

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

### *The objective of monetary policy*

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

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

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

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

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

### *Outcome and deviation from target in 2005*

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

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

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

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

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

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

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

#### *Why was inflation so low in 2005?*

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

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

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

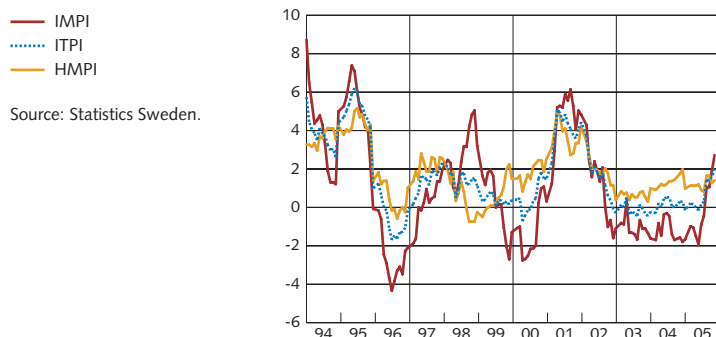
**Table B3. Comparison of different inflation measures. Annual percentage change**

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

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

Sources: Statistics Sweden and the Riksbank.

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



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

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

It should also be pointed out that the low imported inflation could at least partly be an effect of the transition to the new method of calculation for the rate of inflation introduced by Statistics Sweden in January 2005.<sup>20</sup> Under the previous method, somewhat simplified, inflation was calculated as the price increase on an unchanged basket of goods. The new method also takes into consideration the changes in the pattern of consumption that usually occur when the relative prices of goods change. The new calculation method tends to reduce the rate of inflation by an average of 0.2 percentage points viewed over a longer period of time, although the effect can be larger in particular years.

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

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

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

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

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

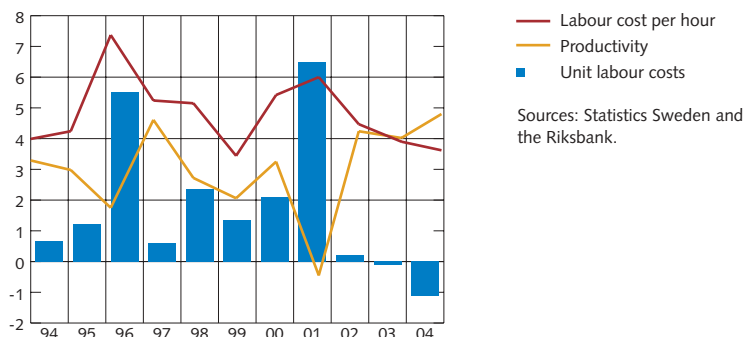
sector (see Figure B10). High productivity growth, in combination with relatively low wage increases, has not only restrained price rises on domestically produced goods and services but has contributed to low imported inflation. Imported goods are processed and distributed in Sweden before being sold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

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

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

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

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



— Labour cost per hour  
— Productivity  
■ Unit labour costs

Sources: Statistics Sweden and the Riksbank.

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

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

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

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

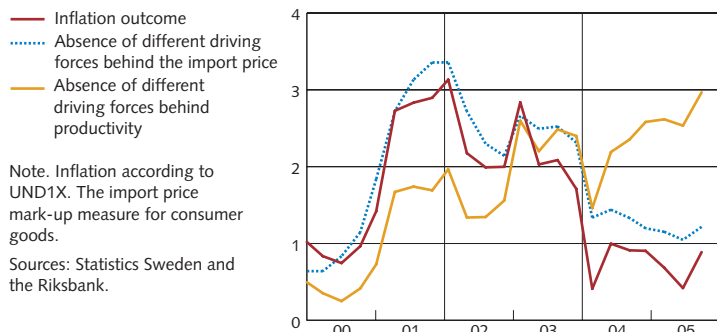
The model belongs to a new generation of dynamic general equilibrium models.<sup>23</sup> These describe the development of the economy at the macro level – i.e. in the aggregate economy – at the same time as they are explicitly based

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

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

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

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



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

Sources: Statistics Sweden and the Riksbank.

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

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

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

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

An analysis of this kind shows that it is primarily greatly reduced import price mark-ups and high productivity growth due to rapid technological development that have been the causes of low inflation in recent years, according to the model. Figure B11 shows the actual inflation outcome and what inflation would have been, according to the model, in the absence of the driving forces underlying productivity growth and mark-ups respectively. From having contributed to holding up inflation, productivity improvements, according to the model, have contributed to keeping inflation down from mid-2003 and onwards (inflation would have been higher without these changes) and this effect has been especially great since 2004.<sup>24</sup> Reduced import price mark-ups have contributed to low inflation for a relatively long time, although the effect has been particularly noticeable in recent years.

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

*Forecasts for the development in 2005 made in 2003–2005*

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

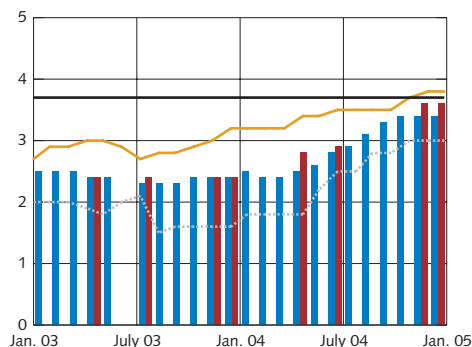
After this downward adjustment, the forecast for domestic inflation would appear to be in line with the final outcome for 2005, while forecasts for CPI and UND1X underestimated inflation. The short-term development of these inflation measures was adjusted upwards slightly in the two subsequent Inflation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

#### Comparison with other forecasters

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

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

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

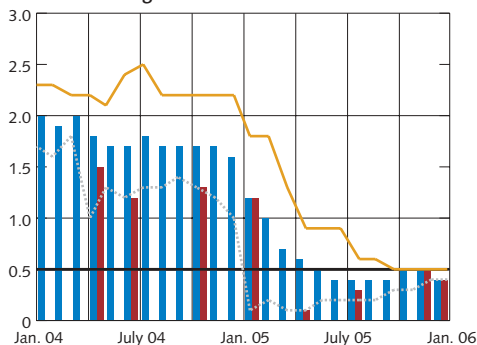


— Outcome  
— Highest forecast  
..... Lowest forecast  
■ Average excl. the Riksbank  
■ The Riksbank

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

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

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



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

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

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

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

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

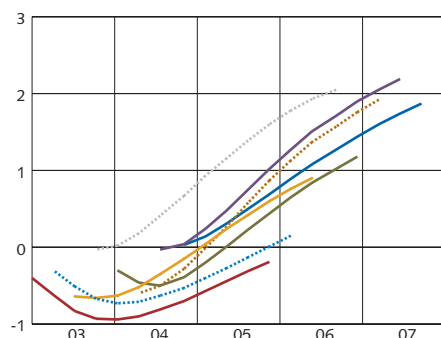




Note. The implied forward rates apply to a 15-day average. The repo rate is the rate that applied at the time of the forecast, i.e. the preceding quarter.

Source: The Riksbank.

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



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

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

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

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

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

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

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

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

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

### REPO RATE DECISIONS 2003

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

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

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

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

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

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

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

### REPO RATE DECISIONS 2004

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

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

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

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

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

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

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

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

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

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

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

#### *Alternative monetary policy stances*

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

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

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

inflation prospects has still not been particularly different.

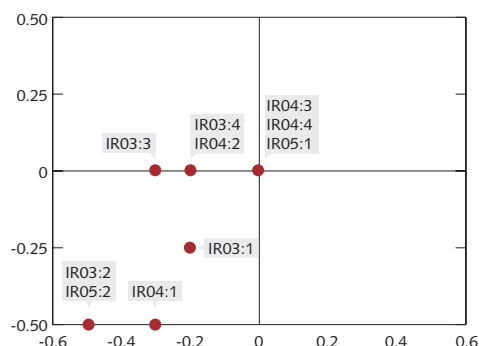
In connection with growing insight at the beginning of 2004 into the strength of the inflation-dampening effects, the inflation forecasts were revised downwards and it was anticipated that it would take a couple of years for inflation to be in line with the target and it would accordingly be below target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

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

#### *Relationship between interest rate decisions and forecasts*

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

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



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

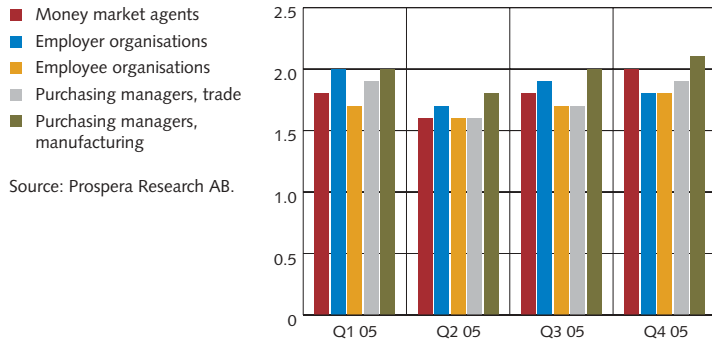
Source: The Riksbank.

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

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

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

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



Source: Prospera Research AB.

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

#### *Inflation expectations*

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

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

#### *Conclusions*

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

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

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

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

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

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

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

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

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

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