided, domestic inflation will gradually rise to 2.3 per cent two years ahead and to 2.9 per cent three years ahead.

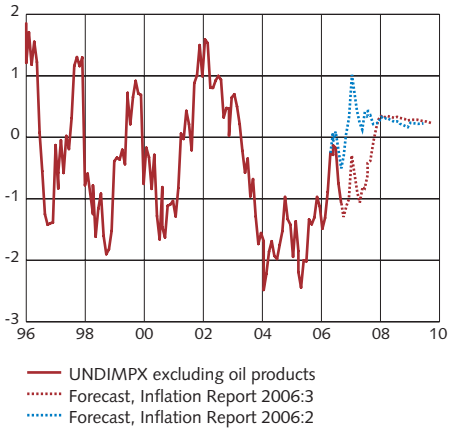
■■ Imported inflation revised downwards but expected to rise.

Excluding oil products, prices of imported goods have fallen by an average annual rate of 1.2 per cent since 2003. This is low compared with the developments of the last ten years (see Figure 51). In September, the annual rate of change in non-oil UNDIMPX stood at -1.1 per cent. Several factors indicate that prices in the future will not fall at the same rate as they have done over the past three years. As cost pressures rise and resource utilisation increases in Sweden, prices of imported goods are also expected to rise slightly for consumers, as these goods are processed and distributed before being sold on the Swedish market. The strengthening of the krona and increased imports from low-cost countries, which is estimated to have kept down the rate of price increase of Swedish imports, is expected to have a dampening effect on imported inflation during the forecast period. At the same time, there is reason to believe that costs and accordingly prices in low-cost countries will increase more rapidly in future as global resource utilisation increases. Overall, it is estimated that prices of imported goods and services will fall at a slower rate during 2007. From 2008 onwards, imported inflation excluding oil is expected to reach just over 0.2 per cent.

■■ Gradually rising inflation.

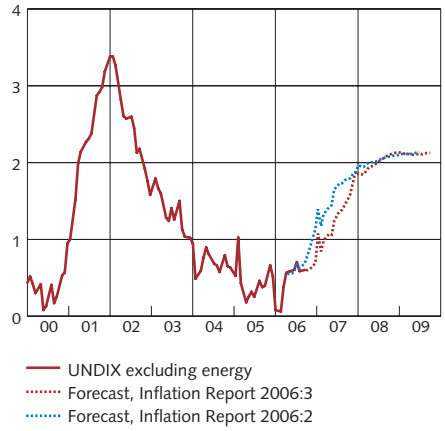
The low inflation is largely due to low cost pressure in the economy following moderate wage increases and strong productivity growth. Assuming that the repo rate develops in line with implied forward rates, inflation is expected to rise relatively slowly in the future as resource utilisation increases and domestic and international cost pressure rise (see Figure 53). For most of the forecast period, underlying inflation, measured as UND1X, is expected to be below 2 per cent and one to three years ahead it is expected to be 1.4, 1.6 and 2.0 per cent, respectively. Compared to the assessment made in June, the inflation forecast remains largely unchanged for 2006,

Figure 51. Imported inflation (UNDIMPX) excluding oil products
Annual percentage change



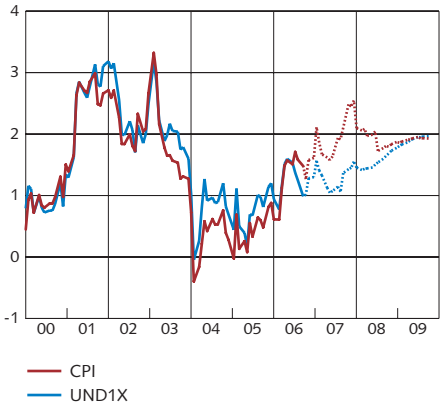
Sources: Statistics Sweden and the Riksbank

Figure 52. UNDIX excluding energy
Annual percentage change



Source: The Riksbank

Figure 53. UND1X and CPI
Annual percentage change



Note. Broken lines represent the Riksbank's forecast.

Sources: Statistics Sweden and the Riksbank

but has been revised downwards slightly for the longer term. This downward revision is mainly due to a lower outcome than expected for imported inflation, which affects the forecast for 2007, although lower inflationary impulses from energy prices are also a contributory factor, particularly with regard to 2008. Unit labour costs are also being revised downward for 2006 as the result of the positive developments in productivity.

■■ CPI inflation slightly higher than UND1X inflation.

The government's Budget Bill proposes some changes in property tax that will cause the CPI to fall, but not UND1X. The Budget Bill also contained proposals for higher indirect taxes that will affect the CPI. Apart from a certain degree of indexation, energy taxes are also expected to remain unchanged during the forecast period. In previous Inflation Reports, it has been assumed that these would rise during the forecast period as a part of the green tax shift decided by the former government.

In recent months, CPI inflation has been higher than UND1X inflation. This is because rising interest rates have resulted in higher interest costs for homeowners, which affects CPI inflation but not UND1X inflation. The fact that both the repo rate and long-term interest rates are now expected to rise will help push CPI inflation above UND1X inflation during most of the forecast period (see Figure 53).

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

	Annual average				12-month rate			
	2005	2006	2007	2008	Sep. 06	Sep. 07	Sep. 08	Sep. 09
CPI	0.5	1.3 (1.5)	2.0 (2.3)	1.9 (2.4)	1.5 (1.5)	2.1 (2.4)	1.8 (2.4)	1.9
UND1X	0.8	1.2 (1.3)	1.3 (1.6)	1.6 (1.8)	1.0 (1.1)	1.4 (1.6)	1.6 (1.9)	2.0
UNDINHX	1.0	1.9 (1.5)	2.3 (2.1)	2.2 (2.7)	2.4 (1.7)	2.2 (2.3)	2.3 (2.7)	2.9
UNDIMPX	0.2	-0.2 (0.6)	-0.9 (0.6)	0.2 (0.1)	-1.9 (-0.3)	-0.3 (0.2)	0.2 (0.0)	0.1

Note. The figures in parentheses are the forecasts in the previous Inflation Report. UND1X is CPI excluding household mortgage interest expenditure and adjusted for 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	1.2 (1.3)	1.3 (1.6)	1.6 (1.8)
Effects of changes in mortgage interest expenditure	-0.4	0.1 (0.1)	0.7 (0.6)	0.4 (0.5)
Effects of changes in indirect taxes and subsidies	0.2	0.1 (0.1)	0.1 (0.2)	0.1 (0.2)
=CPI	0.5	1.3 (1.5)	2.0 (2.3)	1.9 (2.4)

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

Sources: Statistics Sweden and the Riksbank

Revised forecasts since the previous Inflation Report

- Domestic inflation has been revised upwards for 2006 and 2007, largely due to the higher electricity price. Higher productivity will have a counteracting effect during the same period.

- Imported inflation (excluding oil products) has been revised downwards for 2006 and 2007, largely due to lower outcomes than expected in recent months, which will have repercussions during most of 2007.

- Lower oil prices will have a dampening effect on inflation in 2006 and 2007. Movements in electricity prices will contribute to a counteracting effect during the same period, but will dampen inflation in 2008.

Risk assessment

The overall assessment of different risks is that the probability of inflation being higher than in the main scenario is slightly greater than the probability of lower 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 about the repo rate. The forecast is uncertain, however, and when formulating monetary policy the Riksbank takes account of the risk of inflation deviating from the main scenario.

In the June Inflation Report, attention was drawn to the global imbalances as a risk factor for international growth. Uncertainty about the high oil price and its effects on inflation was also discussed. International developments remain an important source of uncertainty in the forecasts concerning the Swedish economy and inflation. Since the June Inflation Report, there have been several indications of weaker development in the USA and at the same time the situation in the oil market seems to have stabilised to some extent. International risks point this time therefore mostly towards lower inflation than in the main scenario.

As before, the most important domestic risk factors are considered to be a faster rise in domestic demand and wages than in the main scenario. In addition, there are risks associated with the continued strong increase in loans and house prices.

Fluctuations in energy prices have given rise to substantial effects on inflation in recent years and are expected to continue to do so during the forecast period. However, experience shows that it is very difficult to predict these fluctuations.

Domestic risks argue mainly in favour of inflation being higher than in the main scenario. For inflation in Sweden, this time, domestic risks slightly outweigh the international risks, which overall means that the risks of higher inflation dominate.

■■ Large fluctuations in energy prices.

Fluctuations in Swedish inflation in recent years have largely been associated with variations in energy prices. There will continue to be a great risk that inflation will deviate from the main scenario as a result of energy prices developing differently than assumed.

The oil price has been about USD 60 per barrel in recent months, which is the lowest level since the end of 2005. In the main scenario, the Riksbank estimates that the oil price will increase again slightly in the coming year in line with forward prices, although the price rise is moderate and is expected to lead to small inflationary spillover effects. There is considerable uncertainty about this future scenario, however.

It now appears more probable than before that inflation could be lower than in the main scenario as a result of the oil price continuing to decline in the coming years. However, this kind of development would probably be associated with lower international growth in general, which would have other repercussions on the Swedish economy than those transmitted via the oil price.

The internationalisation of the electricity market has also contributed in recent years to the adaptation of Swedish electricity prices to a higher international price level. In addition to this structural adaptation, the price of electricity is also affected by more temporary factors. A higher price for emission rights and a dry summer with low water levels have contributed to an increase in electricity prices on the Nordpool power exchange since the June Inflation Report, although prices have decreased recently. The setting of forward rates reflects expectations of a lower average price in future compared with the price level in the autumn and this is one of the reasons for the relatively low inflation forecast a couple of years ahead. However, there is also considerable uncertainty about the development of electricity prices.

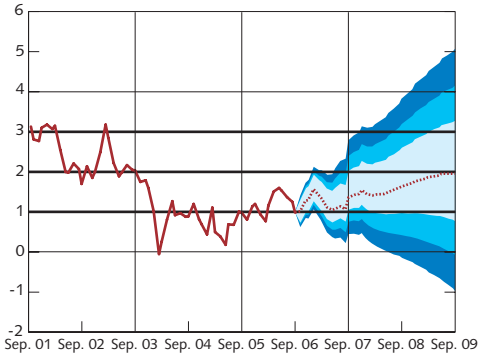
Altogether, the risks associated with energy prices do not point unequivocally towards higher inflation than in the main scenario this time. It seems about as probable that energy prices and inflation could be lower than in the main scenario.

■■ Risk of weaker growth in the United States.

The large deficits in the United States current account and the corresponding surpluses in certain Asian and oil-exporting countries have been regarded as an important risk factor for some time. These imbalances will need to be corrected in the future. This will take place in the main scenario by a progressive adaptation with a gradual increase in saving in the United States and reduced saving in those countries with surpluses. The weakening of the housing market in the United States is an indication that saving in the United States might increase more quickly than expected, both due to the fact that the developments in the housing market can be a signal of reduced optimism about the US economy in general and because reduced asset values may lead to reduced growth in consumption. Furthermore, a decline in the housing market will mean lower demand in the form of construction investments.

However, the picture of the development of the US economy is not entirely straightforward. There are also many signs of continuing strength in the US economy. At the same time, there is firm, stable growth in the rest of the world economy. The uncertainties associated with the state of the US economy, the global imbalances and the consequences for the world economy argue this time none the less for a development towards lower inflation than in the main scenario.

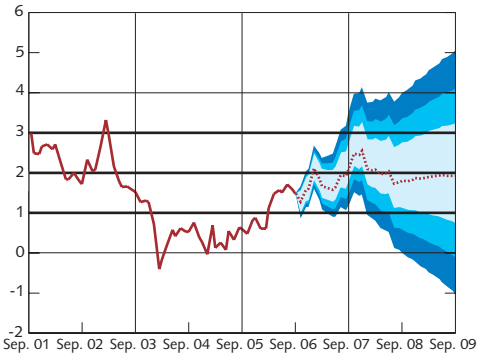
Figure 54. UND1X with uncertainty intervals
Annual percentage change



Note. The uncertainty bands show the 50, 75 and 90 per cent chances of the underlying inflation, UND1X, being within the respective range. The broken lines represents the forecast in the main scenario. The horizontal lines at 2, 1 and 3 per cent respectively are the Riksbank's target and the tolerance limits for the annual rate of increase in CPI.

Sources: Statistics Sweden and the Riksbank

Figure 55. CPI with uncertainty intervals
Annual percentage change



Note. The uncertainty bands show the 50, 75 and 90 per cent chances of inflation being within the respective range. The broken lines represents the forecast in the main scenario. The horizontal lines at 2, 1 and 3 per cent respectively are the Riksbank's target and the tolerance limits for the annual rate of increase in CPI.

Sources: Statistics Sweden and the Riksbank

■■ The domestic economy may be stronger than expected.

The state of the Swedish economy is currently strong. At the same time, inflation is being restrained by a number of favourable supply conditions. The risk of domestic inflation being higher than in the main scenario is estimated to be greater than the risk of lower inflation, even though there are factors which could lead to lower price increases.

The growth of household consumption has been surprisingly strong recently. The Riksbank's assessment in the main scenario is that growth in consumption will remain relatively strong, although there is a risk none the less that the strength of domestic demand is underestimated. Households continue to save a relatively high proportion of their income and interest rates remain low even after the increases that have taken place. Disposable income is expected to increase in line with the rise in employment. Moreover, the improved labour market climate offers less justification for precautionary saving.

■■ Uncertainty about the effects of fiscal policy.

Changes in the sphere of fiscal policy will affect both aggregate demand and its composition. There are also reasons to expect changes of a more structural nature on the supply side of the economy. However, there will be some degree of uncertainty for a time on the net effects of the fiscal policy measures on the balance between demand and supply and thus on the consequences for corporate costs and inflation.

■■ Continued rapid increase in loans and house prices.

The rates of increase for lending, house prices and household debts remain high. This supports the picture of strong growth in demand underpinned by an expansionary monetary policy. If house prices and loans continue to develop at the same rate, there is, however, a risk of imbalances building up which will eventually compel an adaptation with considerable consequences for both inflation and the real economy. As the Riksbank pointed out earlier, these risks are difficult to express in figures with the aid of those forecasting methods currently available. In the short term, the risk is probably greatest that inflation will be higher than in the main scenario while the risk of lower growth of demand and prices predominates in the longer term. Even if the risks are difficult to quantify, they have been taken into account in the conduct of monetary policy.

■■ Uncertainty about wage development.

According to the main scenario, the healthy economic prospects are expected to lead to increased demand for labour and slow rise in the rate of wage increase. Employment has risen recently and the latest statistics on new vacancies, unfilled vacancies and redundancy notices confirm the picture that the labour market has clearly improved since the trough around the turn of the year 2004/2005. Most wage

agreements will be renegotiated next year, when the development of the labour market is expected to be favourable according to the main scenario. It cannot be ruled out that bottlenecks will give rise to generally higher wage demands than expected.

At the same time, it is possible that firms' labour costs per unit produced will increase more moderately than expected. The main scenario is based on the assumption that the increase in productivity will slow down but, in the light of experiences from recent years, it cannot of course be ruled out that productivity will once again increase more rapidly than expected. It is also possible that the labour supply will increase more than expected, both as a result of increased incentives to enter the labour market and due to the enlargement of the EU and labour mobility from low-wage countries. In addition, there is still a relative abundance of unutilised resources in the labour market.

Overall, the strength of the domestic economy none the less indicates that the risk of inflation being higher than in the main scenario is greater than of it being lower. The assessment of the Riksbank is also that the domestic risk of an increase is greater than the international risk of a decline. The risk-adjusted inflation forecast is therefore marginally higher than in the main scenario.

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

	Annual average				12-month rate		
	2005	2006	2007	2008	Sep. 07	Sep. 08	Sep. 09
CPI	0.5	1.4 (1.5)	2.1 (2.3)	2.0 (2.4)	2.2 (2.4)	1.9 (2.4)	2.0
UND1X	0.8	1.3 (1.3)	1.4 (1.6)	1.7 (1.8)	1.5 (1.6)	1.7 (1.9)	2.1

Note. The mean values of the probability distributions for the inflation assessment in Figures 54 and 55. The figures in parentheses are the forecasts in the previous Inflation Report.

Sources: Statistics Sweden and the Riksbank.

Perspectives on the quantity of unutilised resources in the labour market

This Box highlights a number of factors of relevance for assessing the level of resource utilisation in the labour market and discusses different measures of unemployment and their relevance for wage formation. Among other things, this review shows that the commonly used concept of "open unemployment" is a narrow measure of the quantity of unutilised resources. Alternative measures, such as those which include students who are seeking work and which take into account the search behaviour of different groups, may be of greater relevance from the perspective of wage formation.

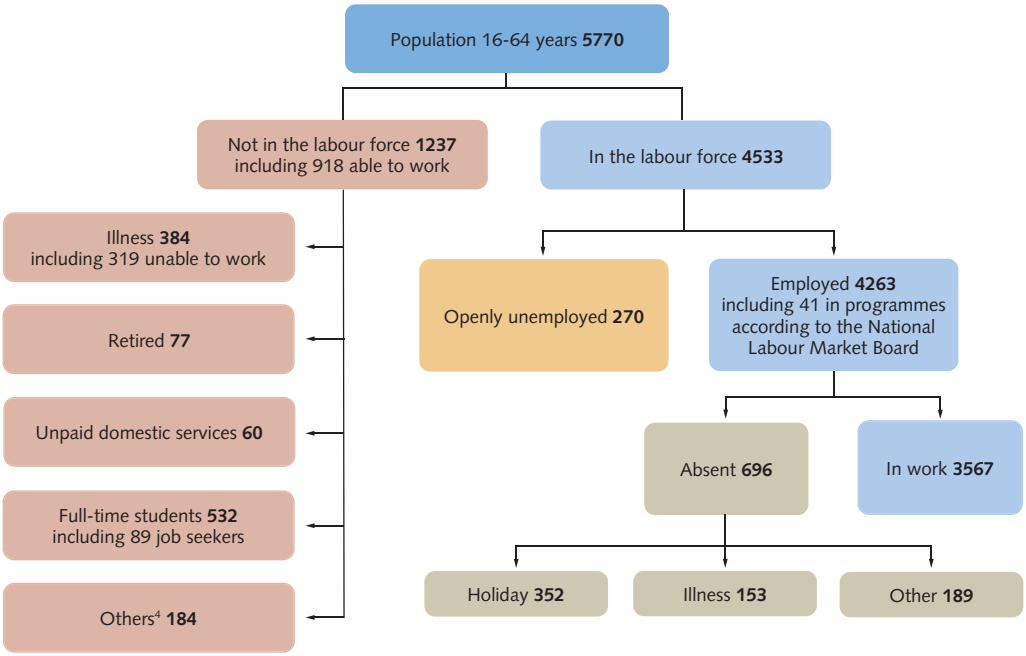
Introduction

Analysis of developments in the labour market is an important part of the Riksbank's work of producing forecasts for inflation. Inflation is primarily determined by inflation expectations and firms' marginal costs. In the aggregate economy, marginal cost is dominated by wages. Labour costs account for approximately two-thirds of value added. Wage development is in turn affected by a number of factors, such as resource utilisation in the labour market. Experience shows that a high level of resource utilisation in the labour market tends to push wages up. Resource utilisation in the labour market is therefore important for inflation analysis.

This Box highlights a number of factors of central importance for resource utilisation in the labour market. The introductory section covers the quantity of resources in the labour market on the basis of the population of working age, its composition and the total number of hours worked. The following section contains a discussion of the relationship between resource utilisation and wage formation with a special focus on the closeness of their labour market integration. A concluding section contains an overview of the extent of the labour market integration of different groups and possible labour reserves.

It should be emphasised that the intention has not been to quantify resource utilisation

Figure B1. Composition of the population of working age 2005
Thousands



Note. The numbers are based on the annual average for 2005.

Sources: National Labour Market Board, Swedish Social Insurance Agency and Statistics Sweden.

4 The category "Others not in the labour force" includes, for instance, 39,000 individuals who claim to be job seekers but do not meet the set criteria, 8,000 conscripts and 94,000 individuals who have given no reason for not belonging to the labour force.

in the labour market but instead to indicate a number of factors that are relevant for the quantification of unutilised resources and for the connection to wage formation.[5]

Resources in the labour market

Composition of the population of working age

In general, resource utilisation means how the actual use of resources deviates from a measure of the quantity of potentially available resources. However, there is no universal agreement as to how this potential is to be measured. Should everyone who is able and willing to work be included or only those who have actively shown that they are searching for (but do not have) jobs? In order to estimate the quantity of available resources in the labour market, it is normal to start by examining the population of working age, i.e. aged between 16 and 64, even if there may also be individuals over the age of 64 who are gainfully employed.

In 2005, the population of working age totalled 5,770,000 (see Figure B1), of whom one in five (1,237,000) did not belong to the labour force. In this group 319,000 were considered unable to work. The potential working population thus totalled 5,451,000 (i.e. the 4,533,000 individuals in the labour force plus the 918,000 who did not belong to the labour force and were considered able to work). Some 270,000 (or 6 per cent of the labour force) were classified as openly unemployed. Openly unemployed refers to people who are without work even though they want to work and are actively searching for a job. Of the 4,263,000 employed, on average 696,000 were absent from work, either on holiday, because of illness or to take care of children.

Of the 1,237,000 of working age who were not included in the labour force, therefore, 918,000 were classified as being able to work. Altogether, this means that 1,884,000 individuals[6] among the potential working population did not have jobs. This represents just under one-third of the potential working population.

Of those outside the labour force, 532,000 were full-time students and 89,000 of these persons stated that they had looked for work in 2005. According to international standards, the latter group should be included among the unemployed. In 2005, 60,000 of those outside the labour force were working at home while 461,000 were either on long-term sick leave, received sickness and activity compensation (previously called disability pension) or agreement-based pensions. Of those outside the labour force, 100,000 have stated that they are willing and able to work but have not looked for work. This group, together with the group of full-time students who have looked for work, totals 189,000 and is referred to as latent job seekers. In other words, a considerably larger group is available for the labour market than those who are openly unemployed.

Number of hours worked

However, the resources utilised for work depend not only on the number of employed but also on how much each person works. If one only studies the composition of the labour force in

Figure B2. Employed and hours worked
Index: 1993 Q1 = 100, seasonally adjusted data

Sources: Statistics Sweden and the Riksbank

5 The Labour Force Survey (LFS) was altered in the spring of 2005, which means that the statistics are not completely comparable over time. For more general reasoning and analysis of developments over a longer time period, data from the old LFS have been used in certain cases; data which extends only up to 2004. The new LFS has been used for more recent assessments.

6 Comprising 918,000 who are capable of work but not included in the labour force plus 270,000 openly unemployed and 696,000 absent.

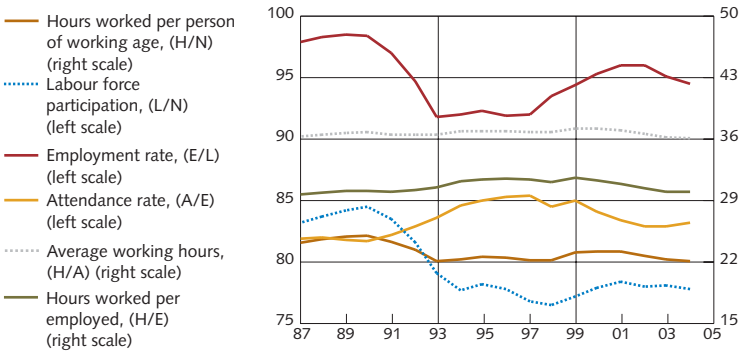
terms of the number of individuals, there is a risk of concealing a number of factors that are relevant to an assessment of resource utilisation in the labour market, as illustrated by Figure B2, which shows the development of the number of employed and the number of hours worked in recent years. During the years after the turn of the century, the number of hours worked decreased while the number of employed remained largely unchanged. In other words there was a sharp decline in the hours worked per person employed. This example indicates that there are good reasons to study the development of the number of hours worked more closely.

One approach would be to study the number of hours worked per person of working age (H/N) broken down according to the labour force participation rate (L/N) where L is the number of individuals in the labour force, the employment rate (E/L) where E is the number of employed, the attendance rate (A/E) where A is the number present at their employment (in work) and the average working hours among those who are present (H/A):

$$\frac{H}{N}=\frac{L}{N}\frac{E}{L}\frac{A}{E}\frac{H}{A}$$

Figure B3 shows how the number of hours worked per person of working age and the different components have developed over time. The number of hours worked per employed person (H/E) has also been included in the figure.

Figure B3. Average working hours per person of working age broken down into labour force participation, employment rate, attendance rate and average working hours for those present
Per cent and hours per week



Source: Statistics Sweden

It is worth noting that the number of hours worked per person of working age (H/N) was lower at the end of 2004 than during the 1980s even though the attendance rate (A/E) and average working hours for people in work (H/A) had increased and were on a par with 1980s levels. The decline in the number of hours worked per person of working age was particularly noticeable during the crisis in the early 1990s. The decline goes hand-in-hand with a lower employment rate. However, the employment rate has recovered markedly since the crisis in the 1990s. The main factor contributing to the decline in the number of hours worked per person of working age is the sharp reduction in the labour force participation rate.

What then has caused this sharp decline in labour force participation? An important observation here is that the declining labour force participation rate has gone hand-in-hand with an increase in the number of those on long-term sick leave and disability pensions and an increase in the number of students. One explanation could be the dramatic increase in the number of unemployed in connection with the crisis in the 1990s together with lengthy unemployment spells which together have contributed to a large group of the population of working age concluding that there is no point in being available for work. This may per se have contributed to the increase in the number in education and those on long-term sick leave or with a disability pension. There is also reason to believe that the economic incentives in the tax and benefit systems have an effect on this, although there may also have been a change in the social norms, i.e. a change in attitude to sick leave and disability pensions.[7]

There may also be reason to study working hours per employed person (H/E) rather more

7 See for instance Lindbeck, A., "Välfärdsstat och sociala normer", B. Swedenborg (ed). "Varför är svenskarna så sjuka?", SNS Förlag, Stockholm 2003.

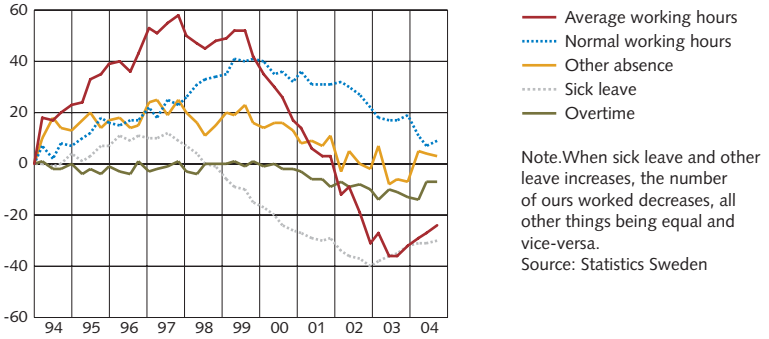
closely. This is usually procyclical. In upturns, for instance, the number of hours worked by existing staff normally increases before firms start to recruit, leading to an increase in working hours per employee. The impact of the upturn on unemployment and employment is thus delayed.

There is also a link between the level of unemployment and the number of hours worked per employee. The attendance rate increased sharply in connection with the crisis in the 1990s but fell back up to 2002 (see Figure B3). Subsequently, the attendance rate has risen again.[8] This indicates that the level of unemployment has affected the attendance of employees.

In order to clarify the idea of resource utilisation measured as the number of hours worked, it may be appropriate to examine more closely how working hours per employed person vary with changes in normal working hours, overtime, sick leave and other absence. Normal working hours (also referred to as working hours or agreed working hours) are determined by the average extent of full-time employment and by the proportion of part-time employees. In 2005, normal working hours in Sweden were around 36 hours per week, which puts us somewhere in the middle of EU countries.[9]

Figure B4 shows how the time spent at work per week (measured in minutes) per employed has changed since 1994, broken down into normal working hours, overtime, sick leave and other absences (e.g. holidays). Hours worked per employee rose between 1994 and the end of the 1990s. One explanation for this is that normal working hours increased during most of this period. Despite agreed reductions in working hours, working hours increased for full and part-time employees during the latter half of the 1990s while the proportion of part-time employees remained relatively stable. A decline in sick leave, probably partly attributable to high unemployment (see previous discussion),

Figure B4. Components of average working hours
Accumulated change in minutes per week, seasonally adjusted data



Note.When sick leave and other leave increases, the number of ours worked decreases, all other things being equal and vice-versa.
Source: Statistics Sweden

also contributed to increased working hours per employee between 1994 and 1997. Between 1997 and 2002, a rise in sick leave in particular but to a certain extent also a reduction in working hours and other leave contributed to a decline in average working hours. The amount of overtime worked was largely constant between 1994 and 2000 although it has since decreased slightly.[10]

One conclusion of this review is that resource utilisation in the labour market calculated as the number of hours worked can change markedly without there being a change in employment. A one-sided focus on open unemployment risks concealing a declining trend in the number of hours worked per person of working age despite an increased number of people of working age. This is due to a decrease in labour market participation.

Resource utilisation, job search and wage formation

It is important to distinguish between resource utilisation in a broad sense and as a measure of the quantity of unutilised resources which are relevant from the perspective of wage formation and inflation. How is wage formation actually affected by resource utilisation?

In the long run, the wage share, i.e. the labour force's share of value added, presumably

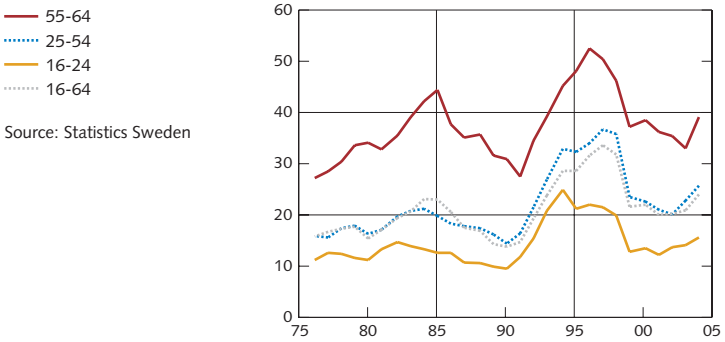
8 Note that one reason why employment rises when the attendance rate diminishes is that both absentees and temporary staff are counted as employed. The higher attendance rate recently may therefore have contributed to lower employment.
9 The number of *potential* working hours is probably much greater. In the nineteenth century, a normal working week for a worker was approximately 70 hours. However, nowadays most people are either not allowed, not able or not willing to work as much.
10 See the Box entitled "Average Hours Worked – A Key Factor Both Structurally and Cyclically", *The Swedish Economy August* 2004, National Institute of Economic Research.

depends on structural factors. In the short term, the wage share is determined by resource utilisation and varies more than in the long term. The wage share also depends on the bargaining strength of employers and employees. Wage levels are affected by wage-earners who are actively looking for jobs, both those who are employed and those who are unemployed. The willingness of a firm to pay a high wage depends on the probability of the employee finding new employment. When unemployment is low, this probability increases, which makes employers more willing to increase wages in order to reduce staff turnover and the firm's personnel costs. More intensive job search activities from both unemployed and employed tend to increase competition for vacancies leading to lower wage pressure.[11]

Job search is accordingly important for the correlation between wages and resource utilisation. The official definition of unemployment in the Labour Force Survey (LFS) has also for a long time been linked to job-searching; a criterion for being classified as unemployed is that a person has actually looked for work. Searching for a job means that an individual has taken specific steps during a four-week period from the week of the survey to apply for paid employment or self-employment or found work within no more than three months from the investigation week. This period has been increased from 1 to 3 months compared with the old LFS. The criterion for active searching has also been changed in the new LFS. It is now sufficient to have studied advertisements in order to find a job to be counted as actively looking for work. An additional important change is that the question about "willingness to work" included in the old LFS has been removed. Those who answered no to this question were not classified as unemployed in the old LFS, despite their being able to work and having looked for work. The measure of unemployment in the new LFS is therefore not totally comparable with the measure in the old LFS. These changes in the LFS have taken place as a result of harmonisation in the EU. This facilitates international comparisons, but means that registered Swedish open unemployment has increased by around 0.5 per cent in April 2005.

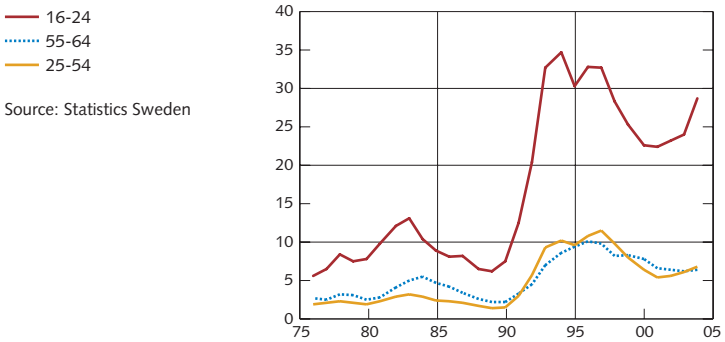
There is no direct information on search intensity in LFS and there are job seekers both in and outside the labour force (students). Those who have stated that they have looked for work and have therefore been classified as unemployed comply with a minimum requirement as regards active job searching. The openly unemployed thus registered may be considered as having a link with the labour market, being able to compete for existing jobs and thus able to influence wage formation.

Figure B5. Average unemployment periods for the openly unemployed in different age groups 1976-2004
Number of weeks



Source: Statistics Sweden

Figure B6. Unemployment (incl. latent job seekers) in different age groups
Proportion of unemployed in each age group



Source: Statistics Sweden

11 The role of unemployment benefit can be seen in this context. Lower benefit levels tend to intensify the search for jobs by the unemployed and to depress wages. The length of the benefit period also plays an important role. In Sweden, this effect has not been especially strong historically since many unemployed persons have avoided exhausting their unemployment benefits and have instead ended up in labour market programme measures. See Holmlund, B., "Unemployment Insurance in Theory and Practice", *Scandinavian Journal of Economics* 100, 1998, 113-141 and Carling, K., B. Holmlund and A. Vejsiu, "Do Benefit Cuts Boost Job Finding? Swedish Evidence from the 1990s", *Economic Journal* 111, 2001, 766-790. Since 2001 it has no longer been possible, in principle, to extend the length of the benefit period by participating in labour market programmes.

Among those outside the labour force, there may be people who are more or less linked with the labour market, for instance, among latent job seekers. They compete indirectly for existing vacancies and can therefore have some impact on wage formation.

The number of latent job seekers varies with the state of the economy. For instance, the labour force usually contracts during downturns due to the fact that many job seekers leave the labour force since the probability of finding a new job decreases. These latent job seekers tend to return to the labour force when demand for labour increases again in an upturn. There is thus a cyclical variation in the labour force which can change the unemployment figure for any given number of employed. This is another reason why open unemployment does not accurately reflect the quantity of unutilised resources in the labour market.

In the light of this, it would, from the perspective of wage formation and inflation, seem reasonable to assume a concept of unemployment which includes latent job seekers (totalling 189,000 in 2005). It is possible that wage development forecasts could be improved if one includes the latent unemployed in a measure of resource utilisation in the labour market. An additional possibility of refining the measure is to explicitly take into consideration the search intensity of different groups. As already pointed out, the LFS statistics do not contain any such information. The duration of unemployment for different groups can, however, be used as an indicator of job search activity. Search activity tends to decline when the unemployment spell is long.

Figure B5 shows average unemployment periods in different age groups. In 2004, the average spell of unemployment for persons

Table B1. Correlation between real and nominal hourly wages in the business sector and measures of unemployment in different age groups

	Real hourly wage			Nominal hourly wage		
	1980-1991	1994-2004	1980-2004	1980-1991	1994-2004	1980-2004
U	-0.881	-0.338	-0.706	-0.554	-0.277	-0.343
1	-0.610	-0.537	-0.537	-0.061	-0.298	0.004
-1	-0.578	-0.339	-0.476	-0.538	-0.390	-0.492
U 16-24	-0.774	-0.306	-0.653	-0.455	-0.108	-0.304
1	-0.509	-0.385	-0.420	-0.011	-0.086	0.033
-1	-0.668	-0.429	-0.525	-0.676	-0.445	-0.532
U 25-54	-0.865	-0.289	-0.684	-0.602	-0.253	-0.340
1	-0.576	-0.520	-0.526	-0.053	-0.278	0.029
-1	-0.565	-0.330	-0.466	-0.567	-0.410	-0.490
U 55-64	-0.903	-0.551	-0.770	-0.450	-0.609	-0.393
1	-0.787	-0.661	-0.681	-0.147	-0.654	-0.175
-1	-0.287	-0.235	-0.299	-0.186	-0.210	-0.348
UL	-0.822	-0.209	-0.665	-0.568	-0.141	-0.347
1	-0.575	-0.462	-0.537	-0.090	-0.198	-0.029
-1	-0.674	-0.478	-0.513	-0.610	-0.540	-0.564
UL 16-24	-0.758	-0.103	-0.630	-0.465	0.037	-0.304
1	-0.478	-0.323	-0.439	-0.082	-0.085	-0.027
-1	-0.818	-0.569	-0.612	-0.714	-0.585	-0.588
UL 25-54	-0.806	-0.204	-0.643	-0.613	-0.169	-0.361
1	-0.555	-0.480	-0.535	-0.058	-0.205	-0.003
-1	-0.591	-0.411	-0.451	-0.602	-0.516	-0.562
UL 55-64	-0.854	-0.505	-0.736	-0.572	-0.541	-0.439
1	-0.824	-0.661	-0.716	-0.171	-0.628	-0.187
-1	-0.229	-0.319	-0.252	-0.150	-0.283	-0.411

Note. U = Openly unemployed as a proportion of the labour force according to LFS. UL = unemployment incl. latent job seekers; 1 refers to one year ahead and -1 refers to one year in the past. The real wage is the hourly wage deflated by the consumer price index.

Sources: Statistics Sweden and the Riksbank.

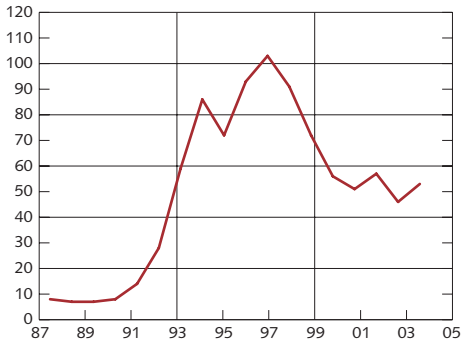
aged 55-64 was approximately 40 weeks and 15 weeks in the age category 16-24.[12] If the duration of unemployment spells partially reflects search intensity, the younger unemployed can play a more important role in wage formation than older unemployed people.

Moreover, youth unemployment varies considerably more than unemployment for older people (see Figure B6). Youth unemployment tends to change more rapidly during the business cycle than unemployment for older people. At times of change in the economic cycle, youth unemployment changes before unemployment for older persons. In combination with the assumed greater search activity by young people, it can therefore be suspected that wage formation is more sensitive to variations in youth unemployment.

Table B1 shows the estimated correlation coefficients between real and nominal hourly wages in the business sector and different measures of unemployment. The correlation is calculated between the hourly wage and different measures of unemployment for the same year, and between hourly wages in a particular year and different unemployment measures one year ahead and one year in the past. The unemployment measures that have been used are open unemployment in accordance with the LFS and unemployment

Figure B7. Full-time students who are willing and able to work and who have looked for work
Thousands

Source: Statistics Sweden



which also includes latent job seekers. The results are reported separately for three different age groups. Furthermore, in addition to reporting results for the whole period 1980-2004, separate results are reported for the years 1980-1991 and 1994-2004 with a view to excluding the most turbulent years at the beginning of the 1990s and the transition to the new stabilisation policy regime.[13]

It is reasonable to believe that there is a time lag in the effect of unemployment on wage formation and that it is therefore the one-year lagged unemployment that is of most interest. As expected, this correlation is negative overall. The calculations also show that the correlation in the earlier period is generally stronger than in the later period. The lower correlation during the later period can reflect a change in wage formation and the fact that wages have become less sensitive to resource utilisation, e.g. because wage agreement periods have become longer.

As expected, wages correlate most strongly with unemployment in the youngest age group in both time periods, even if the differences in relation to other age groups are relatively small. This conclusion applies above all to the correlation between wages for a particular year and unemployment in the previous year. The correlation for the younger age group in particular also increases slightly if the latent unemployed are included.

At the same time, it should be emphasised that simple correlation calculations of this kind should be interpreted with great caution. More sophisticated analyses are required to be able to draw more definite conclusions.

Integration of different groups to the labour market and labour reserves

In an assessment of resource utilisation and wage formation, there is reason to take a less aggregate view of the degree of the integration of different groups to the labour market and of possible labour reserves.

12 This period refers to the average for the stock of unemployed and not the unemployement spell, i.e. the average time the unemployed have been unemployed.
13 All variables have been measured in relative (logarithmic) changes.

Education and training

An important explanation for the declining trend in labour force participation in recent years is that both the number of students and the period of education and training have increased. The average length of the education of those in the labour market increased from around 8 years in the 1970s to around 12 years in 2000.[14] Moreover, study participation has been increased due to the increased investment in higher education in Sweden.

As noted earlier, there are strong arguments for including full-time students who are available for work in the labour force. The size of this group has varied over time although there are at the same time indications of a trend increase (see Figure B7). One possible explanation for this might be that the trend increase in unemployment compared with previous decades has led people who would really have preferred to work but have difficulty in finding a job to decide to study instead. For the same reason, there are also cyclical variations in the number of students. In, for instance, downturns, when there is less probability of finding a job, many opt instead to study.

Ill health

The numbers on sick leave increased during the period 2000-2002 but have since declined slightly. Many of these, those on long-term sick leave, have recently received sickness and activity compensation, which means that they are no longer regarded as belonging to the labour force. All other things being equal, this has contributed to a reduction in registered unemployment. One important question is whether this group could be regarded as a labour reserve. In this group, there are probably a number of people who are able to work and who could return to the labour force. One important aspect in this context is the design of the tax and benefit system.[15]

The employment rate among those born abroad and labour immigration in the wake of globalisation

Employment would increase by over 100,000 if the employment rate among those born abroad aged between 20-64 could be increased to the same level as for those born in Sweden.[16] This assumes that some of those born abroad who are unemployed obtain work and moreover that labour force participation in this group increases. The low employment rate among those born abroad can partly be related to the labour immigration in previous decades (which contributed to a high employment rate among those born abroad) largely having been replaced by the immigration of next-of-kin and refugees.

There is also concealed labour immigration to Sweden. In addition to the number of immigrants in the official statistics, there are a number of people who are staying in Sweden without permission and support themselves by working illegally. However, there is no reliable data on the number of people involved.[17]

One question which has been much discussed recently concerns the effects of globalisation on the labour supply and wage formation. A higher global labour supply can potentially lead to a large inflow of labour to the Swedish labour market. Some argue that a development of this kind can lead to decreasing real wages or high unemployment.[18] Others consider that there are no convincing (empirical) arguments to support this. They argue instead that wages in Sweden and in low-wage countries such as China will converge but that this can take place without reductions in real wages in Sweden.[19] The Riksbank has not been able to find any empirical support for increased globalisation depressing wages in Sweden.

14 See Edling, J., "Alla behövs – Blott arbetsmarknadspolitik skapar inga nya jobb", stencil, Timbro, 2005.
15 See Lindbeck, A., "Välfärdsstat och sociala normer" in B. Swedenborg (ed). "Varför är svenskarna så sjuka?" SNS Förlag, Stockholm 2003.
16 Ekberg, J., "Kan invandrare underlätta försörjningen av en åldrande befolkning?", *Ekonomisk Debatt*, no. 4, 2004.
17 "Arbetskraftsinvandring till Sverige – befolkningsutveckling, arbetsmarknad i förändring, internationell utblick", SOU 2005:50.
18 See Persson, M. and M. Radetzki, "Kina, Sverige och globalisering", *Ekonomisk Debatt*, No. 1, 2006.
19 See Bigsten, A. and B. Holmlund, "Överdrivna farhågor om hotet från Kina", Ekonomisk Debatt No. 2, 2006.

Unemployment in different age groups

As shown by Figure B6, unemployment is considerably lower in the 55-64 age group than in the 16-24 group. At the same time, the average unemployment spell is considerably longer (see Figure B5). This reflects the fact that older people seem to have greater difficulty than young people in returning to the labour market. One reason for this might be that the vocational skills of older people may be less attractive in a rapidly changing labour market.

In the age group over 64, who are not included in the LFS, there are individuals who may be employed and some who might also constitute a labour reserve. This group can moreover have increased in line with improved health among older people.

As noted above, unemployment among young people is considerably higher than in other age groups while unemployment spells are relatively short. This suggests that youth unemployment may largely be a temporary phenomenon. The number of openly unemployed young people in 2005 was just over 70,000 which constitutes a considerable labour reserve.

Summary

This Box has aimed to highlight a number of factors of relevance for assessing the quantity of unutilised resources in the labour market which are also important for wage formation and, ultimately, inflation. The review shows that there are many complicated factors to take into consideration to be able to make this kind of assessment which cannot be summarised in a single measure of resource utilisation in any simple way.

One lesson is that it is important to distinguish between the quantity of unutilised resources expressed in the number of people and in the number of hours worked; during certain periods, wholly different conclusions can be obtained depending on the approach adopted. Regardless of the approach adopted, the conclusion must, however, be that there are a large number of unutilised resources in the labour market in broad terms. Among other things, this review shows that the concept of open unemployment which is currently the one most frequently used, is a very narrow measure of the quantity of unutilised resources. Alongside the openly unemployed, there were 189,000 latent job seekers in 2005 who can be considered as being available to the labour market. Moreover, average working hours can increase.

The Swedish official unemployment figures, for instance open unemployment, exclude groups which are available to the labour market and which can thus be assumed to affect wage formation. This applies above all to full-time students who can work and apply for jobs but also to other latent job seekers. However, it is difficult to determine which groups in the labour market have the greatest impact on wage formation. Simple correlation calculations indicate that the correlation between the hourly wage and unemployment in the age group 16-24 is higher than for other age groups and that this correlation increases slightly if latent job seekers are also included in the unemployment figures. These calculations also indicate that the correlation between wages and resource utilisation has weakened since the mid-1990s. This could be explained by changes in wage formation and the increasing length of agreement periods.

When making an assessment of resource utilisation in the labour market, there are also grounds for considering a more long-term perspective. One important explanation for the decline in the number of hours worked in the past decade is that labour market participation has decreased markedly. A policy that leads to greater labour force participation can have a considerable impact on wage formation and inflation. Seen from this perspective, it is worth considering how factors such as demographic changes, increased integration of immigrants and increased labour immigration can affect labour supply and wage formation. Knowledge of these structural factors is limited, however, and it is therefore too early to assess how they can affect wage formation.

The 2007 wage bargaining round

Next year, wage agreements for a large part of the Swedish labour market will be renegotiated. Wage increases affect how costs and prices develop in the economy. The assessment of the future development of wages is therefore very important for the Riksbank's analysis of the inflation outlook. The Industrial Agreement and the broad support it receives from the social partners have led to moderate wage increases in recent years. This development is expected to continue in the years ahead.

The Industrial Agreement has helped dampen the rate of wage increase

Wage formation in Sweden underwent major changes in the 1990s and in many ways functions better today than in previous decades, when wage increases were considerably higher than in other countries. The deceleration of the rate of wage increase started with the Rehnberg Agreement in 1991. Among other conditions, this agreement prohibited local negotiations and thus wage drift. The realignment of stability policy and the introduction of the inflation target have also contributed to more efficient wage formation.

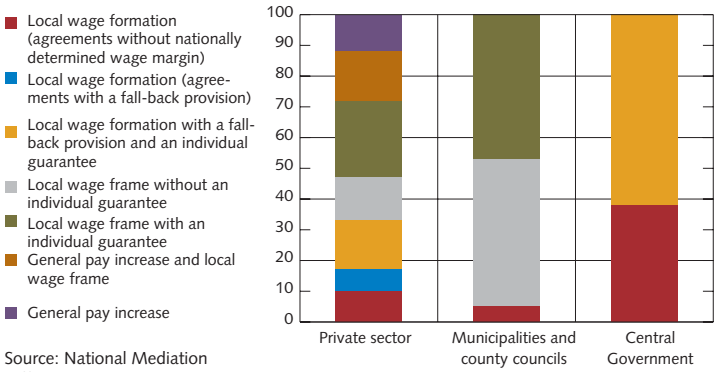
The 1998 bargaining round meant a break in trend for the rate of wage increase. Both the agreed and actual wage increases have since dampened. At the same time, low inflation has meant that employees have had the largest real wage increases since the 1960s despite lower nominal wage increases. There have also been fewer labour market disputes than previously. One important reason for this is the Industrial Agreement, which was signed by the social partners in the industrial sector in 1997. The Industrial Agreement originated as a result of the bargaining round in 1995, which was a failure from the point of view of the national economy as it led to wage increases in the business sector of just over 5 per cent annually. In the Industrial Agreement, the social partners agreed on common principles for wage formation and on the forms for conducting wage negotiations. Among other things, the role of the sector exposed to international competition as wage leader was confirmed. The Industrial Agreement has inspired similar initiatives in other areas of the labour market and more than half of Sweden's wage-earners are now covered by some form of agreement on negotiating processes. There has also been broad agreement among the social partners on the normative role of industrial wages. The Industrial Agreement has thus played a key role for wage formation throughout the Swedish labour market.

Wages are increasingly determined at the local level

At the same time as there has been increased co-ordination between the social partners at the central level in recent bargaining rounds, there has been an increased element of local wage formation, in particular for white-collar employees. Many employees in both private and public sector are now covered by agreements that enable the local partners to affect both the size of the wage margin and the distribution between individuals (see Figure B8). In the private sector, a third involve local wage formation. Of the private sector employees, 10 per cent have no nationally determined wage margin.[20] A further 40 per cent are covered by agreements where the wage margin is determined at central level, while it is up to the local partners to distribute either all or part of wage increases. In the central government sector, all wage formation is local and 38 per cent of wage-earners are covered by agreements that do not contain nationally determined wage margins. In virtually the entire local government sector, wage formation is determined at central level although the local parties are able to influence the distribution wholly or partly.

20 Since the agreements without nationally determined wage margins have been included as zero per cent wage increases in the National Mediation Office's statistical digests, there is a risk that this will lead to an underestimation of the average agreed wage increases at central level in the official statistics. This also applies to agreements with a fall-back provision, which applies if the parties cannot reach agreement at the local level.

Figure B8. Breakdown of wage agreements in different sectors, 2005
Per cent



Source: National Mediation Office's Annual Report "Avtalsrörelsen och lönebildningen 2005"

In the past year there has been a slight increase in the number of private sector employees covered by agreements without a nationally determined wage margin. In the local government sector, there has instead been a marked reduction, partly because the teaching unions have agreed on a minimum guaranteed increase from 2005 onwards. Altogether on the labour market as a whole, there has been a movement towards the centre as far as the type of agreements is concerned, i.e. the proportion of agreements without nationally determined wage margin as well as those with general pay increases has decreased.

Outcome of the 2004 bargaining round

In the 2004 bargaining round, wage agreements were renegotiated for almost the entire private sector and for the entire central government sector. In all, new wage agreements were negotiated for around 1.9 million employees in 2004.

As in the two previous bargaining rounds, industry led the way in signing three-year

Fact Box

Local wage formation (agreements without nationally determined wage margin): Amounts available are determined entirely by the local partners. There is no nationally determined wage margin or individual guarantee.

Local wage formation (agreements with a fall-back provision): Local agreements are required on both the size of the wage margin and distribution to individuals. If the local partners cannot agree, a fall-back provision regulates the total wage margin.

Local wage formation with a fall-back provision and an individual guarantee: Local agreements are required on both the wage margin and distribution to individuals. If the local partners cannot agree, a fall-back provision regulates the total wage margin as well as the individual guarantee or the share of this margin for general distribution.

Local wage frame without an individual guarantee: The wage margin is determined as a wage frame for local distribution.

Local wage frame with an individual guarantee: The wage margin is determined as a wage frame for local distribution, complemented with an individual guarantee or a fall-back provision on an individual guarantee.

General pay increase and local wage frame: The wage margin consists of a general increase and a frame for local distribution.

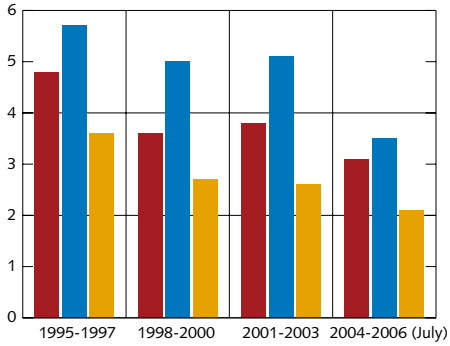
General pay increase: The entire wage margin is distributed as a general increase.

Source: National Mediation Office's Annual Report "Avtalsrörelsen och lönebildningen 2005"

agreements thus creating a benchmark for wage bargaining in other areas. The weak labour market climate and low inflation expectations initially contributed to the lower agreed wage increases at the central level in the business sector than in the 2001 bargaining round (see Figure B9). The average agreed wage increases in the business sector amounted to 2.1 per cent per year. This was a reduction of 0.4 percentage points per year compared with the previous three-year period. The average negotiated wage increases decreased in the local and central government sectors by 0.5 and 0.3 percentage points per year respectively.

According to preliminary short-term wage statistics, wages in the business sector during 2004-2006 (Jan-July) rose on average by 3.1 per cent per year. This means that the rate of wage increase has slowed down by 0.7 percentage points compared with the period 2001-2003. The total labour costs have also increased at a slower rate.[21] This slowdown applies to all sectors and industries (see Figure B10). Contributory causes of this development have been, on the one hand, lower negotiated wage increases at central level and, on the other hand, a weaker labour market climate. Unlike the bargaining rounds in 2001-2003, in the public sector only the municipalities have had a faster increase in wages than the business sector. However, the difference in the rate of increase in relation to the business sector has decreased.

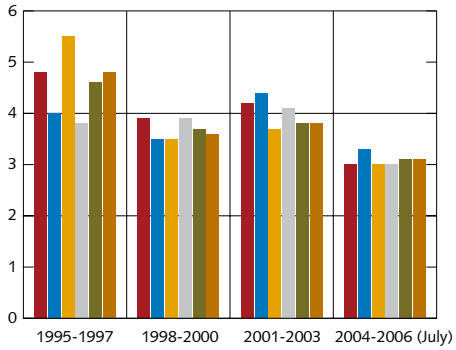
Figure B9. Wages and labour costs in the business sector
Annual percentage change



Wages according to short-term wage statistics
Unit labour costs according to the National Accounts
Agreements

Sources: National Mediation Office and Statistics Sweden

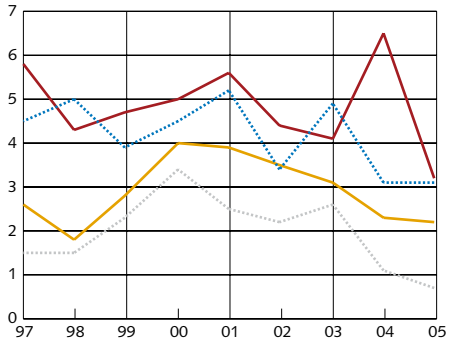
Figure B10. Wage developments according to short-term wage statistics
Annual percentage change



Central government
Municipalities
Industry
Construction
Other businesses
Business sector

Source: National Mediation Office

Figure B11. Hourly labour costs in the business sector
Annual percentage change



United Kingdom
Sweden
Euro area
Germany

Note. The statistics relate to the Labour Cost Index.

Source: Eurostat

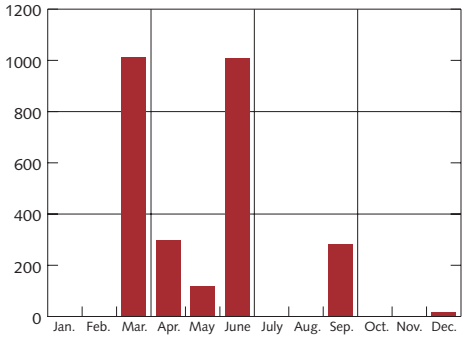
The development of wage costs in our competitor countries

The Industrial Agreement is based on wages in industry in Sweden increasing in line with wages in our competitor countries. Statistics for the period 2004-2005 show that wages in the business sector have risen by just over 1 percentage point per year more quickly in Sweden than in the euro area (see Figure B11). This difference can largely be explained by the fact that wages in Germany only increased by just under 1 per cent annually during the period, which is considerably lower than the centrally agreed wage increases. In most other countries in the euro area, the rate of increase has been considerably higher than in Germany and in some cases also higher than in Sweden. However, strong productivity growth has helped to maintain competitiveness in Sweden despite higher wage increases.

21 Collective charges and indirect wage taxes are also included in total labour costs in addition to the wage sum. The wage sum includes in its turn bonuses and other forms of remuneration. The total labour costs are then divided by the number of hours worked (calendar-adjusted).

Source: National Mediation Office

Figure B12. Number of employees per month whose agreements expire
Thousands



A large proportion of the agreements expire in March 2007

In 2007, wage agreements for around 2.8 million employees will be renegotiated. It is accordingly the largest bargaining round for ten years. Practically all sectors are affected, with the exception of the transport and banking sector (around 500,000 employees). A large proportion of the agreements expire on 31 March, by which time agreements for over 1 million employees in industry, the construction sector and large parts of the service sector have to be renegotiated (see Figure B12). In June, agreements expire for around 1 million municipal and county council employees. The agreements for approximately 240,000 central government employees will be among the last to be negotiated.

The timetable for the bargaining round will largely be governed by the Industrial Agreement which stipulates that negotiations are to be initiated no later than three months before the preceding agreement expires. The partners are expected to submit their demands and counter-demands in December. Negotiations for the agreements that expire in March will probably be initiated directly after the turn of the year. In the 2004 bargaining round, 72 per cent of the agreements in the private sector were concluded before or directly in conjunction with the expiry date of the agreements.

Negotiations are taking place during a strong upturn

Negotiations in next year's bargaining round will take place against a background of strong GDP growth and an improved labour market. Manufacturing activity is buoyant and firms are optimistic about the future, which is reflected, for instance, by the National Institute of Economic Research's confidence indicator for industry rising to its highest level in six years. Strong productivity growth has contributed to increasing profits in industry. During the 2004 bargaining round, when industry was admittedly in a recovery phase, the labour market climate was weak, with stagnating or even declining employment, which restrained wage demands. The depressed state of profits in industry also dampened wage demands. However, at the time of the 2001 bargaining round, unemployment, which had been falling for a number of years, had reached 4 per cent, and this contributed to higher agreed wage rises than in the 2004 bargaining round.

Although the labour market has started to recover before next year's negotiations, there is at present a relative abundance of unutilised resources in the labour market (see the section "Economic developments in Sweden"). This should have a restraining effect on wage demands. Only within the construction sector is there a shortage of labour (see Figure 34). Another restraining factor on wage demands is probably the increased competition that globalisation entails. The inflation target still has a firm basis of support even though the expectations of the social partners are slightly higher than in the 2004 bargaining round.

Potential sources of tension in the bargaining round

In the 2004 bargaining round, a great deal of attention was given to the increased wage

differences between blue-collar and white-collar workers. This was particularly the case in the industrial sector where between 2001 and 2003 white-collar workers had a rate of wage increase that was on average 1.3 percentage points higher per year than for blue-collar workers. This is in spite of the fact that the wage increases agreed at central level for white-collar workers were lower than for blue-collar workers. White-collar workers had instead succeeded in obtaining higher wage increases locally. This development has continued during the past agreement period and risks leading to compensatory demands from blue-collar workers. Another potential source of tension in the coming bargaining round may be wage development in those industries with predominantly female workers. Prior to the 2004 bargaining round, the Swedish Trade Union Confederation (LO) had agreed on a joint platform with a clear low-wage profile. One expression of this was that wage requirements were formulated in kronor instead of in percentage terms in order to ensure that collective agreement areas with low wage levels received higher wage increases initially. However, despite higher agreed wage increases in, for instance, the retail trade, and the hotel and restaurant sector, wages in these industries have only increased marginally more quickly than in the business sector as a whole. Municipal employees seem only to have improved their relative wages to a very limited extent.

Final remarks

To date the Industrial Agreement has proven to be successful in achieving stable wage formation. There has been broad agreement among the social partners on the normative role of industrial wages. This argues for moderate wage increases in the future. Recently, however, a number of trade unions within the Swedish Trade Confederation as well as employers' associations have started to question the role of industry as a wage leader to some extent. Moreover, the Swedish Trade Union Confederation has also proposed a new wage norm in a report. This proposal means that the wage margin is still to be determined by the sector exposed to competition although it need not be industrial agreements that set the norm. The Swedish Trade Union Confederation is expected to make a decision at the end of October on how possible co-ordination for wage negotiations should be structured.

Now is the first time since the inception of the Industrial Agreement that it is being tested in such a positive economic climate. One factor which will probably push wage demands up this time compared with the 2004 bargaining round is the improved labour market climate. At the same time, there is a relative abundance of unutilised resources in the labour market, which should restrain wage demands.

Inflation indicators

The Inflation Report describes the forecasts for the macro economy made by the Riksbank for the coming two to three years. These forecasts are produced by means of expert assessments and various types of macroeconomic models. This Box provides more detailed information on one of these components, namely forecasts of the inflation path produced using the Riksbank's indicator models. These models have proven to be useful for forecasts of up to around one year ahead. However, there is a significant degree of uncertainty in the forecasts produced by these models, as in forecasts produced by competing models and assessments. In certain particular circumstances, indicator models may contribute significantly to the precision of forecasts as they can capture complicated patterns in large amounts of data.

The inflation forecasts are based on both assessments and models

The Riksbank's Inflation Report currently includes forecasts for more than 50 variables in the Swedish and international macro economy. Given the large number of forecast variables, it is necessary to use some form of structural macro model to arrive at a coherent basic scenario.[22] The advantage of a structural model is that a number of theoretical relationships are assumed to apply, which makes it easier to interpret the model's forecasts. However, these theoretical relationships can also impose restrictions on the model, impairing its ability to forecast specific variables, particularly in the short term. It is therefore necessary to make adjustments to the structural model's forecasts. This may be achieved with the help of expert assessments and alternative forecasts produced by models that do not to the same extent require that the variables fulfil the criteria of the theoretical relationships, in other words, models that to a greater degree allow data to "speak for itself". Different assessments suggest that the latter type of model – which in principle merely extrapolates the patterns found in historical data – is above all useful for forecasts in the short term.[23] These indicator models can thus be regarded as a complement to traditional assessment forecasts for shorter horizons. This Box describes the Riksbank's indicator models for inflation.

The database currently includes 88 inflation indicators

The database used to estimate the indicator models contains 88 quarterly observed indicators at present. A general description of the variables included is given in Table B2. The data period currently covers the first quarter of 1991 up to the second quarter of 2006. This choice of period is due to the length of available series and to the fact that older data often reveal other relationships than those which currently apply.[24]

Table B2. Inflation indicators 1991:3-2006:2

Variables
11 labour market
11 other real
12 price development
13 financial
9 international
32 business tendency surveys
88 total

Source: The Riksbank

Three different model approaches are used

In the analysis, three different model approaches are used, all of which are ultimately based on the vector autoregressive method (VAR). These consist of classical VAR models, Bayesian VAR models and VAR models based on statistical

22 Over the years, the Riksbank has used a number of macro models. The model currently used is a Dynamic Stochastic General Equilibrium model, see 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.

23 See, for example, Galbraith, J. and G. Tkacz, "Forecast Content Horizons for Some Important Macroeconomic Time Series", Bank of Canada Working Paper, forthcoming.

24 The Riksbank also uses a database comprising monthly observations. In this case, the number of indicators is 37. The results for monthly data are approximately the same as for quarterly data in terms of the precision of forecasts and longest applicable forecast horizons.

factors, known as Factor-Augmented models (FAVAR).[25] Research in this field indicates that all approaches work well for short-term forecasts in particular.[26] Below is a brief description of the principles underlying each of the approaches.

1. Classical VAR models. Vector autoregression is a system of equations where today's observations are dependent on all variables included in the system at earlier points in time. In one particular case – when only one variable is included – the model is called AR (AutoRegression). In this case the variable is explained (forecast) solely on the basis of its own historical pattern. In the application in this Box, VAR models with two to four variables included are estimated. This will render a large number of estimated models from the given data set.

2. Bayesian VAR models. These are VAR models that have been charged with some form of subjective information prior to estimation. Examples of such subjective information might include the forecaster's view of the long-term sustainable level of growth in the economy and opinions on the nature of different relationships between variables. In the context of the Bayesian analysis, the importance attached to the subjective information can vary depending on how convinced one is of its accuracy. Bayesian VAR models with up to three variables included are used in the forecasting exercise.

3. FAVAR models. VAR models cannot be estimated with too many variables included. In FAVAR models, the information in a large amount of data is summarised with a small number of statistical factors that describe common components in the data. The factors and inflation are then modelled in a small VAR model. In this way, the information in a very large amount of data can be used without necessarily losing too much of the information in the data set.

A useful method for establishing how well the various models perform on average can be obtained by carrying out a simulated forecast evaluation where data is saved for a particular period at the end of the sample and the models' forecasts are then evaluated against the outcomes during that particular period. Forecasts for each model are made for one to eight quarterly periods ahead. The mean value (M) of all forecasts is then calculated for each model approach as well as the best forecast (B).[27] The estimation period is then extended with an observation and the exercise is repeated in the same way. When new mean value forecasts and best forecasts have been calculated, a further observation is added to the estimation period, and so on. This produces a set of M and B forecasts for which the average accuracy can be estimated. This is done using the root mean square error (RMSE), a measure which summarises the standard deviation in the forecast errors and how forecasts systematically misjudge outcomes. The lower the estimated RMSE, the better the forecasting ability (a forecast that is always correct has an RMSE of zero).

The models' short-term forecasting ability is relatively good

Table B3 shows the RMSE for the mean of all models (M) and for the ex ante best model

25 In the Box entitled "GDP indicators" in Inflation Report 2005:3, models based on forward-looking information are also used. These models cannot be used here since inflation statistics are among the first to be published every month and those statistics which are forward-looking (e.g. in the National Institute of Economic Research's business tendency survey) consist of very short series.

26 See, for example Robertson, J. and E. Tallman, "Vector Autoregressions: Forecasting and Reality", Federal Reserve Bank of Atlanta Economic Review 84, first quarter 1999, 4–18; Stock, J. and M. Watson, "Macroeconomic Forecasting Using Diffusion Indexes", Journal of Business and Economic Statistics 20, 2002, 147–162; Wright, J., "Forecasting U.S. Inflation by Bayesian Model Averaging", International Finance Discussion Papers No. 780, 2003; Hansson, J., P. Jansson and M. Löf, "Business Survey Data: Do they Help in Forecasting GDP Growth?", International Journal of Forecasting 21, 2005, 377–389.

27 Best forecast means the forecast model which, according to an evaluation, is best at each given point, in other words, the model which ex ante may be regarded as best. However, this does not mean that this model produces the best forecast outside the sample. The evaluation studies the forecasting abilities of the models outside the sample.

(B). The table shows that all model approaches produce forecasts with similar accuracy, at least as regards short-term forecasts. This amounts to around 0.4 percentage points for UND1X forecasts one quarter ahead and around 0.5-0.6 percentage points for forecasts two quarters ahead. If the forecast errors follow the normal distribution, a forecast interval with the breadth 1.6 percentage points will in 95 per cent of cases typically include the outcome for the inflation rate for the next quarter. The RMSE can be compared with the standard deviation for UND1X, which during the evaluation period has been 0.8 percentage points. By way of comparison, Table B3 also shows the forecasting precision for a random walk model, where the forecast for all horizons is always equal to the latest inflation outcome. All evaluated models consistently show higher accuracy than random walk forecasts.

The size of the indicator models' forecast error is thus appreciable, but is nevertheless smaller than for corresponding forecasts from structural models. For example, the RMSE for forecasts one quarter ahead in the Riksbank's structural model is around 0.5 percentage points. The indicator models offer approximately the same precision as the Riksbank's published forecasts one to four quarters ahead.[28]

In line with the results from research in the field, we can say that forecasts in the form of mean values are often more accurate than individual forecasts, as illustrated in the table, where the RMSE for M forecasts is generally lower than that for B forecasts.[29] For a good model, the forecast RMSE should theoretically increase with the forecast horizon and when the model no longer contributes any information, the RMSE should stabilise at the standard deviation of the series. For the evaluation of the indicator models, the RMSE of the forecasts more or less coincides with the standard deviation for UND1X when the forecast horizon is around three to four quarters. Time series and indicator models thus have their main area of use in short-term forecasts, at best one year ahead.

Indicator models can be particularly useful in particular cases

Table B3 illustrates that the simple autoregressive model (see the AR column) displays on average a forecasting ability that is comparable with the

Table B3. Forecast evaluation for UND1X 1999:1 to 2006:2
Root Mean Square Error (RMSE)

	Classical VAR		Bayesian VAR		Factor VAR			
Forecast horizon (quarter)	M	B	M	B	M	B	AR	RW
1	0.38	0.42	0.38	0.39	0.40	0.38	0.38	0.55
2	0.53	0.62	0.55	0.59	0.60	0.59	0.54	0.75
3	0.67	0.81	0.71	0.76	0.76	0.79	0.67	0.93
4	0.82	0.99	0.89	0.98	0.97	1.02	0.83	1.07
5	0.84	1.04	0.90	1.02	1.00	1.09	0.84	1.10
6	0.85	0.97	0.92	1.06	1.03	1.11	0.84	1.13
7	0.85	0.95	0.94	1.13	1.01	1.09	0.84	1.17
8	0.85	0.96	0.97	1.20	0.99	1.05	0.84	1.30

Note. M is the mean value of all forecasts in each approach and B is the ex ante best forecast. AR is an autoregression and RW is a random walk forecast where the most recently known outcome serves as the forecast.

Source: The Riksbank

28 See Adolfson, M., M. K. Andersson, J. Lindé, M. Villani, and A. Vredin, "Modern Forecasting Models in Action: Improving Analyses at Central Banks", Sveriges Riksbank Working Paper Series 188, 2005.

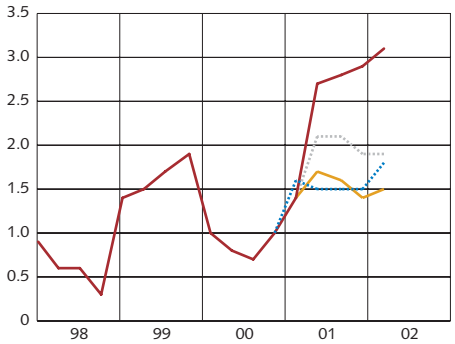
29 See, for instance, Stock, J. and M. Watson, "Combination Forecasts of Output Growth in a Seven-Country Data Set", Journal of Forecasting 23 (Issue 6), 2004, 405–430.

other model approaches. This result is borne out by the research in the field. Research findings also indicate that information from other variables not captured by an autoregression can be particularly useful in particular cases.[30]

Figure B13 shows UND1X forecasts based on quarterly data up to the first quarter of 2001. The first forecast is for the second quarter of the same year.[31] During the second quarter, UND1X inflation rose quite dramatically, partly in consequence of significant and unexpected fluctuations in food prices following mad cow disease and foot and mouth disease. The increase in UND1X came as a surprise, also for the indicator models and the forecast error was significant. However, in Figure B13 it is clear that those models which took into account information in addition to UND1X produced a noticeably better forecast than the autoregression, which means that the indicators contained information that suggested a rising inflation rate. The figure also shows forecasts from the first Inflation Report of 2001. In this case, the assessment made by the Riksbank reveals forecast errors similar to those shown by the autoregressive model.

A more recent example of how information in a large volume of data can be useful is in the forecasts from the second quarter of 2005 (see Figure B14). In this case as well, one can see that the autoregressive model forecast a lower inflation than the actual outcome and that those models which take other information into consideration produced far better forecasts. The timing of the forecast coincides with a period of economic upturn. By way of comparison, the UND1X forecasts from Inflation Reports 2005:2 and 2005:3 are shown. In the first of these forecasts, not all outcomes for the second quarter were known and in the later forecast, two out of the three months in the outcome for the third quarter were known at the time of publishing the report.

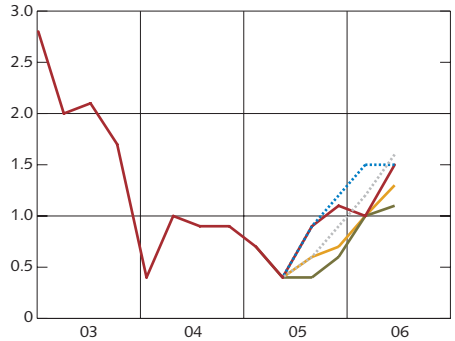
Figure B13. UND1X forecasts 2001:2 to 2002:1
Annual percentage change



UND1X
Inflation Report 01:1
AR
Mean of all indicators

Source: The Riksbank

Figure B14. UND1X forecasts 2005:3 to 2006:2
Annual percentage change



UND1X
Inflation Report 05:3
Inflation Report 05:2
AR
Mean of all indicators

Source: The Riksbank

Naturally there will be occasions when the autoregression will have produced better forecasts than those models that take other information into consideration, since the average forecasting ability compared with the RMSE is similar. These examples merely serve to illustrate the benefits of studying the results from many different models when making assessments of future inflation.

Summary

The results in this Box show that there is appreciable uncertainty in inflation forecasts. Further, the results suggest that the simple autoregressive model produces forecasts that on average fare well compared to other more sophisticated forecast methods. However, it should be noted that the indicator approaches

30 See Stock, J. and M. Watson, "Combination Forecasts of Output Growth in a Seven-Country Data Set", Journal of Forecasting 23 (Issue 6), 2004, 405–430 and Stock, J and M. Watson, "An Empirical Comparison of Methods for Forecasting Using Many Predictors," manuscript, 2005, for a discussion of the significance of using information in other variables in addition to the actual forecast variable.

31 At the time of publication of the first Inflation Report in 2001, only the inflation outcome for two of the first quarter's three months was known, which explains the minor deviation in the first quarter of 2001 in Figure B13.

presented in this Box may, during certain periods, contribute to more precise forecasts than an autoregression. This is due to the fact that the indicator models take into consideration a large amount of information that is not included in the actual inflation series. This is a fairly significant limitation of the autoregression, since in practice, one never knows when such periods might occur.

Even if time series models have proven useful as forecasting instruments, they lack the capability to provide explanations of the economics underlying the forecasts. For this reason, it is also necessary to use models based on economic theory to enable economic interpretations of the forecasts. Furthermore, one earlier evaluation shows that the Riksbank's structural model produces relatively good forecasts for the slightly longer term.[32]

Both indicator models and structural models are important instruments of forecasting and analysis, but they are of course gross simplifications of reality. This means that they cannot possibly be expected to take into consideration all the information that affects the economy, and it is therefore necessary to adjust the model forecasts for both short-term and long-term forecast horizons.

32 See Adolfson, M., M. K. Andersson, J. Lindé, M. Villani, and A. Vredin, "Modern Forecasting Models in Action: Improving Analyses at Central Banks", Sveriges Riksbank Working Paper Series 188, 2005.

Boxes in previous Inflation Reports

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Rigidities in the Swedish labour market

■ 1996:4
M0 as an indicator of inflation
How rapidly rising consumption affects inflation
EMU expectations and Swedish bond rates

■ 1996:3
Determinants of private consumption
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■ 1996:2
A breakdown of the CPI
Estimating potential GDP and the output gap
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■ 1996:1
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EU harmonisation of the CPI

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Relationship between producer and consumer prices
Relationship between output gap and inflation
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Relationship between producer and consumer prices
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Asset prices as inflation indicators
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Underlying inflation