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# Foreword

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

This Inflation Report starts from the presentations and discussions of inflation at the Executive Board meetings on 9 and 16 March 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 22 March 2000. 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 22 March 2000, to be published on 18 April 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 and understand. 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 Q1. 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 consumer price tendencies in relation to the assessments in the December Inflation Report. The account in Chapter 2 concern's inflation's most probable path. The chapter is structured to follow a simple inflation model and thereby provide a clear picture of the factors that are most relevant for future inflation. 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. Material for an assessment of monetary policy in the past three years is included in an appendix.

Stockholm, March 2000

Urban Bäckström Governor of Sveriges Riksbank

# Summary

Since the December Inflation Report both *CPI and UND1X inflation* have followed the expected path. In February the 12-month rate of CPI inflation was 1.3 per cent and UND1X inflation was 1.7 per cent. However, the indicator of domestic underlying inflation, UNDINHX, has followed a somewhat weaker tendency than expected and the February rate was 0.8 per cent.

International economic activity and inflation. International economic prospects have continued to improve since the December Report. Annual growth in the OECD area is judged to be almost 3 per cent this year and over 3 per cent in 2001, while the rate in 2002, when some slowdown is foreseen, particularly in the United States, is estimated to be 2.5 per cent. International consumer prices are expected to broadly follow the path outlined in the December Report. International prices for manufactured exports, on the other hand, are judged to be somewhat weaker than assumed earlier, partly due to growing international competition, not least in the European Community. The effective exchange rate is judged to appreciate, though somewhat more slowly than foreseen in December; the revision has to do with the prospect of stronger rates for the U.S. dollar and sterling in particular. Together with higher prices for oil, this is expected to lead to a somewhat stronger increase in Swedish *import prices* to producers. The pass-through to consumer prices is judged to be more restrained, however, partly due to increased domestic competition.

Domestic demand relative to supply. Economic growth in Sweden is also expected to be stronger than envisaged in the December Report, notwithstanding the repo rate increase. It is mainly growth prospects for private consumption that have improved. Exports are favoured by the brighter international growth prospects but import growth is also judged to be higher on account of the stronger increase in domestic demand. All in all, the GDP growth rate is judged to be 4.0 per cent in 2000, 3.5 per cent in 2001 and 2.6 per cent in 2002. The comparatively rapid growth of total demand is an indication that resources which are unutilised at present will be brought into production in the course of the forecast period. However, the expected increase in labour supply and the assumption of somewhat higher productivity growth are judged to contribute to a relatively limited risk of more widespread capacity restrictions in the coming two years. In the labour market, the introduction of new constructions for wage agreements has been in progress for some time. This is judged to promote wage formation that is more attuned to productivity growth; preliminary

corporate sector wage statistics for 1999 support this. In the coming years, the annual nominal wage rise is judged to be just over 4 per cent, which is marginally lower than the December assessment.

*Deregulations*, particularly in the telecommunications market, still seem likely to go on exerting a downward price effect. The pressure on telecom prices this year is judged to be marginally stronger than assumed earlier. In the coming two years, however, the aggregate effect of deregulations and increased trade liberalisation is much the same as foreseen in the December Report.

*Inflation expectations* have gone on rising for the short run and are now broadly in line with the inflation target. This is a natural consequence of the economic upswing. Meanwhile, expectations for the longer run have stayed around 2 per cent. Stable longterm expectations help to moderate inflationary impulses from the rising activity.

The repo rate increase is calculated to have some upward effect on *house mortgage interest expenditure*, so that CPI inflation moves up more than assumed earlier, above all in the short run. In the absence of any new proposals to c*hange indirect taxes and subsidies*, the CPI contribution from these components is unchanged from the December Report. Under present circumstances the Riksbank disregards these factors in the formulation of monetary policy because they are judged to have no permanent effect on inflation or inflation expectations. This means that in practice monetary policy is currently based on an assessment of inflation as measured by UND1X.

With the successive increase in economic activity, domestic underlying inflation, UNDINHX, is expected to rise comparatively rapidly in the forecast period. UND1X inflation, however, should be restrained by a continuation of subdued import prices in connection with lower oil prices and an appreciating krona. All in all and assuming an unchanged repo rate, in the main scenario UND1X inflation is judged to be 1.6 per cent one year ahead and 2.1 per cent after two years. This means that the assessment of UND1X inflation in the coming twelve to twenty-four months is marginally lower than in the December Report even though prospects for the Swedish economy have improved. It is mainly somewhat lower wage increases but also slightly higher productivity growth that explain the prospect of somewhat more subdued inflationary pressure in this time horizon.

The risk spectrum also has a bearing on the formulation of monetary policy. As in the December Report, there is judged to be some risk that, mainly on account of a less favourable trend in the United States, international activity may be weaker than foreseen in the main scenario and that price effects of market deregulations may be greater than estimated. At the same time, it is conceivable that growth will be higher than assumed in the main scenario, particularly towards the end of the forecast period. This upside risk lies mainly in the possibility of private consumption continuing to grow strongly over a series of years, driven by high asset prices and other optimism about the future. The result could be higher inflation than in the main scenario. Moreover, a stronger development of import prices, due to higher prices for oil and other commodities or higher international export prices, is still an upside risk for inflation even though the main scenario now incorporates some upward revision of the oil price forecast. All in all, the risk spectrum in the inflation assessment is judged to be balanced. With a symmetric risk spectrum, the inflation forecast in the main scenario matches the forecast that also incorporates the risk spectrum.

■ The conclusion from the reported assessments is that, excluding transitory effects from changes in indirect taxes, subsidies and interest rates, inflation will be somewhat below 2 per cent one year ahead but marginally above the target after two years.

# Consumer prices

This chapter presents consumer price tendencies in recent months and their significance for inflation prospects in the near future. 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.

In February the 12-month change rates for the consumer price index (CPI) and for underlying or core inflation as measured by UND1X were 1.3 and 1.7 per cent, respectively, which is in line with the Riksbank's latest assessment. On the other hand, domestic underlying inflation, measured by UNDINHX, has been some weaker than expected earlier and was 0.8 per cent in February (Fig. 1).<sup>1</sup>

#### Inflation broadly as expected.

The accelerating rate of increase in the CPI and UND1X at the end of last year was thus essentially a result of higher prices for motor fuel and domestic heating oil in connection with rising world market prices for crude oil. While the 12-month changes in the CPI and UND1X in February conform with the assessment in the December Report, a somewhat weaker outcome than expected in January was offset by a somewhat stronger one in February. The slowdown in inflation in January came mainly from weak price tendencies for imported goods and domestic services, while the acceleration in February was mainly due to continued prices increases for motor fuel and domestic heating oil. In the coming months, the rapid increase in producer prices, particularly for crude oil, is expected to make a contribution to inflation that is somewhat larger than expected earlier. This is countered, however, by downward price effects from increased competition in the telecom market that are assumed to be somewhat greater than foreseen earlier. Moreover, inflation will be subdued by rent increases that are now judged to be somewhat lower than assumed earlier. As the latter factors are judged to predominate, the shortrun development of underlying prices is expected to be somewhat weaker than envisaged in the main scenario in December.

The overall price tendency conceals differences between

 UND1X is defined as the CPI excluding 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 domestic indirect taxes and subsidies.



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



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 do not include effects of the freeze of taxable property values.

Source: Statistics Sweden

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



petrol, muit, vegetables, conee and pharmaceutical products (23.3%)

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

Source: Statistics Sweden.

components. Since the December Report, the rate of price increases for goods has moved up faster than expected, mainly due to a strong price tendency for imported goods. For services, on the other hand, the price rise has slackened somewhat more than expected. The rate of increase in housing costs has hardly changed since the December Report, which is a somewhat weaker tendency than expected earlier (Fig. 2).

#### STRONG TENDENCY IN IMPORT PRICES TO CONSUMERS

The rate of price increases for goods that are mainly imported has accelerated rapidly since the beginning of 1999 (Fig. 3). This mainly reflects increasingly high prices for petroleum-related goods but prices for other commodities have also risen (Fig. 4). In January, however, the price level for imported goods tended to fall in connection with a weak development of prices for more manufactured products, clothing in particular. The price rise picked up again in February, due to further prices increases for motor fuel and domestic heating oil. The overall price rise for imported goods has been somewhat stronger than foreseen in the December Report.

Consumer prices for imported goods have risen more strongly than expected, mainly due to price increases for crude oil.

The recent development of import prices to producers has also been somewhat stronger than foreseen in the main scenario in December. Commodity prices, for crude oil as well as other items, have moved up faster than expected, while prices for more manufactured products have largely matched expectations. All in all, this is judged to indicate that, compared with the assessment in the December Report, consumer prices for imported goods will rise somewhat faster in the coming months.

#### CONTINUED PRICE INCREASES FOR SWEDISH GOODS

The price rise for more manufactured Swedish goods has accelerated since the December Report (Fig. 5). Home market producer prices have also risen somewhat faster than expected, due to price increases for intermediate and investment goods in particular. Moreover, the December business tendency survey from the National Institute of Economic Research shows that more and more manufacturers are planning to increase their prices. All in all, in the short run prices for Swedish goods are judged to rise somewhat faster than foreseen in the December Report.

#### Table 1. Price indexes for manufacturing

Percentage change

	Nov. '98-	Dec. '98-	Jan. '99–
	Nov. '99	Dec. '99	Jan. '00
Export prices	1.0	1.8	2.7
Home market prices	2.0	2.8	3.5
Import prices	5.3	5.7	7.5
Domestic supply	3.5	4.2	5.5
Producer prices	1.4	2.2	2.9

#### WEAK PRICE TENDENCY FOR SERVICES

Prices for services usually rise faster than for goods (Fig. 2). A number of factors contribute to this. For one thing, productivity gains in the production of services tend to be smaller than in the production of goods, while the development of wages is usually fairly similar. For another, goods in general are more exposed to international competition. Moreover, in periods when the krona appreciates there is an effect from goods having a considerably larger import content than services, so that a strengthening of the krona tends to subdue prices for goods to a greater extent than for services.

The price rise for services has been slowing since mid 1999 (Fig. 6). To a large extent this reflects increased competition in more and more of the services sector, whereby in the past year services prices have risen more slowly than prices for goods. The telecom market, for example, has been deregulated in a number of steps in recent years, leading to stronger competition and price reductions. Consumers were given a free choice of call operator in September 1999; prices for telecom services have fallen rapidly since then. Still, the price tendencies for services in recent months are broadly in line with the main scenario in the December Report. The downward price pressure on telecom products is expected to continue this year and be somewhat stronger in the coming months than was foreseen earlier; this is partly because Telia has cut prices and decided to open the net to competitors. This means that the freedom to choose call operators will also apply to net operators.<sup>2</sup>

Falling prices for telecom services are a major reason why the price rise for services has been slowing.

The 12-month rate of price increases for services has decreased sharply in recent months. This is mainly because the increased dental charges as of 1999 have dropped out of the 12-month change figures but it also has to do with the ongoing price cuts for telecom services. The tendency is partly countered by a somewhat faster increase in prices for services (excl. housing) that are decided administratively.

#### HOUSING COSTS LOWER THAN A YEAR AGO

A considerable proportion of household expenditure on housing is subject to price controls and administrative decisions. The level of housing costs has hardly changed in recent months, mainly because rent negotiations have been protracted. Housing costs therefore remain lower than a year ago (Fig. 7). There are several explanations for this. One is that low interest rates and the reduction of property tax have helped to lower costs for property

Figure 4. Crude oil price index and importweighted commodity price index excl. crude oil. Daily quotations, January 1996=100



Note. The commodity price index 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 crude oil is about 3 per cent (1998). Quotations until 10 March 2000.

Sources: Statistics Sweden and the Riksbank.





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

<sup>2.</sup> The *call operator* provides call services; the growing number of operators has led to lower tariffs here, particularly for international calls. The *net operator* owns the infrastructure for telecom services; Telia used to have the sole right to the access net and has now decided to open it to other operators, which is expected to subdue subscription charges.

Figure 6. CPI component: services excluding indirect taxes.



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

Source: Statistics Sweden





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

Source: Statistics Sweden

owners. Another is the deregulation of the electricity market. A third explanation is that Statistics Sweden has altered the method for calculating the depreciation item in costs for owner-occupied housing and this has entailed a substantial reduction of the price change.

The rent negotiations for 2000 among public housing utilities are still in progress, which has led to lower rent increases than expected, particularly for January this year. Due to rising capital costs and higher oil prices, however, rents are expected to rise somewhat faster during 2000. But all in all, the contribution to CPI inflation from housing costs is judged to be lower in the short run than was foreseen in the main scenario in the December Report.

#### WEAK TENDENCY IN UNDERLYING INFLATION

One way of measuring underlying or core inflation involves excluding certain CPI components. Examples are UND1X and UNDINHX. The 12-month changes in UND1X have been broadly in line with the assessment in the December Report, while UNDINHX has been somewhat weaker than expected. In the short run, the changes in both indexes are expected to remain below what was foreseen in the December Report, partly due to lower rent increases and stronger downward price pressure in the telecom market compared with earlier expectations.

Another way of measuring underlying inflation involves using an econometrically estimated model.<sup>3</sup> The approach represented in Fig. 8 uses components for demand and inflation expectations, respectively. Over the past year there has been some increase in this indicator of underlying inflation in connection with rising demand. Results with the model show that the core rate of inflation in 1999 Q4 was 2.3 per cent, which is the same as for Q3. A noteworthy observation is that for a number of years now the component that measures long-term inflation expectations has been anchored at a level very close to the Riksbank's inflation target.

While the model-based indicator of underlying inflation tended to move up during 1999, UNDINHX inflation fell, partly because this index was affected to a large extent by factors that the model does not catch, for example price effects from the deregulation of dental fees and the telecom market.

#### HOUSEHOLD INTEREST

#### EXPENDITURE DAMPING INFLATION

The difference between underlying inflation, measured as UND1X, and CPI inflation consists of the aggregate effect from changes in indirect taxes, subsidies and house mortgage interest expenditure. The contribution to the 12-month change in the CPI from indirect taxes and subsidies has been marginal in recent months but, for the first time since mid 1998, it was positive in January this year as a result of increased taxes on diesel oil and

 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. energy and the introduction of a tax on waste materials (Fig. 9). House mortgage interest expenditure is still tending to hold back CPI inflation but the downward effect has been diminishing since May 1999. In February this year the contribution to the 12-month change in the CPI was -0.2 per cent.

With the increase in rates for long housing bonds in the past six months and the Riksbank's repo rate increase this February, household interest expenditure will rise more quickly than foreseen in the December Report. The contribution to CPI inflation from house mortgage interest expenditure is therefore judged to be somewhat larger in the short run than allowed for in the main scenario in December.

To sum up, the change rates for UND1X have been much as foreseen in the December Report. In recent months, however, oil prices have risen somewhat more than expected; the contribution to UND1X inflation from petroleumrelated goods some months ahead is therefore judged to be somewhat larger than expected in the December Report's main scenario. On the other hand, the contribution from rent increases is expected to be smaller than expected in the short run and a similar effect is indicated by strong price competition in the telecom market. All in all, the path of underlying prices in the coming months is judged to be somewhat weaker than foreseen in the December Report. With rising house mortgage interest expenditure, however, in the months ahead CPI inflation is judged to rise somewhat faster than expected.

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.

# 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

The characteristic feature of external prospects is a broad and robust upswing. Since the December Report this picture has been accentuated in some respects. In the United States, a good path for productivity points to a continuation of the strong boom. In the euro area, decreased unemployment and the benefits, for exports, of a weak currency are speeding up a recovery. Global activity is being supported, not least in the emerging markets, by the rapid expansion of international trade since the end of the Asian crisis. Among the major industrialised countries it is only the Japanese recovery that looks uncertain.

#### A broad, robust upswing characterises external prospects.

The picture of international activity, already strong in the December Report, is therefore adjusted upwards. For 2000 and 2001, external growth is revised upwards by a total of 0.5 percentage points, though this is followed by a somewhat weaker tendency in 2002 on account of an expected slowdown in the United States (Fig. 10).

Table 2. International conditions.Percentage annual change or annual level

	GDP							CPI						
	1999	rev.	2000	rev.	2001	rev.	2002	1999	rev.2	2000	rev.	2001	rev.	2002
United States	4.1	0.3	3.7	0.5	3.0	0.6	2.5	2.2	0.1	2.5	0.0	2.6	0.2	2.5
Euro 11	2.2	0.1	3.2	0.3	3.1	0.1	2.8	1.2	0.0	1.6	0.0	1.7	0.0	1.8
EU 15	2.2	0.1	3.2	0.3	3.2	0.3	2.8	1.4	0.0	1.7	0.0	1.9	0.0	2.0
Sweden's TCW expo markets	s ort <b>2.2</b>	0.1	3.0	0.4	2.9	0.2	2.6	1.5	0.0	1.8	0.0	1.9	0.0	1.9
OECD 19	2.8	0.2	3.1	0.3	2.8	0.2	2.5	1.5	0.1	1.8	0.0	2.0	0.0	2.0
				1	999	rev	v.2000	re	v.200	)1	re	v.2002	2	
Market g Swedish	rowth f exports	ior S			5.0	0.	1 <b>7.2</b>	0	.6 7.	1		0 6.2		
OECD area export price in national currency			-0.7	0.	3 <b>1.6</b>	-0	.2 1.	8	-0	.2 1.8				
Crude oil price (USD/barrel Brent Blend)			17.8	0.	1 <b>25.0</b>	4	.1 20.	9	1	.7 20.6				

Note. Columns headed rev. show the change from the December Inflation Report Source: The Riksbank.





Note. Consensus Forecast represents an average based on a survey of around 200 international forecasters: the forecast for 2002 comes from Long Term Forecasts in October 1999 and is a weighted average of GDP forecasts for Canada, France, Germany, Italy, Japan, Netherlands, Norway, Spain, United Kingdom, United States.

Sources: Consensus and the Riksbank

#### Figure 11. Output gap. Percentage points



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



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

Figure 13. International consumer prices. Percentage 12-month change



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





Price of Brent crude, USD/barrel (right scale)

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

The stronger international activity has led to expectations of greater pressure on unutilised resources (Fig. 11).

Moreover, in the past year producer and consumer price increases have accelerated appreciably in the United States and Europe (Figs. 12 and 13). While this is almost entirely a consequence of rising oil prices (the level has almost tripled in the course of a year), there is a risk that some of the higher oil price will be reflected in higher wage demands and other price increases. Excluding the oil price rise, inflation in the United States and Europe has been stable to date at a low level (Fig. 14), even though there are signs of incipient price increases in services sectors in the euro area .

In the light of strong growth prospects, since the December Report there has been a further tightening of monetary policy in the euro area as well as the United States and this will help to restrain future international price pressure. In the United States, stronger productivity also suggests that higher growth is feasible without leading to accelerating inflation.<sup>4</sup> In the euro countries there are still unutilised resources and in the coming years there is the prospect of growing price competition; output is accordingly not expected to reach the potential level until 2002 (Fig. 11).

Unchanged assessment of OECD area inflation.

The combination of these factors and stronger international competition leads to the assessment that the outlook for consumer price inflation in the OECD area is the same as in the December Report.

#### HIGHER PRODUCTIVITY STRENGTHENS U.S. ECONOMY

The strong U.S. economy is expected to go on generating the main driving force behind international activity. Judging from preliminary figures, 1999 was the fourth consecutive year in which real GDP growth exceeded 4 per cent in the United States, which has accordingly noted a post-war record of 107 months of unbroken economic expansion. In recent months there have been minor, apparently transient slowdowns in house sales, consumer confidence and employment but other indicators are still pointing upwards.

The most notable information since the turn of the year is perhaps that productivity growth in the second half of 1999 was stronger than expected (Fig. 15). This probably has to do with the investment boom in recent years and the rapid advances in information technology. The picture of a stronger productivity trend since the mid 1990s is accordingly strengthened and points to a higher rate of potential growth in the United States and less risk of overheating in the years ahead.

According to the February 2000 Humphrey-Hawkins Report, the U.S. Federal Reserve considers that the American economy is capable of growing at 3–3¾ per cent without risking increased price pressure.

#### Better U.S. growth prospects without higher inflation.

The picture is complicated, however, by the circumstance that the profits from higher future productivity in the United States are already being anticipated in stock markets, where share prices are historically very high.<sup>5</sup> The increments to wealth from rising share prices have been accompanied by a reduction in household saving to a record low in 1999 (Fig. 16) at the same time as consumption and borrowing have risen rapidly. Meanwhile, for some time the corporate sector has been in a phase of intensive investment that cannot be fully financed from profits. New investment capital has flown in instead from abroad and during 1999 the U.S. current-account deficit rose to almost 4 per cent of GDP. Furthermore, wages continued to lag behind productivity in 1999. In the coming years, the real wage trend is expected to accelerate and exert growing pressure on corporate profit margins (Fig. 15).<sup>6</sup>

In time, therefore, it is likely that the increasingly high expectations of the future will be increasingly difficult to meet. If share prices stop rising, households will have to reconsider their low saving. At the same time there is a risk of decreased access to international venture capital.

In some years from now, U.S. growth is expected to slacken as the imbalances are corrected.

So notwithstanding an optimistic view of productivity growth in the coming years, growth in the United States is expected to slacken some years from now as saving rises and consumer confidence falters.

#### EUROPEAN RECOVERY WITH STRONG EXPORTS

In the euro area the economic outlook is less complex. After the temporary setback in the early part of 1999, a continued recovery is foreseen, with an annual GDP growth rate for 2000–01 of over 3 per cent, which is somewhat higher than anticipated in the December Report. Strong domestic demand is still the main driving force. The reduction of euro-area unemployment to 9.6 per cent, the lowest figure since 1992, is expected to contribute to a continuation of high consumer confidence and rising private consumption (Fig. 17). Further support for household confidence is foreseen when tax reforms that have been planned for a long time are launched in a number of major countries in 2001 and 2002.

Lower unemployment in Europe should promote increased private consumption.





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

### Figure 16. USA: household saving and share prices.

Percentage of disposable income and index



<sup>(</sup>light seale)

Sources: U.S. Department of Commerce and Standard & Poor.

<sup>5.</sup> Share prices for traditional manufacturing companies have fallen since the beginning of the year, while the Nasdaq exchange, which is dominated by new technologies, has gone on rising; overall, shares prices have been unchanged at a historically high level.

To some extent, however, the low real wage trend is explained by the growing prevalence of profitsharing options, which according to some estimates are equivalent to about 10 per cent of real wage growth.

Figure 17. Euro area: Unemployment and consumer confidence. Per cent and net level



Source: Eurostat.



Figure 18. Euro area: contributions to GDP

Source: Eurostat.

Figure 19. UK: unemployment, house prices and consumer confidence. Per cent of labour force, percentage change and



Sources: U.K. Office of National Statistics, European Commission and Halifax plc.

Moreover, the unexpectedly weak euro relative to the dollar, together with the strong international activity, has lifted euroarea exports. After the fall during the Asian crisis, in the coming two years exports are now expected to make a positive contribution to growth (Fig. 18).

#### Non-euro markets in Europe are also picking up.

The British economy is continuing to exceed expectations and growth during 2000 is likely to be higher than assumed in the December Report. Manufacturing and construction have both recovered, while rising prices for houses and other assets, together with the lowest unemployment for 20 years, point to a continuation of strong domestic demand in the coming years (Fig. 19).

The picture of activity in the Nordic area is also somewhat brighter now. Finnish exports are gaining ground, even for more traditional industries such as forest products and metal manufacturing, accompanied by further successes for electronics. Higher employment and planned tax cuts point to a further increase in private consumption. Danish exports will benefit from the economic upswing in the rest of Europe, accompanied by a future relaxation of the restrictive fiscal policy. A slight improvement is discernible in Norway after the recession in 1998–99, not least as a consequence of the high price of oil.

Prospects in the Nordic area have become somewhat brighter but the recovery in Japan is weaker than expected.

The reinforcement of activity in Europe is also evident in the rapid economic upswing among EU candidate countries in Eastern and Central Europe. The recovery in Russia is continuing against a background of higher oil prices and a competitive rouble.

The other emerging markets also seem to have left the Asian crisis behind them. There has been a return to growth in virtually all the Asian economies. Latin America is benefiting from the solid recovery in Brazil and the more stable situation in Argentina.

#### JAPANESE RECOVERY WEAKER THAN EXPECTED

The weakest major export market is still Japan. The promising beginning to 1999 has given way to renewed uncertainty after GDP fell in the second half-year. In 2000–01, demand should be stimulated by another record budget but the economic dualism will continue. An increasingly strong export and investment propensity is raising industrial output but private domestic consumption, which is equivalent to as much as 60 per cent of GDP, still looks very weak. Unprecedented cuts in bonus wages and high unemployment by Japanese standards have contributed to decreased consumption and a continued risk of deflation. All in all, the increase in both GDP and prices in Japan is expected to be even somewhat weaker than foreseen in the December Report.

The promising beginning to 1999 in Japan has given way to renewed uncertainty.

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#### Interest rates and exchange rate

#### SOME INCREASE IN INTERNATIONAL BOND RATES SINCE DECEMBER REPORT

International bond rates have tended to move up since the previous assessment (Fig. 20). Factors behind the upward tendency are considered to be the rapidly rising oil prices, which have caused concern about higher inflation, and the continuation of strong global growth. In Sweden, however, the ten-year T-bond rate is at much the same level, about 5.5 per cent, as at the time of the December Report.

#### Narrower difference between Swedish and German bond rates.

The ten-year interest rate differential between Sweden and Germany has narrowed about 0.3 percentage points to approximately 0.1 percentage point since the December Report. This means that at times Sweden's difference with Germany has been smaller than that of Denmark and certain other euro countries. The forward ten-year bond rate differential with Germany has also narrowed and is negative at present (Fig. 21). Financial information of this kind should be interpreted with caution but the levels do indicate that confidence in Sweden's economic policy is high.

#### EXPECTATIONS OF CONTINUED REPO RATE INCREASES

The February repo rate increase of 0.5 percentage points somewhat exceeded market expectations. Even so, survey data as well as money market pricing indicate expectations of further monetary policy tightening (Table 3, Fig. 22). The latest survey from Statistics Sweden shows that money market agents expect the repo rate will be raised to 4.25 months in the coming three months and to 4.75 per cent twelve months ahead.

 Table 3. Interest and exchange rate expectations of money market agents in March 2000 (November 1999 in parentheses).

Median, percent and index: 18 November 1992=100

	In 3 months	In 1 year	In 2 years
Repo rate	4.25 (3.50)	4.75 (4.00)	5.00 (4.50)
TCW-index	123.0 (122.0)	120.0 (120.5)	120.0 (120.0)
SEK/EUR	8.45 (8.60)	8.40 (8.54)	8.40 (8.54)

Note. The surveys were done on 9 March 2000 and 15 November 1999

Source: Statistics Sweden.



Apr'99

Apr'98

4.5

4.0

3.5

3.0 Apr'97



Note. Interest rates estimated with the extended Nelson & Siegel method.

Source: The Riksbank

#### Figure 22. Repo rate and expected rate implied by forward interest rates.





Note. Prior to 4 January 1999 the SEK/EUR rate is based on an index, calculated by the Riksbank, for the krona's movements against the currencies with EUR exchange rates that are now irrevocably locked; this is equivalent to movements in the TCW index excluding all non-euro currencies, expressed as the SEK/EUR rate.

Source: The Riksbank.

Figure 24. SEK/DEM rate and its historical and expected volatility. Per cent



Source: The Riksbank

#### THE KRONA HAS APPRECIATED SINCE THE DECEMBER REPORT

Since the December Report the krona has fluctuated in terms of the TCW index between 123 and 125; the current level, about 123, is somewhat stronger than at the time of the December Report. The krona has weakened about 3 per cent against the dollar but appreciated approximately 1.5 per cent relative to the euro (Fig. 23).

The volatility of the SEK/EUR rate has increased recently without the krona weakening against the euro. The market expects the volatility to decrease (Fig. 24).

The combined effect on demand from interest rates and the exchange rate has become less expansionary since the December Report (Fig. 25). The real short-term interest rate<sup>7</sup> has risen about 0.5 percentage points since December to 2.3 per cent, while the real long rate<sup>8</sup> has moved up 0.3 percentage points to around 3.5 per cent and the real exchange rate has appreciated more than 0.5 per cent. The spread between most interest rates for the private sector and the corresponding government borrowing rates is currently somewhat wider than at the time of the December Report.

#### ASSESSMENT OF INTEREST RATES AND EXCHANGE RATE

The February repo rate increase entails an upward adjustment of the forecast for short-term interest rates, in accordance with the technical assumption of a constant repo rate.<sup>9</sup> The forecast for bond rates, however, is broadly unchanged.

The krona is judged to appreciate somewhat more slowly than foreseen in the December Report.

The krona is judged, as in the December Report, to appreciate during the forecast period but more slowly than assumed at that time. At the end of 2001 the exchange rate now expected to be about 2 per cent weaker than foreseen in December. This is essentially because the U.S. dollar and sterling are expected to be stronger than foreseen earlier, which has to do with a reappraisal of these currencies in relation to the euro, for example. One reason for this is that the paths for growth and productivity have been unexpectedly favourable in the United Kingdom and, above all, the United States. At the same time, inflation has

9. The assumption of an unchanged repo rate applies up to the end of 2002 Q2, after which the repo rate is assumed to return to the path indicated by market expectations.

<sup>7.</sup> The monthly average of the nominal three-month T-bill rate adjusted for the CPI change that households expect in the coming twelve months (HPI data). The use of a different survey method from January 2000 onwards complicates comparisons with earlier expectations. The average T-bill rate for March is based on the period through 14 March.

<sup>8.</sup> 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 survey. The T-bond rate for March is based on the period through 14 March. The series for the real exchange rate has accordingly been updated with the change in the average nominal TCW exchange rate between February and 1–14 March.

remained low and the potential growth rate is considered to have risen in the United States.<sup>10</sup> Another reason is that the robust American and British economic trends point to monetary policy there being more restrictive than foreseen in the December Report. In the longer run, however, there is still considerable room for an appreciation of the krona against the dollar and sterling. As in December, the level of the krona against the euro is expected to be largely stable.

To sum up, the February reportate increase means that the impact on demand from interest rates and the exchange rate is judged to be less expansionary than at the time of the December Report. Towards the end of the forecast period the effect of the higher report is countered by the assessment that the krona will not appreciate quite as much as expected earlier.

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



Source: The Riksbank.

10. See the section International activity and inflation.



Sources: SIX Market Estimates (SME) and the Riksbank.

Figure B2. The repo rate and expectations twelve months earlier. Per cent



Sources: SIX Market Estimates (SME) and the Riksbank

#### MARKET REPO-RATE EXPECTATIONS

A central bank stands to benefit from a clear picture of the repo-rate expectations of market players. It is then easier to avoid disturbing market pricing unnecessarily through statements or monetary policy adjustments. Expectations of the future repo rate can be derived from survey data, market letters and market prices for various types of interest instruments. The Riksbank uses the yield curve for Swedish Treasury paper to compute the implied forward interest rate curve, from which the market's interest rate expectations are then derived.F11 The Riksbank also follows a number of surveys of inflation, interest rate and exchange rate expectations that are produced by, for example, Statistics Sweden and SIX Market Estimates (SME).

Repo-rate expectations are based on, for instance, inflation prospects in the economy and the Riksbank's monetary policy signals and decisions. In the short run, the co-variation between these expectations and the path of the repo rate is an indication of the degree of transparency in the Riksbank's inflation targeting policy.<sup>12</sup> It may therefore be of interest to study how successful market players have been in predicting the repo rate.

Expectations of the repo rate three and twelve months ahead, derived from implied forward interest rates and survey data, are shown in Figs. B1 and B2, respectively, together with the repo rate's actual path.<sup>13</sup> The three-month expectations seem to catch the repo rate's future path relatively well. Predicting the repo rate twelve months ahead has been considerably more difficult. The explanation for this is, not least, that few observers foresaw the weak price trend in recent years.

Figs. B1 and B2 also indicate that the expectations derived from surveys have been better predictors than implied forward interest rates, which have generally pointed to a higher level than the surveyed expectations. An explanation for the latter may be that the implied forward rates include various types of risk premium

<sup>11.</sup> The implied forward interest rate curves are estimated with the aid of the extended Nelson & Siegel method, cf. Svensson, L. (1995), Estimating forward interest rates with the extended Nelson & Siegel method, Quarterly Review 3, Sveriges Riksbank.

<sup>12.</sup> The general uncertainty associated with assessing inflation affects both the feasibility of clear monetary policy signalling by the Riksbank and the market's possibilities of predicting the repo rate.

<sup>13.</sup> Note that the expectations have been shifted forward in the chart to make it easier to compare them with the outcome to which they refer.

and therefore, particularly during periods of unrest when prices fluctuate widely, tend to overestimate how the repo rate is actually expected to develop. A case in point is the situation last autumn, when the money market was characterised by uncertainty about the future development of interest rates. At that time the difference between implied forward rates and survey data widened to about 1 percentage point (Fig. B3). The opposite applied, however, during the financial crisis in the autumn of 1998, when expectations of cuts in instrumental rates and a flight to secure short-term paper contributed to downward pressure on interest rates and thus to a difference that at times was negative.

One way of looking more closely at whether surveyed expectations have in fact been better predictors than implied forward interest rates is to calculate the accuracy of different forecasts with the same horizon. The results confirm the impression that surveyed expectations have been better than implied forward rates at catching the repo rate's future path (Table B1). They also confirm the conclusion that expectations for the somewhat longer term are less accurate than short-term expectations.

Table B1. Mean squared error of forecasts based on implied forward interest rates and survey data.

	3-month	norizon	6-month	horizon	12-month horizon		
	Implied forw. rate	Survey	Implied forw. rate	Survey	Implied forw. rate	Survey	
Mean squared error	0.11	0.07	0.48	0.28	1.77	1.10	
error	0.11	0.07	0.48	0.28	1.77	1	

Note. The smaller the error, the better is the predictive power of the forecast. Source: The Riksbank.



Sources: SIX Market Estimates (SME) and the Riksbank.

#### REAL INTEREST RATE AND MONETARY POLICY

There are various approaches to the question of what is a desirable long-term level for monetary policy's instrumental rate. The matter is discussed here with reference to the intellectual framework the Riksbank uses for monetary policy in an inflation target regime.

Monetary policy influences inflation mainly through effects on total demand. When the central bank raises the interest rate, demand for consumption and investment is subdued and this tends to restrain the rate of price increases. Matters are complicated by the circumstance that it is primarily the very short-term nominal interest rates that respond to monetary policy, while consumption and investment are presumably more sensitive to real long-term rates. But as the real interest rate over a given time horizon is equivalent to the nominal rate less inflation's expected rate over the same horizon, monetary policy is capable of influencing the real rate provided changes induced by monetary policy in the nominal rate lead to changes of the same magnitude in the expected rate of inflation.

The relationship between the real interest rate, inflation and monetary policy is sometimes discussed with reference to identities of roughly the following appearance:

$$i_{t} = r_{t}^{*} + \pi_{t}^{e} + \partial(\pi_{t}^{e} - \pi^{*}) + b(y_{t} - y_{t}^{p}), \quad (1)$$

where a and b are coefficients greater than zero. Here,  $i_i$  denotes the nominal interest rate set by the central bank,  $\pi^*$  the central bank's inflation target and  $y_i$  real output (GDP). This variables can be observed, at least retrospectively, but that is not the case for either expected inflation (measured over the same period as the interest rate),  $\pi_i^e$ , or the notional 'equilibrium levels' for the real interest rate,  $(r_i^*)$ , and production,  $y_i^e$ .

Relationships of this type are often referred to as Taylor rules.<sup>14</sup> The notion is that when expected inflation exceeds the target, the nominal interest rate ought to be above the 'nominal equilibrium interest rate'. However, the appropriate size of this difference from the equilibrium level also depends on the cyclical situation  $(y_t - y_t^{\rho})$ . When the economy is in equilibrium, in the sense that expected inflation equals  $\pi^*$  and

See Taylor, J.B. (1993), Discretion versus policy rules in practice, Carnegie-Rochester Conference Series on Public Policy 39.

production is in equilibrium  $(y_t = y_t^{\rho})$ , then the real interest rate  $(i_t - \pi_t^{\rho})$  is also at its equilibrium level  $(r_t^{*})$ . If inflation is above the target, on the other hand, the central bank will aim to keep the real interest rate above its equilibrium level (for the given cyclical situation) and vice versa.

While no central bank conducts monetary policy exactly in accordance with this rule, it (or similar rules) has proved serviceable for describing approximately both how policy is actually implemented in many countries and how policy could be constructed. An import insight conveyed by the rule is that in the event of a positive difference between expected and targeted inflation, the nominal interest rate has to be raised by more than the expected acceleration of inflation. This is necessary to make the nominal interest rate increase equivalent to an increase in the real interest rate.

A central bank that wishes to apply the rule above needs to supplement its inflation forecast with an assessment of the equilibrium levels for the real interest rate and production (potential output). Potential output clearly has no particular given or constant *level*. Over the last hundred years, annual GDP growth has averaged around 2–3 per cent, which gives some idea of the rate of increase in potential output. But this variable parameter has to be estimated as reliably as possible.<sup>15</sup> Neither can the other important parameter, the equilibrium level of the real interest rate, be observed directly and the current state of empirical knowledge is hardly better than for the level of potential output.

A measure of a short-term real interest rate in Sweden and the G-10 countries<sup>16</sup> since 1960 is presented in Fig. B4. This measure represents the difference between a nominal three-month rate and *actua*/inflation in the preceding twelve months (rather than expected inflation in the coming three months, which is what we would like to use to arrive at the real interest rate that is theoretically relevant); unfortunately there is no selfevident measure of expected inflation. For present purposes, however, this measurement problem is a secondary concern because expected and actual inflation can be assumed to follow the same path.

From Fig. B4 we can conclude that the real interest rate in Sweden has broadly followed developments elsewhere. The level fell from the mid 1970s, then rose





Sources: OECD, IMF and the Riksbank.

See e.g. Apel, M. & Jansson, P. (1999), System estimates of potential output and the NAIRU, *Empirical Economics 24*.

Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Sweden, United Kingdom, United States.

up to the end of the '80s (possibly the early '90s) and seems to have tended downwards again since then.

#### Table B2. Short-term real interest rates for selected countries in different decades. Per cent

Period	G-10	Germany	Japan	Sweden	United States
1960-69	1.8	1.3	3.1	1.6	1.8
1970-1979	-0.8	1.5	-1.9	-2.0	-0.5
1980-1989	3.3	3.0	3.5	3.7	3.0
1990-1999 Q2	2.5	2.7	1.4	4.6	1.7
1960-1999 Q2	1.7	2.1	1.5	2.0	1.5

Note. The short-term real interest rate is defined as a nominal three-month rate less the average 12-month rate of CPI inflation over the preceding four quarters.

Sources: IMF, OECD and the Riksbank.

### Table B3. Long-term real interest rates for selected countries in different decades.

Per cent

Period	G-10	Germany	Japan	Sweden	United States
1960-69	2.8	4.3	1.7	2.1	2.8
1970-1979	1.2	3.5	-1.3	1.4	1.4
1980-1989	3.4	4.1	2.9	3.2	4.0
1990-1999 02	3.5	3.8	2.2	4.1	3.2
1960-1999 Q2	2.7	3.9	1.3	2.7	2.9

Note. The long-term real interest rate is defined as a nominal long T-bond rate (ten years or the closest approximation) less the average 12-month rate of CPI inflation over the preceding four guarters.

Sources: IMF, OECD and the Riksbank.

Table B2 presents the average level of the short-term real interest rate in different countries and decades, as well as for the whole observation period since 1960. For the G-10 countries the average for the whole period is below 2 per cent but this figure conceals considerable differences between decades; the average level in the 1970s was clearly negative, whereas in the '80s and '90s it was well above 2 per cent. This suggests that the equilibrium level of the real interest rate is something that, like the level of potential output, is liable to vary markedly over time. The picture of long-term real interest rates in Table B3 warrants the same conclusion. To a fairly large extent, therefore, the path of the average real interest rate in Sweden seems to depend on the average international development of real interest rates. The latter in turn has varied fairly considerably over different periods.

So what are the factors that might underlie the marked shifts in the level of Swedish and international real interest rates? In general terms, the development of these rates in different countries can be said to depend on the global relationship between saving and investment. The relative cross-border mobility of capital means that the real return on savings and investment is unlikely to differ all that much across countries. This explains why the average level tends to be fairly similar in different countries (Tables B2 and B3). The fact that real interest rates are still not completely uniform across countries implies that their short-term path is also sensitive to various country-specific factors, even in a small economy such as Sweden. One example of such factors is pronounced cyclical differences between countries.

It should be noted, however, that comparisons between the decades that are covered in the chart and the tables are complicated by the fact that capital markets were strictly regulated in the 1960s and '70s. The prevalent perception of the real interest rate as a mechanism for balancing saving and investment is not applicable in a regulated economy. The upward shift in real rates during the 1980s is possibly an indication that regulations had previously resulted in levels that were artificially low but it may also have to do with other factors.

From the argument above it follows that certain fluctuations in real interest rates may also be deliberate expressions of monetary policy. Changes in the principles for monetary policy in many countries also make it hazardous to attempt comparisons between, for example, the 1960s and '90s.

What does all this tell us about the present situation in Sweden? As defined in Fig. B4, the short-term real interest rate at present in Sweden is not particularly low, either historically or internationally. On the other hand, we know that for some years the actual rate of inflation has been lower than expected, which means that the recent level of the real interest rate is presumably overestimated in Fig. B4. Moreover, as mentioned above, comparisons over time are hazardous, partly due to changes in the regulations for internal and crossborder capital movements, the structure of tax systems and the development of exchange rates. Furthermore, the rule (1) states that the real interest rate should be relatively high when forecast inflation is above the inflation target and/or economic activity is high.

Simple arithmetical examples may be illustrative. Assume that the forecast for inflation two years ahead is exactly on the target, 2 per cent, and that the economy is in a neutral cyclical position. The nominal two-year interest rate should then represent the equilibrium level of the real interest rate plus expected inflation. In this example the latter is 2 per cent and as an approximation of the former we can take the average of the average short and long real interests in Germany in the period 1960-99 (Tables B2 and 3), that is, (2.1 + 3.9)/2 = 3.0 per cent. The nominal two-year interest rate should then be about 5 per cent, which is fairly close to the present level in Sweden. The reason why the level of German interest rates can serve as a benchmark is that monetary policy there has been constructed for a considerable time as it is today in Sweden, with a flexible exchange rate and a focus on low inflation.

Basing the calculations instead on the corresponding data for Swedish interest rates, the hypothetical equilibrium level of the nominal interest rate works out at somewhat below the present level: (2.0 + 2.7)/2 + 2.0 = 4.35 per cent. Starting alternatively with Swedish interest rates in the 1990s, the result is higher than the present level: (4.6 + 4.1)/2 + 2.0 = 6.35 per cent. However, neither period is particularly relevant: the 1960s because the capital market was regulated and the 1990s because the outcome has so much to do with the economic crisis that Sweden experienced.

These examples illustrate the difficulties, using historical data, of forming an opinion about what might be an appropriate long-term level for real interest rates with a maturity of approximately two years. For monetary policy, however, the difficulties are not confined to the assessment of an appropriate average level from which to start. The repo rate applies to very short maturities and we do not have any detailed knowledge about the slope of the yield curve—in the interval from two weeks to two years—that is suitable when the economy is in long-term equilibrium. Moreover, the current level of somewhat longer interest rates incorporates expectations that the repo rate will be raised.

It is up to the Riksbank to adjust the repo rate so that the inflation target is fulfilled. Interest rates will then vary with the business cycle, for example. Arguments, such as those above, about what may be an appropriate long-term level of the real interest rate, are weighted into the foundation for monetary policy decisions and influence the Riksbank's assessment of inflation. However, it is the perception of inflation one to two years ahead that normally determines how monetary policy is formulated.

#### Import prices

Import prices have both a direct and an indirect impact on inflation. In that imported goods and goods competing with imports make up a large proportion of the CPI, the level of consumer prices is affected directly by changes in foreign-currency prices for goods and exchange rate movements. The indirect consequences for inflation arise because the development of international prices and the exchange rate also affect demand and supply in Sweden.

#### Further upward revision of crude oil price forecast.

In recent months, price increases for crude oil and other commodities have exceeded earlier expectations. The barrel price of crude oil, which to date has climbed to a high of over USD 32 during March, is assumed to peak during Q1 this year. There is much uncertainty in the oil market as to whether the OPEC meeting on 27 March will decide to continue with quotas that restrict the supply of oil. Petroleum ministers in some OPEC countries have expressed a desire to raise oil production successively in order to achieve a lower price. For this and other reasons, it is still foreseen that oil prices will fall back in the forecast period. The barrel price is assumed to decline gradually to about USD 22 at the end of 2000 and to not guite USD 21 at the end of the forecast period, 2002 Q1 (Fig. 26). Compared with the December Report, the forecast average oil price has accordingly been revised upwards by about USD 4/barrel for 2000 and about USD 1.5/barrel for 2001 (Table 2, p. 15). Some increase in other commodity prices is also foreseen as the stronger international activity leads to increased demand for these products, above all in Asia.

#### Lower rate of price increases for international goods.

The international price trend for manufactured export in national currencies was stronger at the end of 1999 than had been assumed in the December Report. However, in view of increased competition, for example, producers are likely to have limited scope for price increases. And as cost rationalisation is assumed to have reduced the need to raise prices, the forecast rate of increase in this and the coming year is somewhat lower than was foreseen in the December Report (Table 2). Even so, the stronger international activity and indirect effects of the oil price rise are still expected to result in gradually rising prices in the coming two years.

#### Larger CPI contribution from import prices.

With the weaker exchange rate trend and the assumption of a smaller and more protracted oil price fall, the falling tendency



<sup>(</sup>left scale)

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

CPI component: propellants and heating oil, excl taxes (right scale)



Note. CPI goods that are mainly imported include a considerable proportion of services, for example transportation and retailing.

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

for producer prices for imported goods during 2000 is less marked than assumed in the December Report even though the international price rise for manufactured exports has been revised downwards. In addition to prices for international goods and exchange rate movements, Swedish consumer prices for imported goods are affected by various domestic factors. As previously, the strong consumer demand is judged to result in prices to consumers rising faster than to importers (Fig. 27). In the somewhat longer term, however, the premise is that profits for importers and retailers will develop somewhat more slowly, partly as a result of increased domestic competition.

To sum up, higher commodity prices and a weaker exchange rate mean that the trend for import prices to producers in the coming two years is stronger than foreseen in the December Report. But as the future impact on consumer prices is judged to be limited, it is only the rate of price increases during 2000 that has been revised upwards. The annual price rise for imported goods in the coming two years is judged to be not quite 1.5 per cent, which for 2000 is an upward revision since the December Report of 0.5 percentage points. In both 2000 and 2001 the contribution to CPI inflation is judged to be about 0.4 percentage points.

#### Demand and supply

#### SUMMARY OF GDP GROWTH 1999-2002

The picture of a strong, stable economic upswing, marked by rising domestic demand, is essentially the same as at the time of the December Report. Meanwhile, however, growth prospects have improved in some respects. Private consumption growth is expected to be higher than assumed earlier, partly due to rising asset prices and the increase in household wealth. Investment in turn should be stimulated by the increased demand, successively growing pressure on production capacity and rising share prices. Meanwhile, the improved international prospects are expected to involve increased demand for Swedish exports. The growth contribution from foreign trade is judged to be somewhat curbed, however, in that the stronger domestic demand means that import growth is also somewhat higher.

The picture of a strong, broad economic upswing in Sweden still holds.

All in all, even with the repo rate increase of 0.5 percentage points, GDP growth in the forecast period is expected to be somewhat stronger than assumed earlier. Given an unchanged repo rate through 2002 Q1, GDP growth is judged to be 4.0 per cent in 2000, 3.5 per cent in 2001 and 2.6 per cent in 2002 (Table 4).

### Table 4. Demand and supply in the main scenario. Percentage annual change

	1999 (outcome)	2000	2001	2002
Household consumption	4.1	4.1	3.6	3.1
Public authorities consumption	1.8	1.4	1.4	1.0
Gross fixed capital formation	8.1	8.0	6.9	5.6
Stockbuilding <sup>*</sup>	-0.5	-0.2	0.0	0.0
Exports	5.2	7.1	6.2	4.9
Imports	5.0	6.9	6.8	6.2
GDP at market values	3.8	4.0	3.5	2.6
GDP forecast in December Report	(3.4)	(3.7)	(3.3)	

\*Contribution to GDP growth.

Source: The Riksbank

Figure 28. Contributions to GDP growth. Percentage points, 2000–02 forecast



Sources: Statistics Sweden and the Riksbank

Exports of goods and services rose 5.2 per cent in annual terms in 1999 according to the national accounts, while import growth was 5 per cent.

International economic prospects have continued to improve since the December Report. Growth in the OECD area in the forecast period has been revised upwards by a total of 0.5 percentage points. This points to somewhat stronger export market growth in 2000 and 2001; with some slowdown in international growth, in 2002 market growth is calculated to slacken about 1 percentage point to around 6 per cent (Table 2, p. 15).

The assessment of Sweden's competitive position is broadly the same as at the time of the December Report. The prospect of a weaker exchange rate and a somewhat more optimistic assumption about unit labour costs does admittedly favour competitiveness with the rest of the world but the overall effect for export competition is countered by lower international prices for manufactured exports as well as higher prices for the equivalent Swedish products.

As a combined result of these factors, export growth is judged to be somewhat stronger than foreseen in the December Report, that is, about 7 per cent in 2000, over 6 per cent in 2001 and not quite 5 per cent in 2002.

Imports of goods were comparatively weak in 1999; annual growth fell back to just over 4 per cent, from more than 10 per cent in 1998, without any sizeable changes in the development of demand. Between them, decreased imports of computers, weak industrial production and subdued stockbuilding are judged to account for just over 2 percentage points of this fall-off in import growth.

A successive return to more normal levels of import growth is foreseen in the coming years. The outlook for 2000 is admittedly still affected to some extent by the weak exchange rate during 1998 and 1999 but the strong development of investment and consumption is helping to maintain import growth. Next year, both the continuation of good growth and the increasing appreciation of the krona will contribute to stronger import growth. All in all, imports are expected to rise almost 7 per cent both this year and next. During 2002, the weaker economic trend will tend to subdue import growth to an increase of about 6 per cent.

The contribution to GDP growth from net exports is judged to be roughly as foreseen in the December Report this year and somewhat lower in 2001.

The contribution to GDP growth from net exports is accordingly judged to be as foreseen in the December Report this year and somewhat lower in 2001. This year's contribution is calculated to be clearly positive, followed by a successive reduction as economic growth weakens and the krona appreciates.

#### FISCAL POLICY

Public finances have become appreciably stronger in recent years. The financial balance, measured as public sector revenues net of expenditures, has improved, mainly as a result of a necessary consolidation of public finances but also in connection with the successive economic recovery. A public sector financial surplus was achieved in 1998, for the first time since 1990, and a further improvement followed in 1999.

Two goals have guided fiscal policy in recent years. The Government and Parliament have established a surplus averaging 2 per cent of GDP over the business cycle as a central target for budget policy. For this and the coming year the aim is a 2 per cent surplus provided GDP growth matches the assessment in the Spring Bill in 1997. In last autumn's Budget Bill it was noted that while growth looked like being stronger, the difference was not sufficient to warrant a revision of the target. There are now many indications that growth in these years will be considerably stronger than earlier assessments by the Ministry of Finance suggested. The Riksbank judges that the annual public sector surplus will continue to improve and approach 3 per cent of GDP towards the end of the forecast period but that this mainly reflects cyclical factors (Fig. 29).

#### The annual public sector surplus will continue to improve.

The other fiscal policy goal is a ceiling for central government expenditure excluding debt interest. This goal has also been fulfilled, though the margin has generally been small. The ceiling is considered to be binding for this year and 2001, while the same no doubt also applies in practice to 2002, when rising health insurance expenditure is calculated to broadly match the existing budget margin. This means that there is probably no room for additional central government expenditure in the period through 2002.

Policy changes with effects on, for example, household disposable income or the extent of public activities have consequences for general demand and probably also for the Riksbank's assessment of inflation.

The appraisal of public consumption is the same as in the December Report, though the outcome for 1999 has proved to be somewhat stronger than assumed earlier. Public consumption expenditure is expected to rise in real terms but to go on falling relative to GDP; a growth rate of about 1.4 per cent is foreseen both this year and next. Neither is there any change in fiscal policy's overall impact on household income. The assumptions behind the Riksbank's analysis are essentially the same as those in last autumn's Budget Bill.





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 (cf. Fig. 39).

Source: The Riksbank.



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

Source: The Riksbank

Figure 31. Private consumption and households' own-economy expectations. Percentage 12-month change and net figure



Source: Statistics Sweden.

#### HOUSEHOLD CONSUMPTION

Household expenditure on consumption rose in 1999, according to the national accounts, by 4.1 per cent from the year before, which is more than assumed earlier and the highest annual rate since 1987. The growth came mainly from expenditure on durables. Car sales alone accounted for about 1 percentage point of the annual increase.

The strong growth of consumption has to do with a number of favourable factors in recent years. Rising real wages and employment have been accompanied by a less restrictive shift in fiscal policy. In the past two years, household disposable income has therefore risen comparatively rapidly and a strong trend is foreseen this year and in 2001.

Moreover, share and house prices have moved up very rapidly in recent years and thereby contributed to a substantial increase in household wealth (see box on pp. 36–38). This is judged to provide a further stimulus to private consumption in the years ahead.

In the United States, the improved productivity growth in recent years has been seen as a sign of an upward shift in the trend for labour productivity, implying a higher level of potential growth. This has probably contributed to the endurance of the asset price rise and the build-up of wealth. Moreover, higher labour productivity has created room for a better wage trend in the future.

The extent to which the American pattern is relevant in Sweden is debatable. It is not inconceivable, however, that the asset price rise will stimulate household consumption to a greater extent than expected earlier, particularly now that households are investing a larger proportion of their savings in the stock market.

The more favourable development of income and wealth, together with a better situation in the labour market, have contributed to a very optimistic mood among households. For more than a year now, Statistics Sweden's survey shows that the own-economy expectations of Swedish households have been stable at a level that historically is very high (Fig. 31).

The very favourable mood in the household sector is also a major factor behind the fall in the saved proportion of disposable income. Lending to households by Swedish credit institutions in January was 9.4 per cent higher than a year earlier (Fig. 32). The strong increase in credit demand should be seen as a further indication of household optimism. Gross liabilities have been rising relative to disposable income since 1996 but the level is still appreciably lower than in the late 1980s.

Yet another indication that consumption will remain strong is the continuation of the strong increase in the narrow money supply (M0) after the turn of last year (Fig. 30).

The growth of private consumption has also been promoted by relatively low interest rates. All else equal, however, the fact that interest rates are now somewhat less relaxed than at the time of the December Report will tend to subdue the growth of consumption. A sizeable share of consumption growth in recent years has consisted of investment in durable, cars in particular (Fig. 33). This followed a number of years when volume sales of goods of this type was low. Some of the upswing in consumption accordingly represents a natural renewal of the stock of capital goods. Car sales, along with other durables, are expected to go on rising, albeit at a diminishing rate towards the end of the forecast period in particular.

Consumption is judged to rise more strongly than assumed earlier, though some fall-off in demand for durables is expected to act as something of a damper towards the end of the forecast period.

All in all, the development of consumption in the forecast period is judged to be stronger than assumed earlier. Household expenditure on consumption is expected to rise 4.1 percent this year, 3.6 per cent in 2001 and 3.1 per cent in 2002.

Figure 32. Lending by credit institutions. Percentage 12-month change



--- To resident non-bank sector (right scale)

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.

Figure 33. Households' total expenditure on consumption and car purchases. Percentage annual change, constant (1995) prices





Figure B5. Nominal and real house

Sources: Statistics Sweden and the Riksbank.



Figure B6. Nominal and real share prices incl. dividends.

Sources: Findata and Statistics Sweden.

#### HOUSEHOLD WEALTH AND PRIVATE CONSUMPTION

The path of private consumption is determined to a high degree by the lifetime resources of households, that is, by the actual and expected development of income. The expected development of income is mirrored in turn in prices of the assets that constitute household wealth. The measurable components of household wealth are primarily residential property and shares. In recent years, prices of these assets have risen considerably in real as well as nominal terms (Figs. B5 and B6).

Nominal house prices are now above the peak before the bubble burst in the early 1990s but in real terms they have not yet reached that level. In the two decades since 1981, a person who invested in a diversified share portfolio at that time and subsequently reinvested all the dividends has seen the original value grow twenty times over in real terms; what is most remarkable is the appreciable share of this growth that occurred solely in 1999 Q4.

From Table B7 it will be seen that at the end of 1999, household assets in the form of permanent and secondary dwellings totalled SEK 1,566 billion and shareholdings totalled SEK 594 billion.<sup>17</sup> During 1999, the value of residential property (including secondary dwellings) rose 7.5 per cent and shareholdings 63 per cent. An important issue is how private consumption has been and will be affected by this accumulation of household wealth.

Household behaviour, as represented by the life-cycle hypothesis, is forward-looking. Consumption is influenced mainly by the present value of expected future incomes, from capital as well as employment.

Many empirical studies have confirmed that the lifecycle hypothesis is a good approximation of how households actually behave, though there are conflicting results. One problem with the empirical calculations, however, is the lack of a satisfactory measure of household wealth. This applies in particular to the wealth component that consists of discounted future earned income (human capital) but real assets are also

17. In addition, shares make up the major part of mutual fund holdings in Table B1 as well as an appreciable part of insurance and pension saving.

difficult to quantify. This complicates the interpretation of wealth effects based on estimated consumption functions. Even so, changes in wealth can be presumed to have some impact on household consumption. Empirical studies at the Riksbank indicate that around 2 per cent of a change in the household sector's net real wealth will show up in consumption in the short term. If the change in wealth becomes permanent, in two to three years' time the effect grows by an additional 1–2 percentage points.

In 1999 private consumption rose 4.1 per cent (Fig. B7), which historically is a very high rate (the annual trend rate over the past four decades is 2 per cent). A part of this strong growth is clearly attributable to the exceptionally rapid rise in asset prices (Fig. B8), whereby household net wealth rose during 1999 by about SEK 500 billion; 2 per cent of this figure is about SEK 10 billion, which in turn represents a contribution of about 1 percentage point to the growth of household consumption. And if, as a study by Johnsson & Kaplan<sup>18</sup> suggests, the elasticity of consumption is greater for financial wealth than for the net housing stock, the impact on consumption would be somewhat larger than these figures indicate, since it is for financial wealth that growth has been incomparably stronger.

Consumption can also have been affected by the financial accelerator (the notion that higher asset prices make it easier for households to borrow because the assets they can use as collateral are worth more). Household borrowing has recently risen from banks as well as finance companies. This suggests that households are spending a good deal of their unrealised assets via consumer credit.



### Figure B8. Lending relative to GDP and real price index for assets.





Note. Lending represents borrowing by the resident nonbank sector (households, firms and local authorities). The asset price index is a weighted average of share prices, house prices and commercial property prices. Data up to 1997 from BIS, Riksbank projection for 1998 and 1999.

Sources: Bank for International Settlements and the Riksbank.

18. Johnsson, H. & Kaplan, P. (1999), An econometric study of private consumption expenditure in Sweden, National Institute of Economic Research Working Paper 70; the longterm marginal consumption propensities from changes in financial wealth and the net housing stocks are estimated to be 0.16 and 0.04, respectively, with two-fifths of the adjustment towards equilibrium occurring in year one.

### Table B1. Household wealth SEK billion

	End 1998	End 1999	Percentage change
Residential and secondary houses	1,456	1,566	7.5
Bank deposits and cash	492	503	2.2
Bonds	154	138	-10.4
Shares	364	594	63.1
Mutual funds	362	517	42.8
Loans to financial sector	3	4	33.0
Individual financial saving	548	608	10.9
Collective pension saving	203	234	15.2
Gross wealth	3,582	4,164	16.2
Liabilities	945	1,026	8.5
Net wealth	2,637	3,138	19.0

Note. Financial variables at end 1999 taken from Statistics Sweden's savings survey; real estate values calculated by the Riksbank.

#### FIXED INVESTMENT AND STOCKBUILDING

Investment activity in 1999 was somewhat stronger than envisaged in the December Report. Growth was strongest for residential investment and business sector investment outside manufacturing, though public investment also rose. In manufacturing, however, the volume of investment was much the same as the year before.

Conditions for a strong investment trend in the period 2000– 02 are still good even though market rates of interest are expected to be somewhat higher than allowed for in December.

#### Investment is judged to go on developing favourably.

With the strong growth, above all in domestic demand, the unutilised capacity in many industries will decrease, which implies an increased need to invest in new buildings and machinery (Fig. 34). The strong upward stock-market trend is also expected to have some favourable effects for investment. All else equal, however, the Riksbank's repo rate increase of 0.5 percentage points is likely to have some restraining effect on the future growth of investment.

*Manufacturing investment* in 2000 is expected to be unchanged from the year before, according to the February survey by Statistics Sweden. There are signs, however, that investment activity in manufacturing will be fairly strong. Manufacturing has recovered quickly from the brief dip last year. The latest business tendency data show historically high optimism among manufacturing firms. According to the December survey by the National Institute of Economic Research, moreover, a relatively high proportion of firms report the supply of buildings and machinery as their primary bottleneck (Fig. 34). All this points to a good development of manufacturing investment this year as well as in the rest of the forecast period.

Business sector investment excluding manufacturing rose strongly in 1999 and is expected to go on growing at a good rate, though some fall-off seems likely towards the end of the forecast period.

*Residential investment* has started to recover; the national accounts show an increase of about 19 per cent for 1999. The recovery is expected to continue for some years, thereby making considerable contributions to growth. The supply of labour and land may have a restrictive effect but no general shortage of construction workers is discernible at present, though there may be grounds for some concern about personnel resources regionally as well as in a longer perspective.

All in all, gross fixed investment is expected to rise 8 per cent this year, almost 7 per cent in 2001 and just over 5.5 per cent in 2002. The forecasts for 2000 and 2001 are thus somewhat higher than in the December Report. In 2002, it is higher interest rates as well as weaker growth that tend to slow the increase in gross investment.

Figure 34. Gross fixed capital formation in manufacturing and firms with machinery and plant capacity as the primary bottleneck. Per cent



bottleneek in machinery and plant

Note. Series seasonally and trend adjusted; the series for fixed capital formation at constant 1995 prices in accordance with SNA 93 has been linked to the earlier series at 1991 prices.

Sources: National Institute of Economic Research and Statistics Sweden.

#### Figure 35. Employment (persons). Seasonally-adjusted moving 3-month average; index: 1980 Q3=100



Figure 36. Unemployment and job vacancies. Per cent and thousands, respectively; seasonally adjusted data



Sources: National Labour Market Board and Statistics Sweden.



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.

Stock movements contributed -0.5 percentage points to GDP growth in 1999. Business tendency data show a negative shift in as-of-now assessments for stocks of finished manufactured goods, that is, in a direction that is normally positive for the producers. However, the data on the absolute size of stock movements indicate that the changes are small. In the case of wholesale and retail trade, for example, the changes are negligible.

Changes in stocks are judged, as in the December Report, to make some negative contribution to GDP growth this year and the effects in the coming two years are assumed to be neutral.

#### EMPLOYMENT AND PRODUCTIVITY

The number in employment rose 2.2 per cent or about 90,000 persons in 1999, the largest annual increase in the past thirty years. The expansion of employment occurred mainly in private and public services, with weak growth in manufacturing as well as construction (Fig. 35).

### Employment is judged to rise somewhat faster than assumed earlier.

Employment is expected to go on rising throughout the forecast period. During 2000 the effects of the strong activity should spread to employment in more sectors, though some fall-off is foreseen in private services.

Rising industrial production is expected to contribute to a renewed expansion of employment there, even though the effect will be limited to some extent by good productivity growth. With stronger manufacturing activity, increased labour demand is also foreseen in the related segments of the services sector, leading to a more general expansion of employment in private services. Employment in construction is also expected to be higher in 2000 than the year before. Factors that point in this direction are the continuation of strong investment in construction and particularly the increase in residential construction.

The risk of labour shortages is greatest in occupations that require highly trained labour. Unemployment in this category has dropped rapidly to around 3 per cent, while the rate for labour with little training is still above 6 per cent. This indicates that there are certain matching problems in the labour market that might jeopardise the continued expansion of employment.

All in all, employment is expected to rise in the coming three years by almost 200,000 persons. The strong economic activity is also contributing to an increased labour supply and this will tend to hold back the reduction of unemployment; a contrary effect comes, however, from higher participation in labour market programmes in connection with the Government's ambition to bring unemployment down to 4 per cent at the end of 2000. Open unemployment is calculated to average 4.5 per cent in 2000, 3.9 per cent in 2001 and 3.7 per cent in 2002.

Labour productivity rose comparatively strongly in the second half of 1999 but the annual change was relatively weak. Subject to certain conditions, labour productivity can be subdivided into capital intensity and total factor productivity; the former represents effects on productivity from changes in the relative inputs of capital and labour, while the latter is usually seen as representing underlying technology (Fig. 37).

The relatively weak annual change in productivity in 1999 is judged to have been mainly a result of transitory factors; productivity growth in the forecast period is therefore expected to be higher.

The relatively weak annual change in productivity in 1999 can be explained to some extent by the concentration of strong employment growth to the services sector, where productivity normally rises more slowly than in manufacturing, for example (Fig. 38). There are many indications that the fall-off was primarily a result of transitory phenomena. Widespread recruitment, for instance, can tend to hold productivity back on account of learning costs.

In the forecast period, some fall-off is foreseen in the growth of employment, accompanied by a more uniform development over sectors. According to the simple calculation presented in Fig. 37, the growth of total factor productivity (the technological factor in productivity) has followed a rising trend since 1993. While it would be hazardous to draw far-reaching conclusions from calculations of this type, the tendency could herald some improvement in the potential growth rate for the Swedish economy. During the forecast period, the strong investment activity is expected to promote productivity growth both via rising capital intensity and through a more rapid introduction of new technology. A successive increase in the growth of labour productivity is therefore foreseen this year and in 2001, followed by some renewed slowdown towards the end of the forecast period for cyclical reasons, for instance as capacity becomes more strained.

Productivity growth is calculated to be 1.7 per cent in 2000, 2.1 per cent in 2001 and 1.5 per cent in 2002. This path is somewhat higher than was foreseen in the December Report (Table 5).

Table 5. Labour market forecast in the main scenario. Percentage annual change or per cent

	1999	2000	2001	2002
Hourly wage	3.3	4.0	4.3	4.3
Labour productivity	1.0	1.7	2.1	1.5
Unit labour costs	2.3	2.3	2.2	2.8
Hours worked	2.7	2.4	1.4	1.1
Open unemployment rate	5.6	4.5	3.9	3.7
Source: The Riksbank				

Figures 38. Sectorwise productivity. Percentage annual change





Note. Data presented as moving four-quarter average. W-H stands for the Whittaker-Henderson or Hodrick-Prescott filter, which is based on the Riksbank's GDP forecast for 2000–02; UC is the Unobserved Components method and PF the production function approach.

Sources: Statistics Sweden and the Riksbank

Figure 40. Manufacturing shortages of skilled labour and salaried technicians. Per cent





#### RESOURCE UTILISATION

Resource utilisation is a central factor for the path of inflation. One of several indicators of total resource utilisation is the output gap, which aims to quantify the difference between actual output and the potential level. As the potential level is not observable, the output gap has to be estimated indirectly with econometric methods, which entails uncertainty.

The Riksbank undertakes various estimates of the output gap. For 1999 the results indicate that the gap averaged almost -1 percentage point (Fig. 39).

The degree of unutilised capacity can also be assessed from information on capacity utilisation, shortages and so on in different sectors of the economy. In manufacturing, business tendency data indicate that capacity utilisation decreased from 85 per cent in September to 83 per cent in December. The shortage of skilled labour, which had risen fairly sharply during the first three quarters of 1999, also tended to drop back in December. This was accompanied by no change from September in the shortage of salaried technicians (Fig. 40). The proportion of firms reporting machinery and plant capacity as the primary bottleneck rose marginally, while the proportion with labour shortages as the primary obstacle to increased production fell. The proportion reporting 'other factors' as the main obstacle was 7 per cent, which is relatively high; this was particularly the case in the manufacture of telecom products, where it may have had to do with temporary problems with the rearrangement of production, new models, etc. All in all, industrial capacity utilisation must be considered moderate and the changes in 1999 Q4 seem to be negligible.<sup>19</sup>

In construction, an absence of capacity shortages was reported by 85 per cent of firms. The proportion reporting that labour shortages restricted production was 8 per cent in December. This suggests that there is still plenty of unutilised resources for construction in the country as a whole.

All in all, it seems that some shortage of capacity may arise during the forecast period.

In the services sector, where output is restricted mainly by labour supply, there is still a substantial shortage of personnel with the relevant competence. For computer consultants and computer services, however, capacity utilisation has decreased markedly and so has the level of order books; still, this was accompanied by an increase from September to December in the shortage of

For a discussion of the significance of capacity utilisation for the path of inflation, see e.g. *Inflation Report 1999:3*, box on pp. 37–39.

competent personnel, to a level around 80 per cent. The combination of an increased personnel shortage and decreased capacity utilisation presumably means that the latter is a temporary phenomenon in connection with the millennium transition, for example.

Thus, the picture of resource utilisation is not entirely uniform. The output gap estimates point to a rapid reduction of unutilised capacity so that, given present assumptions, the gap will close in the course of this year. At the same time, information from surveys and other sources suggests that there is still a good deal of unutilised capacity. The overall assessment is that with the comparatively rapid growth of total demand, the unutilised resources will successively be incorporated in production. In time, this can lead to capacity restrictions and affect price formation. With the somewhat higher forecast for GDP growth, the unutilised resources at present should be reduced somewhat more quickly than assumed earlier. The effect of this is countered, however, by the prospect of somewhat higher productivity growth.

#### WAGES AND UNIT LABOUR COSTS

In the December Report it was assumed that the average hourly wage rise in 1999 would be 3.2 per cent. This forecast is well in line with the available wage statistics, though the outcome is still preliminary.

The forecast for wage increases in the coming years has been revised downwards to some extent from the main scenario in December. Nominal wages are now expected to rise by an average of 4.0 per cent in 2000 and 4.3 per cent in both 2001 and 2002.

In 1999, preliminary statistics indicate that wages rose 3.3 per cent. A higher rate of wage increases in the coming years is indicated by rising resource utilisation. Moreover, wages for large groups are being renegotiated in an economic situation that favours employees, with strong labour demand. High wage increases for certain groups may be motivated in some cases but there is a risk of this leading to demands for compensation for other groups in the labour market.

Changes have occurred in the labour market that may tend to restrict wage increases compared with the earlier pattern in Sweden. New types of agreement, whereby wages are allocated locally to a greater extent, are judged to result in a development of wages that is more in line with productivity. Such agreements are also considered to have reduced the risk of demands for compensation, which may be one reason why the level of wage settlements to date has been comparatively low. And as expectations of inflation one to two years ahead among labour market organisations are still low, nominal wage increases do not have to be all that large to secure a real improvement. Wage increases may also be restrained by the circumstance that the real increases in recent years have been high and exceeded the growth of productivity. Figure 41. Operating surplus and wage costs. Per cent of GDP at factor values



Note. Series based on both the earlier and the current national account systems (SNA 68 and ESA 95, respectively).

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

With lower wage increases and higher productivity growth compared with the December forecast, the trend for unit labour costs in 2000 and 2001 is somewhat weaker than foreseen earlier, or 2.2–2.3 per cent, followed by 2.8 per cent in 2002. Unit labour costs are accordingly expected to move up faster than prices in the coming years. The profit share in the total economy will accordingly fall, though that is normal in the present cyclical phase (Fig. 41). With the downward revision of the forecast for unit labour costs, however, the profit share declines somewhat more slowly than foreseen in the December Report.

The forecast for the nominal hourly wage implies that real wages go on rising at a rate that is historically high and exceeds the growth of productivity. This is not sustainable in the longer run. A further downward adjustment of the rate of wage increases will therefore be necessary in future years unless productivity growth improves.<sup>20</sup>

 For a more detailed discussion of wage formation in the long run, see *Inflation Report 1999:4*, box on pp. 48–50.

#### INFLATION EFFECTS OF SHORTENING WORKING HOURS

The issue of shortening working time has been politically topical for a long time. It is frequently argued that such a reform would pave the way to a reduction of unemployment by sharing work. Another argument that has come to the fore more recently is that shorter working hours can be a way of enhancing social welfare at the expense of material welfare; this amounts to an alternative way of benefiting from productivity gains in the Swedish economy.

The focus here, however, is on how a change in working hours affects inflation. The starting point is that any impact on inflation arises over just a limited period. The notion is that in the long run a shortening of working time only leads to a change in the price *level*. The discussion of effects presupposes an unchanged monetary policy.

A discussion of how a reform of working hours affects employment can start by considering two extreme cases. One assumes a constant hourly wage, that is, wage income falls in proportion to the reduction of working time. If the supply of labour is plentiful, it is possible in principle for employers to hire additional personnel without increasing their total wage costs. The wage costs for the reform of working hours are then carried by those who were employed prior to the reform; they share both working time and wage income with those who were unemployed earlier. This extreme case generates the largest effect on employment.

At the other extreme, employees work shorter hours for the same wage income as before, that is, the firm's costs rise in proportion to the reduction of working time. The wage costs for the reform of working hours are then carried by employers. This case generates the least effect on employment. If firms are obliged to cut production when wage costs rise, the effect on employment may even be negative.

The outcome in practice probably lies somewhere in between these two extremes, that is, employment rises but so do labour costs.<sup>21,22</sup> Whether or not inflation is

<sup>21.</sup> Empirical evidence that employment does rise when working time is shortened has been presented by, for example, Holmlund, B. (1989), Wages and employment in unionized economies: theories and evidence, in Holmlund; B., Löfgren, K-G. & Engström, L., *Trade Unions, Employment and Unemployment Duration*, Oxford University Press.

A tendency for shorter working time also to push hourly wages up has been found in macro-economic studies, e.g. Forslund, A. (1994), Wage setting at the firm level insider versus outsider forces, *Oxford Economic Papers* 46, pp. 245–261.

affected will depend on a number of factors.

One factor to consider is the *competitive situation* in product markets. For firms that are in a position to adjust their prices, increased wage costs can be passed through to consumers, leading to higher inflation.

Another factor is *labour productivity* in connection with a reduction of working hours. If such a reduction results in, for example, more concentrated labour, less absenteeism for sickness and a lower incidence of accidents, it may lead to higher labour productivity. This implies a smaller direct increase in employment from the reform as well as lower unit labour costs; compared with no change in productivity, the effect on inflation would then be more moderate. The opposite, however, is also conceivable, so that shorter working hours lead to a higher proportion on 'unproductive' working time in the form of preparing for and finishing the working day, for example. Increased recruitment may lower labour productivity for a time because most jobs require an initial period of learning.<sup>23</sup>

A third factor to consider is the prevalence of *fixed labour costs*, for example for training, administration, recruitment, departures and fringe benefits. When working hours are shortened, such expenditures can make it more costly for the firm to hire additional labour than to pay existing employees for overtime.

A fourth factor is how *utilisation of the capital stock* changes when working hours are shortened. In this context it is important to distinguish between working hours and operating hours; the former denotes the time spent by an individual employee at work, the latter the time during which a facility is in operation. If operating time increases when working time is shortened, the capital stock may be used more efficiently, thereby reducing unit capital costs. This in turn may cushion any upward effect on inflation. Shorter working hours may just as well lead to decreased operating time, thereby cutting output and raising unit capital costs.

<sup>23.</sup> Results from empirical studies differ. A positive productivity effect of shorter working time has been found by, for example, Åberg, Y. (1986), *Produktionens och sysselsättningens bestämningsfaktorer i svensk ekonomi. Med särskild betoning på arbetstidens betydelse* (Determinants of production and employment in the Swedish economy, with particular reference to the significance of working time), DELFA, Ministry of Labour, Stockholm, and Skedinger, O. (1994), *En ekonometrisk studie av arbetstidsproduktiviteten* (An econometric study of working time productivity), in *6 juni Nationaldagen. Betänkande av Nationaldagsutredningen*, SOU 58. No such effect is reported, on the other hand, by Anxo, B. & Bigsten, A. (1989), Working hours and productivity in Swedish manufacturing, *Scandinavian Journal of Economics* 91, or Holmlund, B. (1989) *idem.* 

To the extent that higher production costs are passed on in higher prices, this will tend to raise inflation.

Attempts to calculate the consequences of shorter working hours by simulating with macro-economic models have been made in a number of studies.<sup>24</sup> The main finding in a majority of them is that cutting working hours leads to a short-run increase in inflation. In the long run, however, the effect is just a shift in the price *level*.

The effects on inflation of shortening working hours are clearly complex. Assessments inevitably involve assumptions about productivity effects and the degree of wage compensation, for example. For both these factors, however, assessments need to be optimistic to avoid the conclusion that a reduction of working hours is associated, at least in the short run, with higher inflation.

<sup>24.</sup> See e.g. van Ginnekin, W. (1984), Employment and the reduction of the work week: a comparison of seven European macro-economic models, *International Labour Review* 123.1, pp. 35–52, Donders, J. & Manders, T. (1997), Does work-sharing work?, *CPB Report* 2, pp. 25–28, National Swedish Institute of Economic Research (1998), *Modellsimuleringar av macroekonomiska effekter vid en arbetstidsförkortning* (Model simulations of macro-economic effects of shortening working hours), November, Stockholm, and *idem* (2000) *Macroekonomiska effekter vid en arbetstidsförkortning* (Macro-economic effects of shortening working hours), February.

## Price effects of deregulations and trade liberalisation

Market deregulations and the liberalisation of trade have effects on inflation in both the short and somewhat longer run but estimating the magnitude and timing of such effects on consumer prices is difficult. The discussion in recent Inflation Reports has focused on effects of deregulations in electricity and telecom markets and the Agenda 2000 reform for agriculture, which between them affect about 10 per cent of household consumption. But there are other sectors of the Swedish economy where pricing and competitive conditions have attracted attention and where any measures can also be expected to have consequences for the future development of prices. Some examples are construction, the food sector, transportation, and health and medical care. Moreover, increased competition and thereby downward price pressure can be generated by changes in market conditions, such as extended markets for international corporations, new channels for communications and distribution (with the aid of information technology, for instance), and stricter requirements for public procurement. Contrary effects are liable to come, however, from such factors as increased concentration in business and the EU ban on parallel imports.

Electricity prices have gone on falling, as expected, since the time metre requirement was abolished as of last November. During 1999, price reductions for electricity tended to lower both CPI and UND1X inflation by about 0.2 percentage points (Fig. 42). As of January 1999, Statistics Sweden is implementing a new method that affects the registered seasonal pattern of electricity prices and since last autumn is also allowing for the increased number of players in the electricity market.<sup>25</sup> The assessment of future electricity prices is complicated by uncertainty about the fixed tariffs and whether network operators can achieve a further rationalisation of costs rather than having to charge increased tariffs. To date, network operators have used rationalisation to meet the increased costs associated with the abolition of the time metre requirement. As in the December Inflation Report, falling electricity prices are judged to restrain CPI inflation in 2000 by 0.1 percentage point.

Electricity and telecom prices are judged to go on subduing inflation.

A series of telecom market deregulations was initiated in the early 1990s in connection with a new Telecommunications Act. This led to the entry of a number of new companies. A further step was taken in September 1999 when consumers were given a

<sup>25.</sup> The former change of method means that the CPI is now affected by planned, seasonallydetermined changes in electricity prices (time tariffs), which was not the case in earlier years; the latter change leads to more sources being asked for information about electricity prices.

free choice of call operator. Once this reform had been approved, prices began to decline even before the measures came into force.

There are signs that the downward pressure on tele-product prices during 2000 may be marginally greater than assumed earlier. With the next step in the deregulation process, in the first half of this year consumers will probably be free to choose their net operator, just as they are already free to choose their call operator; this is expected to subdue prices. In the longer run, however, the price effects are difficult to assess. If the present price ceiling on subscriptions is removed, as proposed by the National Post & Telecom Agency, the downward pressure on prices may be countered by rising subscription charges because current income probably does not cover operating costs for the access net.

During 1999 the impact of the price fall for telecom services on both CPI and UND1X inflation was -0.1 percentage point, which is in line with the assessment in the December Report. In view of the new information about the telecom market, the downward price effect in 2000 is expected to be marginally greater.

The discussion of increased trade liberalisation has suffered setbacks since the December Report. The WTO negotiations broke down in December and are unlikely to be resumed in the short run. Probable price effects were not quantified in the December Report but a continued liberalisation of trade may generate increased price pressure through bilateral trade agreements and the admission of new WTO members, above all China, which is expected to become a member this year.<sup>26</sup>

The adjourned Round also eases the pressure for reforms of EU agricultural policy, though the implementation of Agenda 2000 still holds. This Agenda, which includes reforms of farm price subsidies (the guaranteed price level to farmers), involves a reduction of the intervention prices for farm crops, milk and beef, which will affect import as well as home market prices for agricultural products. The reforms concern an early stage in the food production chain and their effects on later stages are difficult to gauge. It is estimated that the agricultural reforms will have a downward consumer price effect of about 0.4 percentage points, spread over about ten years.

Taken as a whole, the various deregulations and trade liberalisation are judged to have a downward price effect in the forecast period of 0.1-0.3 percentage points a year (Table 6).

Table 6. CPI effects of deregulations.Percentage points

	1999	2000	2001	2002
Dental charges	0.2	0.0	0.0	0.0
Electricity prices	-0.2	-0.1	0.0	0.0
Telecom prices	-0.1	-0.1	0.0	0.0
Agricultural prices	0.0	-0.1	-0.1	-0.1
Total CPI effect	-0.1	-0.3	-0.1	-0.1

Note. The downward effect on CPI inflation from telecom prices in 2000 is somewhat larger than foreseen in the December Report; due to rounding, this is not evident from the table.

Source: The Riksbank

26. Sweden's trade with China is admittedly of minor importance (1.0 per cent of imports and 1.8 per cent of exports) but as China's share of world trade is about 3 per cent, indirect effects may contribute to price pressure.

Figure 42. Electricity and telecom prices. Percentage annual change



#### Effects of political decisions and interest expenditure

No new proposals to change indirect taxes have been put forward since the December Report and the contributions to inflation are calculated to be small throughout the forecast period. Many indirect taxes are indexed, leading to annual adjustments in January for price movements in the previous year. In the coming two years this is judged to add almost 0.1 percentage point to CPI inflation. In January 2000, moreover, the taxes on diesel oil and energy were increased and a new tax was imposed on waste materials.

Table 7. Direct CPI effects from indirect taxes, subsidies and interest expenditure. Percentage points

	Dec. 2000	March 2001	Dec. 2001	March 2002
Indirect taxes and subsidies	0.1	0.0	0.0	0.1
Temporary freeze on taxable value of residential property	-0.1	-0.1	-0.1	-0.1
House mortgage interest expenditure	0.0	0.0	0.2	0.2
Total CPI effect	0.0	-0.1	0.1	0.2

Note. These CPI components are excluded from UND1X, which accordingly covers rather more than 90 per cent of the CPI.

Sources: Statistics Sweden and the Riksbank.

A return to the indexing of property taxes as of 2001 is currently proposed, together with an end to the temporary reduction of the property tax on rented housing. In the December Report it was judged that the freeze on taxable values of residential property would be prolonged to include 2001. The present forecast assumes that the freeze will continue in both 2001 and 2002, while the property tax on rented housing is changed as planned.

In February 2000 the contribution to the 12-month rate of CPI inflation from house mortgage interest expenditure was -0.2 per cent. The contribution is expected to turn into a positive item in the course of the next two years. Compared with the calculations in the December Report, the contribution to inflation is larger during 2000 in particular, partly as a consequence of the Riksbank's latest repo rate increase (Table 7).

In addition to the effects considered above, there are a number of political proposals that will very probably affect price components that are not excluded from UND1X (Table 8). With a full pass-through to rents, in January 2001 the increased property tax on rented housing adds almost 0.2 percentage points to the 12-month rate of CPI inflation. For 2001 and 2002, the CPI effect of the proposed introduction of a maximum day nursery charge is calculated to be -0.1 percentage point a year; this figure is uncertain, however, because the construction of the charge has not yet been presented in detail. Moreover, day nursery charges are not included in the CPI at present; the assessment is based on their inclusion as of 2001.

### Table 8. UND1X effects from political decisions. Percentage points

	Dec. 2000	Dec. 2001	March 2002
Maximum day nursery charge	0.0	-0.1	-0.1
Property tax on rented housing	0.0	0.2	0.0
Total UND1X effect	0.0	0.1	-0.1

Note. UND1X covers rather more than 90 per cent of the CPI.

Source: The Riksbank.

#### Inflation expectations

Surveys published since the December Report indicate rising inflation expectations in the short run but broadly unchanged expectations further ahead. The short-run expectations, as well as those for the medium and longer run, are now in line with the inflation target. Thus, the upward profile that inflation expectations previously presented has become less pronounced (Fig. 43). The differences between the inflation expectations of different groups have also decreased (Table 9).

Short-run inflation expectations, as well as those for the medium and longer run, are in line with the inflation target.

Expectations of inflation one year ahead have been revised upwards both by households and in manufacturing and the services sector (Fig. 44).<sup>27</sup> All the categories interviewed in the March survey from Statistics Sweden likewise adjusted their oneyear expectations upwards from the previous survey in November and the figures are now in line with the inflation target. Expectations for 2 and 5 years ahead are anchored around 2 per cent. The same conclusion can be drawn from the February survey by Aragon of inflation expectations among Swedish money market agents (Fig. 46). Figure 43. Money market agents' inflation expectations.



Note. As Statistics Sweden, on behalf of the Riksbank, altered the questionnaire prior to the March survey, it is not relevant to compare the level of the March expectations with that of expectations for more than one year ahead in earlier series.

\*From Statistics Sweden; otherwise Prospera Research AB.

Sources: Prospera Research AB and Statistics Sweden.





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.

27. The use of a different method for surveying households' inflation expectations as of January 2000 onwards complicates comparisons with earlier expectations; when both methods were used last November, the new one put the inflation expectations of households at 1.6 per cent, which was 0.3 percentage points higher than expectations according to the earlier method. The difference is not statistically significant but does illustrate the uncertainty involved in surveys of this type.

#### Figure 45 Implied forward interest rates. Effective annual rate, per cent



Source: The Riksbank.

### Figure 46. Inflation expectations. Per cent



--- Expected average rate in coming five years

Note. Implicit inflation expectations are derived from the difference between implied 5–15-year real and nominal bond rates.

Sources: Aragon Fondkommission and the Riksbank.

#### Table 9. CPI inflation expectations in March 2000. Annual rate, per cent

Expected inflation 1 year ahead		
Money market agents	1.8	(0.3)
Employer organisations	1.9	(0.3)
Employee organisations	1.9	(0.3)
Purchasing managers, trade	1.9	(0.2)
Purchasing managers, manufacturing	2.1	(0.1)
Households (HIP, February)	1.8	(-0.1)
Manufacturing firms (tendency surveys, December)	1.7	(0.2)
Services firms (tendency surveys, December)	1.5	(0.2)
Expected inflation 2 years ahead		
Money market agents	2.0	
Employer organisations	2.2	
Employee organisations	2.2	
Purchasing managers, trade	2.0	
Purchasing managers, manufacturing	2.2	
Expected inflation 5 years ahead		
Money market agents	1.9	
Employer organisations	2.3	
Employee organisations	2.3	
Purchasing managers, trade	2.3	
Purchasing managers, manufacturing	2.3	

Note. The figures in parentheses are the change in percentage points from the previous survey. On behalf of the Riksbank, Statistics Sweden has altered the questionnaire for the March survey; it is therefore not meaningful to compare expected inflation two and five years ahead in that survey with the expectations in the November survey.

Sources: National Institute of Economic Research and Statistics Sweden

Inflation expectations can also be derived from market interest rates, though great caution should be observed because these rates are also sensitive to other factors. Rates for the medium term (one to two years) have risen by up to 0.5 percentage points, which seems to indicate some increase in expected inflation as well as expectations of a tighter monetary policy in the form of a higher real short-term interest rate in the medium run (Fig. 45).

Expected inflation in the long run can be derived from the difference between nominal and real long-term interest rates. For forward rates between 5 and 15 years this difference has tended to fall since the December Report and is now a bit below the 2 per cent inflation target (Fig. 46).<sup>28</sup>

To sum up, expectations of inflation in the short run have become somewhat higher. At the same time, expectations for the medium and longer term are anchored around 2 per cent.

28. Some observers consider that changes in this indicator of expected inflation should be interpreted somewhat cautiously because market liquidity in real interest bonds is too low to provide a reliable picture of the expected future real interest rate.

# Inflation assessment

This chapter summarises the Riksbank's assessment of inflation prospects up to 2002 Q1, 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 the Riksbank's appraisal of the uncertainties and risks in the inflation prospects.

#### Inflation prospects in the main scenario

International economic prospects have gone on improving since the time of the December Report. This applies primarily to economic activity in the United States, which is continuing to be remarkably positive, but it also looks as though growth in the euro area and the United Kingdom could be higher than assumed earlier. In the United States, consumer confidence has reached new records in recent months, accompanied by a further reduction of unemployment. The stronger trend in the United States, driven by good productivity growth, is also mainly responsible for the higher growth in the OECD area. The upswing in the euro area has firmed, with a continuation of strong domestic demand and rising exports in connection with the weak development of the euro. Of the major industrialised countries, it is only in Japan that the recovery seems uncertain. All in all and compared with the December Report, annual growth in the OECD area in the forecast period is judged to be somewhat higher.

International consumer prices are expected to follow broadly the same path as foreseen in the December Report. Oil prices are expected to be somewhat higher but a somewhat weaker tendency than assumed earlier is foreseen for international prices for manufactured exports, partly as a consequence of growing international competition, not least in the European Community.

As in December, the krona is expected to appreciate in the coming years but this is now assumed to occur somewhat more slowly than foreseen earlier. The revision stems from a different appraisal of the U.S. dollar and sterling relative to the euro, for example. To some extent, the path of the dollar is judged to mirror a higher potential growth rate for the American economy. The stronger dollar and sterling also have to do with the prospect of a monetary stance in the United States and the United Kingdom that is tighter than foreseen in the December Report.

The inflation assessments start from the technical assumption that in the coming two years the repo rate is unchanged. The repo rate increase of 0.5 percentage points to 3.75 per cent at the beginning of February means that the present assessment is Figure 47. UND1X, UNDINHX and import price for goods: outcome and main scenario.



Sources: Statistics Sweden and the Riksbank.

based on a level of short-term interest rates that is higher than for the December assessment. The forecast for longer interest rates, on the other hand, is much the same as in December.

Prices for commodities, crude oil in particular, and intermediate goods have risen more than expected in recent months and their level in the coming two years is judged to be higher than foreseen in the December Report. Even with the lower forecast for international export prices, import prices to producers are judged to follow a stronger path because the krona is now assumed to appreciate somewhat more slowly. In the somewhat longer run, however, it is envisaged that, partly as a result of increased domestic competition, profits for importers and retailers will develop rather more slowly. The pass-through to consumer prices from the higher producer prices is therefore judged to be limited (Fig. 47).

GDP growth is judged to be 4.0 per cent this year, 3.5 per cent in 2001 and 2.6 per cent in 2002.

Economic growth in Sweden is also expected to be stronger than envisaged in the December Report. A higher increase is foreseen for private consumption, partly on account of increased household wealth. Investment should be stimulated in turn by the increased demand. Moreover, the improved international prospects are expected to result in higher demand for Swedish exports. But as somewhat increased import growth is also foreseen on account of the stronger domestic demand, a somewhat lower contribution to growth is envisaged from foreign trade. All in all, GDP growth is judged to be 4.0 per cent this year, 3.5 per cent in 2001 and 2.6 per cent in 2002.

The picture of resource utilisation is not clear-cut. Output gap estimates suggest that resource utilisation is already fairly high, while information from surveys of industries and firms gives a partly different impression. Still, the comparatively high growth of total demand does point to the unutilised resources being brought into production in the course of the forecast period. In time, therefore, capacity restrictions will probably being to act and influence price formation. In that the overall growth forecast is now somewhat higher, the unutilised resources at present should be reduced somewhat more quickly than assumed earlier. However, the expected increase in labour supply and the assumption of somewhat higher productivity growth are judged to contribute to a relatively limited risk of more widespread capacity restrictions in the coming two years.

Some of the tendencies in the Swedish economy resemble, at least superficially, the favourable development in the United States in recent years. As happened earlier in the United States, towards the end of last year there was increased investment in Sweden accompanied by higher productivity growth. Judging from the rate of price increases to date, the supply side has been able to cope with increasingly strong private consumption with mounting consumer confidence. Consumer confidence in both countries has been fuelled by higher employment and wealth gains, partly from rising share prices. In the United States, however, the higher growth has been continuing for several years and the growth of investment and productivity has been appreciably stronger. So although there are certain features of development in Sweden in recent years that are reminiscent of the American economy, it is still too early to draw far-reaching conclusions.

Although the rapid growth is a sign that the unutilised resources will be brought into production successively, the risk of more widespread capacity restrictions in the coming two years is relatively limited.

Nominal wage increases in the years ahead are judged to average just over 4 per cent a year, which is marginally less than foreseen in the December Report. Rising capacity utilisation points to a higher rate of wage increases in the coming years but considerable changes have occurred in the labour market. A larger proportion of wage increases is now allocated locally, for example. Moreover, inflation expectations in line with the inflation target and historically high real wage increases in recent years are expected to create conditions for a moderate development of wage costs. Still, the element of uncertainty about wage developments is considerable.

In the coming years it is judged that an average annual wage rise of just over 4 per cent is feasible without jeopardising the inflation target. In the somewhat longer run, however, such a wage trend would probably conflict with the inflation target wages are rising faster than is probably commensurate with trend productivity. A lower rate of wage increases would provide room for stronger growth and a better development of employment.

The short-run inflation expectations of households have gone on rising since the December Report and are now broadly in line with the inflation target, while expectations for the longer term continue to be around 2 per cent. Stable long-term expectations help to subdued inflationary impulses from the economic upswing. It should be born in mind, however, that the long-term inflation expectations incorporate expectations that the Riksbank is active in holding inflation in line with the target.

To sum up, international activity has continued to improve and demand in Sweden is growing strongly. Higher commodity prices and a slower appreciation of the krona mean that the producer price rise for imported goods is somewhat higher than expected despite a weaker tendency in international prices for manufactured exports. Partly as a result of increased domestic competition, however, the pass-through from import to consumer prices is judged to be limited. The assumption that the wage trend will be more subdued and productivity somewhat stronger than envisaged earlier is a factor that will tend to restrain inflation. Figure 48. CPI and UND1X: outcome and the main scenario in this and the previous Report. Percentage 12-month change



Sources: Statistics Sweden and the Riksbank.

In the main scenario the rate of underlying inflation, measured as UND1X, is judged to be 1.6 per cent one year from now and 2.1 per cent after two years.

Against this background, in the main scenario with an unchanged repo rate, the rate of underlying inflation, measured as UND1X, is judged to be 1.6 per cent one year from now and 2.1 per cent after two years. This assessment is marginally lower than in the December Report even though the picture of economic activity in Sweden has become somewhat stronger (Fig. 48). The downward revision is larger for the short run, when lower rent increases and lower telecom prices are judged to counter the direct impact of higher oil prices and a weaker exchange rate. It is partly due to these factors that, compared with the December Report, the average annual rate of UND1X inflation is judged to be somewhat lower in both 2000 and 2001 (Table 10).

Table 10. Inflation forecasts in the main scenario. Percentage change

	Annual rate		12-month rate			
	2000	2001	March 2001	March 2002		
CPI	1.4	1.6	1.3	2.1		
UND1X	1.6	1.8	1.6	2.1		
UNDINHX	1.2	2.1	2.0	2.5		
HICP	1.5	1.6	1.4	2.0		

Source: The Riksbank.

The difference between the CPI and UND1X consists of house mortgage interest expenditure, indirect taxes and subsidies. The combined effect of these transitory factors on CPI inflation is judged to be -0.1 percentage points one year from now and 0.2 percentage points after two years. These factors are judged to have no permanent effect on inflation or inflation expectations and accordingly should not affect the formation of monetary policy.

A major factor behind the consumer price tendency in recent months has been the oil price rise. A pertinent question is whether this price increase for oil should be incorporated in the formation of monetary policy. The answer depends in part on whether the effects of the price increase are judged to be transitory or more permanent, for instance by influencing inflation expectations. Oil price movements can be seen in certain cases as a supply shock, with effects on inflation that are mainly transitory; in such cases they should be of secondary importance for the formation of monetary policy. The price rise for oil in the past year is primarily a consequence of OPEC's decision to cut oil production but the recent tendency has also had to do with increased international demand. The higher oil prices are also expected to spread to later processing stages. The various aspects of the oil price rise cannot be separated satisfactorily at present. Monetary policy is therefore currently based on an assessment of UND1X inflation.

#### 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. However, inflation forecasts are uncertain and the risk spectrum is therefore also relevant in the formation of monetary policy.

The inflation assessment in the December Report was judged to contain some upside risk, mainly because inflation might react sooner and more markedly to the strong growth of demand and a strong import price trend than in the main scenario could not be ruled out. In the present assessment the risk spectrum has shifted to a balanced position.

The principal threat to global economic growth comes from low saving in the U.S. economy as a consequence of the long upward phase and greatly increased share prices. Via effects on the international development of prices and economic activity, a stock market collapse there could lead to lower growth and inflation in Sweden as well.

There are also factors in Sweden that could result in inflation being lower than in the main scenario. The magnitude and timing of consumer price effects from market deregulations and trade liberalisation, for example, are difficult to quantify. The downward pressure last year on both electricity and telecom prices was surprisingly strong and it is conceivable that the impact of these market deregulations will be greater than foreseen, leading to lower inflation.

Higher prices for oil and other commodities, together with a weaker path for the krona compared with the main scenario, were perceived to be an upside risk in the December Report. To some extent, this has now been incorporated in the main scenario in the form of some upward revision of the oil price forecast. Moreover, the inflation forecast now assumes a weaker exchange rate tendency than before. But some upside risk still exists in that the oil price may not necessarily fall as much as assumed in the main scenario. International export prices, which are now assumed to rise more slowly than envisaged earlier, could be stronger than in the main scenario if the oil price were to be higher or international activity were to rise more quickly.

The main scenario presupposes that Swedish and international economic growth is high in the coming years but slows towards the end of the forecast period. This cannot be taken for granted. Developments in the United States and other countries show, for example, that strong consumption growth can continue over a series of years, driven by high asset prices and other optimism about the future. Such a development might result in appreciably higher demand and stronger upward pressure on prices.

All in all, the risk spectrum in the inflation assessment is judged to be balanced. The main factor behind the shift in the spectrum is that the earlier risk of a stronger path for oil and other commodity prices, along with a weaker krona, is now taken into account to a greater extent in the main scenario. Another factor in the same direction is the somewhat more optimistic assessment of wage formation in Sweden. Thus, the probabilities of inflation being higher and lower, respectively, than in the main scenario appear to be approximately the same. This is evident from Fig. 49, which presents the uncertainties around the forecast of underlying inflation, measured as the annual change in UND1X.<sup>29</sup> As the upside risk is judged to be as great as the downside risk, the uncertainty intervals above and below the path of inflation in the main scenario are the same width.

The risk spectrum in the inflation assessment is balanced around the assessment in the main scenario.

The forecast for CPI inflation in the main scenario also presents a balanced risk spectrum (Fig. 50). The degree of uncertainty in the assessment of future underlying inflation as well as CPI inflation is approximately the same as in the December Report, as is evident from the width of the uncertainty intervals being largely unchanged.

As monetary policy decisions are based primarily on an assessment of price tendencies one to two years ahead, the inflation prospects with this time horizon are of particular interest. The risk spectrum is balanced, so the inflation forecast in the main scenario matches the forecast with the risk spectrum taken into account. The mean value for the comprehensive assessment of UND1X inflation is 1.6 per cent one year ahead and 2.1 per cent after two years (Table 11).

Table 11. Inflation forecasts including the risk spectrum. Percentage change

	Annu	al rate	12-month rate			
	2000	2001	March 2001	March 2002		
CPI	1.4	1.6	1.3	2.1		
UND1X	1.6	1.8	1.6	2.1		

Note. The table gives the mean values of the inflation assessment's probability distributions (see Figs. 49 and 50).

Source: The Riksbank.

 For an account of how the uncertainty interval is derived, see Blix, M. & Sellin, P. (1999), Inflation forecasts with uncertainty intervals, *Ouarterly 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. The probabilities of UND1X inflation being inside certain intervals one to two years ahead are shown in Table12. In the coming two years UND1X inflation will probably be inside the tolerance interval for the development of consumer prices. The probability of UND1X inflation being above 2 per cent at the end of the forecast period is somewhat smaller than at the time of the December Report. At the same time, two years from now it is more probable that inflation, measured either with the CPI or with UND1X, will be above than below 2 per cent.

#### Table 12 UND1X inflation.

#### Percentage probability, 12-month rate

	UND1X<1	1 <und1x<2< th=""><th>2<und1x<3< th=""><th>UND1X&gt;3</th><th>Total</th></und1x<3<></th></und1x<2<>	2 <und1x<3< th=""><th>UND1X&gt;3</th><th>Total</th></und1x<3<>	UND1X>3	Total
2000 (March–March)	19	55	24	2	100
2002 (March–March)	16	29	32	23	100

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

Source: The Riksbank

#### Table 13. CPI inflation. Percentage probability, 12-month rate

· oroontage probability	,, <u>,</u> , <u>,</u> , , , , , , , , , , , , , ,								
	CPI<1	1 <cpi<2< th=""><th>2<cpi<3< th=""><th>CPI&gt;3</th><th>Total</th></cpi<3<></th></cpi<2<>	2 <cpi<3< th=""><th>CPI&gt;3</th><th>Total</th></cpi<3<>	CPI>3	Total				
2001 (March-March)	33	49	17	1	100				
2002 (March-March)	18	27	30	25	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 interest rates, inflation will be somewhat below 2 per cent one year ahead and marginally above the inflation target after two years. All in all, the risk spectrum in the inflation assessment is judged to be balanced. Thus, the probabilities of inflation being higher and lower, respectively, than in the main scenario appear to be more or less equal.

#### Figure 49. 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 50. 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

### 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 increased successively in the coming two years. The inflation forecasts of external observers likewise incorporate a rising repo rate. In the main scenario, however, inflation is forecast with 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 March 2000.

The survey data show expectations of repo rate increases to 4.25 per cent three months from now, to 4.75 per cent after one year and to 5 per cent two years ahead.<sup>30</sup> 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 consumption and investment. Moreover, the stronger exchange rate curbs net exports. All in all, this is judged to lower GDP growth by about 0.1 percentage point in 2000 and approximately 0.3

30. The median value of the expectations.

### percentage points in 2001. The damping of activity is also assumed to result in a somewhat weaker wage trend.

Table B2. Modified inflation forecast, incorporating the interest rates expected in Statistics Sweden's survey in March 1999. Percentage change and percentage points

	Annual rate	Annual rate	12-month rate March	12-month rate March
	2000	2001	2000	2001
CPI	1.6 (0.2)	1.8 (0.2)	1.7 (0.4)	2.0 (-0.1)
UND1X	1.6 (-0.0)	1.6 (-0.2)	1.4 (-0.1)	1.9 (-0.2)

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

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 an average of about 0.2 percentage points higher in both 2000 and 2001. It is not until later in 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 downward effect on UND1X inflation from weaker demand and lower import prices is therefore only 0.1 percentage point in 2000; the effect in 2001 is somewhat larger but the full impact of the repo rate increases does not occur until the year after that.

# Material for assessing monetary policy 1997–99

#### Introduction

The Parliamentary Standing Committee on Finance declared last year that monetary policy should be assessed annually as regards the three preceding years. To facilitate the assessment, an account of the path of inflation and the formation of monetary policy in the period 1997–99 is presented in this appendix.

The objective of monetary policy is to keep inflation, measured by the consumer price index (CPI), at 2 per cent, with a tolerance for deviations up to  $\pm 1$  percentage point. The purpose of the tolerance interval is allow for normal fluctuations from the target. The Riksbank influences inflation by adjusting its instrumental rate, the repo rate. Changes in the repo rate affect the development of prices mainly with a time lag of twelve to twenty-four months. This means that monetary policy has to be based on an assessment of future inflation and that the picture one to two years ahead is particularly relevant. The basic rule for monetary policy is simple: if forecast inflation one to two years ahead is above/below 2 per cent, the repo rate shall normally be raised/lowered in order to fulfil the inflation target. However, the rule is not applied mechanically and minor deviations from the target may be weighed against other factors. As inflation forecasts are subject to considerable uncertainty, in addition to a main scenario (the most probable path) the Riksbank considers alternative scenarios in the formation of monetary policy. Since the spring of 1998 the alternatives are presented in terms of a probability distribution for conceivable outcomes for inflation.

#### Development of prices 1997–99

In the period 1997–99 the average annual increase in the CPI was 0.5 per cent, with rates of 0.9 per cent in 1997, 0.4 per cent in 1998 and 0.3 per cent in 1999. It will be seen from Fig. A1 that in this period there was no month in which CPI inflation was above the inflation target and for most of the time it was outside the lower tolerance limit. There were also some brief periods when inflation was negative.

Figure A1. CPI and UND1X inflation. Per cent



Note. The horizontal lines are the Riksbank's tolerance interval for the change in the CPI.





Note. The time axis refers to the date of forecasts. The repo rate is the quarter-end level.

Sources: Statistics Sweden and the Riksbank.

In the context of monetary policy, however, the CPI poses problems in that it is subject to transitory effects with no permanent impact on inflation. For this reason the Riksbank has had reason to consider whether the CPI is appropriate as a target variable. All alternative indexes have advantages and drawbacks that have to be weighed up when selecting the target variable. The Riksbank has chosen to continue with the CPI as the target variable but has clarified how the inflation target is to be interpreted. To the extent that inflation is attributable to marked and readily identifiable shocks, in connection with monetary policy decisions the Riksbank is to present the calculated effects on inflation. The rate at which monetary policy should then bring inflation back after a shock depends on the nature of the shock. This means that when consumer prices are influenced transiently by factors - changes in indirect taxes, subsidies and house mortgage interest expenditure, for example- that do not have permanent effects on inflation or price formation, there may be grounds for departing from the inflation target.

The monetary policy principles largely amount to a codification of the policy that has been followed in recent years. Thus, the weak CPI trend in 1997–99 was to a considerable degree a consequence of transitory factors. This is evident from Fig. A1, where the CPI is accompanied by UND1X, an indicator of underlying inflation that excludes indirect taxes, subsidies and house mortgage interest expenditure. UND1X inflation in the period 1997–99 averaged 1.2 per cent a year, with rates of 1.4 per cent in 1997, 0.9 per cent in 1998 and 1.4 per cent in 1999. Measured in this way, inflation was likewise below 2 per cent but it was inside the tolerance interval.

#### Inflation assessments and monetary policy considerations

A review of the monetary policy assessments and decisions that lay behind the development of inflation must recognise that there is a time lag before policy measures elicit effects. As the lag before monetary policy affects inflation is one to two years, an analysis of price developments in the period 1997–99 should start from the Riksbank's assessments and decisions in the period 1995– 98. The Riksbank's forecasts of inflation one to two years ahead and the path of the repo rate are summarised in Fig. A2.

#### INFLATION IN 1997

During the summer and autumn of 1995, confidence in Sweden's general economic policy grew. Inflation expectations had been subdued, though in November 1995 their level for two years ahead was still above 3 per cent, and the krona had appreciated, probably in part as a result of the extensive budget consolidation and monetary tightening that had been achieved earlier. The Riksbank judged that the conditions for price stability had improved and that confidence in the Swedish economy had risen among financial

agents. In the autumn of 1995 forecast it was considered that inflation during 1997 would be above the target but still be inside the tolerance interval. The risk spectrum was dominated by rising pressure from wage costs and it was judged that stronger growth might lead to inflation moving above the upper tolerance limit. It was also noted that growth and consequently the pressure from costs might follow a weaker path. Against this background the Riksbank chose to leave the instrumental rate unchanged during the autumn of 1995.

The inflation assessment early in 1996 pointed to a downward path to levels in line with the inflation target.<sup>31</sup> Prospects for both the international and Sweden's economy had weakened, accompanied by more subdued inflation expectations. It was also judged that the Swedish economy had become less prone to inflation. Still, survey data indicated that expectations of inflation two years ahead remained above 2 per cent. The risk spectrum was characterised by less concern about inflationary impulses from demand. Against this background the Riksbank initiated a series of repo rate reductions. During the year the instrumental rate was lowered almost five percentage points.

The average rate of UND1X inflation in 1996 was 2.2 per cent, followed by 1.4 per cent in 1997. The level was accordingly below the target in 1997 but inflation as measured by UND1X was well inside the tolerance interval.

#### INFLATION IN 1998

In the latter part of 1996 the Swedish economy picked up by degrees, after signs of a further weakening in the early months. Growth prospects for 1997 and 1998 were still revised successively downwards early in the year, partly in view of the krona's appreciation. The appraisal of capacity utilisation also changed and it was expected that full capacity utilisation would not be reached in the course of 1997. Moreover, inflation expectations continued to move down. Wages and unit labour costs rose relatively strongly during 1996. Considering the weak growth prospects, however, it was foreseen that firms would be able to raise prices to just a limited extent. Towards the end of 1996 the economic recovery became increasingly distinct and it was now expected that growth would rise gradually during 1997 and 1998. Even so, unutilised resources were expected to be available throughout the forecast period. Underlying inflationary pressure was judged to be broadly unchanged in the forecast period.

Two alternatives dominated the risk spectrum: one was that the inflation propensity might have changed more appreciably, which could lead to lower inflation, and the other that demand for consumption might conceivably be stronger than expected and inflation appreciably higher. All in all, it was judged that inflation prospects had improved. Inflation was expected to

Throughout 1996 the Riksbank's inflation forecasts for 1997 were below the level reported by Consensus Forecast and also below money-market inflation expectations.

average not quite 1.5 per cent in 1997 and about 2 per cent in 1998. Against this background, monetary policy was considered to be relatively well balanced. By the end of 1996 the repo rate had been brought down from 8.91 per cent to 4.10 per cent, which meant that it had been more than halved.

During 1998, however, the path of inflation was characterised by the global crisis that had begun in Southeast Asia in the second half of 1997 and then spread to other emerging markets. The Riksbank, along with many other observers, could not foresee the crisis and, mainly for this reason, overestimated the rate of inflation. The average rates of CPI and UND1X inflation in1998 were 0.4 and 0.9 per cent, respectively, and thus below the tolerance interval.

#### INFLATION IN 1999

In the main scenarios for the Inflation Reports in the spring and autumn of 1997 it was judged that in 1999 the average development of prices, in terms of both the CPI and UND1X, would be broadly in line with the inflation target. The risk spectrum featured uncertainty about the exchange rate, private consumption and the degree of unutilised resources. A weak exchange rate tendency could lead to inflation being higher than in the main scenario. This was accompanied by concern that private consumption would be weaker than foreseen. All in all, monetary policy was considered to be well balanced and against that background the repo rate was left unchanged. In the late autumn of 1997, however, it was judged that somewhat stronger activity and rising labour costs might lead to a somewhat stronger increase in domestic inflation in particular. Support for this came in the form of survey data where inflation expectations for 1999 had moved up to almost 2.5 per cent. At the end of 1997 the risk spectrum featured one possibility that prospects could be weaker on account of the situation in Asia and another that a series of wage negotiations entailed a risk of labour costs being higher than in the main scenario. All in all, the risk spectrum was considered to be balanced. Against this background, in December 1997 the Riksbank chose to raise the repo rate 0.25 percentage points.

During the spring of 1998 inflation prospects seemed to become somewhat more subdued again. The situation was unusually difficult to assess, however, with initial signs of downward price effects from the Asian crisis but slowly rising resource utilisation in Sweden and a weak exchange rate. In view of the uncertainty, the Riksbank chose to await further information and assess the formation of monetary policy in its light. The instrumental rate was left unchanged during the winter and spring. During the late spring and early summer, however, the assessment was gradually revised; it was now foreseen that inflation one to two years ahead would be below the target and be about 1.6 per cent. This conclusion was strengthened by the assessment of uncertainties, where the dominant probability was that inflation would be weaker than in the main scenario. The Riksbank therefore chose to lower the instrumental rate in June 1998 by 0.25 percentage points.

In the early autumn of 1998 it was judged that inflation one to two years ahead would be in line with the target. The risk spectrum featured weaker international prospects on the one hand and, on the other, a risk that, as the krona had weakened appreciably, a more permanently weak exchange rate could lead to higher inflation. In addition, extensive financial turbulence in the global economy, with a situation that was constantly changing, made the outlook unusually difficult to assess. During September and October the Riksbank therefore chose to leave the repo rate unchanged. In the late autumn, however, there were three cuts totalling 0.7 percentage points. These were motivated by a further improvement in inflation prospects now that the global financial crisis was expected to have more sizeable consequences for the real economy. This had to do with, for example, the suspension of payments by Russia in August and the collapse of the American hedge fund Long Term Capital Management at the end of September.

The average rates of CPI and UND1X inflation in1999 were 0.3 and 1.4 per cent. Underlying inflation was below the target but well inside the tolerance interval.

#### Summary and conclusions

During the period studied here, the economic recovery in Sweden after the crisis in the early 1990s continued. After a dip in 1996, annual growth in 1997-99 averaged 3 per cent and employment rose. Monetary policy at the beginning of the period still mirrored the problems with credibility that beset the Swedish economy, mainly on account of weak government finances. Interest rates were lowered vigorously during 1996 but both the rate at which this was done and the level that was established during 1996 were conditioned by the aim of maintaining the policy credibility that had recently been gained. From the autumn of 1997 onwards the global economy was affected by the Asian crisis and its consequences for financial markets. This led to appreciably lower global price pressure, with effects on inflation in Sweden. In the period 1997-99, underlying inflation (UND1X), on which policy mainly focused, averaged about 1.2 per cent a year, which is below the target but inside the tolerance interval. CPI inflation in this period averaged 0.5 per cent. The circumstance that CPI inflation was appreciably lower than UND1X inflation was mainly a consequence of the Riksbank's reduction of interest rates.

#### Annex: Riksbank forecasts for 1999

The Riksbank's Inflation Report contains forecasts for the path of consumer prices, measured by the CPI as well as by UND1X. A basic technical assumption for the forecasts is that the repo rate is unchanged throughout the forecast period. The primary purpose of this assumption is to clarify whether or not a repo rate adjustment is called for and, if it is, in which direction. If the interest rate is subsequently altered, this will modify the forecast development of prices and thereby complicate comparisons between forecast and outcome. In order to arrive at a more reasonable comparison, the forecasts need to be revised for any subsequent changes in the repo rate. The effects on growth and inflation of a given adjustment of the instrumental rate cannot be predicted exactly but a rough approximation is that a 1 percentage point increase in the repo rate has a downward effect of about 0.4 percentage points on both GDP growth and UND1X inflation one to two years ahead.

#### Forecasts in $1997^{3^2}$

During 1997 the Riksbank and other forecasters judged that the favourable economic development in Sweden would continue in 1998 and 1998, with a successive depletion of unutilised resources. But no general capacity shortage was calculated to arise during the forecast period. Expectations of inflation two years ahead tended to move up but remained in line with the inflation target. All in all, it was concluded that domestic inflation would rise and reach up to 2.5–3 per cent in the course of 1999. At the same time, however, international price increases were expected to be more moderate, around just over 1.5 per cent.

The average price rise in 1999, measured by UND1X, turned out to be about 1 percentage point lower than the main scenario forecasts that were presented during 1997. The forecast levels averaged about 2.4 per cent and the outcome was 1.4 per cent. A closer inspection shows that both domestic and imported inflation were overestimated.

There were two main reasons why domestic inflation was lower than expected. One was that GDP growth in 1998, which affects price formation primarily in 1999, was about 0.5 percentage points below the forecast rate; this was a consequence of the Asian crisis' repercussions on the Swedish economy. The assessment of activity led to the domestic price tendency in the main scenario being overestimated by approximately 0.3–0.4 percentage points. Had the actual path of the exchange rate been foreseen, it is probable that the GDP forecast would have been even higher and thereby accentuated the impression of overestimated activity. The other reason was that the deregulations of dental care and the electricity and telecom markets in 1999

The first forecast considered in this section is *Inflation Report 1997:2* (in the first Inflation Report in 1997 the forecast horizon did not extend beyond 1998).

were not predicted; these deregulations subdued inflation and account for about 0.3 percentage points of the discrepancy between forecast and outcome for the development of domestic prices. Thus, the major part of the measured error in the forecast of domestic inflation is explained by the circumstances that the Asian crisis had a downward effect on growth and inflation and that various deregulations were implemented.

The path of prices for goods that are mainly imported was also overestimated in every forecast in 1997. One of the premises for these forecasts was a sizeable appreciation of the krona. Adjusting the forecasts for an exchange rate tendency that was weaker than expected, as well as for the reduction of subsidies for prescribed medicines<sup>33</sup> in 1999, increases the discrepancy between forecast and outcome. The main cause of this discrepancy was that the Asian crisis tended to lower prices for commodities as well as more manufactured goods.

#### FORECASTS IN 1998

During 1999 the Riksbank's main scenarios, as well as assessments by other forecasters, were characterised by the Asian crisis and its increasing repercussions.

In the main scenario in March 1998, underlying inflation measured by UND1 was forecast to average about 2 per cent in 1999. In the subsequent Inflation Reports during 1998, however, the forecast averages were lower, 1.4–1.5 per cent. The outcome was about 1.5 per cent. As shown in Figs. A3 and A4, the Riksbank's inflation forecasts for 1999 have been close to the mark since the second Inflation Report in 1998.

The fact that UND1X inflation in 1999 turned out to be somewhat lower than foreseen in the main scenario in the March 1998 Inflation Report is mainly explained by some overestimation of domestic price pressure. The discrepancies are essentially accounted for by deregulations and subsidy cuts in 1999 that were not known at the time of the forecast.

The discrepancies between forecast and outcome for UND1X in the other three Inflation Reports during 1998 are small. Minor overestimations of domestic price pressure were offset by some underestimation of imported price pressure.

#### TRANSITORY EFFECTS

The difference between inflation as measured by the CPI and UND1X, respectively, is that indirect taxes, subsidies and house mortgage interest expenditure are excluded from the latter.

Table A1 shows that in 1999 the aggregate contribution from changes in indirect taxes, subsidies and mortgage interest expenditure had a downward effect on CPI inflation of 1 percentage point. The figures also mirror the information that was available for each forecast as regards planned changes to indirect taxes and subsidies in 1999. The difference between the





Sources: Statistics Sweden and the Riksbank.

Figure A4. CPI: outcome and forecasts for 1999. Percentage 12-month change



Sources: Statistics Sweden and the Riksbank

average price change in 1999 as measured by the CPI compared with UND1X is essentially explained by interest expenditure. All the forecasts in 1997 and 1998 underestimated the downward price effect of this. A number of factors lay behind the erroneous assessments in 1997: the repo rate was lowered during 1998 and 1999 and interest rates for longer maturities decreased more than expected; moreover, the dynamics of house mortgage interest expenditure as measured by Statistics Sweden were underestimated. The forecasting errors during 1998 were exclusively due to the interest rate cuts.

Table A1. Annual CPI effects in 1999 from changes in indirect taxes, subsidies and house mortgage interest expenditure

Contribution in percentage points

	IR 97:4	IR 98:1	IR 98:2	IR 98:3	IR 98:4	IR 99:1	IR 99:2	IR 99:3	IR 99:4	utfall
Indirect tax and subsidies	0.3	0.3	-0.2	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2
Taxable property values	y 0.0	0.0	-0.2	-0.2	-0.2	-0.1	-0.1	-0.1	-0.1	-0.1
Mortage interes expenditure	st -0.1	-0.1	-0.1	-0.2	-0.4	-0.6	-0.8	-0.7	-0.7	-0.7
Total CPI effec	t 0.3	0.3	-0.5	-0.5	-0.7	-0.9	-1.1	-1.0	-1.0	-1.0

Note. The figures for changes in indirect taxes and subsidies represent the direct effect

Sources: Statistics Sweden and the Riksbank.

#### Riksbank forecasts in relation to pure model forecasts and external forecasts

Another way of assessing the Riksbank's forecasts is to compare them with forecasts based solely on models. An appropriate model for analyses of this type has been estimated at the Riksbank.<sup>34</sup>

A comparison of inflation's path in the main scenarios in Inflation Reports from 1997 and 1998 with forecasts generated by models shows that it is not easy for the latter to out-perform the former. On the contrary, the additional information that nonmodel assessments bring to the work of forecasting have led to predictions that are better than those of forecasts based exclusively on models.

Yet another approach to studying the forecasting capability of the Riksbank involves comparing Inflation Report forecasts with inflation expectations and forecasts published by others. Such comparisons, however, are liable to be misleading. For one thing, the basic assumptions may differ between forecasters. The main difficulty in arriving at meaningful comparisons is that the Riksbank starts from an unchanged repo rate in the forecast period. For another, comparisons are complicated by the circumstance that forecasts are presented in different ways. These problems can be circumvented to some extent by including the GDP growth

See Jacobson, T., Jansson, P. Vredin, A. & Varne, A. (1999), A VAR model for monetary policy analysis in a small open economy, Sveriges Riksbank Working Paper Series 77.

forecasts in the comparison. In the case of survey data on inflation expectations, there is no information about other conditions.

As the price tendency weakened in the course of 1996, there was some downward revision of price assessments one to two years ahead. Even so, the path of prices during 1997 was overestimated. However, the Riksbank's price forecasts for 1997 tallied with those of most other observers, while money market expectations of inflation one to two years ahead were generally somewhat closer to the mark.

The path of prices in 1998 was overestimated by all observers. Riksbank forecasts in 1996 and 1997 for the annual CPI change in 1998 were around 2 per cent, which was in line with other observers. Money market expectations of inflation were slightly lower, however, and thus somewhat more accurate. The minor differences between forecasts from different sources are difficult to explain; they cannot be attributed to systematic differences between the GDP forecasts, for instance.

The Riksbank's price forecasts for 1999 agreed with or were somewhat higher than expectations elsewhere during 1997 and 1998 Q1. The opposite was the case during the rest of 1998 (Fig. A5). The growth forecasts for 1998 do not differ systematically (Fig. A6); all the forecasters, including the Riksbank, overestimated CPI inflation and usually GDP growth as well. This implies that the Riksbank and other observers arrived at broadly the same assessment of the trade-off between growth and inflation. All in all, the Riksbank forecasts of 1999 inflation have been closer to the outcome compared with both the average of assessments by external observers and the inflation expectations derived from survey data.

To sum up, the review shows that during 1997 and the beginning of 1998, the Riksbank, along with many other observers, overestimated the underlying price trend in 1999. The primary reason for this was that in the main scenarios the Riksbank did not foresee either the extent of repercussions from the Asian crisis or that certain protected sectors in the Swedish economy would be deregulated. A substantial economic impact from the Asian crisis was admittedly already being included in the assessment during the second half of 1997 but initially it was not considered to be the most probable outcome and was treated instead as a conceivable risk scenario. From 1998 Q2 onwards, the average increase in underlying inflation in 1999 was judged to be 1.5 per cent, which proved to be correct.

The difference between inflation as measured by the CPI and UND1X, respectively, is that indirect taxes, subsidies and house mortgage interest expenditure are excluded from the latter. The downward CPI effect from changes in interest expenditure was greater than forecast, which is mainly a consequence of the Riksbank forecasts starting from the assumption that the repo rate is unchanged in the forecast period.

Figure A5. CPI: forecasts and outcome for 1999. Average annual level



Note. The inflation expectations of money market agents are derived from survey data collected in the same month as the Riksbank produced the corresponding forecast. As the expectations start from the survey data and accordingly do not refer to a specific calendar year, a result that represents 1999 has been obtained in the form of a weighted combination of expectations for 1, 1–2 and 3–5 years ahead. Forecasts by money market agents represent an unweighted average of forecasts by Merita-Nordbanken (earlier Nordbanken), Svenska Handelsbanken, SEB and ForeningsSparbanken (earlier Swedbank). Other observers comprise the Federation of Swedish Industries, the Trade Union Confederation (LO), the Confederation of Professional Employees (TCO), the Wholesale & Retail Research Institute (HUI), the National Institute of Economic Research, the Ministry of Finance. Haastromer & Ovibera and the OECD.

Sources: The above and the Riksbank

### Figure A6. GDP growth: forecasts and outcome for 1998.



- Outcome

Note: External forecasts are from the same month/quarter as the corresponding IR forecast. Forecasts by money market agents represent an unweighted average of forecasts by Merita-Nordbanken (earlier Nordbanken), Svenska Handelsbanken, SEB and FöreningsSparbanken (earlier Swedbank). Other observers comprise the Federation of Swedish Industries, the Trade Union Confederation (LO), the Confederation of Professional Employees (TCO), the Wholesale & Retail Research Institute (HUI), the National Institute of Economic Research, the Ministry of Finance, Hagströmer & Ovibera and the OECD.

Sources: The above and the Riksbank.