Contents

Foreword

Monetary policy is targeted at keeping inflation at 2 per cent, with a tolerance for deviations up to ±1 percentage point.

This Inflation Report reproduces the main features of the presentations and discussions of inflation at the Executive Board meetings on 28 September and 4 October 2000. The assessment of inflation presented here represents the Riksbank's overall appraisal of inflation prospects in the present situation. The Report constitutes the background to the Riksbank's monetary policy decision on 9 October 2000. Executive Board members may differ in their opinions about how inflation's main determinants will develop and the resultant impact on future inflation. Any divergent opinions of inflation prospects are recorded in the separate minutes of the Board meeting on 9 October 2000, to be published on 24 October 2000.

The Riksbank Act (1988:1385, Chapter 6, Article 4) requires the Riksbank to hand over a written monetary policy report to the Parliamentary Standing Committee on Finance at least twice a year. The Riksbank has chosen to use the Inflation Report for this purpose.

The Inflation Report aims to provide a basis for monetary policy decisions and make our deliberations known to a wider public, so that monetary policy is easier to follow, understand and evaluate. The Report is also intended to encourage a discussion of matters relating to monetary policy.

This Report presents the Riksbank's appraisal of the path of inflation up to the end of 2002 Q3. In order to bring out the consequences for monetary policy, the analysis assumes that the repo rate is kept unchanged in this period.

Chapter 1 presents recent price tendencies in relation to the assessments in the June Report. The account in Chapter 2 concerns the most probable development of inflation's principal determinants. Chapter 3 summarises the Riksbank's assessment of inflation prospects. The Report also contains a number of boxed texts, the purpose of which is to provide more detailed insights into matters of importance for inflation assessments and the formation of monetary policy.

Stockholm, October 2000

Urban Bäckström
Governor of Sveriges Riksbank

Summary

Both CPI and UND1X inflation have risen somewhat more than expected in the period since the June Inflation Report. In August the 12-month rate of both these indicators was 1.3 per cent. The somewhat stronger price pressure is mainly due to the price of crude oil having risen more than assumed earlier, accompanied by an unexpectedly weak krona exchange rate tendency in connection with the strong dollar. Domestic price pressure, on the other hand, has been in line with the June forecast.

International economic activity and inflation. The prospects for international economic activity have gone on improving since June. As before, it is primarily the trend in the United States that continues to exceed expectations even though signs of a slowdown are starting to appear. But somewhat stronger activity also appears to be feasible in other countries, for example Denmark, Norway and Finland. The forecasts accordingly start from a somewhat higher path for international growth, in the OECD area almost 4 per cent this year, 3 per cent in 2001 and over 2.5 per cent in 2002. Compared with the outlook in the June Report, import growth in major markets for Sweden is now expected to be stronger in all the forecast years. Even though world trade is rising strongly, international prices for manufactured exports have remained weak. Throughout the forecast period the rate of price increases is lower than foreseen earlier. As previously, the *effective exchange rate* is judged to strengthen in time but the path is now expected to be weaker than foreseen in June, mainly on account of the strong dollar. Together with higher oil prices, the weaker exchange rate is expected to result in Swedish *import prices* rising more this year than envisaged earlier even though some downward adjustment has been made to international export prices. The import price forecasts for 2001 and 2002 have been revised only marginally.

Domestic demand relative to supply. Growth prospects for the Swedish economy have not changed in any major respect since the June forecast but some shift in the composition of growth does seem likely. A somewhat smaller growth contribution is now foreseen from domestic demand and a somewhat larger contribution from the development of exports. The revisions are mainly occasioned by new outcome data and higher market growth in connection with, for example, the improved international prospects. All in all, GDP growth is expected to be 4.0 per cent this year, 3.7 per cent in 2001 and 3.0 per cent in 2002. The comparatively rapid growth indicates that unutilised resources will be brought into production successively in the forecast period. There are some signs, however, that the amount of unutilised resources may be

somewhat larger than assumed earlier. Wage development has remained comparatively weak. Moreover, business tendency data continue to suggest that labour shortages are moderate in the economy as a whole. Furthermore, new econometric estimates of the output gap, using broader measurements of labour market activity, indicate that calculated capacity utilisation is somewhat lower than estimated earlier. Somewhat stronger productivity growth and an expected increase in labour supply likewise imply a relatively limited risk of more widespread capacity restrictions. Partly in view of the lower resource utilisation, the nominal wage rise in 2000 and 2001 is judged to be somewhat slower than forecast in June. Wages are expected to rise 3.5 per cent this year, 4.0 per cent in 2001 and 4.3 per cent in 2002.

The picture of price effects from *deregulations* has not changed since the June Report. As before, it is mainly the downward pressure on telecom prices that is tending to subdue price tendencies this year.

Changes in *house mortgage interest expenditure* are judged to have just a marginal effect on CPI inflation in the forecast period. The Budget Bill for 2001 contains a number of proposed tax changes that affect the contribution from *indirect taxes and subsidies*. Some of these proposals, primarily as regards the taxation of real estate, also affect the taxes that are not excluded from the calculation of UND1X inflation. All in all, these proposals are expected to lead to UND1X inflation in 2001 being about 0.2 percentage points lower than assumed earlier. The overall CPI effect from changes in indirect taxes and subsidies is broadly as foreseen earlier for this year and 2001 but the positive contribution in 2002 is somewhat larger.

Inflation expectations for the medium as well as the longer term continue to be firmly anchored around the inflation target. The comparatively low and stable inflation expectations are judged to help subdue the inflationary pressure from the ongoing economic upswing.

■ The successively rising level of activity is expected to generate an increase in domestic underlying inflation (UNDINHX) during the forecast period. The restraining effect on inflation from import prices means that the rate of UND1X inflation does not rise to the same extent. But both UNDINHX and UND1X inflation are judged to rise less than forecast in June, partly due to the present prospect of somewhat lower wage increases and higher productivity growth. One of the factors behind this prospect is that resource utilisation is now judged to be somewhat lower. All in all, given an unchanged repo rate, UND1X inflation in the main scenario is judged to be 1.5 per cent one year ahead and 1.9 per cent after two years. The corresponding rates for UNDINHX inflation are expected to be 1.9 and 2.1 per cent, while for CPI inflation they are 1.4 and 2.0 per cent.

■ The risk spectrum also has a bearing on the formation of monetary policy. Just as in the June Report, there is a small probability of wage developments being considerably stronger than in the main scenario. Another possibility of somewhat higher inflation lies in a path for the exchange rate that is weaker than assumed in the main scenario. This upside risk mainly has to do with a path for the dollar that could continue to be stronger than expected. In that case, import prices might be higher and export growth stronger. A stronger import price trend could also come from a higher oil price. Lower inflation might result, as envisaged earlier, from the relationship between growth and inflation turning out to be even more favourable. Support for this is to be found, for example, in additional signs of somewhat stronger productivity growth. All in all, however, the upside risks in the inflation forecast are judged to predominate both one and two years ahead. An upside risk means that when the risk spectrum is incorporated in the inflation forecast, the assessment is higher than in the main scenario. Including the risk spectrum, the assessments of both UND1X and CPI inflation are approximately 0.1 percentage point higher one year ahead and approximately 0.2 percentage points higher after two years.

■ The conclusion from the reported assessments is that, excluding transitory effects from indirect taxes, subsidies and interest expenditure and taking the risk spectrum into account, with an unchanged repo rate of 3.75 per cent, UND1X inflation one year ahead will be 1.6 per cent and after two years 2.1 per cent. The corresponding assessment of CPI inflation gives rates of 1.5 and 2.2 per cent, respectively.

Consumer prices

This chapter presents consumer price tendencies in recent months and their expected path in the rest of this year. The account begins with the overall development of prices, followed by an analysis of price movements for the goods and services that are included in underlying inflation as measured by UND1X. Finally there is a discussion of consumer price effects from indirect taxes, subsidies and house mortgage interest expenditure.

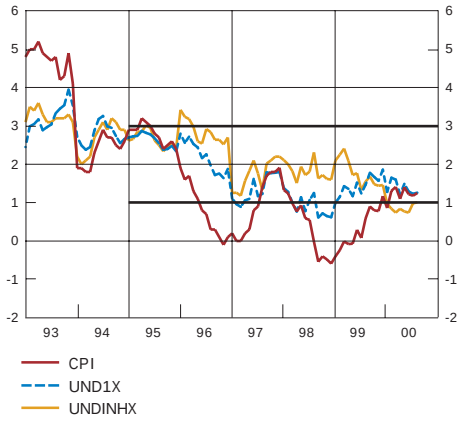
The 12-month change rates for the consumer price index (CPI) and for underlying or core inflation (UND1X) have moved up in the most recent four-month period and both rates in August were 1.3 per cent, which is 0.3 and 0.2 percentage points higher, respectively, than foreseen in the June Report. It is mainly the price rise for petrol and domestic heating oil that has exceeded expectations, which has to do with a continued increase in the world market price for crude oil and a path for the Swedish krona that has been somewhat weaker than foreseen. The rate of imported inflation excluding tax was 1.9 per cent in August, which is 0.8 percentage points higher than expected.

Domestic underlying inflation (UNDINHX) has also risen marginally, to 1.0 per cent in August (Fig. 1), which is in line with the forecast.[1]

Inflation has been somewhat higher than expected earlier.

In the coming months, some fall is foreseen in the price of crude oil, while the krona is not expected to strengthen to the extent that was anticipated earlier. The development of other import prices is assumed to be marginally weaker. In the short run, domestic underlying inflation is judged to follow the earlier forecast. All in all, in the rest of 2000 both imported and UND1X inflation are expected to rise somewhat more than allowed for in the main scenario in the June Report.

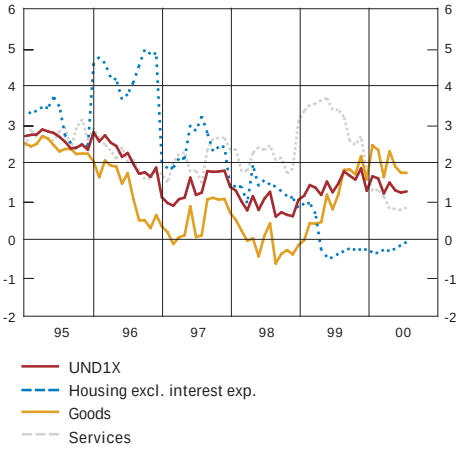
Figure 1. CPI and underlying inflation. Percentage 12-month change



Note. The horizontal lines from 1995 onwards represent the Riksbank's tolerance interval for the change in the CPI.

Source: Statistics Sweden.

Figure 2. UND1X components: goods, services and housing. Percentage 12-month change

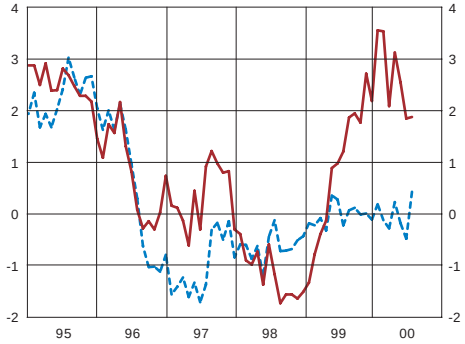


Note. UND1X corresponds to the CPI excluding indirect taxes, subsidies and house mortgage interest expenditure. Housing costs have not been adjusted for effects of the freeze of taxable property values.

Source: Statistics Sweden.

1 UND1X is defined as the CPI excluding house mortgage interest expenditure and direct effects of altered indirect taxes and subsidies; UNDINHX is the CPI excluding interest expenditure, goods that are mainly imported and direct effects of altered indirect taxes and subsidies.

Figure 3. CPI component: imported goods excluding indirect taxes.
Percentage 12-month change

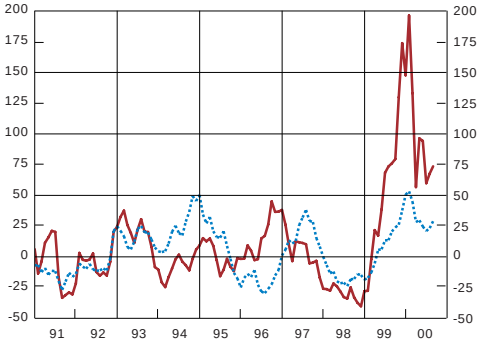


All imported goods (28.7%)
Imported goods except for domestic heating oil, petrol, fruit, vegetables, coffee and pharmaceutical products (23%)

Note. The figures in parentheses are the component's CPI weight.

Source: Statistics Sweden.

Figure 4. SEK prices for oil and import-weighted commodities excl. oil.
Percentage 12-month change



Oil
Other commodities

Note. The price for commodities excluding oil covers aluminium, copper, nickel, zinc, gold, silver, lead and tin, each weighted for its annual share of total Swedish imports; the aggregate share is approximately 2 per cent, while the share for oil is about 5 per cent (1999).

Sources: Statistics Sweden and the Riksbank.

IMPORT PRICES RISING SOMEWHAT MORE SLOWLY

During 1999 prices for goods that are mainly imported turned from a decline to an accelerating increase. The upswing peaked in February this year and has tended to slacken since then, though less than expected earlier. To a large extent the price movements are linked to the world market price for crude oil (Figs. 3 and 4). Import prices for more manufactured consumer goods have risen in annual terms in recent months. Prices to producers display a similar pattern, with unexpectedly large increases for petroleum products and a path for more manufactured products that is in line with earlier assessments.

RISING PRICES FOR SWEDISH GOODS

The rate of consumer price increases for more manufactured domestic products began a gradual increase in the middle of 1999 and since the June forecast the rate has moved up somewhat more. Domestic market prices to producers for consumer goods have also risen in recent months, presaging a continued increase in consumer prices. Such a development would be in line with the earlier assessment and the price forecast for Swedish goods in the rest of the year is accordingly unchanged.

SERVICES PRICES STILL RISING SLOWLY

Prices for services usually rise faster than for goods, partly because productivity gains are normally smaller in the production of services, while the development of wages is similar, and the goods sector is more exposed to competition. In addition, when the krona is appreciating there is a downward price effect for goods in that they have a considerably larger import content than services. In mid 1999 the 12-month rate of price increases for services was 3.7 per cent; since then it has slackened about 3 percentage points and from February this year onwards it has been below the rate for goods (Fig. 2). A large part of the deceleration is due to a growing proportion of the services sector being exposed to competition. The telecom market is one example, with falling prices for telecom services as a consequence of deregulation and increased competition.[2] The rate of price increases from administrative decisions has been virtually unchanged in recent months (Fig. 6). All in all, the development of services prices is in line with the main scenario in the June Report and there is no new information that alters the appraisal of the outlook in the near future.

2 For further information about the telecom market's deregulation see the section: Price effects of deregulation and trade liberalisation, pp. 48–49.

WEAK TENDENCY IN HOUSING COSTS

To some extent, household expenditure on housing is subject to price controls and administrative decisions. Since mid 1999 the 12-month changes in housing costs have been slightly negative as a result of low interest rates, property tax cuts, lower electricity prices and technical changes in the calculations.[3] Although rents have been higher than a year earlier since April this year, the overall change in housing costs has remained negative, partly due to a continued fall in electricity prices (Fig. 7).[4]

WEAK TENDENCY IN UNDERLYING INFLATION

One way of measuring underlying inflation is as the 12-month change in Statistics Sweden's index UND1X, which covers prices for the goods and services discussed above. Another is UNDINHX, which is restricted to goods and services produced in Sweden. An alternative way is to reduce the impact of volatile prices (see the box on pp. 13–14). Yet another indicator of underlying inflation involves estimating it econometrically. Such an indicator, consisting of a demand component and an inflation expectations component, is presented in Fig. 8.[5] Measured in this way, inflation's underlying rate has fallen back approximately 0.5 percentage points since the end of last year, primarily because of a diminishing contribution from demand. Inflation expectations have become marginally lower but are still around 2 per cent. The underlying rate of inflation in 2000 Q2 is calculated to have been 1.7 per cent, which is somewhat lower than in Q1.

The development of the model-based indicator during the year is in line with the paths of UND1X and UNDINHX. The estimated indicator is, however, at a higher level than the other two, which can be explained at least in part by the model not catching the recent downward price effects from markets being deregulated and more exposed to competition.

CPI AND UND1X INFLATION CONVERGING

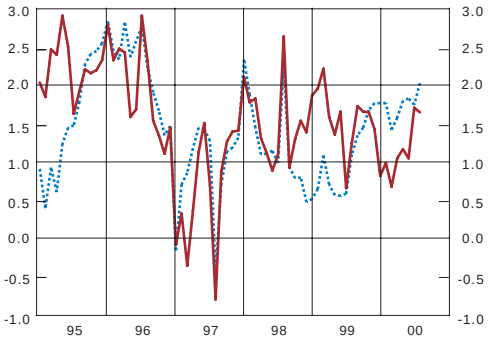
The difference between underlying inflation measured as UND1X and the CPI consists of the net effect of the former excluding changes in indirect taxes and subsidies and house mortgage interest expenditure. The contribution from indirect taxes and subsidies has been negligible since April (Fig. 9). The earlier

3 Changes by Statistics Sweden in the method for measuring write-downs for owner-occupied houses has occasioned a considerable downward break in the measured price change.

4 For further information about the electricity market's deregulation see the section: Price effects of deregulation and trade liberalisation, pp. 48–49.

5 See *Inflation Report 1999:2*, box on pp. 51–52, or Apel, M. & Jansson, P. (1999), *A parametric approach for estimating core inflation and interpreting the inflation process*, Sveriges Riksbank Working Paper 80.

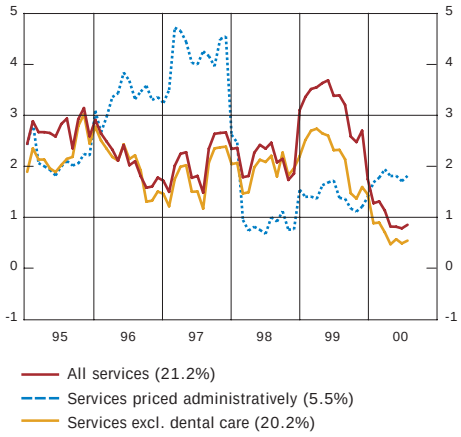
Figure 5. CPI component: Swedish goods excluding indirect taxes.
Percentage 12-month change



Note. The figures in parentheses are the component's CPI weight.

Source: Statistics Sweden.

Figure 6. CPI component: services excluding indirect taxes.
Percentage 12-month change



Note. The figures in parentheses are the component's CPI weight.

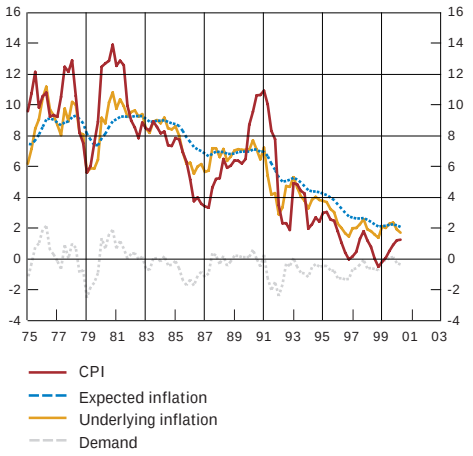
Source: Statistics Sweden.

Figure 7. CPI component: housing excluding indirect taxes and interest expenditure.
Percentage 12-month change

Note. The figures in parentheses are the component's CPI weight.

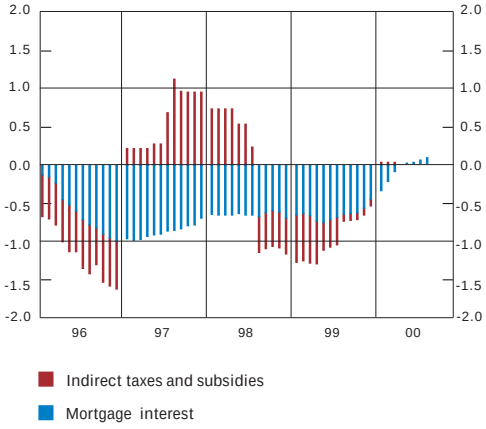
Source: Statistics Sweden.

Figure 8. CPI inflation and model-based measure of underlying inflation.
Percentage 12-month change



Sources: Statistics Sweden and the Riksbank.

Figure 9. CPI effects of changes in indirect taxes, subsidies and house mortgage interest expenditure.
Percentage points



Sources: Statistics Sweden and the Riksbank.

downward CPI effect from house mortgage interest expenditure has turned into a slightly positive contribution. The June forecast foresaw a slight negative contribution throughout this year. But as the contribution is small, the earlier forecast still largely holds.

To sum up, the path of domestic inflation has been in line with the assessment in the June Report, while imported inflation and thereby also UND1X inflation have risen somewhat more than expected earlier. The latter is due to the unexpectedly strong development of the crude oil price, accompanied by a weakening of the krona that has also exceeded expectations. These tendencies are expected to continue for the rest of this year, which occasions a minor upward revision of the forecasts of UND1X and CPI inflation in the coming months.

THE CPI COMPILED WITH COMPONENTS WEIGHTED FOR STANDARD DEVIATIONS

The Riksbank's inflation target is formulated in terms of the CPI. Various indicators of underlying inflation are also used as a basis for monetary policy.

Underlying or core inflation can be estimated in different ways. In the most usual approach, actual inflation is calculated excluding price movements that are judged to be transient and subject to factors other than inflation expectations and demand. UND1X, for example, represents the CPI adjusted for the net change in indirect taxes and subsidies and for house mortgage interest expenditure. In other countries, underlying inflation is often measured as the CPI excluding energy and food. There are also instances of adjustments for other goods for which price volatility has been historically high.

Another approach to measuring underlying inflation is econometric estimation. In this way, underlying inflation can be defined by, for example, identifying both expected and cyclically-related inflation in a model.

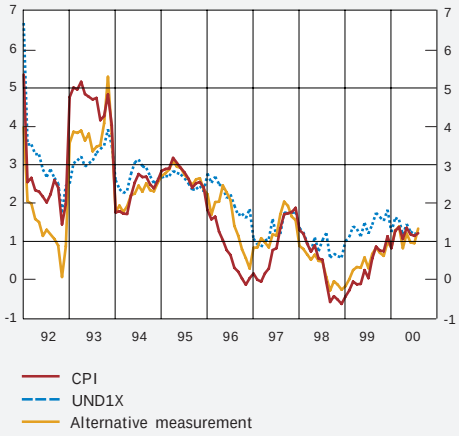
A third approach starts from statistical properties of the total CPI or various components. Examples of this are median inflation and centred mean.

Variants of all three ways of measuring underlying inflation are, or have been, presented in these reports. Yet another way is presented here; it involves basing the weights for groups of items on the *stability* of each group's price instead of on its share of household consumption. In that this approach rests on statistical properties of CPI components, it is most akin to the statistically defined measurements of underlying inflation.

Calculating this indicator involves assigning a weight to each CPI component that is inversely proportional to its standard deviation from total inflation. With this procedure, the higher the price volatility of the components, the smaller will be their impact on the total index. The standard deviations on which the components' weights are based are estimated for a time period that is moved successively forward.

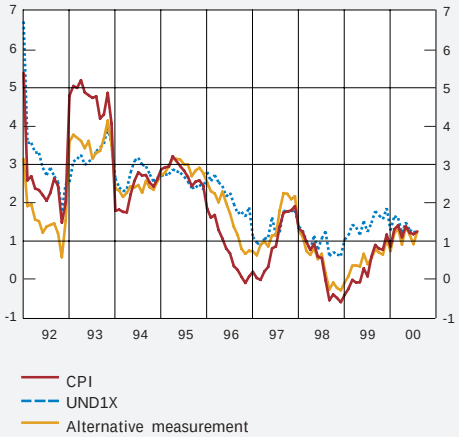
Results for the CPI decomposed into 8 and 70 groups, respectively, are presented in the accompanying figures. In each case, underlying inflation has been

Figure B1. Alternative measurement of underlying inflation based on an 8-component CPI with standard deviations estimated over 12 months. Percentage 12-month change



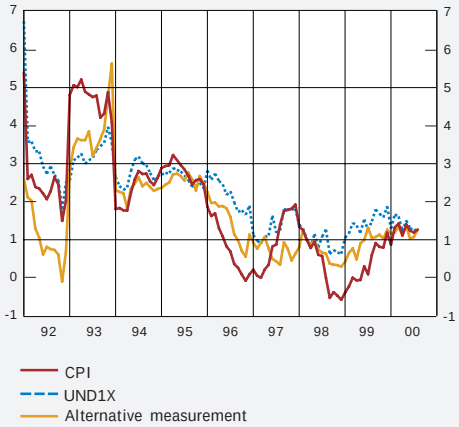
Sources: Statistics Sweden and the Riksbank.

Figure B2. Alternative measurement of underlying inflation based on an 8-component CPI with standard deviations estimated over 24 months. Percentage 12-month change



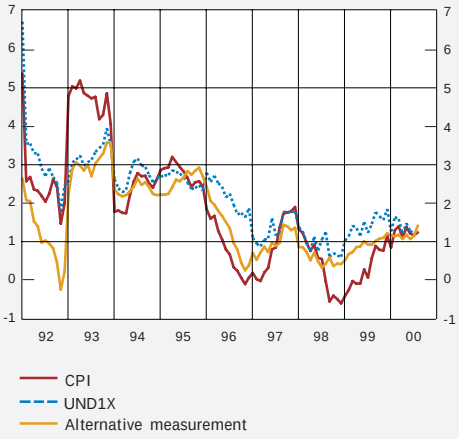
Sources: Statistics Sweden and the Riksbank.

Figure B3. Alternative measurement of underlying inflation based on a 70-component CPI with standard deviations estimated over 12 months. Percentage 12-month change



Sources: Statistics Sweden and the Riksbank.

Figure B4. Alternative measurement of underlying inflation based on a 70-component CPI with standard deviations estimated over 24 months. Percentage 12-month change



Sources: Statistics Sweden and the Riksbank.

calculated with standard deviations estimated over 12 and 24 months, respectively. The changes in the CPI and UND1X are included for comparison.

It will be seen that both the choice of the period for the estimation of standard deviations and the number of subdivisions are crucially important for the characteristics of the calculated indicators: the shorter the estimation period and the more aggregated the subdivision of the CPI, the greater the volatility of the time series. The more detailed subdivision of the CPI (70 groups) and the standard deviations estimated over 24 months give a time series that is smoother and comparatively close to UND1X. However, this alternative index has most often been somewhat below UND1X. It appears that the index smoothes what retrospectively turned out to be transient shifts in the level of CPI inflation.

A statistically defined indicator of underlying inflation has the advantage of being simpler to compute than measurements based on larger models. Another advantage is that all price movements for items with a high price variability are weighted down, not just the items that are excluded in advance. On the other hand, the statistically defined indicators lack ties to economic theories of inflation, which may make it difficult to understand what actually underlies a change. Other problems may arise in connection with sudden shifts in the rate of price changes for items with a close historical co-variation with total inflation. Price movements occasioned by adjustments to the rate of VAT, for example, which mostly result in transient shifts in the rate of inflation, can have undesirable effects on underlying inflation measured in this way.

Determinants of inflation

This chapter presents the assessment of the most probable development of inflation's main determinants in the coming twenty-four months. International factors are considered first, followed by a survey of developments in the Swedish economy.

International activity and inflation

International economic activity has become appreciably stronger in the past year. The economic trend in the United States continues to be very robust and the upswing in the euro area was reinforced during the spring. Growth in Japan also seems to have picked up. Vigorous growth is being recorded in virtually every part of the global economy. Compared with the assessment in the June Report, this year's growth in the OECD area has been revised upwards by around 0.5 percentage points. In the main scenario, global economic growth is judged to peak next year and slacken gradually in the rest of the forecast period, though somewhat more slowly than assumed in June (Table 1).

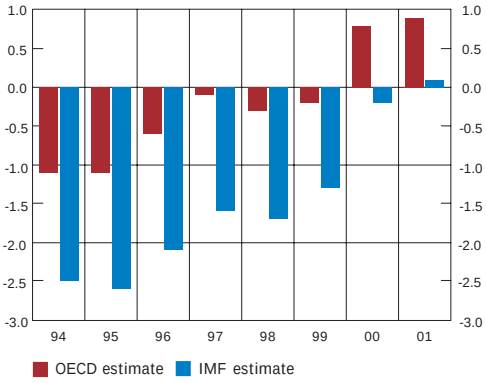
Higher oil prices give rising international consumer prices.

The price of oil has risen about 10 per cent since the time of the June Report. Mainly as a consequence of higher oil prices, producer prices in the various countries have recently moved up markedly (Fig. 11). The oil price rise is also the main factor behind the consumer price increases in much of the OECD area. Trend inflation has not yet been affected appreciably by either higher oil prices or the global improvement in growth. A probable explanation for this is that unutilised resources continued to be plentiful last year in the OECD area as a whole (Fig. 10). Neither do inflation expectations in the United States and Europe suggest that oil prices will have any sizeable impact on the price trend in a longer perspective. All in all, inflation in the OECD area is judged to be about 2 per cent throughout the forecast period.

Prices for manufactured exports are rising less than expected.

International prices for manufactured exports in national currencies have remained weak notwithstanding the very good world market growth. The outcome to date this year is considerably lower than expected and in certain countries export prices are falling. Deregulation, strong competition and surplus capacity in manufacturing in particular are probably some of the reasons why firms have not raised prices as much as expected. These factors are expected to go on contributing to moderate

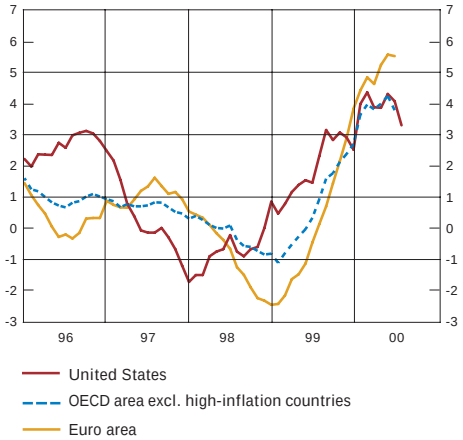
Figure 10. Output gap in OECD area. Per cent of potential GDP



Note. The IMF series represents 'major industrial countries'.

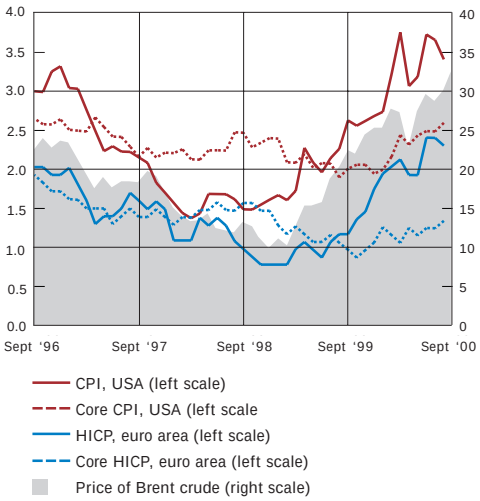
Sources: IMF and OECD.

Figure 11. International producer prices. Percentage 12-month change



Sources: U.S. Bureau of Labour Statistics, Eurostat and OECD.

Figure 12. CPI and core inflation in the United States and the euro area and the price of crude oil. Percentage 12-month change and USD/barrel



Note. Core CPI defined in the euro area as the HICP excluding seasonally dependent food products and energy, and in the United States as the CPI less all food products and energy; the two are therefore not entirely comparable.

Sources: U.S. Bureau of Labor Statistics, Eurostat and Hanson & Partners AB.

price pressure. In addition, it seems that oil prices have not had any impact on international export prices. Together with some changes in the forecasting method, the low outcome to date this year suggests that export prices will rise somewhat more slowly in both this and the coming two years.

Since the June Report the ECB has raised its instrumental rate by a total of 0.75 percentage points and further tightenings are expected. But the euro has still continued to weaken. However, a successive appreciation of the euro is foreseen, partly against the background of diminishing differences in growth between the euro area and the United States. Long-term interest rates are broadly unchanged in the euro area, while they have fallen markedly in the United States. Further interest rate increases are admittedly expected in the United States but they are predicted to be smaller and to occur later than assumed earlier. In Japan, both long-term and short-term interest rates have moved up in the period and the central bank has raised the instrumental rate 0.25 percentage points. International stock market prices have been relatively unchanged but volatile since the marked increase early in June.

The growth of world trade is accelerating strongly.

With the high global activity, the growth of international trade is rising strongly. Market growth in respects that are important for Sweden has increased more than expected this year and a strong future trend is also foreseen. A relatively marked upward revision has been made to the forecast for Swedish export market growth this year and growth in 2001 and 2002 is also expected to be stronger than expected in June.

Table 1. International conditions.
Percentage annual change or annual level

	GDP							CPI						
	1999	2000	rev.	2001	rev.	2002	rev.	1999	2000	rev.	2001	rev.	2002	rev.
U.S.A.	4.2	**5.1**	*0.6*	**3.2**	*0.3*	**2.7**	*0.3*	2.2	**3.2**	*0.4*	**2.5**	*0.0*	**2.3**	*-0.2*
Japan	0.3	**1.5**	*0.4*	**2.0**	*0.5*	**3.0**	*1.0*	-0.3	**-0.5**	*-0.5*	**0.0**	*-0.6*	**0.5**	*-0.5*
Germany	1.5	**3.0**	*0.0*	**3.0**	*0.0*	**2.3**	*-0.3*	0.6	**2.0**	*0.4*	**1.7**	*0.0*	**1.7**	*0.0*
France	3.2	**3.6**	*-0.1*	**3.2**	*0.0*	**2.6**	*-0.1*	0.6	**1.7**	*0.6*	**1.5**	*0.0*	**1.5**	*-0.1*
U.K	2.1	**3.1**	*-0.1*	**2.8**	*0.0*	**2.5**	*0.0*	2.3	**2.1**	*-0.3*	**2.5**	*0.0*	**2.5**	*0.0*
Italy	1.4	**3.0**	*0.3*	**3.0**	*0.0*	**2.8**	*-0.2*	1.7	**2.5**	*0.5*	**2.0**	*0.2*	**1.9**	*0.3*
Denmark	1.6	**2.8**	*0.7*	**2.4**	*0.0*	**2.4**	*-0.1*	2.1	**2.7**	*0.2*	**2.3**	*0.0*	**2.0**	*0.0*
Finland	3.5	**5.1**	*0.6*	**4.4**	*0.5*	**3.5**	*-0.4*	1.3	**2.8**	*0.4*	**2.4**	*0.2*	**2.0**	*0.0*
Norway	1.0	**1.9**	*0.7*	**1.7**	*-0.3*	**1.7**	*-0.5*	2.3	**3.0**	*0.5*	**2.5**	*0.3*	**2.2**	*0.0*
Euro11	2.3	**3.5**	*0.2*	**3.2**	*0.1*	**2.6**	*-0.2*	1.1	**2.2**	*0.4*	**1.9**	*0.1*	**1.8**	*0.0*
Sweden's TCW export markets	2.3	**3.4**	*0.3*	**2.9**	*0.0*	**2.6**	*0.0*	1.4	**2.3**	*0.3*	**2.0**	*0.1*	**1.9**	*0.0*
OECD 19	2.8	**3.8**	*0.4*	**3.0**	*0.3*	**2.7**	*0.2*	1.4	**2.2**	*0.2*	**1.9**	*-0.1*	**1.9**	*-0.1*

	2000	rev.	2001	rev.	2002	rev.
Market growth for Swedish exports	**10.6**	*3.3*	**8.8**	*1.7*	**8.0**	*1.8*
OECD area manufactured export price in national currency	**1.0**	*-0.3*	**1.3**	*-0.2*	**1.3**	*-0.3*
Crude oil price (USD/barrel Brent Blend)	**28.8**	*3.0*	**26.1**	*4.5*	**24.5**	*3.9*

Note. In the United Kingdom CPI stands for RPIX and in Germany, France, Italy, Denmark and Finland for HICP. In Norway GDP refers to the mainland economy. The figures in italics are the revision compared with the June Inflation Report.

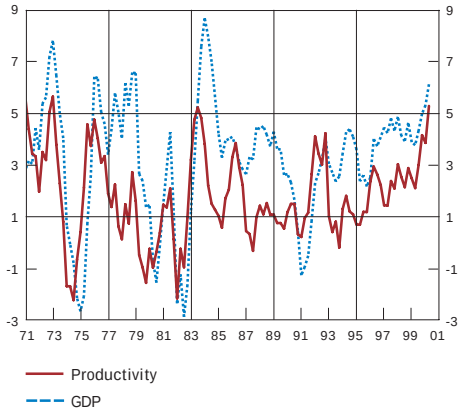
Source: The Riksbank.

Growth in the U.S. economy remains strong.

Economic growth in the *United States* has continued with undiminished strength; GDP growth in annual terms in the first half of 2000 was almost 6 per cent. But the composition of growth does suggest a somewhat slacker underlying trend. The high Q2 rate came mainly from increased public consumption and stock accumulation. Private investment remained strong, above all in the IT sector, where growth exceeded 10 per cent and roughly matched the Q1 rate.

Persistently strong productivity growth (Fig. 13) has contributed to relatively subdued price pressure. Inflation has moved up from 2.7 per cent in January to 3.4 per cent in August, mainly due to increased oil prices. Underlying inflation, which excludes energy and food, has also accelerated, from 2.0 per cent in January to 2.6 per cent in August, above all because of rising prices in the services sector. But considering the high economic growth, the level of inflation remains moderate and is expected to fall back as activity weakens in the future.

Figure 13. United States: labour productivity and GDP. Percentage annual change



Sources: U.S. Bureau of Labour Statistics and Department of Commerce.

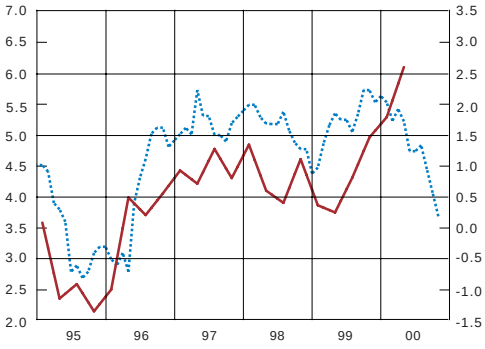
There are signs that activity in the United States is slackening.

Although the recent outcome has been strong, there are more and more signs that an economic slowdown in the United States has now begun. Private consumption and activity in construction and the housing sector have slackened in recent months. Consumption growth from Q1 to Q2 was only 0.7 per cent, the lowest figure for three years. Forward indicators such as the purchasing managers index (NAPM) and other leading indicators have also continued to point downwards (Fig. 14).

Contributions to more subdued domestic demand in the coming years are judged to come from high energy prices, a weaker and more volatile stock market in the past half-year and effects of the past year's monetary tightening. Since the June Report there has been some fall in long-term interest rates, including house mortgage rates.

Compared with the June Report, growth has been revised about 1 percentage point upwards in the forecast period as a whole but its course is the same as before. The high resource utilisation in the United States is judged to decrease gradually in the forecast period. As oil prices decline and demand is subdued, inflation is expected to drop from just over 3 per cent this year to around 2.5 per cent in 2001 and 2002.

Figure 14. United States: leading indicators and GDP. Percentage annual change

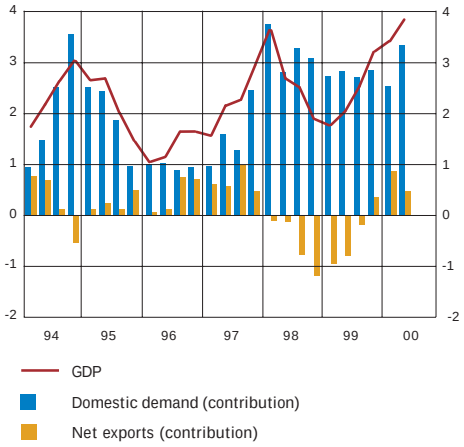


Source: U.S. Department of Commerce.

Euro area exports have been strong.

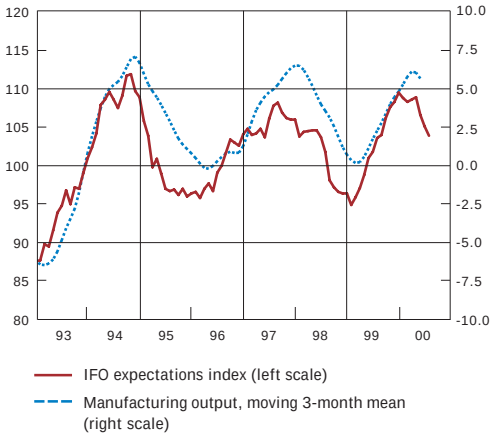
Growth in the *euro area* remains strong, underpinned by favourable global demand and a weak exchange rate as well as by strong domestic demand. Growth in this year and 2001 is now expected to be somewhat higher than foreseen in the June Report. But there are signs – in the form of slower increases in manufacturing output, orders received and forward indicators – that growth may peak as soon as this year.

Figure 15. Euro area: GDP growth and contributions from components. Percentage annual change and percentage points



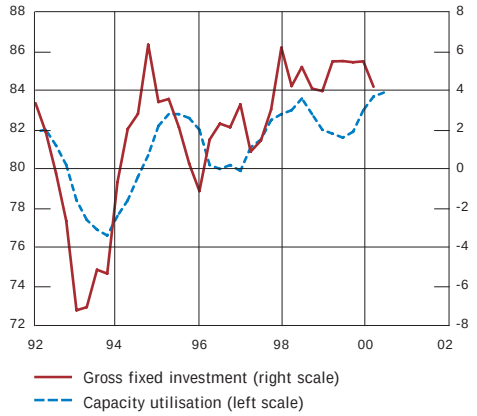
Source: Eurostat.

Figure 16. Germany: IFO expectations, and euro area: manufacturing output. Percentage annual change and index: 1991=100



Sources: Eurostat and IFO.

Figure 17. Euro area: industrial capacity utilisation and investment. Per cent and percentage annual change



Sources: Eurostat and EU Commission.

The upswing in the euro area's GDP growth has come mainly from the swing in net exports from 1999 to 2000. Net export's contribution to GDP growth is judged to be more than 0.5 percentage points this year, as against –0.4 percentage points in 1999. In the coming two years, however, an appreciation of the euro's effective exchange rate and weaker international demand are judged to result in a diminishing contribution from net exports.

The very strong growth of manufacturing output to date, together with the persistently optimistic mood in manufacturing, suggests that investment growth this year will be somewhat higher than in 1999. Signs that a slowdown in manufacturing output is beginning have appeared, however, mainly as regards cyclically sensitive intermediate goods, export-dependent capital goods and consumer durables. A slowing of growth is also signalled by a number of business indicators, for example IFO (Fig. 16), the EU Commission's surveys and Reuter's PMI. At the same time it should be noted that the surveys continue to report a very optimistic mood. But they do indicate that manufacturing activity will presumably not continue to accelerate in the future.

Fiscal policy in the euro area will become more expansionary.

During the summer, tax cuts next year were decided in both Germany and France, and such decisions are expected soon in several other countries. The German tax cuts are equivalent to about 1 per cent of GDP, the French to 0.5 per cent. Moreover, in order to soften the impact of the oil price rise, a number of energy tax reductions are now being introduced in Europe. Their effect is uncertain and depends in part on the future path of the oil price and in part on whether or not the tax relief is linked to the level of oil prices.

Although unemployment is falling and optimism rising, household consumption in the euro area shows no signs of picking up. Lower real disposable income, as a consequence of higher inflation and increased short-term interest rates, suggests that the growth of private consumption this year is much the same as in 1999. But some increase in consumption is foreseen in 2001 in connection with higher real wages as well as tax cuts. The full impact of the tighter monetary policy is not expected until towards the end of next year and will tend to curb the growth of domestic demand, mainly during 2002.

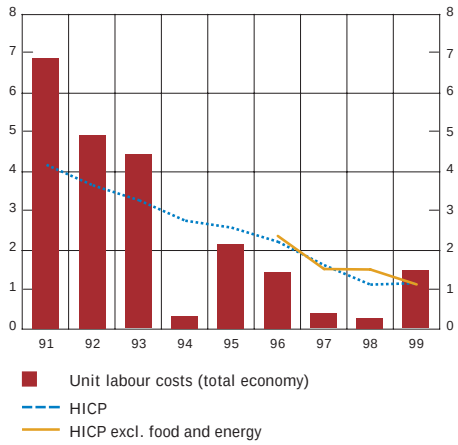
Underlying inflation in the euro area is still moderate.

The 12-month rate of HICP inflation in the euro area was 2.3 per cent in August or 0.1 percentage point lower than in July. Inflation was highest, 5.7 per cent, in Ireland and lowest, 1.8 per cent, in Germany. Roughly half of the HICP inflation came from increased energy prices. At 1.3 per cent, underlying inflation (HICP excluding energy and some special food prices) was unchanged from July. Some acceleration of services prices is discernible since the end of last year, while the price rise for goods remains weak.

As resource utilisation moves up, there is reason to count on a further moderate and successive increase in underlying inflation during the forecast period. A continued improvement in the labour market situation is expected to contribute to a somewhat higher rate of wage increases next year. Given a stable development of labour productivity, this implies some increase in unit labour costs in 2001.[6] At present there are no clear signs that the oil price and exchange rate movements have had an impact on underlying inflation and wage costs in the euro area as a whole. Neither have medium-term expectations of inflation risen appreciably.

The development of demand, together with a persistently weak currency and the higher oil price, has accentuated the risk of inflation in the euro area. This has prompted the ECB to adjust monetary policy in a less expansionary direction during the summer and autumn. Since the June Report the instrumental rate has been raised on two occasions by a total of 0.75 percentage points to 4.5 per cent. Short money market rates have risen and further increases in the instrumental rate, totalling approximately 0.5 percentage points, are foreseen in the coming years. The good economic prospects and rising short-term interest rates, together with a slowdown in the U.S. economy, are judged to strengthen the euro in the forecast period. Along with lower oil prices, the tighter monetary conditions are expected to lead to a rate of inflation that remains relatively stable around 2 per cent in the years ahead.

Figure 18. Euro area: unit labour costs, HICP and core inflation.
Percentage annual change



Source: OECD.

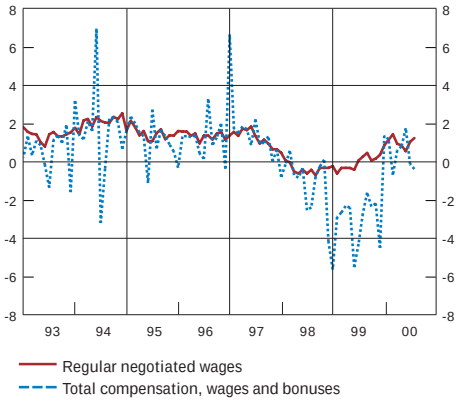
Wage costs rising in the Nordic area.

Growth in the *Finnish economy* is still high and it has been generated on a broad front that includes exports and investment as well as household consumption. The growth rate has been revised upwards about 0.5 percentage points for this year as well as 2001. Signs that growth is beginning to slacken have not yet appeared but a slowdown is foreseen towards the end of the forecast period. The strong growth has led to bottlenecks in some sectors of the economy and together with the high oil price and a weak euro, this has resulted in a gradual acceleration of inflation in recent months to about 3 per cent. The development of wage costs also points to somewhat higher inflation. The inflation forecast is therefore revised upwards to some extent for this year as well as 2001.

This year's economic development in *Norway* also looks stronger than was assumed in June. Falling unemployment and high wage increases have stimulated private consumption and export growth has been higher than expected. At the same time, the rapid wage increases and rising prices for oil and electricity are generating strong price pressure. Consumer prices rose 3.5 per cent in August. Since last April, the Norwegian instrumental rate has been raised 1.5 percentage points. Weaker

6 The increase in overall unit labour costs accelerates from 0.6 per cent this year to 1.1 per cent in 2001 according to *OECD Economic Outlook* 67 (June 2000), while the EU Commission's estimates from the spring forecast give rates of 0.5 and 0.8 per cent.

Figure 19. Japan: wages and bonuses. Percentage annual change



Note. Series seasonally adjusted.

Source: Japanese Ministry of Labour.

competitiveness, combined with a slower growth of international demand and a tighter monetary stance, means that growth prospects for 2001 and 2002 have worsened.

Economic growth in *Denmark* this year is also judged to be considerably stronger than expected earlier, mainly as a result of very good investment activity and strong export growth. But household consumption remains subdued.

No sizeable changes are envisaged in the forecast for the United Kingdom. Activity is slowing gradually and inflation this year is expected to be somewhat lower, mainly due to the strength of sterling.

Economic recovery in Japan.

The upward trend in the *Japanese economy* is becoming stronger this year. Orders received, manufacturing output, exports, imports and Tankan business expectations are all rising. Corporate debt has been reduced and profit margins have risen. Even wages seem to be picking up slightly again. Household consumption is therefore judged to become stronger in the future. All in all, these developments point to rising capacity utilisation and an upturn for investment as capital stocks need renewing. Investment growth is particularly high in the IT sector, with a strong trend in mobile communication.

Growth throughout the forecast period is accordingly judged to be appreciably stronger than envisaged earlier. The main obstacles to an even faster recovery are the numerous bankruptcies in the wake of the structural adjustment, and a fiscal policy that becomes less and less expansionary. It also looks as though the process of deflation will continue some way into next year. This has to do with the combination of growing competitive pressure, not least in retailing, continued consumer restraint and a marginally tighter monetary stance.

Interest rates and exchange rate

European bond rates are much the same as at the time of the June Inflation Report, while rates in the United States have fallen approximately 0.5 percentage points (Fig. 20).

Swedish bond rates broadly unchanged.

The Swedish ten-year T-bond rate has followed the path of the European rates and has not moved much on the whole. The long-term interest rate differential between Sweden and Germany has been stable and is currently just about zero.

Monetary policy is expected to be somewhat less tight.

The repo rate has not been changed since the June Report and is 3.75 per cent. Survey data as well as money market pricing indicate expectations of future monetary tightenings but the expected increase in the interest rate has become somewhat smaller (Table 2, Fig. 22). In the latest survey from Statistics Sweden, market players believe the repo rate will be raised to 4.00 per cent in the coming three months, to 4.50 per cent one year ahead and to 4.75 per cent after two years. A further tightening of monetary policy is also foreseen in the euro area and compared with the Swedish repo rate the expected increases in the refinancing rate are more rapid and lead to a higher level.

Table 2. Interest and exchange rate expectations of money market agents in September 2000.
Median, per cent and index: 18 November 1992=100

	In 3 months	In 1 year	In 2 years
Repo rate	4.00 (4.00)	4.50 (4.65)	4.75 (4.95)
TCW index	124.0 (121.0)	122.0 (120.0)	120.0 (120.0)
SEK/EUR	8.40 (8.25)	8.40 (8.32)	8.40 (8.28)

Note. The surveys were done on 18 September and 15 May 2000; the May figures are in parentheses.

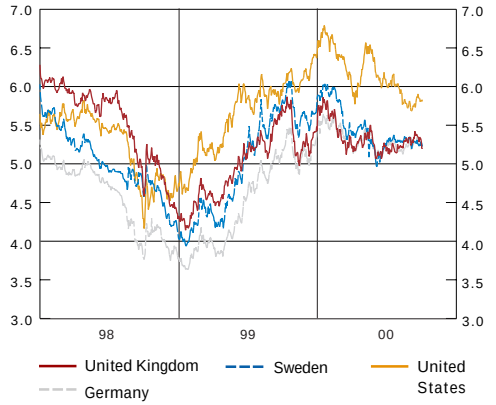
Source: Statistics Sweden.

The Swedish krona has been weaker than expected earlier.

In 2000 Q3 the krona's TCW index has been weaker than foreseen in the June Report. This is due to the unexpected strength of the U.S. dollar in the first place and also to some extent of sterling. Against the euro, on the other hand, the path of the krona has been more or less as expected and stable around 8.40–8.50. The krona's volatility against the euro has decreased since June but option pricing points to expectations of some increase in the short run (Fig. 24).

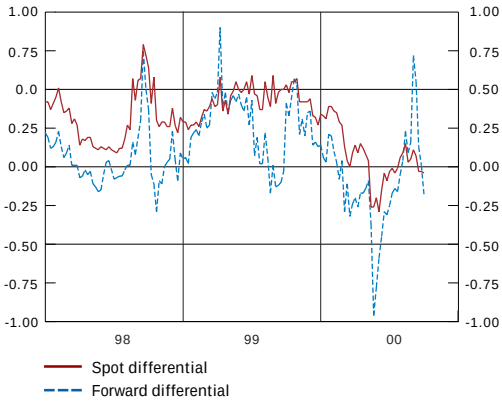
The combined effect on demand from interest rates and the exchange rate has become more expansionary since the June Report (Fig. 25). The real short-term interest rate has been virtually unchanged around 2.4 per cent but the real long rate

Figure 20. Ten-year bond rates in selected countries. Daily quotations, per cent



Source: The Riksbank.

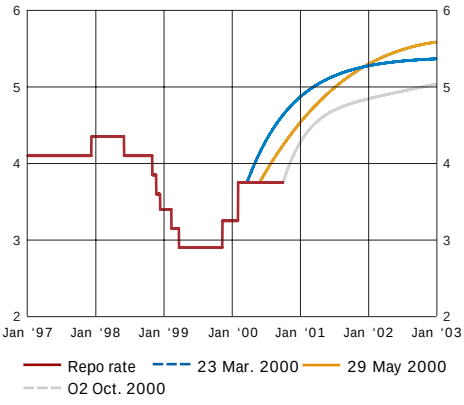
Figure 21. Ten-year spot and forward rate (zero coupon) differences between Sweden and Germany. Percentage points



Note. Interest rates estimated with the extended Nelson & Siegel method. The forward differential is the implied expected difference between the overnight rates ten years ahead.

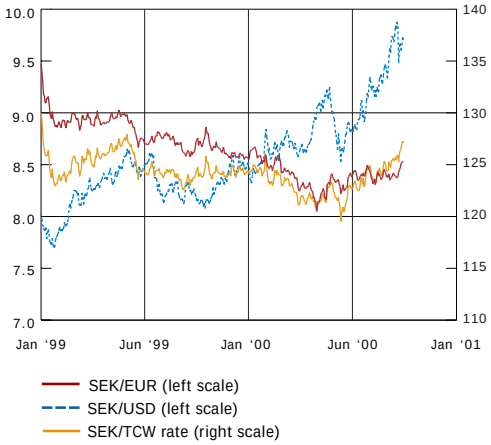
Source: The Riksbank.

Figure 22. Repo rate and expected rate implied by forward interest rates. Simple annual rate, per cent



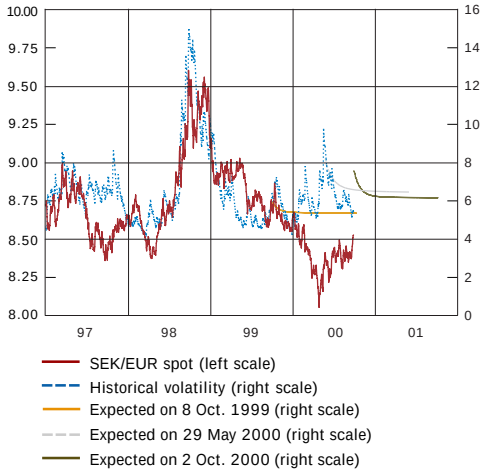
Source: The Riksbank.

Figure 23. Nominal effective TCW exchange rate for SEK, SEK/USD rate and SEK/EUR rate. Daily quotations, index: 18 November 1992=100



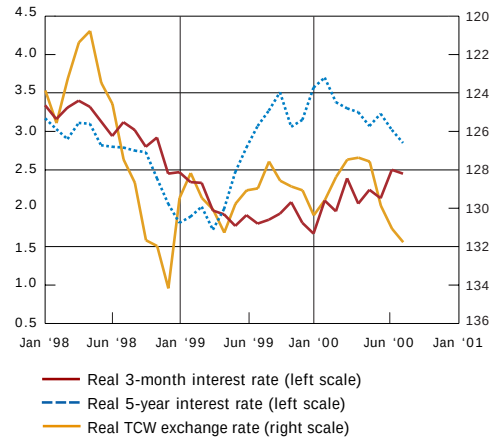
Source: The Riksbank.

Figure 24. SEK/EUR rate and its historical and expected volatility. SEK/EUR rate and per cent



Source: The Riksbank.

Figure 25. Real interest and exchange rates. Per cent and index: 18 November 1992=100



Source: The Riksbank.

has decreased about 0.4 percentage points to about 2.9 per cent.[7] Meanwhile, the real TCW exchange rate has weakened about 3.5 per cent.

The forecast long-term interest rate is now somewhat lower.

As the repo rate has not been adjusted since the June Report, the forecast is based on a broadly unchanged level of nominal short-term interest rates. But the forecast for the ten-year bond rate is adjusted downward by an average of about 0.1–0.2 percentage points over the whole forecast period, mainly in view of the market trend. This rate is now expected to move up approximately 0.3 percentage points in the forecast period to just over 5.60 per cent.

The krona's appreciation is expected to be somewhat smaller than foreseen in the June Report.

As in June, the krona is judged to appreciate during the forecast period but the trend is now expected to be somewhat weaker than envisaged earlier. This is essentially because the krona's appreciation against the U.S. dollar and, to some extent, sterling is now expected to occur somewhat later. In the main scenario the TCW index is judged to average just over 122 in 2001 and just over 119 in 2002. As previously, it is foreseen that the krona will be largely stable against the euro.

The combined economic impact of interest rates and the exchange rate is judged to be somewhat more expansionary during the forecast period than was foreseen in the June Report. It is envisaged, however, that the appreciating exchange rate and rising bond rates will contribute to a successive reduction of the expansionary effect in the years ahead.

7 The short rate is calculated as the monthly average of the nominal three-month T-bill rate adjusted for the CPI change that households expect in the coming twelve months (HIP data). The long rate is calculated as the average monthly level of the five-year T-bond rate adjusted for the rate of inflation in the coming five years that financial investors expect according to Aragon's latest survey.

Import prices

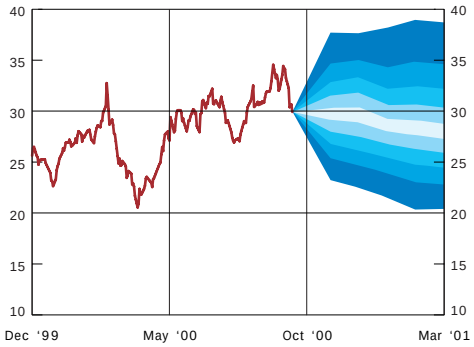
The development of import prices to producers as well as consumers is partly dependent on the exchange rate. All else equal, the present starting point of an exchange rate that is somewhat weaker than assumed earlier implies that the import price trend is somewhat stronger.

A further upward adjustment is made to the price of crude oil.

Import prices are also influenced by the development of international prices for goods, including the price of oil. In the June Report the barrel price of crude was judged to average USD 26 in 2000 and then decline successively to USD 22 and USD 20, respectively, in the coming two years. In recent months, however, both spot and forward prices for oil have risen more than expected earlier. Market expectations, as expressed in option pricing, also indicate an increased upside risk for the oil price (Fig. 26). The rising price mirrors concern that OPEC's increased output will not suffice to meet the coming seasonal increase in demand for heating oil. The generally strong economic activity also entails increased demand for oil. Moreover, stocks are still very low, making the oil price sensitive to disturbances in production. Of the OPEC countries, only Saudi Arabia has enough capacity for a further increase in output and the non-OPEC oil-producing countries also have limited possibilities of stepping up production in the short run. There is, moreover, a shortage of oil tankers, which pushes freight costs up and ultimately the price of oil. In addition, uncertainty about future supply has been accentuated by problems with bottlenecks at refineries. Recently, however, the price of crude has fallen back to some extent, partly as a consequence of the U.S. decision to release some of the emergency oil reserves, though this measure is judged to have some downward price effect only in the short run. Against this background, the forecast has been revised upwards to average barrel prices of about USD 29 this year and about USD 27 and USD 25, respectively, in the coming two years. Other commodity prices are judged to rise somewhat faster in the rest of this year, followed in the years ahead by a slackening rate of price increases.

The new oil price forecast combined with a weaker exchange rate means that in the early part of the forecast period, prices to producers as well as consumers of petroleum-related products are expected to rise faster than foreseen earlier. To some extent, however, this price effect is countered by a weaker development of international prices for manufactured exports in national currencies as well as of international agricultural and food prices. All in all, the average level of prices for imported consumer goods excluding tax is judged to rise 2.3 per cent this year, which is almost 0.5 percentage points more than foreseen in the June Report. During 2001 the average rate of price increases is assumed to slacken, as a result of falling prices for petroleum

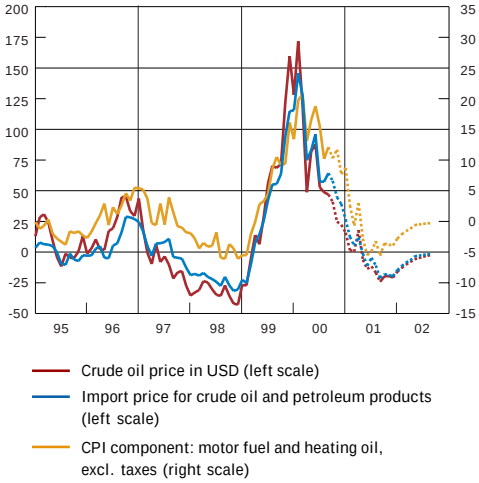
Figure 26. Crude oil price (Brent) and uncertainty intervals on 29 September 2000. USD per barrel



Note. The central band is the price range that is expected to apply at the indicated dates and represents 10 per cent of the total probability range; each successive pair of bands covers an additional 20 per cent of the probability, so that the outermost pair encloses 90 per cent.

Sources: International Petroleum Exchange and the Riksbank.

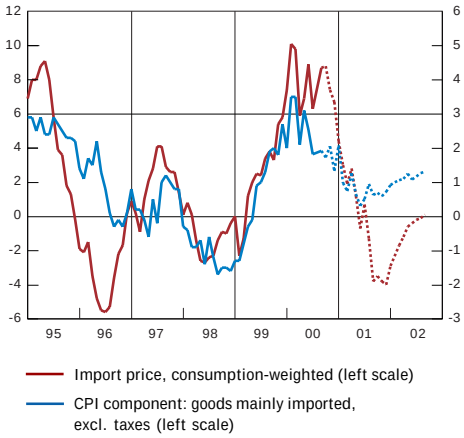
Figure 27. Prices for crude oil and petroleum products. Percentage 12-month change



Note. 2000–02 forecast.

Sources: International Petroleum Exchange, Statistics Sweden and the Riksbank.

Figure 28. Import prices to producers and consumers.
Percentage 12-month change



Note. CPI goods that are mainly imported include a considerable proportion of services, for example transportation and retail trade. 2000–02 forecast.

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

products; the forecast rate is about 0.8 per cent, which is broadly the same as the assessment in June. In September 2002 the 12-month rate is expected to be 1.3 per cent, likewise in line with the June assessment. Excluding crude oil and petroleum products, the price rise is assumed to accelerate gradually from the very low levels at present to just over 1.5 per cent at the end of the forecast period.

CRUDE OILPRICE'S IMPACT ON PRICES FOR PETROL AND HEATING OIL

Prices for both petrol and domestic heating oil have risen strongly since the beginning of 1999. In August this year petrol prices were about 10 per cent higher than a year earlier, while the price of heating oil had gone up 24 per cent (Fig. B5).

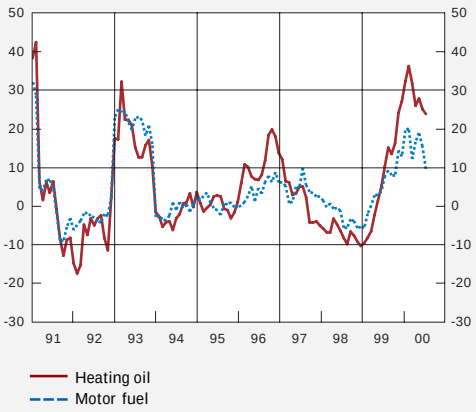
So what lies behind the rapid price increases for these petroleum products? Of the total price of petrol and heating oil, approximately two-thirds consists of taxes and charges.[8] These taxes were increased markedly in the early 1990s but in recent years there have been only a number of minor rate adjustments. The recent price trend is therefore not a consequence of altered tax rates (Fig. B6).

Apart from taxes, it is the world market price for crude oil and the U.S. dollar's exchange rate that are major determinants of prices for petrol and heating oil. A higher price for crude, as well as a weakening of the Swedish krona against the dollar, can be expected to result in higher prices for petrol and heating oil. Similarly, a lower crude oil price and a stronger SEK/USD rate can be expected to have a downward effect on these prices. During the past twelve months the dollar price of crude has risen strongly, accompanied by a weakening of the krona against the dollar. Measured in kronor, in August the price of crude was about 70 per cent higher than a year earlier. This is the primary explanation for the rapid increase in consumer prices for the refined products.

The consumer price trend has, however, been considerably more subdued than both the SEK price for crude and the producer price for petroleum products. This is usually the case, because the price of crude is only one item in total processing costs (Fig. B7). As processing is undertaken to a large extent in Sweden, prices for the refined petroleum products are also conditioned by, for example, the domestic development of wages.

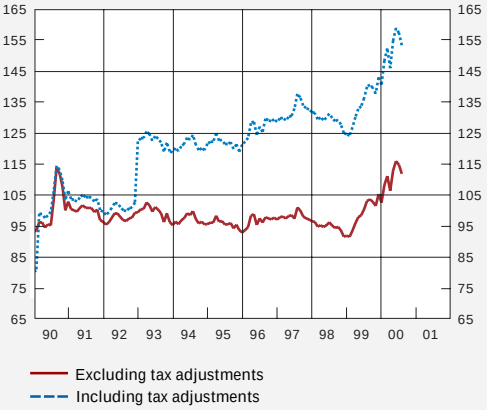
The recent price increases for petroleum products have been accompanied by questions about the pricing principles of petrol companies, for example. Are there differences in these principles for a rising compared

Figure B5. Motor fuel and heating oil prices including tax changes. Percentage 12-month change



Source: Statistics Sweden.

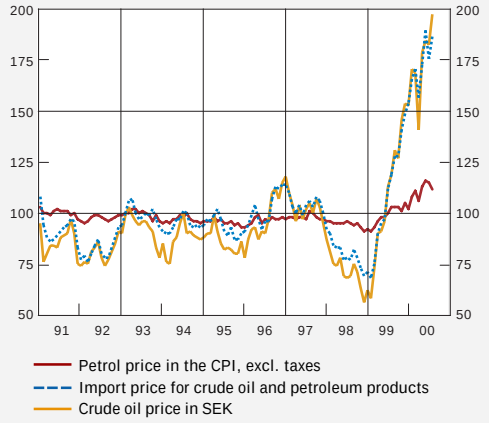
Figure B6. Motor fuel price, including and excluding tax adjustments. Index: 1990=100



Sources: Statistics Sweden and the Riksbank.

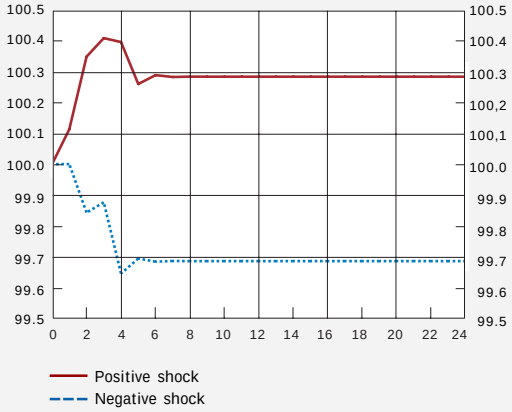
8 As the taxes consist of a fixed levy in SEK in addition to VAT, the tax share decreases when the price of petrol rises.

Figure B7. Crude oil price in SEK and producer and consumer prices for petroleum products. Index: 1990=100



Sources: Statistics Sweden and the Riksbank.

Figure B8. Simulated price effect for heating oil of a 1 per cent change, up or down, in the SEK price for crude oil. Monthly change in price index



Sources: The Riksbank.

with a falling world market price for crude? That is, are petrol price adjustments larger and more prompt when the price of crude rises than when it falls?

In order to study how changes in the price of crude affect prices for petrol and domestic heating oil, a regression equation is estimated where monthly movements in prices for petrol and heating oil, respectively, are explained in terms of movements in, for example, the SEK price of crude. The hypothesis of differences in pricing behaviour when the crude oil price rises and falls, respectively, can then be tested by dividing the time series for the price of crude into periods with rising and falling prices, respectively. This is followed by calculations of the extent to which petrol and heating oil prices are affected when the crude oil price moves 1 per cent up or down.

The results for the price of heating oil indicate that in statistical terms, the hypothesis of an asymmetric price adjustment can be rejected. A crude oil price movement of 1 per cent measured in SEK leads on average to a total price change for heating oil of about 0.3 per cent, regardless of whether the price of crude rises or falls (Figs. B8 and B9).[9] The time profile of the price effect does differ, however, depending on whether the price of crude rises or falls. An increase in the price of crude elicits an upward effect in the same month as well as a positive effect in each of the next two months, followed by some downward tendency after that (Fig. B9). When the price of crude falls, on the other hand, the adjustment of the price of heating oil begins a month later and is smaller than when prices are rising; the major downward adjustment does not occur until three months after the fall in the price of crude.[10]

The results for the price of petrol are more dependent on the empirical model's specification. Some specifications indicate the same total price effect when the price of crude rises as when it falls, while others suggest that the impact is somewhat larger when the price of crude rises. But compared with the price effect for heating oil, a change in the price of crude has an impact on the price of petrol that is generally smaller. Most of the models suggest that when the price of crude rises 1 per cent, the price of petrol moves up by an

9 As the CPI weight for domestic heating oil is 0.006 of the total index, a 10 per cent increase in the price of crude can be calculated to have a short-run partial impact on inflation of about 0.02 percentage points.

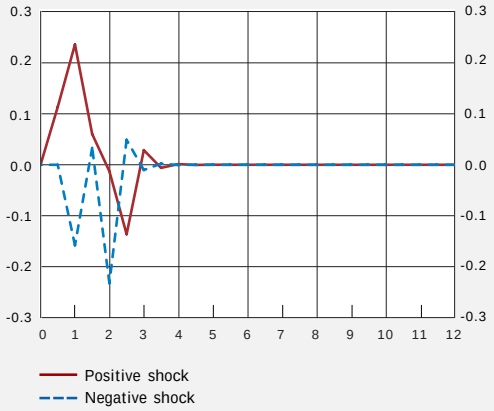
10 Based on data for the period January 1990 to July 2000; the result for a shorter period is qualitatively the same.

average of 0.1 to 0.2 per cent.[11]

The dynamics of the adjustment also vary with the model's specification. Some estimates indicate that the price of petrol is adjusted both rapidly and immediately, while others suggest that when the price of crude falls, the adjustment tends to be lagged.

To sum up, there is a clear — but quantitatively limited — relationship between the SEK price for crude oil and the path of consumer prices for petroleum products. The relationship is limited because crude oil is only one item in the total market value; it may also be the case that, for various reasons, firms have limited possibilities of passing on their costs. It is conceivable, moreover, that if allowance is made for consumer aversion to marked price fluctuations, the price of petrol and heating oil is affected to only a minor extent by transient variations in the price of crude. Furthermore, it seems that the consumer price adjustments which are made for petroleum-related products tend to occur sooner when the SEK price of crude has risen than when it has fallen.

Figure B9. Simulated price effect for petrol of a 1 per cent change, up or down, in the SEK price for crude oil.
Monthly change figures

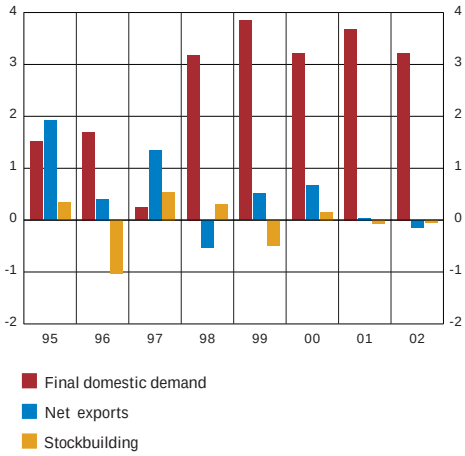


Sources: The Riksbank.

11 As the CPI weight for petrol is 0.0424 of the total index, a 10 per cent increase in the price of crude can be calculated, given a pass-through of 0.2 per cent, to have a short-run partial impact on inflation of about 0.1 percentage points. Summing the price effects of both petrol and domestic heating oil, a 10 per cent price increase for crude has an aggregate CPI effect of just over 0.1 percentage point.

Demand and supply

Figure 29. Contributions to GDP growth. Percentage points



Note. 2000–02 forecast.

Sources: Statistics Sweden and the Riksbank.

SUMMARY OF GDP GROWTH 2000-2002

Growth prospects for the Swedish economy have not changed in any major respect since the forecast in June. The macroeconomic future continues to be characterised by a stable and comparatively strong upswing in activity, driven above all by rising domestic demand. To some extent, however, the growth profile during the forecast period needs to be modified because investment and consumption in the first half of this year were somewhat weaker than expected earlier, while the international trend was stronger. For this reason, growth this year is revised 0.3 percentage points downwards, followed by upward revisions of 0.2 and 0.1 percentage points, respectively, in 2001 and 2002. Assuming an unchanged repo rate, GDP growth is expected to be 4.0 per cent this year, 3.7 per cent in 2001 and 3.0 per cent in 2002 (Table 3).

The macroeconomic picture shows a stable, strong upswing.

The public finances are expected to generate large surpluses throughout the forecast period. This provides scope for a quicker repayment of public sector debt in 2001 as well as further income tax reductions. The Budget Bill includes some proposed compensation to wage-earners for the increased social security charges paid by the individual. The Riksbank also counts on further compensation being made in 2002. The larger tax cuts lead to a stronger development of income and purchasing power that underpin the rapid development of consumption.

In the June Report the Riksbank judged that total resource utilisation last year had been somewhat lower than assumed earlier. Factors behind this assessment included the weak price and wage trends as well as the moderate accentuation of various labour shortages. Since then, the rate of wage increases has remained low. Moreover, the picture of moderate overall labour shortages still holds in the latest business tendency data from the National Institute of Economic Research. New econometric estimations of the output gap, using broader measurements of labour market activity, likewise suggest that resource utilisation is currently somewhat lower than the Riksbank counted on earlier. All in all, it is judged that shortages of unutilised resources in the coming years will not be as great as foreseen in the June Report.

Shortages of unutilised resources are judged to be somewhat less than assumed earlier.

Table 3. Demand and supply in the main scenario.
Percentage annual change

1999	2000	2001	2002	
Household consumption	4.1	4.6 (5.2)	3.9 (3.8)	3.4 (3.6)
Public authorities comsumption	1.8	-1.0 (-0.3)	1.2 (1.4)	1.0 (1.0)
Gross fixed capital formation	8.1	7.0 (8.6)	8.2 (8.0)	7.0 (7.0)
Stock building*	-0.5	0.2 (-0.2)	-0.1 (0.0)	0.0 (0.0)
Exports	5.2	9.9 (7.2)	7.8 (6.1)	6.6 (4.8)
Imports	5.0	9.5 (7.0)	8.8 (7.4)	7.9 (6.6)
GDP	3.8	4.0 (4.3)	3.7 (3.5)	3.0 (2.9)

*Contribution to GDP growth in percentage points.

Note. 2000–02 forecast; the figures in parentheses are the assessment in the June Report.

Sources: Statistics Sweden and the Riksbank.

FOREIGN TRADE

According to the national accounts, export as well as import growth in 2000 H1 was stronger than envisaged in the June Report. The volume increase from the corresponding period a year earlier was 11.9 per cent for exports of goods and 9.9 per cent for imports of goods.

The inflow of export orders rose comparatively strongly in the first half-year, though at a slackening rate. Some slowdown is confirmed by various domestic business tendency surveys, as well as by leading indicators for the OECD area and the EU. All this suggests that the high growth figures for the first half-year will probably not be maintained.

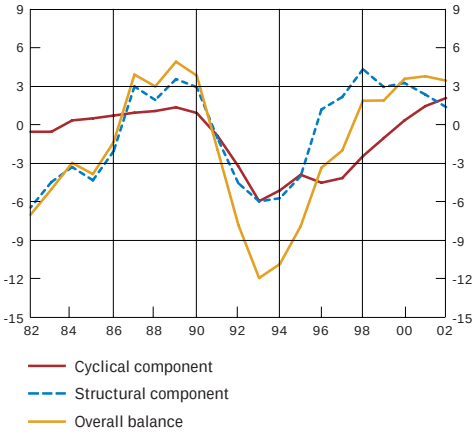
International economic activity has been stronger than foreseen in the June Report and the global development of imports also seems to have been underestimated. For this reason, export market growth is revised upwards for the whole of the forecast period.

The stronger international trend leads to an upward revision of export market growth.

The assessment of Sweden's international competitive position has not changed appreciably since the June Report. This is because the revisions to the forecasts for the exchange rate and the relative movements of prices for Swedish and international export products largely cancel out. As previously, the relative export price is expected to rise in the forecast period, leading to some, albeit limited, loss of market share.

Under these circumstances, exports of goods are expected to rise more rapidly than assumed earlier. The increase in volume slackens, however, as international growth becomes more subdued and the somewhat impaired competitive position makes itself felt. Services exports are revised downwards for 2000 in view of a poor outcome. Some increase is foreseen in the coming years as a consequence of rising exports of goods. The volume of total exports is judged to rise 9.9 per cent this year, 7.8 per cent in 2001 and 6.6 per cent in 2002.

Figure 30. Consolidated public sector financial balance, cyclical and structural components. Per cent of GDP



Note. Riksbank forecast for 2000-02. The structural balance is calculated as the difference between the consolidated public sector's total and cyclical financial balances; the calculation of the cyclical balance starts in turn from output gap estimates obtained with the Unobserved Components method.

Source: Statistics Sweden and the Riksbank.

Export growth in the forecast period is expected to be stronger than assumed in the June Report.

The improved prospects for exports tend to raise the forecast growth of imports. The total volume of imports is expected to rise 9.5 per cent this year, 8.8 per cent in 2001 and 7.9 per cent in 2002.

All in all, the contribution to growth from net exports is judged to be somewhat larger than assumed in the June Report. But the tendency over time is unchanged, with a contribution that becomes successively smaller and then turns negative in the course of 2002.

FISCAL POLICY

The favourable economic trend in recent years has resulted in large public financial surpluses. Having generated a deficit as recently as in 1997, in the period 2000–2002 the public finances are calculated to achieve annual surpluses equivalent to about 3.5 per cent of GDP. The positive development comes from strong economic activity combined with tighter control of central government spending and the Government's budget target for public sector finances.

Each year the Government imposes a nominal ceiling on central government spending in the coming three fiscal years and is required by the Budget Act to take measures if spending is calculated to exceed the ceiling. Since 1997, when the ceiling was implemented for the first time, central government spending has been below the limit. The budget target is formulated as a consolidated public sector financial surplus equivalent to 2 per cent of GDP as the annual average over a business cycle. This year's target is a surplus of 2.0 per cent of GDP and the target for 2001 proposed in the latest Budget Bill is 2.5 per cent. The surpluses in recent years have resulted in a successive reduction of public sector debt.

Besides leading to an increased repayment of public sector debt, the favourable trend for the public finances has paved the way for income tax cuts. The most important cuts for this and the coming years are the compensation for increased personal social security contributions and the upward adjustment of state income tax brackets. The intention is to provide the compensation in four equal steps over a four-year period. The first quarter of the compensation has been arranged this year in the form of a higher general tax allowance and higher tax brackets and the Budget Bill promises another quarter in 2001. The Riksbank counts on continued surpluses and assumes that income taxes are cut by about another SEK 15 billion in 2002, which is judged to be in line with the Government's ambition.

The Riksbank counts on continued compensation for the increased personal social security contributions in both 2001 and 2002.

The public sector budget surplus for 2001 is expected to be larger than foreseen in the June Report mainly as a result of lower interest expenditure and less public spending on investment and consumption. For 2002, however, the calculated surplus is lower than expected in June on account of the envisaged tax cuts. The Riksbank's calculations of the cyclical and structural components of the public sector's financial balance indicate that cyclical improvements are an important reason why saving is maintained at a high level (Fig. 30).

According to the national accounts, public consumption in 2000 H1 was 1.6 per cent lower than a year earlier.[12] Local government consumption moved in line with the June forecast, while central government consumption was weaker than expected earlier.

The outcome for the first half-year calls for a downward revision of the annual forecast for public consumption, which is now expected to fall 1.0 per cent this year, a downward adjustment of 0.7 percentage points from the June assessment. For the rest of the forecast period, however, the public consumption forecast is unchanged, which means that public consumption relative to GDP is still assumed to fall.

HOUSEHOLD CONSUMPTION

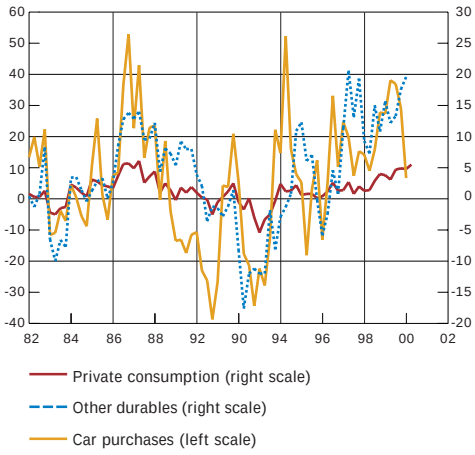
Household expenditure on consumption rose 4.1 per cent last year according to the national accounts, the highest annual figure since 1987 (Fig. 31). The strong growth came mainly from purchases of durables, cars in particular, and it accelerated during the second half-year, probably due in part to temporary tax relief for car purchases.

During 2000 total spending on consumption has gone on rising comparatively rapidly, though the rate has been somewhat lower than calculated earlier. The increase between the first halves of 1999 and 2000 amounted to 5.1 per cent.[13] Retail sales have likewise remained strong to date this year, particularly as regards capital goods. The favourable consumption trend is mirrored, moreover, in such financial aggregates as the money supply and household borrowing, though the recent path of some of these indicators has been more subdued (Figs. 32 and 34).

Household consumption expenditure rose somewhat less than expected in 2000 H1.

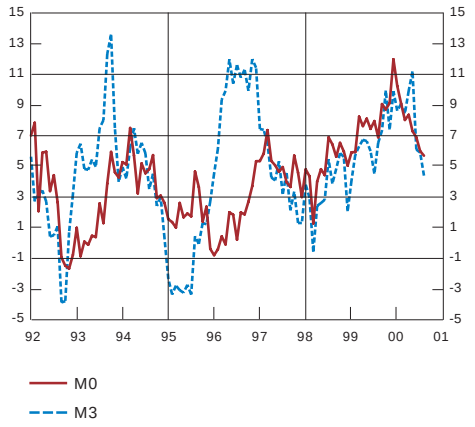
A number of favourable factors have contributed to the comparatively strong growth of consumption in recent years. Household real disposable income has increased thanks both to

Figure 31. Household expenditure on total consumption, car purchases and other durables. Percentage annual change, constant (1995) prices



Sources: Statistics Sweden.

Figure 32. Money supply. Percentage 12-month change



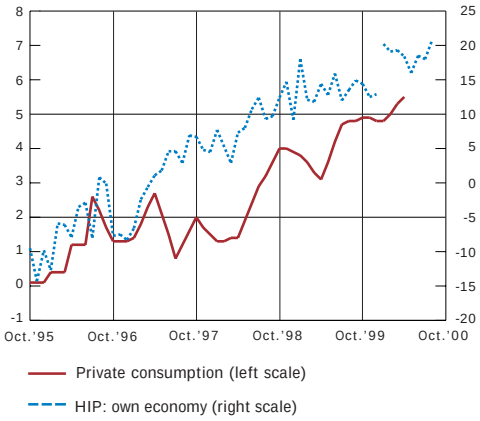
Note. M0 covers the resident household and corporate sectors' holdings of banknotes and coins; M3 covers M0 plus the non-bank sectors' bank deposits and certificates of deposit.

Source: The Riksbank.

12 Adjusted for the effect of the Church of Sweden being assigned as of 2000 to the household sector instead of the public sector, consumption rose 0.3 per cent.

13 Around 0.9 percentage points of this increase is explained by the Church of Sweden being included in the household sector (instead of the public sector) as of 2000. Adjusted for this technical rearrangement, household expenditure on consumption rose 4.2 per cent in 2000 H1, which is somewhat less than expected earlier.

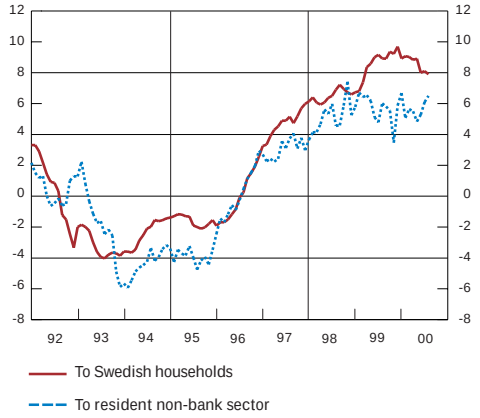
Figure 33. Households' consumption expenditure and own-economy expectations. Percentage 12-month change and net figure



Note. The procedure for collecting household purchasing plans (HIP) was changed as of January 2000.

Source: Statistics Sweden.

Figure 34. Lending by credit institutions. Percentage 12-month change



Note. Credit institutions comprise banks, house mortgage institutions and other credit market companies. The non-bank sector is defined as households, firms and local authorities. Banks' repos with the non-bank sector are included from 1995 onwards. Lending by house mortgage institutions has been adjusted for the transfer of state housing loans to this category in July 1995.

Source: The Riksbank.

rising real wages and employment and to a less tight fiscal policy. The fact that inflation has remained low has also been important for real income. In the forecast period, household real disposable income is expected to rise 4 to 5 per cent a year, mainly due to further tax cuts and a favourable outlook for real wages and employment.

The present forecast assumes that wage-earners are compensated for the increased personal social security contributions in both 2001 and 2002. It is naturally difficult to tell how this tax relief will affect consumption. For the foreseeable future, the Riksbank assumes that the effect of the coming tax changes on household consumption will be comparatively limited. This is partly because there are reasons for supposing that to some extent household consumption behaviour had already been adjusted earlier to expected tax relief. The effect is likely to be greater, however, for households that for various reasons have more difficulty in financing consumption by saving less or borrowing.

Total net wealth is also important for household consumption decisions. The wealth position of households is strong at present. Consumption is being driven by a favourable growth of wealth and a rapid development of income. The value of owner-occupied housing, which is normally the most important item for the development of consumption, has risen strongly in recent years. Moreover, the value of households' share holdings rose around 60 per cent in 1999. This year, however, the development of share prices has been unstable.

Household consumption is driven by a favourable growth of wealth and rapidly rising income.

The combination of rising employment and a favourable development of income and wealth has contributed to a very optimistic mood among households as regards their own as well as the national economy (Fig. 33). Interview data from Statistics Sweden show, for example, that around 30 per cent of households believe their own economic situation will improve in the coming twelve months, while only 10 per cent count on a deterioration. The optimism about the future is mirrored, moreover, in households' comparatively high demand for credit. Although the growth of household borrowing has tended to slacken recently, the ratio of debt to disposable income has gone on rising (Figs. 34 and 35). However, the ratio of household interest expenditure to disposable income, which is an indication of households' ability to service debt, has fallen markedly since the early 1990s as a result of decreased liabilities and lower interest rates (Fig. 36). The household saving ratio (the saved share of disposable income) has declined in recent years but the assumptions made here about the effect of the tax relief on consumption imply a renewed increase in the saving ratio in the period ahead. Total household expenditure on consumption is expected to rise 4.6 per cent this

year, 3.9 per cent in 2001 and 3.4 per cent in 2002.[14] The forecast for this year has accordingly been revised downwards by 0.6 percentage points, mainly in view of the unexpectedly weak outcome. The revisions for the coming years are small.

FIXED INVESTMENT AND STOCKBUILDING

Investment activity in the first half of this year, as reported in the national accounts, was somewhat weaker than expected in the June Report. But the good prospects of a strong investment trend in the coming years still hold.

The strong growth of domestic demand in particular is expected to lead to a diminishing amount of unutilised capacity in many industries and thereby generate a need of investment in new plant and machinery. Export-intensive manufacturing, moreover, is benefiting from the stronger export growth. Since the June assessment, there has been some further fall in real bond rates and the prospects for the coming years imply a favourable development of capital costs. Even with this year's stock market unrest, the strong development of share prices in recent years should have a positive effect on investment.

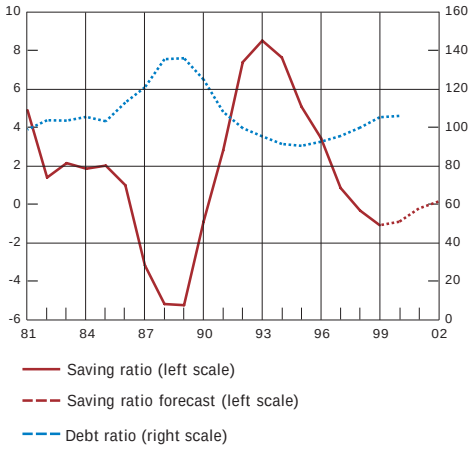
The growth of gross fixed capital formation in 2000 H1 was somewhat weaker than expected earlier.

The Q2 business tendency survey from the National Institute of Economic Research shows that the supply of machinery and plant is restricting production for almost 30 per cent of the interviewed firms in manufacturing (Fig. 37). Considering that the survey data also show comparatively high business optimism about the near future, the high utilisation of the capital stock points to relatively strong growth of industrial investment. In addition, the quarterly survey shows a favourable development of demand in the services sector, which supports the picture of good investment prospects even in other parts of the corporate sector.

Business optimism about the future, combined with relatively high utilisation of the capital stock, points to rising investment in manufacturing.

The ratio of corporate sector value added to the capital stock can be interpreted as measuring the return on capital. The capital stock becomes generally more productive when either labour intensity (the ratio of labour to capital inputs) or total factor productivity rises. There are indications that increased total factor productivity may have contributed to the rising return on capital in recent years (Fig. 42). The return on capital in the corporate sector is comparatively high at present, indicating that it is profitable to expand production capacity (Fig. 38).

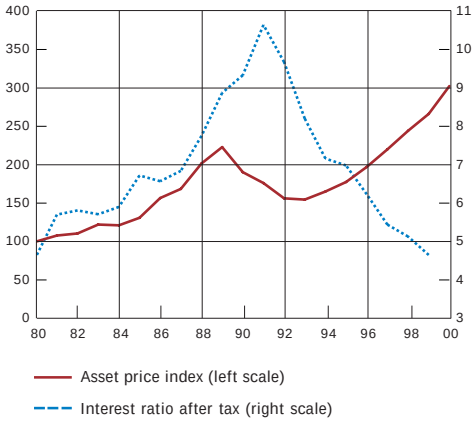
Figures 35. Household debt and saving ratios. Per cent of disposable income



Note. Negotiated employment pensions are excluded here from the saving ratio, which is calculated by deducting consumption expenditure from household disposable income and expressing the result as a percentage of disposable income. The debt ratio is defined as the ratio of total household debt to disposable income.

Source: Statistics Sweden.

Figure 36. Asset prices and the interest ratio after tax. Index (1980=100) and per cent of disposable income

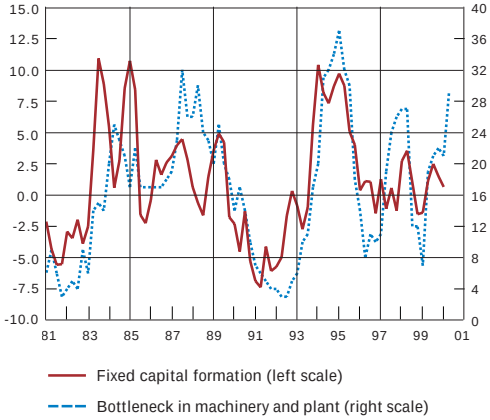


Note. Asset prices are defined as a weighted average of prices for shares, owner-occupied houses and commercial real estate. The asset price index is based on BIS data up to the end of 1997; the Riksbank has projected the time series after that. The interest ratio is household interest expenditure after tax in relation to disposable income.

Sources: Bank for International Settlements, Statistics Sweden and the Riksbank.

14 These figures refer to the total household sector, which includes the Church of Sweden as of 2000. Annual consumption growth in 2000 excluding the Church of Sweden is judged to be 3.7 per cent.

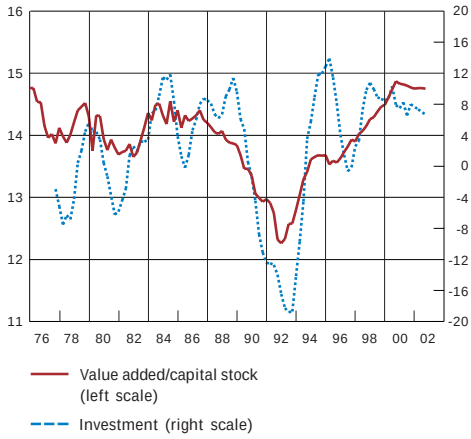
Figure 37. Gross fixed capital formation in manufacturing and firms with machinery and plant capacity as the primary bottleneck. Percentage change from previous quarter and per cent



Note. Seasonally-adjusted series expressed as moving quarter-centred means.

Sources: National Institute of Economic Research and Statistics Sweden.

Figure 38. Corporate sector: Value added relative to capital stock, and investment. Percentage points and percentage annual change



Note. 2000–02 Riksbank forecasts.

Sources: Statistics Sweden and the Riksbank.

The number of new housing starts in 1 and 2-family houses and apartment buildings in the first half of this year rose according to Statistics Sweden by as much as 36 per cent from the corresponding period a year earlier.[15] Other data from Statistics Sweden show that in the course of this year the number of vacant dwellings has decreased continuously in every county. In Stockholm county, for example, only around 0.2 per cent of dwellings were vacant at the time of the survey this spring. So housing demand remains high.

All in all, gross fixed investment is judged to rise 7.0 per cent this year, 8.2 per cent in 2001 and 7.0 per cent in 2002. The forecast for this year has accordingly been revised downwards by 1.6 percentage points but the forecasts for 2001 and 2002 are broadly unchanged.

Stock movements contributed 0.4 percentage points to GDP growth in 2000 H1. In the June Report it was foreseen that this year's annual contribution would be slightly negative. The outcome for the first half-year accordingly motivates some upward revision of the annual contribution from stocks in 2000. Business tendency data suggest, however, that firms' assessments of stocks have not changed at all remarkably. According to the quarterly survey in June, firms in manufacturing and distribution, for example, seemed content with the current level of stocks (Fig. 39). During 2001 and 2002 the contribution to growth from changes in stocks is judged to be more or less neutral.

EMPLOYMENT AND PRODUCTIVITY

The labour market has continued to develop favourably this year, though not quite as strongly as expected earlier. Compared with the corresponding period in 1999, employment has risen 1.7 per cent, which is equivalent to about 70,000 persons (Fig. 40). The positive labour market trend is expected to continue throughout the forecast period.

Ever since total employment began to pick up early in 1998, the increase has occurred mainly in private services. The positive development of employment has been accompanied by increased labour force participation. Since January the average number of persons in the labour force has risen 1.0 per cent or by over 40,000. One explanation for the increased inflow to the labour force is the marked reduction of participation in labour market programmes. Another is that full-time students who were job-seekers previously have obtained employment to a greater extent than before and accordingly belong to the labour force.[16] To date

15 Note that as large standardised upward revisions are normally made for a certain amount of under-reporting of residential construction, this outcome is still rather uncertain.

16 The Labour Force Surveys define job-seeking full-time students as not belonging to the labour force, so this category is not included in open unemployment.

this year the number of job-seeking students has decreased by a third from the corresponding period in 1999.[17]

The inflow to the labour force has risen, partly in connection with decreased participation in labour market programmes.

The number of new job vacancies is still rising rapidly. In the first eight months of this year the number averaged over 42,000, which is almost 20 per cent higher than a year earlier. Meanwhile, the number of unfilled job vacancies has risen almost 40 per cent to a current level of 38,000 (Fig. 41). The figures indicate that labour demand remains strong and that filling vacant jobs is taking increasingly longer.

Although labour demand is strong, there do not yet seem to be any general labour shortages in Sweden, though employment as well as unemployment are distributed unevenly across regions as well as occupations. The incoming statistics suggest that labour shortages are beginning to appear in construction. In segments of the services sector there are still major shortages of competent labour and the shortage of salaried technicians in manufacturing is comparatively widespread. However, the shortages are concentrated to the metropolitan areas and unemployment is still high in much of Sweden.

With the strong labour demand, both the labour force and the number in employment are expected to go on rising throughout the forecast period, though at a diminishing rate. The average level of employment is expected to rise 1.8 per cent this year and by a total of 3 per cent in 2001 and 2002. As the labour force is judged to grow somewhat more slowly than employment, open unemployment would fall to an average of 4.7 per cent this year, 4.0 per cent in 2001 and 3.4 per cent in 2002. The present unemployment forecast is marginally lower than in the June Report; the revisions are occasioned by minor changes in the development of employment and the labour force.

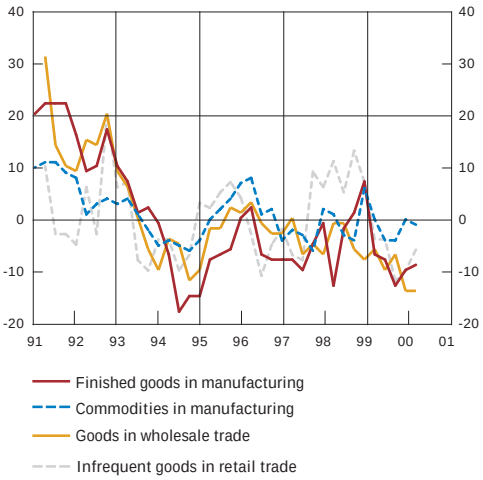
Table 4. Labour market forecast in the main scenario.
Percentage annual change and per cent

1999	2000	2001	2002	
Hourly wage	3.3	3.5 (3.7)	4.0 (4.3)	4.3 (4.3)
Labour productivity	1.0	2.0 (1.9)	2.1 (2.1)	1.8 (1.6)
Unit labour costs	2.6	1.9 (2.2)	1.8 (2.2)	2.5 (2.7)
Wage share	66.3	67.0 (67.2)	66.9 (67.2)	67.0 (67.5)
Hours worked	2.7	2.0 (2.4)	1.6 (1.4)	1.3 (1.3)
Open unemployment	5.6	4.7 (4.7)	4.0 (4.1)	3.4 (3.6)

Note. The figures in parentheses are the assessment in the June Report. The wage share is calculated as wages, including collective contributions, as a percentage of GDP at factor values.

Source: The Riksbank.

Figure 39. As-of-now stock judgements from business tendency surveys.
Net figure's deviation from historical average



Note. The net figure is the proportion of firms reporting stocks as too large less the proportion reporting them as too small. The historical average from which the net figure's deviation is shown refers to the period 1964 Q1–2000 Q2 for manufacturing and to 1991 Q2–2000 Q2 for trade.

Source: National Institute of Economic Research.

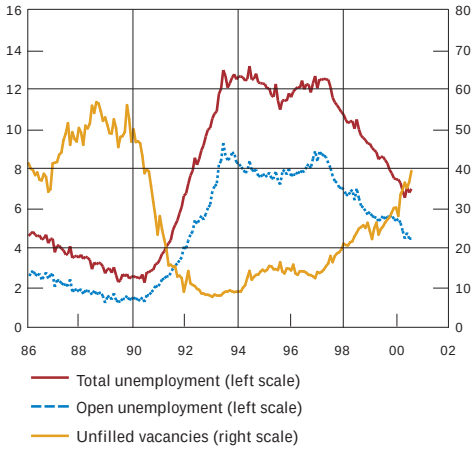
Figure 40. Employment (persons).
Index: 1980 Q3=100

Note. Seasonally-adjusted series expressed as moving 3-month averages.

Source: Statistics Sweden.

17 There is probably some statistical overlap here: many participants in labour market programmes can also be included in the Labour Force Survey statistics as job-seekers who are also students; this may explain why the total increase in the labour force is smaller than the combined fall in the numbers of training programme participants and job-seeking students.

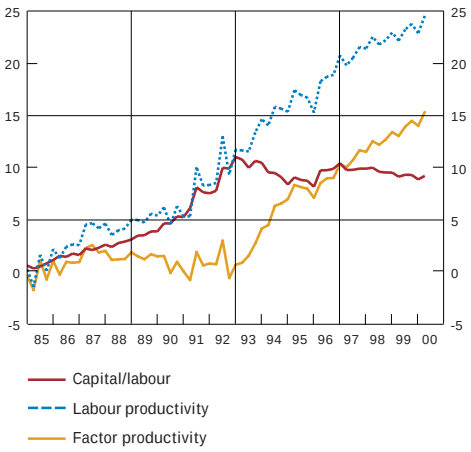
Figure 41. Unemployment and job vacancies. Per cent and thousands, respectively



Note. Seasonally-adjusted series.

Sources: National Labour Market Board and Statistics Sweden.

Figure 42. Corporate sector labour productivity. Logarithmic index: 1984=0



Note. Labour productivity decomposed with a Cobb-Douglas production function with constant returns to scale; the wage share of GDP is set at 0.6.

Sources: Statistics Sweden and the Riksbank.

The prospects for productivity are judged to be still good. The assessment implies productivity gains in this and next year that are somewhat larger than in 2002. In the initial phase of a cyclical upswing, production can be stepped up, at least in part, by making better use of the current labour force. Measured labour productivity accordingly rises comparatively rapidly when capacity is not yet particularly strained. As resource utilisation rises, it becomes necessary as well as possible to recruit additional labour, which tends to check the increase in labour productivity. This effect is accentuated, moreover, in that the acceleration of growth as such slackens as activity approaches the cyclical peak. Against this background, the picture of a somewhat larger initial amount of unutilised resources provides support for somewhat stronger productivity gains during the forecast period (Table 4).

Given certain assumptions, average labour productivity can be decomposed into one factor associated with capital intensity and another with total factor productivity. Capital intensity mirrors effects on productivity from changes in the relative inputs of capital and labour, while total factor productivity catches the effects of technological advances in a wide sense. Fig. 42 indicates that the growth of total factor productivity has followed a rising trend since 1993. While it is hazardous to draw far-reaching conclusions from calculations of this type, this may be a sign of some improvement in the economy's potential growth rate. The strong investment trend in the forecast period is also expected to stimulate productivity growth both by raising capital intensity and by speeding up the introduction of new technology.

RESOURCE UTILISATION

Resource utilisation is a central factor in the assessment of inflation's path. One of several indicators of total resource utilisation is the output gap. Put simply, the output gap can be said to measure the degree of over- or under-utilisation of the economy's total resources. When resources are over-utilised, prices and wages tend to rise faster than usual; when the opposite applies, price and wage increases tend to be more subdued than is normal. As the output gap is not observable, it has to be estimated indirectly with econometric methods. The resultant measurements of the output gap are therefore uncertain.

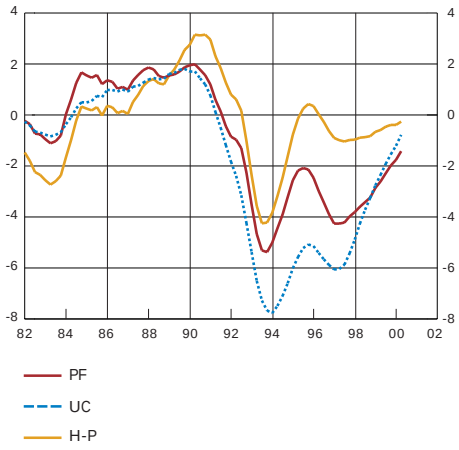
The output gap calculations have been updated in two respects. For one thing, new national accounts statistics for Q2 have been used and, for another, a broad indicator of labour market activity has been adopted for two of the indicators (UC and PF; see the box on pp. 40–43). The results from the updated calculations suggest that capacity utilisation has been somewhat lower than

assumed earlier (except for the HP measurement, see Fig. 43). The possibility that the amount of unutilised resources in the economy has been underestimated previously, even though some revision had already been made in the June Report, is supported mainly by the wage trend continuing to be weaker than expected. In addition, the National Institute's business tendency data show that although growth has been strong, capacity utilisation in manufacturing has been virtually unchanged in the past half-year and labour shortages are not widespread as the primarily obstacle to increased output in the production of goods (Fig. 44). In some service industries, however, there still seem to be large shortages of competent personnel. At present it is primarily in construction that shortage figures are clearly rising.

Another factor of major importance for the path of resource utilisation is the potential growth rate, that is, the difference between actual growth and the change in the output gap. For some time now the Riksbank's working assumption has been that the annual rate of potential growth is in the interval 2–2.5 per cent. As pointed out earlier, it is conceivable that the Swedish economy's potential growth rate has risen in the 1990s. There have been considerable changes in many respects, such as reforms of systems for taxation, social security and pensions. Legislation and EU membership have improved conditions for competition. For a decade now, moreover, stabilisation policy has focused on low inflation and macroeconomic stability. This has been accompanied by certain changes to the institutional framework for wage formation. Some allowance for all this has already been made in the assumptions about potential growth, which is now judged to be somewhat higher than the economy's average growth rate since the 1970s. Growth corresponding to 2–2.5 per cent a year is also more in line with the average rate over a longer period. It is mainly various changes that may have affected the economy's trend supply of labour and productivity that are relevant in this context.[18]

An amount of unutilised resources that is somewhat larger than assumed earlier reduces the risk of more widespread capacity restrictions in the coming years. Cyclically-dependent inflationary pressure is now judged to be marginally lower than was assumed in the June Report. It should be underscored, however, that current growth and the rate foreseen in the years ahead are above the potential rate and are therefore still expected to lead to the unutilised resources being brought into production successively during the forecast period, ultimately with an impact on prices.

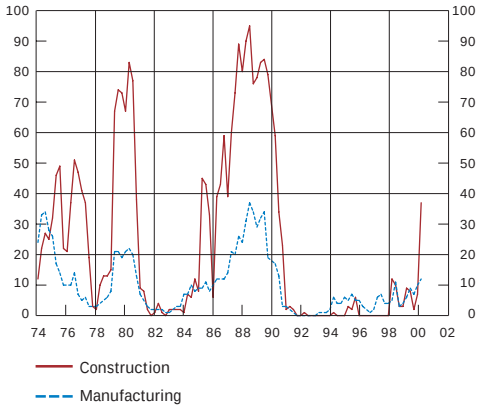
Figure 43. Econometric estimates of the output gap.
Per cent of potential GDP



Note. Data presented as moving four-quarter averages. UC is the Unobserved Components method and PF the production function approach. H-P stands for the Whittaker-Henderson or Hodrick-Prescott filter, which is based on the Riksbank's GDP forecast for 2000–2002. UC and PF have been updated with extended unemployment (see the box on pp. 40–43).

Source: The Riksbank.

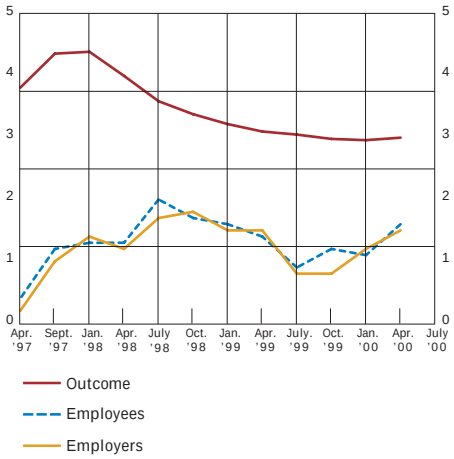
Figure 44. Proportion of firms with primary bottleneck in labour supply.
Per cent



Source: National Institute of Economic Research.

18 See *Inflation Report 1999:4*, box on pp. 41–44. Conceivable effects on inflation from changes in the trend labour supply and productivity are discussed in *Inflation Report 2000:2*, box on pp. 32–34. For a discussion of the related issue of how demographic changes affect the path of productivity, see the box on pp. 44–47 in this report.

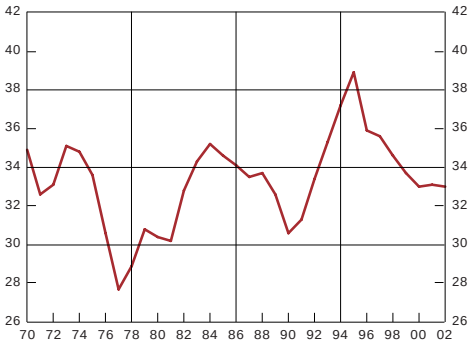
Figure 45. Actual and expected real wage increases.
Per cent



Note. Expectations calculated as the expected nominal wage rise less expected CPI inflation; wage rise defined as the percentage wage increase for all sectors combined excluding social security contributions but including carry-over effects and wage drift.

Sources: Prospera Research AB and Statistics Sweden.

Figure 46. Profit share.
Per cent of GDP at factor values.



Note. Series based on the earlier system of national accounts (SNA 68) as well as the new system (ESA 95). 2000–02 forecast.

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

WAGES AND UNIT LABOUR COSTS

In the June Report, wages were expected to move up 3.7 per cent this year and 4.3 per cent in both 2001 and 2002. However, the outcome to date this year has continued to be lower than expected. Part of the reason is considered to be somewhat lower resource utilisation that assumed earlier.

The lower rate of wage increases may also have to do with the circumstance that wage-setting principles in the labour market have been adapted to individuals and firms. This could lead to greater agreement between wage development and productivity growth at workplace level.[19] Examples are the absence of wage development guarantees in a number of union agreements and the occurrence, in the services sector's new labour markets, of wage-setting based more on performance and profits.[20] The risk of labour market disputes should be reduced, moreover, by the introduction of the Mediation Institute and the tendency for several unions to conclude multi-industry agreements on negotiating procedures, for example the manufacturing agreement.

Another factor that favours a moderate rate of future wage increases is the rising wage share. Between 1996 and 2000 H1, the average level of real wages rose 1.8 percentage points more than productivity. It is reasonable to suppose that in the long run the rate of real wage increases must be adapted to productivity growth. One explanation for the discrepancy in recent years is that the labour market organisations' inflation expectations at the time of the wage negotiations were above the outcome for the relevant period (Fig. 45). This has to do with the unexpectedly low inflation from 1998 to 2000 in the wake of the Asian crisis' effects on international prices, accompanied by remarkably low domestic price pressure.[21] Experience in recent years has shown that relatively low nominal wage increases can be associated with considerable improvements in real wages. Together with strong confidence in the low-inflation policy, this should create good conditions for relatively low nominal wage increases in the years ahead.

Against this background, the wage forecasts for this year and 2001 are revised downwards to some extent, to 3.5 and 4.0 per cent, respectively, while the forecast for 2002 is left unchanged.

19 See e.g. Calmfors, L. & Driffill, J. (1998), Bargaining structure and economic performance, *Economic Policy 6*.

20 See e.g. Giertz, E & Blomgren H. (2000), *Tillväxt och lönebildning – Om löne- och anställningsvillkoren på tjänstesamhällets nya arbetsmarknader* (Growth and wage formation – wages and terms of employment in the services society's new labour markets), IVA, Stockholm.

21 For a more thorough account of price developments from 1997 to 1999, see *Inflation Report 2000:1*.

The lower wage increases, together with somewhat higher productivity at the end of the forecast period, lead to a downward revision of the forecast for unit labour costs throughout the forecast period. Unit labour costs are now expected to rise less than 2 per cent this year and next, followed by an increase of 2.5 per cent in 2002. But even with the lower wage increases, during the forecast period it is judged that unit labour costs will continue to rise somewhat faster than domestic prices. This means that the profit share continues to fall, though somewhat more slowly than before (Fig. 46).

THE LABOUR MARKET AND RESOURCE UTILISATION

During the past year, the econometric methods used by the Riksbank to estimate the output gap indicate that the amount of unutilised resources has become successively smaller. An assessment based solely on these econometric data indicates that the Swedish economy was operating at full capacity in 2000 Q2.

At the same time, other major indicators show that resource utilisation in Sweden is moderate, though rising. According to the business tendency data for manufacturing, for example, labour shortages are still relatively limited. Neither do labour shortages seem to be a serious problem in the services sector, although conclusions in this respect are complicated by the shortness of the time series.

Another facet of the picture is that the development of domestic prices and wages in the past year has remained moderate. Relatively low inflationary pressure to date in Sweden is also evident from comparisons with other countries (see the box on pp. 60–61).

Determining the level of resource utilisation in the economy at all exactly is always difficult. The Riksbank uses a large variety of indicators and models for this. The assessments have been revised on a number of occasions, for example in the light of new econometric results.

It is conceivable that the output gap and thereby the amount of unutilised resources in the economy have been underestimated with the econometric models used by the Riksbank to date.

The Unobserved Components model (UC model) decomposes unemployment into cyclical and structural components.[22] The cyclical component is identified as the proportion of unemployment that co-varies with changes in the rate of inflation. The relationship between this 'unemployment gap' and the output gap is often referred to as an Okun relationship.

The share of unemployment that is not cyclical can be regarded as structural. In economic theory, structural unemployment (NAIRU or equilibrium unemployment) is the level of unemployment at which the rate of inflation neither rises nor falls. When actual

22 The model is described in *Inflation Report 1999:2*, box on pp. 51–52. See also Apel, M. & Jansson, P. (1997), *System estimates of potential output and the NAIRU*, Sveriges Riksbank Working Paper 41.

unemployment corresponds to equilibrium unemployment, on average the output gap is closed.

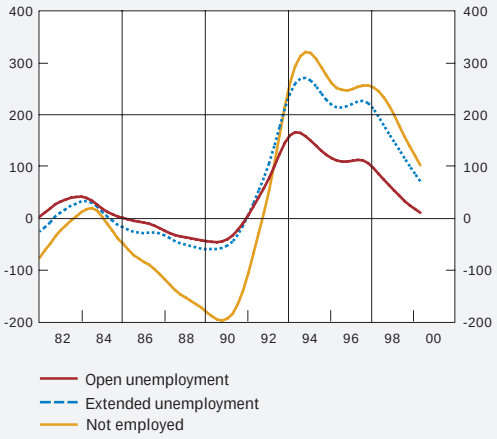
In the UC model unemployment has been measured to date as *open unemployment*, defined as the quotient of the number unemployed and persons in the labour force. In the Labour Force Surveys from Statistics Sweden, persons who are both willing and able to work and have looked for work during the period in question are registered as unemployed. This definition accordingly excludes participants in various forms of labour market programmes.

Persons in the labour force are defined correspondingly as those who are either employed or unemployed. Outside the labour force defined in this way is the group of *latent job-seekers*, which consists of persons who wanted and were able to work in the period in question but for various reasons did not look for a job, as well as those who looked for work at the same time as they were studying full-time.[23] The latter group may overlap to some extent with the group on labour market training.

Historically there has been a very strong co-variation between the labour force and labour market activity. This is partly due to the inflow to and outflow from the group of latent job-seekers. When unemployment is high, many people see no point in looking for work or use the period of unemployment for studies or other activities outside the regular labour force. When labour demand then recovers, many of these people tend to return to the labour market. In this way, latent job-seekers have constituted a labour reserve that is not caught in the Labour Force Survey's definition of unemployment. This has also meant that open unemployment has not normally fluctuated as much as employment.

In an alternative indicator of unemployment, used by the National Institute of Economic Research and others, both the labour force and unemployment are defined to include latent job-seekers. The cyclical fluctuations are smaller for this extended labour force measurement. An even broader indicator of unemployment is the proportion of persons who are not employed in the total age group 16–64 years.

Figure B10. Estimated unemployment gap with alternative indicators of labour market activity. 1000s of persons



Note. Series expressed as moving four-quarter averages.

Source: The Riksbank.

23 The latter group is included in the ILO definition of unemployment, which is presented in OECD statistics, for instance, as 'standardised unemployment'.

The results of estimations with the UC model are studied here to see how they are affected when these alternative and broader measurements of unemployment and employment are inserted instead of open unemployment.

The different estimated time series for the unemployment gap are presented in Fig. B10. It will be seen that in the period after 1992 the broader measurements indicate considerably larger unutilised resources. Another point to note is that resource utilisation, particularly as represented by the broadest indicator (not employed), is calculated to have been considerably more strained in the late 1980s.

With the UC model estimated with the extended measure of unemployment, today the unemployment gap is around 70,000 persons as opposed to around 10,000 persons when estimated with open unemployment. With the broadest unemployment indicator, the unemployment gap is about 100,000 persons. The output gap estimated correspondingly with extended unemployment is –0.8 per cent as against +0.2 per cent using open unemployment.[24]

Formal statistical criteria cannot be used to show which of these models yields the most accurate description. An indication can be obtained, however, by calculating the simple correlation between the different output gaps and the future rate of inflation. The correlation turns out to be higher for the broader indicators (Table B2). In order to control for variables that have a bearing on inflation without being directly linked to the level of domestic activity, the following equation was also estimated:

$$\Delta P_t = \alpha + \beta_1 UGAP_{t-4} + \beta_2 \Delta PM_t + \beta_3 \Delta T_t + \beta_4 \Delta P^*_{t-4},$$

where ΔP is the percentage 12-month change in consumer prices, $UGAP$ the respective unemployment gap (lagged 4 quarters), ΔPM the percentage change in import prices, ΔT the net change in indirect taxes and subsidies, and ΔP^* the changes in households' inflation expectations (lagged 4 quarters).

24 All figures are moving four-quarter averages.

Table B1. Correlations and regression estimates.

	Correlation	β_1	*t statistic*	*p value*
Open unemployment	-0.629	-0.217	-1.666	0.100
Extended unemployment	-0.716	-0.190	-2.303	0.024
Not employed	-0.718	-0.161	-2.894	0.005

Note. Estimated on the period 1983 Q1–2000 Q2.

Source: The Riksbank.

Considering that the broader unemployment indicators are numerically larger, the differences between the parameter estimates are not particularly great. But the estimates do point to the broader indicators being associated with a clearer effect on inflation. When the calculations use open unemployment, the hypothesis that the unemployment gap does not affect inflation cannot be rejected at the 5 per cent level. With the broader indicators, on the other hand, the effect of the gap does attain statistical significance.

Using the estimates above for the broader unemployment indicators, the cyclical component of inflation can be calculated to be about 0.3 percentage points lower than when open unemployment is used.

There are good grounds for assuming that open unemployment is less appropriate for measuring the amount of unutilised resources in the labour market. This indicator tends to overestimate resource utilisation when labour demand is low and to underestimate labour shortages when labour demand is high. This pattern is confirmed by estimates with the UC model using broader measurements of labour market activity, for example the extended indicator, which includes latent job-seekers. Calculated with the broader activity indicators, the unemployment gap also appears to co-vary more closely with future inflation.

DEMOGRAPHY, CAPITAL INTENSITY AND LABOUR PRODUCTIVITY

Regardless of how it is measured, the standard of living in an economy has to do with the development of productivity: productivity gains mean that output can be raised without requiring a larger input of production factors. The path of productivity is also highly relevant when assessing inflation prospects, partly because it can affect the potential growth rate and consequently the amount of resources that is available to meet current demand. The higher the rate of potential growth, the less will be the risk of bottlenecks in the economy.

The massive investment in information technology in recent years has probably benefited or will benefit productivity. Market deregulation and the growing international competition can likewise contribute to gains in productivity via increased pressure to rationalise production. One aspect of productivity that has not attracted all that much attention to date in the economic policy debate is the future effects of expected demographic shifts. Some conceivable consequences for productivity of the changes that are foreseen in the age structure of Sweden's population in the next fifty years are discussed here.

The starting point is a simple growth model with a production function:

$$Y=AK^{\beta}L^{1-\beta}, \qquad (1)$$

where A stands for the level of production technology (total factor productivity), K for the total capital stock, L for the labour force (total hours worked) and β measures the share of output that is paid to owners of capital. Average labour productivity is defined as volume output per man-hour:

$$\frac{Y}{L}=\frac{AK^{\beta}L^{1-\beta}}{L}=A\left(\frac{K}{L}\right)^{\beta}=Ak^{\beta}. \qquad (2)$$

Equation (2) states that labour productivity is determined by total factor productivity A and capital intensity $k = K/L$. The more efficiently the factors of production K and L are employed in the production

process (that is, the higher total factor productivity A becomes), the more productive labour will be. Labour also becomes more productive as capital intensity rises, that is, as each employee has more capital equipment to work with.

Capital intensity can be affected by the distribution by age, for example. Demographic changes that affect the relative supplies of capital and labour will then affect labour productivity. Assume, for example, that the capital stock is determined by the capital savings of the elderly population and that the labour force consists of younger persons.[25] Capital intensity is then determined by the elderly's capital savings per individual (s) multiplied by the result of dividing the number of elderly persons (N_e) by the number of younger persons (N_y):

$$k = \frac{K}{L} = s\frac{N_e}{N_y}, \qquad (3)$$

Equation (3) shows that an ageing population (a rising age quotient) results in rising labour productivity. While the size of the contribution to productivity from the expected demographic trend is naturally difficult to estimate in reality, a simple arithmetical example may be illustrative.

Assume that the number of economically active younger persons is represented by the total population aged 21–50 years and that the number of elderly persons consists of everyone aged 51–80 years. Assume further that owners of capital obtain 30 per cent of output (approximately the historical average since 1970) and that both capital savings per elderly person and total factor productivity are constant (and equal to 1.0). Given these assumptions, we find that $Y/L=(N_e/N_y)^{0,3}$ and $k=N_e/N_y$, that is, both labour productivity and capital intensity are solely functions of the age ratio.

Using Statistics Sweden's age forecast up to 2050, the paths of capital intensity and labour productivity are presented in Fig. B6. The calculations indicate that in the period 2000–2030 the demographic trend is expected to raise labour productivity by an average of 0.2 percentage points a year. It is worth noting, however, that in the coming ten years the contribution is expected

25 The model behind this simplification envisages that each person's life is divided into two periods. When they are young, people offer their labour, earn income and decide how much to save for the second period. On entering the second period, they invest their savings and then consume the return as well as the initial capital in the course of that period.

to become successively smaller. According to the simple calculations, the demographic effect on labour productivity is largest in the period just before 2020. Relatively large contributions are also indicated just before 2040.

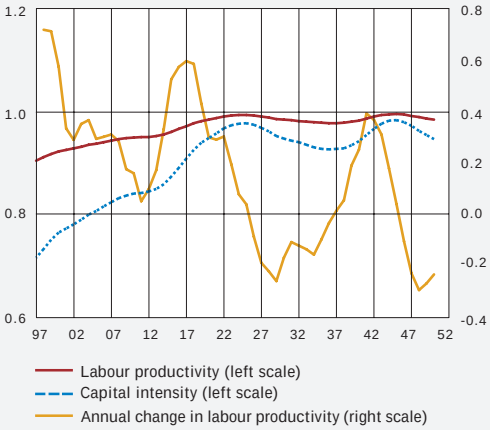
The above account is naturally a gross simplification. In the real world, most younger persons also have capital savings that yield a return and many elderly persons work. A division of the life cycle into more than two periods is therefore likely to be more realistic and the relationship between the age structure and capital intensity is probably more complex than equation (3) implies. Moreover, the age trend probably affects total factor productivity A, a circumstance that is disregarded in this simple analysis. It seems likely, for instance, that middle-aged Swedes in general have a larger stock of knowledge than other age groups because in the course of a long working life they have accumulated valuable experience. A rising age ratio can then tend to raise total factor productivity. But it is also reasonable to suppose that for older persons, total factor productivity ultimately begins to decline. So, too large a group of old individuals could have a negative impact on factor productivity. Another negative effect on potential growth is that labour supply tends to be reduced by an ageing population. Another simplification is that the model does not take developments in other countries into account. Capital intensity is also affected by a country's net financial balance with the rest of the world. If, for example, domestic investment exceeds aggregate saving, a certain amount of capital has to be imported, net, from abroad, giving a negative external financial balance. A negative balance accordingly tends to raise capital intensity and labour productivity. A good example of this is the United States, which in recent years has been a net capital importer.

The arithmetical example presented above roughly illustrates the extent to which the Swedish age trend — via the relative supplies of capital and labour — might affect average labour productivity. The results clearly have to be treated with caution but they do indicate that there are at least periods in the coming decades when demographic changes can be expected to have fairly large consequences for the path of productivity. According to the simple calculations, in the period

2000–2030 the average annual growth of labour productivity is raised about 0.2 percentage points.

The proportion of elderly persons in the population rises continuously, which will entail strains on the economy and the public finances. The ratio between those who work and those who are maintained will become less favourable. This study shows that another economic mechanism is at work that can counter these problems: higher savings can lead to increased investment and thereby to higher productivity. Little is known, however, about how important this aspect will be in practice.

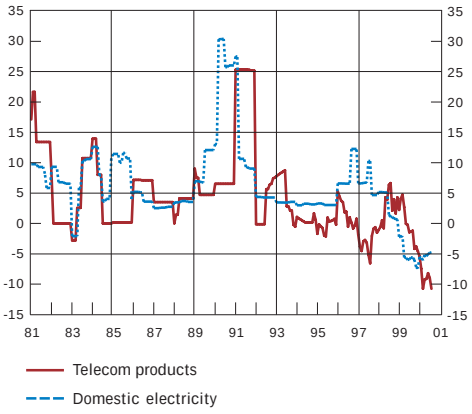
Figure B11. Capital intensity and labour productivity.
Index and per cent



Note. Capital intensity calculated in accordance with equation (3), labour productivity with equations (2) and (3). Age forecast from Statistics Sweden. The calculations start from A=s=1 and β=0.3.

Sources: Statistics Sweden and the Riksbank.

Figure 47. Electricity and telecom prices. Percentage annual change



Source: Statistics Sweden.

Price effects of deregulation and trade liberalisation

The development of prices is affected both by market deregulation and by the liberalisation of trade, but estimating the exact timing and magnitude of such effects is difficult. In the past year the discussion has mainly concerned effects of deregulating electricity and telecom markets and the EU's Agenda 2000 reform of agriculture, which between them affect about 10 per cent of household consumption. Changes in market conditions, such as extended markets for international corporations and stricter requirements for public procurement, have contributed in recent years to increased competition in other markets, too, and this has also subdued price pressure. Moreover, attention has been drawn to deficient pricing and competitive conditions that still exist in certain sectors of the Swedish economy, which paves the way for measures that will affect the future development of prices.[26] Contrary effects are liable to come, however, from such factors as the recent trend towards increased concentration in business and the EU ban on parallel imports.

Since the Swedish electricity market began to be deregulated in 1996, prices have fallen successively. Increased competition has resulted from the abolition of the time metre requirement at the end of 1999. More new players have entered the market and contributed to further price cuts. The level of electricity prices in August was almost 5 per cent lower than a year earlier (Fig. 47). For 2000, however, the assumed downward CPI effect from falling electricity prices is now somewhat smaller than envisaged earlier.

Telecom prices are judged to go on curbing inflation.

The new Telecommunications Act from the early 1990s has led to a stepwise deregulation of the telecom market. Competition has increased in certain segments of this market, particularly in international and mobile telephony, where prices have been pushed down markedly. During the summer there have been further price cuts for fixed phone calls, for example for calls to mobile phones as a result of the reduced tariff for transmitting calls from other operators. Competition is still weak for products that require an access net. This applies to local calls and subscriptions, which make up two-thirds of the total telecom market, where Telia is still dominant. The proposal to open the access net to additional operators has been deferred. The National Post & Telecom Agency considers that a decision should be combined with the removal of the present price ceiling on subscriptions and ancillary services.[27] The price ceiling makes it difficult for new players to compete with Telia. Telecom prices have fallen about 10 per

26 See Konkurrensverket (2000), *Konkurrensen i Sverige under 90-talet – problem och förslag* (Swedish Competition Authority, 'Competition in Sweden in the 1990s – problems and proposals'), Report series 1.

27 Post- och telestyrelsen (2000), *Analys av prisreglering på telemarknaden* (National Post & Telecom Agency, 'Analysis of price controls in the telecom market)'), June.

cent to date this year, which is in line with the forecast in the June Report. All in all, this year's contribution to CPI and UND1X inflation from telecom prices is judged to be just under –0.3 percentage points. Compared with the June assessment, this year's contribution from falling telecom prices is now judged to be somewhat larger and the contribution from falling electricity prices somewhat smaller. The combined assessment of effects of deregulations is therefore broadly the same as in June.

The assessment of effects of Agenda 2000 is also unchanged. Their downward impact on CPI inflation is judged to total about 0.4 percentage points, spread over ten years.

Taken as a whole, the various deregulations and liberalisation of trade are judged to hold CPI inflation back by between 0.4 and 0.1 percentage points a year during the forecast period (Table 5).

Table 5. CPI effects of deregulations.
Percentage points

	Dec. 1999	Dec. 2000	Dec. 2001	Sep. 2002
Dental charges	0.2	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Electricity prices	-0.2	0.0 (-0.1)	0.0 (0.0)	0.0 (0.0)
Telecom prices	-0.1	-0.3 (-0.2)	0.0 (0.0)	0.0 (0.0)
Agricultural prices	0.0	-0.1 (-0.1)	-0.1 (-0.1)	-0.1 (-0.1)
Total CPI effect	**-0.1**	**-0.4 (-0.4)**	**-0.1 (-0.1)**	**-0.1 (-0.1)**

Note. The forecasts in the June Report are shown in parentheses for comparison. The present forecasts for September 2002 are accordingly compared with the earlier forecasts for June 2002.

Source: Statistics Sweden and the Riksbank.

Effects of political decisions and interest expenditure

The Budget Bill for 2001 contains a number of proposed tax changes that are judged to affect both CPI and UND1X inflation. The changes to property taxes are the most important.

The calculations in the June Report assumed that taxable property values for owner-occupied houses would continue to be frozen in both 2001 and 2002. The Budget Bill proposes that property values are uprated in 2001 in accordance with the indexing system but that the tax rate is simultaneously reduced from 1.5 to 1.2 per cent of the taxable value, and that annual indexed uprating is reintroduced. In 2001, the CPI effect of these three changes to property tax on owner-occupied houses is calculated to be 0.1 percentage point higher than assumed in the June Report (Table 6). The new proposal does not affect UND1X.

Property tax changes for owner-occupied houses give a somewhat increased contribution to CPI inflation.

Other proposals in the Budget Bill involve increased taxes on energy and lower VAT on travel, for example. The adjustment of tax rates on energy and carbon dioxide contribute about 0.2 percentage points to the CPI in January 2001, accompanied by an effect of –0.1 percentage point from lower VAT.

Table 6. Direct CPI effects from indirect taxes, subsidies and interest expenditure.
Percentage points

	Dec. 2000	Sept. 2001	Dec. 2001	Sept. 2002
Indirect taxes and subsidies	0.1 (0.1)	0.1 (0.0)	0.1 (0.0)	0.0 (0.1)
Increased taxable value of owner-occupied houses		0.4 (0.0)	0.4 (0.0)	
Temporary freeze on taxable value of residential property	-0.1 (-0.1)	0.0 (-0.1)	0.0 (-0.1)	0.0 (-0.1)
Property tax cut for owner-occupied houses		0.4 (0.0)	0.4 (0.0)	
Total for owner-occupied houses	-0.1 (-0.1)	0.0 (-0.1)	0.0 (-0.1)	0.0 (-0.1)
House mortgage interest expenditure	0.0 (0.0)	0.0 (0.1)	0.1 (0.1)	0.2 (0.2)
Total	**0.0 (0.0)**	**0.0 (0.0)**	**0.1 (0.0)**	**0.2 (0.1)**

Note. The forecasts in the June Report are shown in parentheses for comparison. The present forecasts for September are accordingly compared with the earlier forecasts for June. This table shows only direct effects of changes to indirect taxes; indirect effects are presented in Table 6. The overall CPI effect is therefore represented by the sum of the total effects in Tables 6 and 7.

Sources: Statistics Sweden and the Riksbank.

House mortgage interest expenditure in August 2000 was somewhat higher than a year earlier. The assumption of an unchanged repo rate means that mortgage rates are assumed to become somewhat lower than at present. The contribution to CPI inflation is judged to be small throughout the forecast period (Table 6).

In the same way as for owner-occupied houses, it was assumed in the June Report that the taxable value of apartment buildings would continue to be frozen, accompanied by an end to the temporary reduction of the tax rate. The Budget Bill proposes that these taxable values are also uprated and that the tax rate is

lowered from 1.2 to 0.7 per cent. These changes affect UND1X inflation because a tax adjustment for apartment buildings is classified as an indirect effect of an indirect tax. The combined contribution to UND1X inflation during 2001 is calculated to be –0.1 percentage point, which is just over 0.2 percentage points below the assumption in the June Report (Table 7).

Property tax changes for apartment buildings reduce the contribution to UND1X inflation.

For 2002 the proposed maximum day nursery charge is judged to have a downward effect on CPI inflation of 0.3 percentage points. Day nursery charges are included in the HICP at present but not in the CPI; the present assessment assumes that they are included in the CPI before 2002.

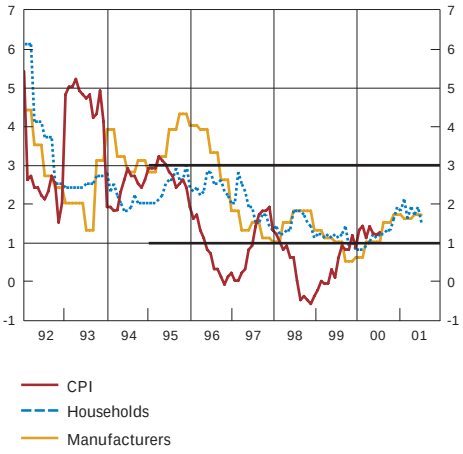
Table 7. CPI and UND1X effects from political decisions.
Percentage points

	Dec. 2000	Dec. 2001	Sep. 2002
Maximum day nursery charge	0.0 (0.0)	0.0 (0.0)	-0.3 (-0.3)
Property tax on apartment buildings	0.0 (0.0)	-0.1 (0.2)	0.0 (0.0)
Total effect	**0.0 (0.0)**	**-0.1 (0.2)**	**-0.3 (-0.3)**

Note. The forecasts in the June Report are shown in parentheses for comparison. The present forecasts for September 2002 are accordingly compared with the earlier forecasts for June 2002. See also the note to Table 6.

Source: The Riksbank.

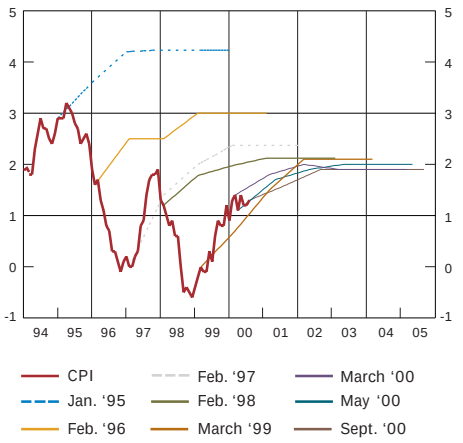
Figure 48. CPI inflation and expectations of households and manufacturers. Percentage 12-month change



Note. The curves for expectations have been shifted twelve months into the future so that they coincide with the period to which the expectations refer. As of 1996, households' ten most extreme responses at either end are excluded; prior to 1996 the curve shows the responses in the range 0–15 per cent. The horizontal lines from 1995 onwards represent the Riksbank's tolerance interval for the change in the CPI.

Sources: National Institute of Economic Research and Statistics Sweden.

Figure 49. Money market agents' inflation expectations. Percentage 12-month change



Sources: Prospera Research AB and Statistics Sweden.

Inflation expectations

Surveys published since the June Report show a slight tendency for inflation expectations to become somewhat lower. Both the medium-term and the longer-term expectations remain firmly anchored around 2 per cent. It is envisaged that the comparatively low and stable inflation expectations in Sweden will tend to subdue the inflationary pressure from the ongoing economic upswing. The high oil prices do not appear to have had any appreciable effect on Swedish inflation expectations. Neither does this seem to have been the case in the United States or the euro area. Since the spring, the average level of inflation expectations in the euro area has admittedly tended to move up but this seems to be essentially a result of the stronger international activity.[28] According to Statistics Sweden, since the June Report Swedish households have adjusted their one-year inflation expectations 0.1 percentage point downwards to 1.5 per cent (Fig. 48, Table 8). Among firms in manufacturing and service industries, on the other hand, the one-year expectations have moved up 0.1 and 0.2 percentage points, respectively, to 1.7 and 1.6 per cent.[29] In the September survey from Statistics Sweden there was a slight tendency for inflation expectations to be somewhat lower than in the May survey (Table 8). Purchasing managers in manufacturing have adjusted their expectations downwards to some extent, bringing them more into line with the other categories' expectations around 2 per cent. The August survey from Aragon showed some increase in inflation expectations for the coming five years, to an average of about 2.2 per cent, but the expectations for the coming two years were unchanged.

Medium- and longer-term inflation expectations continue to be firmly anchored around the inflation target.

Inflation expectations can also be derived from market interest rates by studying the difference between nominal and real bond rates.[30] Since the June Report, the average level of expectations of inflation approximately 4 years ahead has fallen some tenths of a percentage point and is currently about 1.4 per cent. Expectations of inflation in the longer run can be derived from the difference between nominal and real forward long-term interest rates. For forward rates between 4 and 14 years this difference has fallen marginally to about 1.5 per cent since the June Report (Fig. 50).

28 Expectations data obtained from Sifo Research & Consulting and Aragon Fondkommission (Aragon Euroland Inflation Rate Survey).

29 The change from March to June is taken from business tendency data from the National Institute of Economic Research.

30 The results should be interpreted with caution because nominal interest rates are also affected by other factors, for example risk premia; moreover, the market liquidity of real interest bonds is comparatively low.

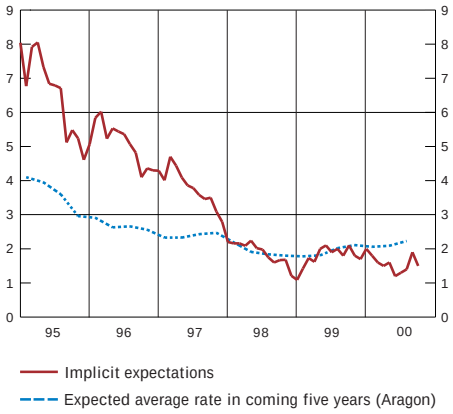
Table 8. Expected rate of CPI inflation.
Annual rate, per cent

Expected inflation 1 year ahead		
Money market agents	1.6	(-0.1)
Employer organisations	1.8	(-0.1)
Employee organisations	1.8	(0.0)
Purchasing managers, trade	1.9	(0.0)
Purchasing managers, manufacturing	2.1	(-0.1)
Households (HIP)	1.5	(-0.4)
Manufacturing firms (tendency surveys)	1.7	(0.1)
Services firms (tendency surveys)	1.6	(0.2)
Expected inflation 2 years ahead		
Money market agents	1.9	(0.0)
Employer organisations	2.0	(0.0)
Employee organisations	2.0	(0.0)
Purchasing managers, trade	2.1	(0.0)
Purchasing managers, manufacturing	2.2	(-0.2)
Expected inflation 5 years ahead		
Money market agents	1.9	(-0.1)
Employer organisations	2.1	(-0.1)
Employee organisations	2.1	(-0.1)
Purchasing managers, trade	2.3	(-0.1)
Purchasing managers, manufacturing	2.2	(-0.2)

Note. The figures in parentheses are the change in percentage points from the previous survey.

Sources: National Institute of Economic Research and Statistics Sweden.

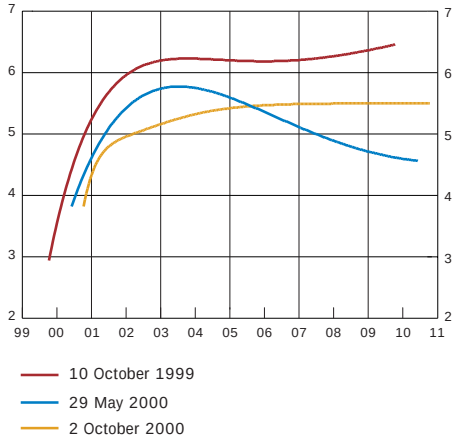
Figure 50. Inflation expectations.
Per cent



Note. Implicit inflation expectations are derived from the difference between implied 4–14-year real and nominal bond rates.

Source: Aragon Fondkommission and the Riksbank.

Figure 51. Implied forward interest rates.
Effective annual rate, per cent



Source: The Riksbank.

Inflation assessment

This chapter summarises the Riksbank's assessment of inflation prospects up to 2002 Q3, given that the repo rate is left unchanged at 3.75 per cent. The principal features of the main scenario (the developments in the coming twenty-four months that are considered most probable) are described, followed by an appraisal of the uncertainties and risks in the inflation prospects.

Inflation prospects in the main scenario

International economic prospects have improved since the June Report. Economic growth in the United States has remained rapid and is judged to be higher this year than foreseen in June. A slowdown is foreseen in the coming two years, partly in view of the interest rate hikes and the slackening tendencies that have been noted in forward indicators. But even the growth forecasts for 2001 and 2002 are now somewhat higher than earlier. Growth in the euro area has strengthened this year, though recently the positive prospects have tended to weaken. Growth in Japan as well as in the Nordic area is now also judged to be stronger in the forecast period. All in all, growth this year in the OECD area has been adjusted upwards about 0.5 percentage points to 3.8 per cent. A gradual slackening of OECD area growth is foreseen in the rest of the forecast period but it is somewhat slower than assumed in the June forecast. The growth rates are now forecast to be 3.0 per cent in 2001 and 2.7 per cent in 2002. The high global activity entails a rapid expansion of international trade, with favourable effects on Sweden's export market growth, for example.

The price of crude oil is judged to fall back gradually in the coming two years but not as markedly as assumed in June. This means that the price is expected to remain above the OPEC target of USD 25 for some time to come. An expansion of production capacity in other oil-producing countries is ultimately expected to contribute to a price fall. Against this background, the forecast average barrel price of crude has been adjusted upwards in the main scenario from about USD 26 to almost USD 29. In the course of 2001 and 2002 it is judged that the price will fall back to USD 26 and USD 25, respectively; compared with the June forecasts, these price levels are about USD 4 higher. Other commodity prices are judged to rise somewhat more than assumed earlier in the rest of this year, after which the rate of increase is expected to slacken.

The high oil price has led to some increase in the rate of inflation in the major industrialised countries. As the oil price starts falling, however, the increase is judged to slacken. Underlying inflation has admittedly tended to move up but is still low in both the euro area and the United States and there

are still no signs that the high oil price has affected inflation expectations in these countries. All in all, the forecast increase in international consumer prices is broadly unchanged around 2 per cent throughout the forecast period.

Even though world trade is rising strongly, the international price trend for manufactured exports in national currencies is expected to be subdued. The outcome to date this year has been considerably below expectations and export prices are falling in some countries. Deregulation, strong competition and surplus capacity, above all in manufacturing, are probably some of the reasons why firms have not raised prices as much as expected. The oil price's impact on prices to producers does not yet seem to have affected prices for other goods. Against this background, in all the forecast years the international price rise for manufactured exports in national currencies is judged to be somewhat slower than assumed earlier.

The krona's exchange rate has been somewhat weaker in the third quarter than was assumed in the June Report. This is mainly because the U.S. dollar has been considerably stronger than had been foreseen. As in June, the krona is judged to appreciate during the forecast period. In the main scenario the TCW exchange rate is judged to average 122 during 2001 and just over 119 in 2002. This development is somewhat weaker than the earlier forecast.

The weaker exchange rate and higher oil prices imply larger price increases for imported goods to producers as well as consumers, above all in the early part of the forecast period. To some extent, however, these price effects are countered by a weaker development of international prices for manufactured exports in national currencies. All in all, the average price level for imported consumer goods is judged to rise 2.3 per cent this year, which is almost 0.5 percentage points more than foreseen earlier. For 2001 and 2002 the changes in the import price forecast are small.

The inflation assessment starts from the technical assumption of an unchanged repo rate in the coming two years. As the repo rate has not been adjusted since the June Report, the forecast level of nominal short-term interest rates is broadly the same as at that time. The forecast longer bond rates, however, have been adjusted marginally downwards.

The direction of fiscal policy is also important for economic developments. The favourable development of the public finances has enabled the Government to initiate a reduction of income taxes. Further income tax cuts totalling SEK 13.5 billion in 2001 are proposed in this autumn's Budget Bill. These cuts have been incorporated in the forecast for private consumption. The main scenario also assumes that, as a part of the declared goal of compensating all employees for earlier increases in personal social security contributions, the Government cuts income taxes by about another SEK 15 billion in 2002. However, the effect of these cuts on household consumption is judged to be relatively limited.

This is partly because, since households have already had grounds for counting on the cuts, they have presumably adjusted their spending in advance.

The development of asset prices is another important factor in this context. Household net wealth has developed positively in recent years and contributed to the rapid growth of private consumption. House prices have gone on rising this year in line with the June assessment. Share prices have been unstable, however. It is conceivable that this has affected households' assessments of their wealth and the scope it provides for consumption.

Developments in recent months have not provided grounds for any major revision of growth prospects for the Swedish economy. The macroeconomic picture is therefore still judged to be characterised by a stable and comparatively strong upswing, driven above all by rising domestic demand. Together with the stronger international trend, however, paths for investment and consumption in the first half of this year that were somewhat weaker than expected motivate some modification of the growth profile over the forecast period. Forecast growth is adjusted downwards by 0.3 percentage points this year, followed by some upward adjustment in 2001 and 2002. All in all, the GDP growth rate is accordingly judged to be 4.0 per cent in 2000, 3.7 per cent in 2001 and 3.0 per cent in 2002.

All in all, GDP growth is judged to be 4.0 per cent in 2000, 3.7 per cent in 2001 and 3.0 per cent in 2002.

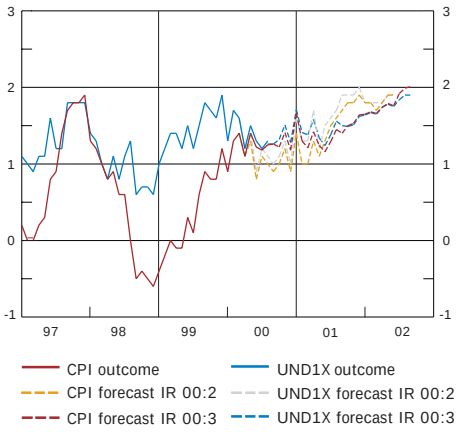
There are signs that the amount of unutilised resources may be somewhat larger than the Riksbank had reason to count on earlier. Wages and various shortage figures, for example, are still rising at moderate rates.

Partly in view of the lower resource utilisation, wage increases in 2000 and 2001 are judged to be somewhat lower than assumed in the June Report. The forecast for 2002, however, is unchanged. Moreover, the forecast development of unit labour costs has been revised downwards throughout the forecast period, partly because wage increases are now expected to be lower. Towards the end of the forecast period, the prospect of marginally higher productivity growth also has an impact on unit labour costs.

Expectations of inflation in the medium and long term continue to be firmly anchored around the inflation target. The low and stable inflation expectations are judged to help subdue the inflationary pressure from the ongoing economic upswing.

Against this background and given an unchanged repo rate, UND1X inflation in the main scenario is judged to be 1.5 per cent one year ahead and 1.9 per cent after two years. The forecast rates one to two years ahead are accordingly unchanged from the main scenario in June even though the economy has been in a strong upswing for four more months. For 2000 the UND1X inflation forecast is marginally higher than in the June Report, mainly on account of the higher oil prices. The fact that the forecast rates one to two years ahead are not higher even though

Figure 52. CPI and UND1X: outcome and the main scenario in this and the previous Report. Percentage 12-month change



Sources: Statistics Sweden and the Riksbank.

the horizon has now been shifted forward is partly due to somewhat lower wage increases and higher productivity growth. Those developments stem in turn from, for instance, the assessment that resource utilisation is somewhat lower than envisaged earlier. Lower UND1X inflation in 2001 also has to do with some of the Budget Bill's proposed tax adjustments. These factors also lie behind the assessment that even UNDINHX inflation is now expected to be somewhat lower than foreseen in June.

Underlying inflation, measured by UND1X, in the main scenario is judged to be 1.5 per cent one year ahead and 1.9 per cent after two years.

Table 9. Inflation forecasts in the main scenario. Percentage change

	Annual rate		12-month rate	
	2000	2001	Sept. 2001	Sept. 2002
CPI	1.2 (1.1)	1.4 (1.4)	1.4	2.0
UND1X	1.4 (1.2)	1.5 (1.6)	1.5	1.9
UNDINHX	1.0 (1.0)	1.8 (2.1)	1.9	2.1
HICP	1.3 (1.1)	1.4 (1.5)	1.4	1.8

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

Source: The Riksbank.

The CPI differs from UND1X in that changes in house mortgage interest expenditure, indirect taxes and subsidies are excluded from the latter. During the forecast period the overall impact of these transient factors on CPI inflation is judged to be negligible.

The path of UND1X inflation this year has been markedly affected by the price of crude oil. In keeping with earlier inflation reports, the price of oil is judged to be dependent on aspects of supply and demand that cannot be distinguished, which complicates the analysis of how the price rise affects inflation. The crucial issue is whether the impact on inflation is transient or more permanent, for example by influencing inflation expectations. There is no new information that alters the appraisal of how oil price developments should be taken into account in monetary policy. This speaks in favour of handling the development of oil prices in the same way as before in the formation of monetary policy.

When discussing the inflation assessment's consequences for monetary policy, it is also necessary to consider how the Budget Bill's proposed tax adjustments should be treated. A minor problem in this context is that the changes in the taxation of real estate are expected to affect both the direct and the indirect impact of indirect taxes. In the calculation of underlying inflation as represented by UND1X, it is only the direct impact of indirect taxes that is excluded. It follows that the tax adjustments for owner-occupied houses do not show up in UND1X. The tax changes for apartment buildings, on the other hand, do affect UND1X inflation during 2001. The appropriateness or otherwise

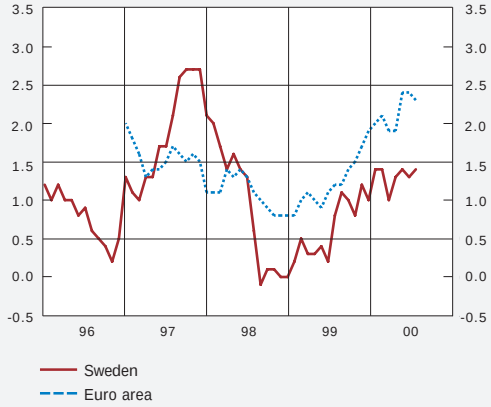
of disregarding one or the other of these effects in the formation of monetary policy cannot be argued from economic grounds. The proposal last spring to introduce a maximum day nursery charge also has an impact on UND1X inflation.

There is no universally perfect measurement of inflation. There are educational reasons for refraining from unduly frequent changes in the indicator that guides monetary policy. Policy would become difficult to interpret and ultimately its credibility would be undermined. Another point is that alternative ways of classifying the tax changes affect inflation one to two years ahead by no more than some tenths of a percentage point. Considering the uncertainty associated with forecast of this type, that is less than the margin of error and not decisive for monetary policy.

Against this background, it is considered appropriate to continue to base the formation of monetary policy on the assessment of UND1X inflation.

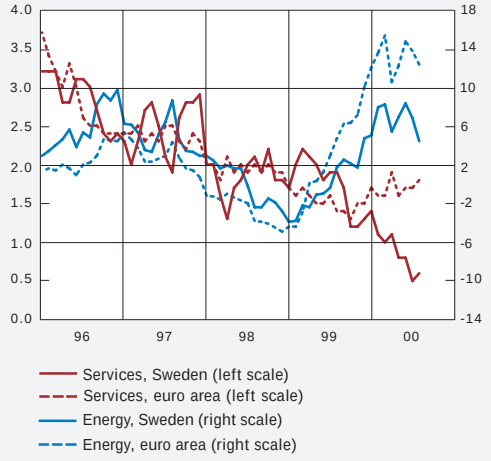
INFLATION IN SWEDEN AND THE EURO AREA

Figure B12. HICP.
Percentage 12-month change



Source: Eurostat.

Figure B13. HICP components: energy and services.
Percentage 12-month change



Source: Eurostat.

Even in an international perspective, the rate of inflation in Sweden has recently been remarkably weak. Compared with the euro area, HICP inflation has been consistently lower in Sweden since the middle of 1998 (Fig. B12). Price developments in Sweden and the euro area are compared here by studying the relative paths of various HICP components, namely energy, food (processed and unprocessed), manufactured goods and services.

The comparison shows that recent price tendencies in Sweden have been lower for virtually all HICP components. During 2000 the differences are largest for services and energy, which for services is mainly due to differences in rent increases and the development of telephone tariffs (Fig. B13).

The development of services prices differs considerably, however, between countries in the euro area. In Portugal and Ireland, for example, the average level of services prices rose 4.0 and 5.9 per cent, respectively, in the past half-year as against only 0.4 and 1.8 per cent in France and Austria, respectively. France is the only euro-area country were services prices have risen less than in Sweden. There, too, falling telephone tariffs as a result of deregulations have contributed.

Table B2. HICP components.
Average annual change

	Euro area	Sweden
Total HICP	1.5	0.9
Unprocessed food	0.4	0.9
Processed food	0.9	0.1
Manufactured goods excl energy	0.6	-0.1
Energy	6.6	2.5
Services	1.6	1.4

Source: Eurostat.

The differences as regards energy prices can presumably also be attributed in some measure to market deregulation. The electricity market in Sweden was deregulated in a number of steps in the 1990s, leading to successively lower electricity prices.

The above indicates that the differences in price developments for electricity and telecom services, together with comparatively low rent increases, are major factors behind Sweden's lower rate of inflation in the past year compared with the euro area. But even

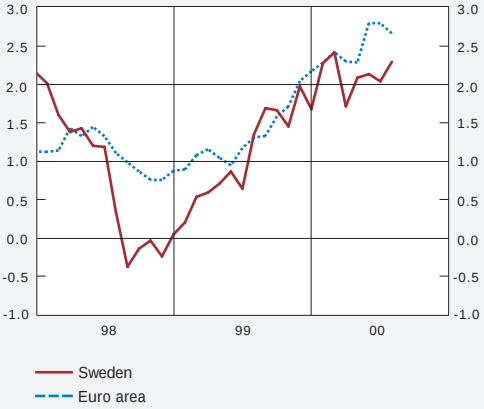
excluding these components, inflation has been somewhat lower in Sweden (Fig. B14).

The lower rate of price increases in Sweden for virtually all components may have to do with differences in the general economic situation. Generally lower price pressure may be an indication that there are more unutilised resources in Sweden than in the euro area.

Another factor that may have contributed to relatively higher price pressure in the euro area is the past year's weakening of the euro. Although the Swedish krona has also depreciated in nominal terms against the U.S. dollar, during the past year the krona's effective exchange rate has, if anything, tended to strengthen. In recent months it is rather prices for services that explain the lower inflation in Sweden.

When discussing the relative development of inflation, consideration must also be paid to initial differences in the price level. Studies of purchasing power parity show that the price level in Sweden is higher than in many other countries. The slow price rise in Sweden could, perhaps, be taken as a sign that an adjustment is in progress to price levels elsewhere in Europe.

Figure B14. HICP excluding electricity, telecommunications and rents. Percentage annual change



Source: Eurostat.

The risk spectrum

The inflation forecast in the main scenario is the path the Riksbank considers most probable, given the assumption of an unchanged repo rate in the coming two years. But as inflation forecasts are uncertain, the risk spectrum is also relevant in the formation of monetary policy.

The main scenario in this Report is based on the Swedish economy being in a strong upward phase. Some slackening in the growth of demand is foreseen in the coming two years, due to somewhat lower growth in the rest of the world as well as higher household saving. But as demand growth is above the sustainable long-term rate, resource utilisation and underlying inflationary pressure still move up. Productivity growth is strong and in line with the trend in the 1990s. At the same time, the average annual wage rise in the forecast period is expected to be not quite 4 per cent. Inflation is held back by strong international competitive pressure combined during the forecast period with an assumed appreciation of the krona by about 4.5 per cent and a price fall for oil of almost 20 per cent.

At the time of the June Report the risk spectrum one year ahead was judged to be balanced around the Report's main scenario, that is, the upside and downside risks were judged to be roughly equal, while two years ahead the upside risks tended to predominate. The main upside risks were considered to be that domestic activity might be stronger than allowed for in the main scenario, that fiscal policy could be more expansionary and that wages would rise more rapidly. The main downside risks in the inflation scenario had to do with the uncertainty about the relationship between growth and inflation and the risk of a sharper slowdown in the U.S. economy leading to weaker international activity. The risks associated with the oil price and the exchange rate were considered to be balanced.

Today the *fiscal policy risks* are judged to be more balanced in that further tax cuts are now incorporated in the main scenario. However, the impact of the tax cuts on household consumption is a source of uncertainty and the surplus — in excess of the target — is calculated to be substantial even allowing for the expected tax cuts in 2001 and 2002. So some upside risk is still considered to exist from fiscal policy.

Similarly, the risks associated with the uncertainty about the *relationship between growth and inflation* seem to have diminished in that the main scenario now allows for a somewhat larger amount of unutilised resources and accordingly incorporates some of this uncertainty. But some downside risk for inflation is considered to remain in view of the possibility that the economy's potential growth rate in the forecast period could be higher than assumed in the main scenario.

A persistently higher oil price can have considerable effects on inflation and growth.

The uncertainty about the future *oil price* has increased since the June Report. The main scenario envisages that the barrel price

of crude falls from the current level of USD 30 to around USD 25. At the September meeting OPEC decided to step up oil production with a view to lowering the world market price. It is conceivable, however, that this increment to output will not suffice. The low levels of oil stocks currently make the price of oil very sensitive to shocks.

The direct effect on inflation from a price increase for crude consists of the increment to prices for petroleum products, such as petrol and domestic heating oil, as well as to prices for transportation, for example. But if the oil price remains high or rises still higher, it may also have greater effects via real adjustments to demand and supply. The magnitude of the effects on growth and inflation depends in part on the extent to which firms can pass through increased costs to other prices. The smaller the possibilities of this, the larger will be the effect on growth and the smaller the impact on inflation, at least initially. Other major factors are how inflation expectations are affected and the extent to which demands for compensation influence wage formation.

Higher prices for crude oil also entail a transfer of income from the industrialised countries to oil-producing countries. To the extent that the reduced demand in industrialised countries is not offset by correspondingly increased demand in the oil-producing countries, the oil price rise will also have negative effects on global demand. In the 1970s, massive price increase for crude oil contributed to the phenomenon known as stagflation, that is, the combination of low growth and high inflation. It should be underscored, however, both that the current oil price rise has been smaller to date and that the industrialised countries are now less dependent on oil.

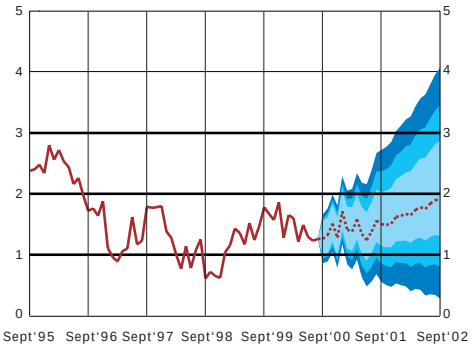
Although the path of oil prices that is incorporated in the main scenario is higher than in the June Report, the Riksbank considers that a stronger price trend for oil is still a considerable upside risk in the inflation assessment. It can be noted, for example, that a continuation of the present oil price throughout the coming two years is calculated to make UND1X inflation at the end of the period about 0.4 percentage points higher than in the main scenario.

The other *international risks* appear to be fairly balanced. On the one hand there is still some risk that an adjustment of financial imbalances in the United States will lead to a more sudden or longer impairment of demand, with consequences in other countries as well. On the other hand there is the possibility of a somewhat stronger development compared with the main scenario, for example as a result of the synergism inherent in concurrent international growth and the difficulties in assessing the external effects of developments in the U.S. economy.

The relatively strong dollar is an indication that the Swedish krona may be weaker for longer.

The TCW *exchange rate* in the main scenario is expected to strengthen from the current level of 126 to an average of just over 119 in 2002. This appreciation is seen as coming mainly against the dollar, and to some extent sterling, in connection

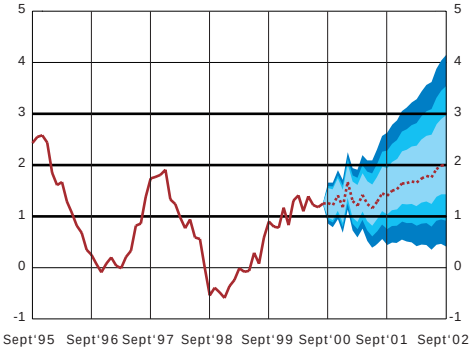
Figure 53. UND1X with uncertainty intervals. Percentage 12-month change



Note. The uncertainty intervals show the 50, 75 and 90 per cent chances of UND1X inflation being within the respective range. The broken line represents the main scenario's forecast; the horizontal lines at 1, 2 and 3 per cent are the Riksbank's inflation target and the tolerance interval for the annual change in the CPI.

Sources: Statistics Sweden and the Riksbank.

Figure 54. CPI with uncertainty intervals. Percentage 12-month change



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

Sources: Statistics Sweden and the Riksbank.

with a relatively rapid slowdown in the U.S. economy. The path of the exchange rate is, however, rather uncertain, as has been evident in the past year. A weaker exchange rate can be assumed to have a direct effect on domestic inflation from higher import prices as well as an indirect effect from a combination of increased external demand for Swedish exports and decreased domestic demand for imports.

The path of the exchange rate on which the main scenario is based is somewhat weaker than in the June Report. However, the strength of the dollar against the euro — which is partly connected in turn with the U.S. economy being so remarkably robust, at least to date — is an indication that in TCW terms the krona could remain weaker for longer than allowed for in the main scenario. This risk is judged to be relatively large, with an effect on inflation that is not negligible. With the TCW index at 125 throughout the forecast period, inflation is judged to be about 0.5 percentage points higher than in the main scenario.

There is judged to be some probability of an appreciably higher wage rise.

The risks connected with *domestic economic activity* are now judged to be balanced. As in June, some upside risk is considered to be associated with the development of *wages*. This mainly has to do with the uncertainty about how wage formation will function in a period of high growth and higher resource utilisation. There is judged to be a small risk of a wage outcome that is appreciably higher than is compatible with the inflation target but no corresponding risk of an outcome that is appreciably lower.

All in all, there is considered to be some predominance of upside risks in the assessment of inflation one year ahead and a somewhat greater predominance after two years. This mainly has to do with the risks associated with the price of oil, the exchange rate and wage developments. Higher inflation than in the main scenario thus appears more probable than lower inflation. This is evident from Fig. 53, which presents the uncertainty around the forecast of underlying inflation, measured as the 12-month change in UND1X. As the upside risks are judged to be greater than the downside, the uncertainty interval is broader above than below the forecast path in the main scenario.[31]

The CPI forecast in the main scenario also has some predominance of upside risks one year ahead and a somewhat greater predominance after two years (Fig. 34). The degree of uncertainty in the assessment of future CPI as well as underlying inflation is broadly the same as at the time of the June Report.[32]

Monetary policy decisions are based primarily on an assessment of price tendencies twelve to twenty-four months ahead, which makes the inflation prospects for this time horizon

31 For an account of how the uncertainty interval is derived, see Blix, M. & Sellin, P. (1999), Inflation forecasts with uncertainty intervals, *Quarterly Review 2*, Sveriges Riksbank; for a fuller analysis, more focused on models, see *idem* (1999), *Uncertainty bands for inflation forecasts*, Sveriges Riksbank Working Paper 65.

32 In connection with this report, the general breadth of the uncertainty interval has been reviewed in the light of characteristics of earlier forecasting errors. As the results suggest that some reduction of the general breadth is appropriate, in this report the interval has been narrowed by 10 per cent.

particularly relevant. In the main scenario the 12-month changes in UND1X are expected to be 1.5 per cent in September 2001 and 1.9 per cent in September 2002. With the predominant upside risk in the inflation assessment, the mean value of the complete assessment of UND1X inflation, that is, including the risk spectrum, is approximately 0.1 percentage point higher one year ahead and 0.2 percentage points higher after two years. The mean assessment of UND1X inflation is accordingly 1.6 per cent one year ahead and 2.1 per cent after two years.

Table 10. Inflation forecasts including the risk spectrum.
Per cent

	Annual rate		12-month rate	
	2000	2001	Sept. 2001	Sept. 2002
CPI	1.2 (1.1)	1.5 (1.4)	1.5	2.2
UND1X	1.4 (1.2)	1.6 (1.6)	1.6	2.1

Note. The table gives the mean values of the inflation assessment's probability distributions (see Figs. 53 and 54). The figures in the June Report are in parentheses.

Source: The Riksbank.

Table 11. UND1X inflation.
Percentage probability, 12-month rate

	UND1X<1	1≤UND1X<2	2≤UND1X≤3	UND1X>3	TOTAL
2001 (Sept.)	18	55	25	2	100
2002 (Sept.)	17	31	30	22	100

Note. The figures show the probability of UND1X inflation being in the column's interval.

Source: The Riksbank.

Thus, when the various inflation risks are weighted together, the rate of inflation including the risk spectrum is expected to be marginally higher than in the main scenario one year ahead. After two years the risk-adjusted forecast is 0.2 percentage points higher. This assessment is evidently dependent on the probabilities that are assigned to the various risk scenarios. Assigning a value of 50 per cent, for example, to the probability that the price of oil remains at the present level throughout the forecast period means that the contribution to inflation two years ahead is 0.2 percentage points.

Table 12. CPI inflation.
Percentage probability, 12-month rate

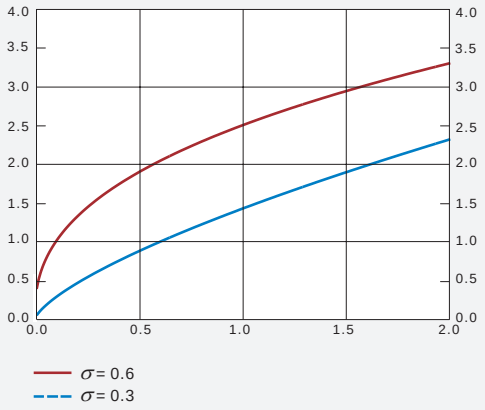
	CPI<1	1≤CPI<2	2≤CPI≤3	CPI>3	TOTAL
2001 (Sept.)	23	55	21	2	100
2002 (Sept.)	14	30	32	24	100

Note. The figures show the probability of CPI inflation being in the column's interval.

Source: The Riksbank.

The conclusion from the reported assessments is that, excluding transitory effects from changes in indirect taxes, subsidies and house mortgage interest expenditure and given an unchanged repo rate of 3.75 per cent, inflation one year ahead in the main scenario will be below the 2 per cent target. Two years ahead, the rate is expected to be marginally below the target. When the risk spectrum is incorporated, however, inflation at the end of the forecast period is judged to be marginally above the inflation target. The uncertainty in the forecast of both underlying and CPI inflation is judged to be unchanged compared with the June Report.

Figure B15. Graphic illustration of the utility function when $\sigma = 0.3$ or 0.6.



Note. The level of consumption, c_t, is plotted on the *x*-axis and the level of utility, $U(c_t)$, on the *y*-axis.

Source: The Riksbank.

THE CONCEPT OF A REAL LONG-TERM EQUILIBRIUM INTEREST RATE

Empirical estimations of real equilibrium interest rates in different countries and periods were presented in *Inflation Report 2000:1* (in a box on pp. 24–28). They suggested that the real equilibrium interest rate can fluctuate a good deal over time and also differ fairly appreciably across countries.

Factors that according to economic theory explain the real equilibrium interest rate are discussed here. Rather than providing estimations of the path or level of this rate, the main aim is accordingly to provide a simple theoretical framework for continued discussions and analyses.

The (long-term) level of the real equilibrium interest rate is determined by households' consumption and saving decisions over time. A simple yet generally applicable approach that is often used to study consumption and saving is the Ramsey model.[33] The utility of aggregate household consumption, $U(c_t)$, is described there by a function of the following form:

$$U(c_t) = \frac{c_t^{1-\sigma}}{1-\sigma},$$

where c_t is aggregate household consumption and σ a parameter that is greater than zero. The assumption that s exceeds zero implies that the marginal utility of consumption diminishes, that is, the utility of an increment to consumption declines as the level of consumption rises. This is illustrated in Fig. B15 for two values of σ: 0.3 and 0.6. A lower value of s means that the marginal utility declines more slowly.

The parameter σ is important for several reasons. Besides representing households' attitude to uncertainty, it measures their propensity to substitute consumption between time periods. A high σ means that households dislike uncertainty about the future potential for

33 For a detailed description of the model, see e.g. Campbell, J. (1996), Consumption and the stock market, *Swedish Economic Policy Review*, 3. See also the original paper: Ramsey, F. (1928), A mathematical theory of saving, *Economic Journal*, 38. The model used here does not, of course, include every conceivable factor that can affect the real interest rate. Tax effects, for example, are disregarded; the inclusion of a tax on capital income, for instance, would tend to push the real interest rate up in equilibrium.

consumption, that is, they are averse to unforeseen variations in consumption. It also implies a low substitution propensity. The use of a single parameter to determine both the attitude to uncertainty and the substitution propensity is a consequence of the particular type of utility function that is assumed to apply. There are other types of utility function that enable these properties to be separated, which can sometimes be desirable.

Households have a subjective discount rate or time preference, δ, that represents how they value future consumption compared with consumption today. Their discounting of future consumption can be described as follows:

$$U(c_t) + \frac{1}{1+\delta} U(c_{t+1}) + \frac{1}{(1+\delta)^2} U(c_{t+2}) + \ldots$$

A value of δ that is greater than zero means that households are 'impatient' and value consumption today more highly than future consumption. If δ is less than zero, households are 'patient' and see future consumption as more valuable.

Moreover, households are assumed to maximise their expected utility, subject to the budget restriction, which includes the possibility of investing in an asset that yields a no-risk real return. From this model one can derive the following expression for the real long-term equilibrium interest rate:

$$r = \delta + \sigma\gamma_c - \frac{\sigma^2}{2} Var(\gamma_c),$$

where γ_c denotes consumption's growth rate and $Var(\gamma_c)$ the variance of this growth rate in equilibrium.[34]

The expression states that the real long-term equilibrium interest rate is determined by three factors. One is a simple *time preference* effect. In the case where households are 'impatient' and value consumption today more highly than future consumption, compensation is required to induce them to save and postpone consumption. This compensation consists of interest on their savings.

Another factor is an effect that is dependent on *economic growth*. An expanding economy generates a potential for future consumption that is larger than today's. As the marginal utility of consumption declines

34 This expression is an approximation of the solution in the paper by John Campbell (see previous footnote).

over time, households value increased consumption today more highly than a future increase. They will therefore be prepared to pay a premium or interest in order to be able to increase their current consumption. The interest rate they are prepared to pay will depend on their substitution propensity; a low propensity means they are willing to pay a high rate of interest in order to achieve increased consumption today.

Thirdly, the real interest rate is influenced by *uncertainty about the potential for future consumption*. If this potential is uncertain, households will save in order to have a buffer against a poor outcome. Increased saving tends to lower the real interest rate. The magnitude of this effect depends on the level of uncertainty and households' attitude to uncertainty. The more households dislike uncertainty, the higher will saving be and the lower the real interest rate.

The terms δ and σ represent what are known as preference parameters and arriving at a definite opinion of their value is difficult. However, d is usually assumed to be greater than zero, although there are arguments for setting it close to zero. In his 1928 paper, for example, Ramsey assumed that δ should be equal to zero on the grounds that it would be 'ethically indefensible' to value the utility of future generations at less than that of today's generation.

The value of σ is particularly important because it determines households' attitude to uncertainty as well as their substitution propensity. Studies at household level have found that households are relatively willing to substitute[35] but this behaviour has been more difficult to confirm with aggregated data.[36] Studies attempting to measure households' attitude to uncertainty have found that an upper limit for what can be regarded as reasonable is $\sigma = 4$.[37]

The sensitivity of the real interest rate to some alternative values of δ and σ, with the growth rate and variance given, is shown in Table B3.[38] The level of the interest rate is relatively sensitive to variations in both the time preference and the substitution propensity. The quantitative effect of uncertainty, on the other hand, is small. If, for example, the attitude to

35 See Runkle, D. (1988), Liquidity constraints and the permanent income hypothesis: evidence from panel data (manuscript), Federal Reserve Bank of Minneapolis.

36 See Hall, R. (1989), Consumption, in Barro, R., *Modern Business Cycle Theory*, Harvard University Press.

37 See Romer, D. (1996), *Advanced Macroeconomics*, McGraw-Hill.

38 In the period 1970:1–1995:1 the annual growth rate for Swedish consumption was 0.70 per cent and the variance 0.00037, see Campbell, J. (1999), Asset prices, consumption and the business cycle, in Taylor J. & Woodford, M., *Handbook of Macroeconomics*, Elsevier Science B.V.

uncertainty, σ, is given the value 2, the effect on the real interest rate amounts to only around 0.07 per cent. This may seem remarkable. It could, indeed, well be the case that households' attitude to uncertainty is considerably higher. Another, perhaps more probable, explanation is that uncertainty is higher at individual level than at the aggregated level.

Table B3. Real long-term equilibrium interest rate with alternative values of δ and σ.
Per cent

	σ=0.5	σ=1	σ=2	σ=4
δ=0	0.3	0.7	1.3	2.5
δ=0.02	2.3	2.7	3.3	4.5
δ=0.04	4.3	4.7	5.3	6.5

Source: The Riksbank

In certain contexts the real long-term rate of economic growth is commonly used as an approximation of what the real long-term equilibrium interest rate should be. This accords with economy theory only under certain specific assumptions, however. In the model presented here, it is valid only if uncertainty is disregarded and assuming that δ=0 and σ=1.

Table B4 presents the average real interest rate *ex post* and the growth of consumption for a number of countries since the 1970s. The data for Sweden are also given separately for each decade. The figures for the real interest rate should be interpreted with caution, however, partly because capital markets in Sweden and many other countries were regulated up to the mid 1980s.

Table B4. Real long-term equilibrium interest rate and consumption growth since the 1970s.
Per cent

Country	Period	r	γ_c
Australia	1970 Q1–1996 Q2	1.8	1.8
Canada	1970 Q1–1996 Q2	2.7	1.9
France	1973 Q2–1996 Q2	2.7	1.6
Germany	1978 Q4–1996 Q2	3.3	1.6
Italy	1971 Q2–1995 Q2	2.1	2.4
Japan	1970 Q2–1996 Q2	1.5	3.4
Netherlands	1977 Q1–1996 Q1	3.7	1.5
Sweden	1970 Q1–1994 Q4	1.5	0.8
United Kingdom	1970 Q1–1996 Q2	1.1	2.0
United States	1970 Q1–1996 Q3	1.4	1.7
Sweden	1970 Q1–1979 Q4	-2.0	1.6
Sweden	1980 Q1–1989 Q4	3.7	1.1
Sweden	1990 Q1–1999 Q2	4.6	0.2

Sources: John Campbell (1999), Asset Prices, Consumption and the Business Cycle, John Taylor and Michael Woodford, *Handbook of Macroeconomics,* Elsevier Science B.V., and the Riksbank.

From Table B4 it will be seen that, as an average, the real interest rate has been at approximately the same level as the growth of consumption in most of these countries. At the same time, for some countries the difference between the interest rate and consumption is considerable.

The breakdown into decades for Sweden shows, moreover, that consumption growth has varied considerably over time. This suggests that the long-term growth rate is not constant over time, which in turn may have meant that the long-term equilibrium interest rate also fluctuated over time (see also *Inflation Report 2000*, box on pp. 24–28).[39]

The purpose of this presentation has been to put forward a simple theoretical framework for discussions about the real long-term interest rate. The factors discussed have been households' time preference (their valuation of consumption today relative to future consumption), the long-term rate of economic growth and uncertainty about the potential for future consumption.

In certain contexts the real long-term rate of economic growth is commonly used as an approximation of what the real long-term equilibrium interest rate should be. It is only under certain specific assumptions, however, that economic theory regards this as a good approximation.

39 With today's economic policy commitment to stability in Sweden, however, growth — and thereby the real interest rate — may fluctuate less in the future.

AN ILLUSTRATION OF INFLATION FORECASTING WITH A RISING REPO RATE

Market pricing and survey data on analysts' opinions indicate expectations at present that the repo rate will be raised successively in the coming two years. The inflation forecasts of most external observers likewise incorporate a rising repo rate. In the main scenario, however, inflation is forecast as usual on the assumption that the repo rate will be unchanged; this serves to bring out the consequences for the formation of monetary policy. An illustrative calculation is therefore presented here that incorporates repo rate increases in line with market expectations as reported in Statistics Sweden's survey in September 2000.

The survey data show expectations of repo rate increases to 4.00 per cent three months from now, to 4.50 per cent after one year and to 4.75 per cent two years ahead.[40] Here it is assumed that the short-term market interest rates broadly follow the repo rate, while the pass-through to the longer rates is judged to be smaller. Compared with the main scenario, the short rates are judged to be 0.5–1.0 percentage point higher, while the effect on long rates stops at approximately 0.1 percentage point. The higher level of interest rates is considered to strengthen the krona: in the forecast period the effective exchange rate is judged to appreciate about 1 per cent more than in the main scenario.

Compared with the main scenario, a path for the repo rate that follows the expectations in Statistics Sweden's survey accordingly gives a higher level of interest rates and a stronger exchange rate in the forecast period. This in turn means that the combined effect on demand from interest rates and the exchange rate is judged to be less expansionary than in the main scenario.

The higher interest rates compared with the main scenario are judged to have some downward effect on the growth of both consumption and investment. Moreover, the stronger exchange rate tends to curb net exports. All in all, this is judged to reduce GDP growth to some extent in both 2001 and 2002. The damping of activity is also assumed to result in a somewhat weaker wage trend.

40 The median value of the expectations.

Table B5. Modified inflation forecast, incorporating the interest rates expected in Statistics Sweden's survey in September 2000.
Percentage change and percentage points

	Annual rate 2000	Annual rate 2001	12-month rate September 2001	12-month rate September 2001
CPI	1.3 (0.0)	1.7 (0.3)	1.7 (0.3)	1.9 (-0.1)
UND1X	1.4 (0.0)	1.4 (-0.1)	1.4 (-0.1)	1.7 (-0.2)

Note. The figures in parentheses are the difference from the main scenario's rate of inflation with an unchanged repo rate.

Source: The Riksbank.

The higher interest rates imply increased interest expenditure for households and this affects price tendencies already during 2000. Compared with the main scenario, CPI inflation is therefore judged to be marginally higher in 2000 and 0.3 percentage points higher in 2001. It is only towards the end of the forecast period that the weaker demand and the lower import prices associated with a stronger exchange rate begin to affect inflation more substantially. This has to do with the assumption that the repo rate increase is spread over the coming two years and that monetary policy's influence on prices is lagged. The weaker demand and lower import prices therefore begin to subdue UND1X inflation only in the course of 2001, by approximately 0.1 percentage point. During 2000 the impact is somewhat greater, about 0.2 percentage points.