



# Quarterly Review

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# The current situation for monetary policy

BY URBAN BÄCKSTRÖM

*Urban Bäckström is Governor of Sveriges Riksbank. This opening speech was held at the hearing of the Standing Committee on Finance on 25 March 1999.*

*On 1 January 1999, the Riksbank acquired an independent status even in a formal sense. By the same token, Chapter 6, Article 4 of the amended Riksbank Act (1998:1385), stipulates that the Riksbank is to hand over a written report on monetary policy to the Riksdag's Standing Committee on Finance at least twice a year. Today, such an account has been presented to the Standing Committee and I shall now briefly summarise its contents and our appraisal of the conditions for monetary policy.*

I shall begin with a short account of economic developments in Sweden and of matters to do with inflation in recent years. Then I shall describe how the Riksbank conducts monetary policy in the context of the new legislation. A review of the past year will follow, with an appraisal of the path of consumer prices during 1998 and the accompanying monetary policy. Finally, I shall be looking ahead at how the Riksbank views the prospects for inflation and the current situation for monetary policy.

## Sweden's economy in the 1990s

After the profound crisis in Sweden in the early 1990s, a favourable development of exports and investment has laid a foundation for a stable economic recovery. The contribution to growth from private consumption has also gradually risen. Since January 1993, when the inflation target was announced, annual GDP growth in Sweden has averaged almost 3 per cent.

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Inflation expectations have decreased and the credibility of general economic policy has been enhanced, partly by the consolidation of Government finances

and the stabilisation of the banking sector. Long-term inflation expectations have decreased to the targeted level of 2 per cent. The prevailing macroeconomic regime is accordingly perceived to be basically credible, which in turn is a precondition for sustaining a favourable economic development.

Since the inflation target was announced, inflation has remained low. The CPI has risen since 1993 at an average annual rate of 2 per cent and since 1995, when the target was first applied, at an average of 1.2 per cent. Excluding interest expenditure and the direct impact of altered indirect taxes, core inflation (UNDIX) has increased by an average of 1.8 per cent a year since 1995.

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**A major factor behind the low inflation is the unutilised capacity that existed, and still exists, in the Swedish economy after the recession in the early 1990s.**

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**At the same time, the heightened credibility of monetary policy, together with the lower inflation expectations that this has engendered, is reflected in price and wage formation.**

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A major factor behind the low inflation is the unutilised capacity that existed, and still exists, in the Swedish economy after the recession in the early 1990s. But that is not the only explanation. The low inflation also has to do with changes of a more structural nature, in Sweden as well as abroad. Pressure from international competition has increased appreciably in the 1990s. This has made it more difficult for firms to raise prices. Although, strictly speaking, the effects on inflation are presumably mostly of the one-off type, the stronger international competi-

tion can continue to act on global inflationary pressure for a long time. Increased international trade, deregulation of various types and EMU, all suggest more prolonged effects. At the same time, the heightened credibility of monetary policy, together with the lower inflation expectations that this has engendered, is reflected in price and wage formation.

## Clarification of the inflation target and the conduct of monetary policy

The amended Riksbank Act states that the objective of monetary policy shall be to maintain price stability. The Executive Board of the Riksbank has specified this: monetary policy is to be targeted on keeping the change in the consumer price index at 2 per cent in a somewhat longer, annual perspective. A deviation of  $\pm 1$  percentage point can be tolerated. Thus, even in the transition from the earlier to the amended Riksbank legislation, monetary policy is characterised by continuity.

Monetary policy's main impact on inflation is judged to occur with a time



lag of twelve to twenty-four months. The Riksbank therefore has to base its policy on a forecast of inflation with this time horizon. In the account that the Standing Committee has received from the Riksbank today, such a forecast is presented as the foundation for monetary policy. Under normal circumstances, monetary policy is formed in the light of a simple rule of thumb:

*If the Riksbank's inflation forecast shows that inflation twelve to twenty-four months ahead deviates from the targeted rate, then the repo rate should be adjusted.*

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The ambition is to adjust the repo rate so that forecast rate of inflation twelve to twenty-four months ahead is in line with the target. But the rule is not applied mechanically. Inflation forecasts are surrounded by considerable uncertainty. In practice, policy therefore has to consider other conceivable paths for the economy and inflation in addition to the main scenario.

Under certain special circumstances, moreover, there may be reasons for allowing a more flexible interpretation of the rule. The Executive Board has decided that there can be two grounds for deviating from the established inflation target. This is, in principle, a codification of monetary policy practice that has been applied in recent years.

1. *One reason is if consumer prices twelve to twenty-four months ahead are affected by factors that are judged to have no permanent impact on inflation. Such factors may be changes in housing mortgages or in indirect taxes and subsidies, which alter the path of inflation in the short run but do not have a more lasting impact.*
2. *Another reason from departing from the rule can be that a prompt return to the target would generate large real economic costs. In certain cases there may therefore be reason to disregard the time horizon and aim at returning inflation to the target more gradually.*

If one of these situations were to occur, the magnitude of the divergence from the inflation target twelve to twenty-four months ahead that may be motivated shall be stated clearly by the Riksbank in advance.

## Inflation during 1998 and monetary policy appraisal

Against this background, I should now like to discuss how inflation developed last year and comment in this context on the degree to which the Riksbank fulfilled

its inflation target. I should add that the appraisal will no doubt be developed in the future in the light of the clarifications of the new Executive Board.

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**For 1998 the average of the 12-month CPI change figures is 0.4 per cent.**

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For 1998 the average of the 12-month CPI change figures is 0.4 per cent. In other words, CPI inflation was below the 2 per cent target as well as the lower tolerance interval.

The path of inflation last year, as well as in 1996 and 1997, included considerable effects both from the sizeable interest rate reductions introduced by the Riksbank in recent years and from the changes to indirect taxes and subsidies introduced by the Riksdag. When such transitory effects are excluded, the average rate of inflation in 1998, measured as UNDI<sub>X</sub>, works out at approximately 1 per cent. It is effects of this type that the Riksbank ought to disregard because we are not in a position to continuously eliminate the disturbances they inflict on the rate of inflation. A procedure whereby a change in transitory factors is countered with an interest-rate adjustment, followed by a readjustment when the effect of those factors has passed, would inject unnecessary instability into the real economy. An illustrative example is the change that was introduced last year in the tobacco tax, which had a marked but only transitory impact on inflation.

Another major reason for the low inflation outcome is the weaker international price pressure, occasioned for example by the Asian crisis and its contagious effects. In December 1998, the price reductions on petroleum-related products and coffee alone lowered the 12-month CPI change figure almost half of a percentage point. This was more of a direct forecasting error. Along with most other observers, the Riksbank did not envisage that the international crisis would be so extensive or that commodity prices would fall as much as proved to be the case.

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**While the rate of inflation has been low, it cannot be said that the Swedish economy is experiencing deflation.**

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While the rate of inflation has been low, it cannot be said that the Swedish economy is experiencing deflation. This is evident from the fact that underlying domestic inflation, measured as UNDI<sub>NHX</sub>, which excludes goods that are mainly imported in addition to changes in interest expenditure, indirect taxes and subsidies, rose by almost 2 per cent in 1998.

During my previous appearance here I underscored the difficulty of making policy transparent when transitory factors – elicited to some extent by the Riksbank's own actions – result in inflation below the targeted rate. That is why the Executive Board recently adopted a clarification of the inflation target and emphasised the importance of the Riksbank giving advance notification of occasions when deviations from the target may be warranted. That should facilitate

appraisals. As I pointed out, the basic reason for disregarding transitory effects of this type is concern for real economic stability.

## Inflation prospects

### LOW INTERNATIONAL PRICE PRESSURE

Since the December Inflation Report, the CPI and underlying inflation have both developed broadly as expected. In February 1999, the 12-month rate of CPI inflation was  $-0.2$  per cent, and core inflation, measured as UND1X, was 1.2 per cent.

One reason for the weak tendency is the low international prices. There are also many signs that international price pressure will continue to be low. Weaker international demand, increased competition and surplus capacity in many sectors are likely to mean that inflation in the OECD area will remain low in the years ahead.

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**There are many signs that international price pressure will continue to be low.**

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The Japanese economy is still in a recession and shows no clear signs of a recovery. Despite a series of stimulatory fiscal programmes, together with vigorous efforts to overcome the bank crisis, consumer and business confidence has not yet improved.

Development in the euro area, which is of major importance for Swedish exports, has also been more subdued this winter than we envisaged in the December Report. But a consumption-led upswing still seems probable in the euro area as a whole, though it may be somewhat less lively than the Riksbank counted on earlier. The US economy is showing continued strength; a slowdown there is probable in time.

In the Riksbank's main scenario, GDP growth in the OECD area in 1999 is judged to be just above 1.5 per cent. Partly in the light of the easing of monetary policy in various countries, some recovery is foreseen in the year 2000, when growth is judged to reach almost 2 per cent. Compared with the Riksbank's assessment in December, the international economic prospects are thus marginally more subdued.

### GRADUAL ECONOMIC RECOVERY IN SWEDEN

The international outlook, with weaker growth in Sweden's neighbouring countries, is expected to result in growth in Sweden being somewhat lower than in 1998. The slowdown in Europe affects Swedish manufacturing to a greater extent than the upward revision in the United States. But the prospects for growth in the



coming years are still relatively good. Domestic demand is judged to rise successively in the forecast period, partly on account of the low real interest rate. This picture is supported by various financial indicators, such as lending to households and growth of the money supply. It counters the somewhat weaker prospects for export growth and the poorer outlook for manufacturing, particularly in 1999. In addition, the restrictive effect of fiscal policy on demand is assumed to be smaller than during the budget consolidation in recent years.

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**GDP growth is expected to be above 2 per cent in 1999 and approximately 2.5 per cent in the year 2000.**

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Together with a gradual recovery of international economic activity, this means that GDP growth is expected to be above 2 per cent in 1999 and approximately 2.5 per cent in the year 2000. The somewhat weaker

cyclical outlook implies that employment may rise somewhat less than was assumed in the December Report. Unemployment is judged to decline from 6.5 per cent this year to 6.2 per cent in 2000.

Financial market pricing and survey data show that households, firms and market players still count on very low inflation in the coming year. Further ahead, inflation is expected to be in line with the Riksbank's target.

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**The Riksbank judges that CPI inflation will be 1.1 per cent in twelve months time and 1.4 per cent after twenty-four months.**

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Despite relatively good growth, the economy will probably have unutilised capacity in the coming two years. This points to low underlying inflationary pressure in the forecast period. The Riksbank judges that CPI inflation

will be 1.1 per cent in twelve months time and 1.4 per cent after twenty-four months.

The weak consumer price trend is partly explained by transitory factors that are considered to have no lasting impact on inflation and therefore do not influence the formation of monetary policy. Transitory effects – from declining housing mortgages and changes in indirect taxes and subsidies – are judged to hold back the CPI increase in the coming twelve months by 0.5 percentage points and by 0.2 percentage points after twenty-four months, that is, in March 2000 and March 2001 respectively. Core inflation, measured by UNDIX, is accordingly judged to be 1.7 per cent in March 2000 and 1.8 per cent in March 2001.

Against the background of the Executive Board's formulation of the inflation target, I want to emphasise the Riksbank's assessment that transitory price movements will accordingly also occur in 1999 and 2000 as a result of the interest-rate reductions and the approved changes in indirect taxes and subsidies. The combined effect of these factors is expected to lower the average annual rate of CPI

inflation in these years by 0.9 and 0.6 percentage points respectively. Thus, there is reason to count on deviations from the inflation target because of these factors during 1999 and the year 2000 as well.

### RISKS OF LOWER INFLATION PREDOMINATE

The inflation forecast is subject, as always, to uncertainty. Given the somewhat divided picture, it is just as difficult to forecast the development of economic activity now as it was last December.

The financial market unrest has admittedly subsided but the uncertainty about international economic prospects is considerable and has increased, if anything, during the recent month with the strong US statistics. This, in turn, has led to a global increase in long bond rates and also affected cyclically sensitive equity prices.

A weaker international trend could be triggered by an abrupt downturn in the United States. Stock markets in the United States are at a high level, household saving is low and the investments may seem high compared with corporate profit expectations. If a slowdown in the United States were to coincide with a weakening of domestic markets in Europe and a continued lack of growth in Japan, the consequences for the global economy could be serious.

A stronger trend could materialise, on the other hand, if, for example, activity in Europe, thanks to high consumer confidence and a pull from US demand, were to pick up more rapidly than in the Riksbank's main scenario at the same time as the recovery in Asia comes sooner than expected.

All in all, however, there is judged to be a greater risk of international activity being weaker. That is also why the Riksbank considers that the risk of inflation being lower than in the main scenario is greater than the risk of a higher rate.

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### MONETARY POLICY CONCLUSIONS

The conclusion from the Riksbank's inflation forecast is that, even when transitory effects from changes in indirect taxes, subsidies and interest rates are disregarded, the rate of inflation twelve to twenty-four months ahead will be below the Riksbank's target. Moreover, as I just said, the risk of lower inflation compared with the main scenario is greater than the upside risk. At yesterday's meeting, the Executive Board therefore decided to reduce the repo rate 0.25 percentage points, from 3.15 to 2.90 per cent, with effect from 31 March.

# Inflation forecasts with uncertainty intervals

BY MÅRTEN BLIX AND PETER SELLIN\*  
*Economics Department of Sveriges Riksbank.*

*Since December 1997, the Riksbank's Inflation Report has contained an inflation forecast with uncertainty intervals. These intervals illustrate the assessment of the Riksbank of whether uncertainty in the forecast is greater or less compared with previous forecasts, and whether it is more probable that the main scenario of the forecast is an underestimate or an overestimate of future inflation. The uncertainty intervals together with a probability distribution for the inflation forecast are derived from an assessment of the uncertainty of those factors considered to affect inflation.*

In January 1993, the Governing Board of the Riksbank adopted an explicit inflation target, stating that the annual change in the consumer price index is to be held at 2 per cent  $\pm 1$  percentage point.<sup>1</sup> Since monetary policy is judged to have a full effect on inflation with a lag of one to two years, the Riksbank should base its monetary policy on an assessment of future inflation. This is done with an inflation forecast based, in principle, on all relevant economic information available to the Bank at the time of preparing the forecast. It is also based on the assumption that the repo rate will remain unchanged during the forecast period. The Riksbank presents its view of the inflation outlook in the Inflation Report, published since 1993 (quarterly since 1996).

Since December 1997, the Inflation Report has contained an explicit inflation forecast with uncertainty intervals. Having uncertainty intervals is useful for several reasons. Firstly, the intervals illustrate the fact that the forecast is uncer-

\* We would like to thank Claes Berg, Hans Lindberg, Hans Lindblad, Pernilla Meyersson, Staffan Viotti and Anders Vredin for valuable comments. A detailed technical description of a method for calculating uncertainty intervals is available in Blix and Sellin (1998).

<sup>1</sup> See Bäckström (1998) for a detailed discussion of the inflation target.



tain. This uncertainty concerns the shocks that will affect the economy during the forecast period as well as the economic relationships, that is, how factors such as the demand in the economy influences inflation.<sup>2</sup> Secondly, the intervals allow the Riksbank to communicate its judgement of uncertainty at any given forecast horizon, for example whether an inflation figure lower than the forecast in the main scenario is more likely than an inflation figure outcome above this forecast.<sup>3</sup> Thirdly, when uncertainty is specifically illustrated in the form of uncertainty intervals, this creates favourable conditions for a more systematic discussion within the Riksbank regarding the assessment of uncertainty in inflation forecasts. This discussion focuses on the sources of inflation uncertainty and their quantitative significance. Lastly, uncertainty in itself in the inflation assessment can influence the formation of monetary policy. A high level of uncertainty may constitute a reason to have a more cautious policy stance in order to avoid unnecessary large and sudden movements in interest rates.

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In the preparation of the Inflation Report of the Riksbank, an initial assessment of risk and uncertainty is done at the Economics Department. This then functions as the basis for the uncertainty analysis of the Executive Board which is presented in the Inflation Report. A somewhat different approach for producing uncertainty intervals for the inflation forecast is used by the Bank of England,<sup>4</sup> which bases its uncertainty assessments on the inflation risks identified by the Bank's highest decision-making body, the Monetary Policy Committee (MPC). These risks are then described in more detail and accounted for by the Bank's economists. The approach used by the Riksbank, on the other hand, can be described as a 'bottom-up' approach, since the initial assessment is conducted by the Economics Department. In order to implement this kind of approach, we have developed a method that differs significantly in several respects from that used by the Bank of England. This method and the way in which it is used is described in this article.

The traditional statistical approach to producing uncertainty intervals would involve first constructing a model intended for inflation forecasts. In a linear multivariate model, the exogenous shocks would be assumed to be normally distrib-

<sup>2</sup> For a description of these relationships, see Hörngren (1995).

<sup>3</sup> The inflation forecast in the main scenario refers to the most likely development for inflation during the next two years.

<sup>4</sup> See Britton, Fisher and Whitley (1998) for a detailed description.

uted. This would in turn mean that the endogenous variables (inflation among them) would be normally distributed as well. Deriving uncertainty intervals in this kind of model is a well known and, from a methodological standpoint, straightforward statistical problem.<sup>5</sup>

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**We prefer an approach that is as explicit and rigorous as possible in incorporating subjective judgements about uncertainty into the forecast.**

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The Riksbank, however, does not use the approach described above for several reasons. Firstly, the Riksbank does not use any one specific model for making inflation forecasts. Secondly, the standard approach does not allow specific information relevant to the particular forecast period to be used. Thirdly, subjective judgements have proved to be important in making good forecasts. We therefore prefer an approach that is as explicit and rigorous as possible in incorporating subjective judgements about uncertainty into the forecast.

This article is structured as follows. We begin by giving a brief outline of how the main scenario inflation forecasts are prepared. We will then describe how assessments of uncertainty and risk in the most important macro variables for future inflation can be quantified. Finally, we will discuss how these assessments can be aggregated to give an overall picture of the inflation forecast distribution.

## The inflation forecast

For a foreign trade dependent economy, such as the Swedish, the international development of growth and inflation is highly important. Forecasts of developments in the economies of Sweden's major trading partners are therefore a natural starting point in making forecasts for the Swedish economy. A further significant international factor is exchange rates. Changes in exchange rates are significant in that they influence Swedish exports and imports. Furthermore, exchange rates have a more direct effect on inflation via import prices in Swedish kronor. Exchange rate movements that are consistent with economic activity in general are therefore an important ingredient in inflation forecasts. In Alexius and Lindberg (1996), several different models are used to obtain an understanding for the level of the long-term exchange rate. It can be more difficult to assess how long the adjustment to this equilibrium exchange rate will take.<sup>6</sup>

The greater part of the work in the inflation forecast is to undertake an

<sup>5</sup> In a non-linear multivariate model, it is necessary to use simulations to calculate uncertainty intervals. This is a time-consuming but well-known procedure.

<sup>6</sup> See also "The krona's long-term path" in Inflation Report 1998:3, pages 26–28.

assessment of the future demand and supply situation in the Swedish economy.<sup>7</sup> Inflation pressure is likely to build up if the total demand in the economy exceeds the long-term production capacity. A number of indicators can be used to assess inflation pressure, such as industrial capacity utilisation, the labour market situation and the output gap. This latter indicator measures the difference between the actual output and the sustainable supply that the economy is capable of producing, known as the potential output. The potential output cannot be observed but can be estimated using several different models, as described in Apel, Hansen and Lindberg (1996) and Apel and Jansson (1999). Inflation expectations are also significant for assessing future inflation. If the decision-makers in the economy expect higher inflation, this can in itself lead to inflationary price and wage increases. For this reason, surveys concerning the inflation expectations of different actors are of interest when making inflation forecasts. Inflation expectations can also be measured on the basis of pricing on the money market, as described in Svensson (1993).

It can be seen from this overview that a large number of indicators and models are used in preparing inflation forecasts. Lastly, an overall assessment of all these factors has to be made and the most probable path for inflation – the main scenario – is presented in the Inflation Report of the Riksbank. It should be noted that the main scenario gives the most probable inflation development

under the assumption that the repo rate will remain unchanged. This assumption is made mainly for pedagogical reasons in order to clarify whether the repo rate needs to be raised or lowered. A consequence of this assumption of an unchanged repo rate is that the inflation forecast of the Riksbank is not directly comparable with inflation forecasts prepared by other actors, since these generally assume some form of monetary policy reaction from the Riksbank.

The statistical measure best corresponding to the forecast in the main scenario is the mode, since this represents the most probable outcome in the distribution (or rather the value that corresponds to the peak of the distribution). In a standard Gaussian distribution, the most common measures of central tendency – the mean, the mode and the median – coincide, but this is not the case for most

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**The main scenario gives the most probable inflation development under the assumption that the repo rate will remain unchanged.**

**The inflation forecast of the Riksbank is therefore not directly comparable with inflation forecasts prepared by other actors.**

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<sup>7</sup> The factors judged to be most significant for inflation are discussed in more detail in the facts box at the beginning of Chapter 2 in the Inflation Reports.

other distributions.<sup>8</sup> In the distribution used by the Riksbank (discussed below), the measures *may* coincide but *need not* do so. An advantage of using the mode is that it does not take into account the risk of extreme events. This is also a weakness since the mode does not use information from the entire distribution.<sup>9</sup>

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**The main issue is not which measure of central tendency is chosen but rather whether the forecast distribution is reasonable.**

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Finally, it should be noted that different measures of central tendency are simply different ways of summarising information about the distribution in a more easily interpreted and standardised manner. The main issue is not which measure of central tendency is chosen but rather whether the forecast distribution is reasonable. Given that the distribution is reasonable, it will contain more information than the above-mentioned measures. Part of this information can be gauged by using additional measures, such as variance, skewness and kurtosis.<sup>10</sup> For example, if the distribution shows unusually large variance – which can be interpreted such that the uncertainty is greater than usual – then this is useful information for formulating monetary policy. The September 1998 Inflation Report stated that situations that are exceptionally difficult to assess constituted in themselves an argument in favour of not changing the repo rate.

## Uncertainty assessment and asymmetric risk assessment

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**The uncertainty within a factor may vary over time. The more important the factor is for inflation, the more it should affect the inflation forecast distribution.**

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such as aggregate demand and output in the economy, import prices and wages.

The main scenario inflation forecast prepared by the Riksbank is the path of inflation which is considered the most probable for the coming two years. It is based on an assessment of the most probable development of a number of factors that are likely to affect inflation,

<sup>8</sup> See Appendix for definitions of the different measures.

<sup>9</sup> The mode, the mean and the median *may*, however, can be misleading measures of central tendency if the distribution has more than one “peak”. In this case, the mode selects only one of the peaks and disregards information about other peaks. With regard to the mean and the median, the situation is no better, since they risk selecting the least probable outcome. This problem does not occur, however, in the distribution used by the Riksbank, since this distribution has only one peak.

<sup>10</sup> Skewness is a measure (approximate) of whether or not the distribution is symmetric. A standard Gaussian distribution is an example of a symmetric distribution that consequently has no skewness. Kurtosis is a measure (approximate) of the risk of extreme events occurring (that is, how wide the tails of the distribution are). Kurtosis is often discussed when the distribution is compared with a standard Gaussian distribution. The common expression “excess kurtosis” means that the tails in the distribution are fatter than in a standard Gaussian distribution.



However, the development of these important factors for inflation is naturally uncertain. At a specific point in time, this uncertainty may be greater or less than the level of uncertainty which has historically been characteristic for a particular factor. This should be reflected in the distribution of the inflation forecast. The more important a particular factor is for inflation, the more importance should be attached to it when assessing the total uncertainty of the inflation forecast.

In addition to the forecast having greater or less uncertainty than normal, there may sometimes be reason to presume that the forecast in the main scenario has more likely underestimated rather than overestimated future inflation. If this is the case, we say that the forecast carries an upside risk. Correspondingly, the forecast is said to carry a downside risk if it is judged to be more likely that the main scenario is an overestimate of future inflation. This kind of asymmetry in the forecast distribution for individual factors that affect inflation should be reflected in the form of asymmetry in the inflation forecast distribution. Just as in the case of the uncertainty as discussed above, the more important the particular factor is for inflation, the more importance should be attached to the asymmetric risk (asymmetry in the inflation forecast distribution). As a measure of asymmetry – or skewness – in the forecast distribution, we use the difference between the mode and the mean.<sup>11</sup>

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**A factor may have asymmetric risks. The more important the factor is for inflation, the more the asymmetry should affect the inflation forecast distribution.**

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In practice, assessments of uncertainty and asymmetric risk are carried out as follows: economists at the Bank prepare forecasts for twelve months and twenty-four months ahead for those factors that form their particular areas of expertise. For each forecast horizon, they then specify whether the assessments are more (or less) uncertain than the historical norm. In Table 1, economist Y.Y. has stated that he estimates the level of uncertainty in factor 1 for 1999 to be 90 per cent of what has historically been considered normal. Let us assume, for example, that factor 1 concerns wage formation and that several significant labour market agreements have recently been entered into. This means that the uncertainty is assessed to be less than normal. If, instead, a turning point in the business cycle is ahead, this could entail greater uncertainty since turning points are notoriously hard to forecast. Another example which could lead to greater uncertainty is if a political election is due to occur during the forecast period. For the year 2000, Y.Y. has stated the uncertainty of factor 1 to be 1.00, which means that the uncertainty is neither greater nor

<sup>11</sup> This measure is proportional to the third central moment, which is normally used to derive a measure of skewness in a probability distribution. See Appendix for a more detailed description.



less than normal. The economists also state whether they consider the upside risk in the forecast to be greater or less than 50 per cent. An economist stating an upside risk of, for example, 55 per cent thus considers that the forecast carries a slight upside risk, whilst a forecaster stating an upside risk of 50 per cent considers that the forecast is equally likely to be an overestimate as an underestimate. If an economist reports an upside risk of less than 50 per cent, as shown by Z.Z. in Table 1 for 1999, it implies that the forecast carries a downside risk.

**Table 1. Uncertainty assessment and asymmetric risk assessment**

	Uncertainty		Asymmetric risk		Economist
	1999	2000	1999	2000	
Factor 1	0.90	1.00	50	55	Y.Y.
Factor 2	1.00	1.10	45	50	Z.Z.

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**Everyone involved in the forecasting meets to discuss their assessments and bring them into line.**

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How is consistency among uncertainty and risk assessments achieved? All subjective assessments expressed as a percentage must be followed by an explanation in economic terms. This is in order to create a basis for discussions about consistency in terms of the overall picture of uncertainty. Everyone involved in the forecasting meets to discuss their assessments and bring them into line. The approach using assessments of inflation uncertainty and asymmetric risk entails that these meetings are a rewarding forum for focused discussion among those involved in preparing the inflation forecast. During such a discussion, it would be conceivable that the original assessments of, for example, asymmetric risks for factors 1 and 2 in Table 1 would be brought into line with one another if the asymmetric risks for these two factors are likely to be similar. This may, for example, cause Y.Y. to revise his/her figures to 47 for 1999 and to 53 for the year 2000. At a later stage, the Executive Board of the Riksbank also becomes involved in the discussion of the inflation forecast and the uncertainty assessments surrounding it. A discussion of different assessments of the uncertainty can then be conducted in concrete terms concerning the factors that affect inflation, and the final assessment of the Riksbank is gradually formulated.

For each factor that is important for inflation, we thus now have a forecast in the main scenario, an assessment of whether the uncertainty is greater or less than historically characteristic for the factor, and an assessment of whether the forecast in the main scenario is more likely to be an overestimate or an underestimate. All of this information then has to somehow be summarised and aggregated to produce an assessment of uncertainty and asymmetric risk in the inflation forecast. This is described in the following section, which is of more methodologi-

cal and technical character; it describes how a special probability distribution for inflation forecasts can be designed so that it reflects the subjective judgements that have been made about uncertainty and asymmetric risk in the factors that are important for future inflation.

## Probability distribution for inflation forecasts

A comprehensive description of the forecast for a given factor together with the uncertainty and asymmetric risk in the forecast can be shown in a probability distribution that allows

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**The forecast distribution for inflation that is used by the Riksbank allows skewness.**

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skewness. An example of such a distribution is the two-piece normal distribution.<sup>12</sup> The name is derived from the fact that the distribution to the left of the mode is proportional to a Gaussian distribution with a specific standard deviation, whilst the distribution to the right of the mode is proportional to a Gaussian distribution with another standard deviation. If both standard deviations are the same, then the two-piece normal distribution coincides with a Gaussian. The two-piece normal distribution is completely defined with three parameters, the mode and the two standard deviations mentioned above. This can be compared with the standard Gaussian distribution which can be fully defined using two parameters, the mean (which coincides with the mode and the median) and the standard deviation.<sup>13</sup>

We use the subjective judgements of uncertainty and asymmetric risk to increase or decrease the “standard deviation parameters” in the two-piece normal distribution. For example, if we have 10 per cent greater uncertainty than normal and 55 per cent upside risk, this gives an approximate<sup>14</sup> two-piece normal distribution, the right side of which is proportional to a standard Gaussian with the standard deviation  $1.10(55/45)S$ , whilst the left side is proportional to a standard Gaussian with the standard deviation  $1.10(45/55)S$ , where  $S$  is the standard deviation estimated from historical data. The historical standard deviation is calculated on the basis of historical errors in the Bank’s inflation forecasts, adjusted to account for the assumption of a constant repo rate.<sup>15</sup> Figure 1 shows the two-piece normal distribution together with a Gaussian distribution with the same

<sup>12</sup> See Appendix for a brief description of the two-piece normal distribution and John (1982) for a more detailed description. This distribution should not be confused with a Gaussian bivariate distribution, which is a joint distribution for two Gaussian variables.

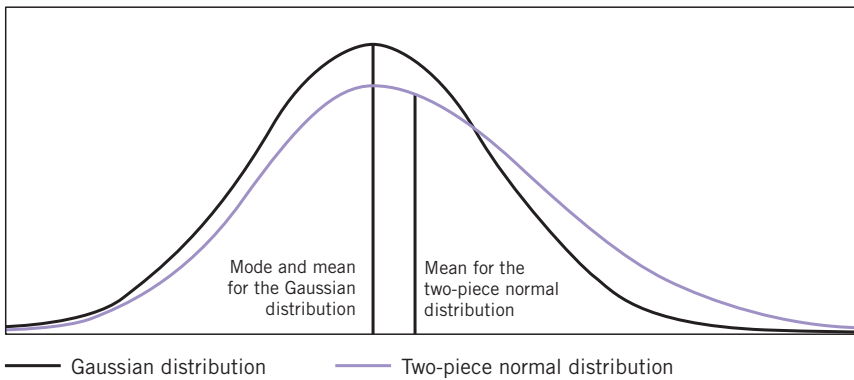
<sup>13</sup> See Appendix for a more detailed description of the relevant probability distributions.

<sup>14</sup> See Blix and Sellin (1998) for the exact formulae.

<sup>15</sup> Since the inflation forecast is made on the basis of a technical assumption that the repo rate will be held constant, no account has been taken of the fact that changes in interest rates will affect demand in the economy and thereby inflation.

mode and with the standard deviation  $S=1$ . It can be seen that there is upward skewness in the two-piece normal distribution, since the mean is higher than the mode, which means that there is a higher probability of an outcome above the forecast than below the forecast. The standard deviation for the two-piece normal distribution is a function of the two “standard deviation parameters” and is greater than the previous standard deviation  $S$ , which reflects both the 10 per cent higher uncertainty and the asymmetric risk.

**Figure 1. Gaussian distribution and two-piece normal distribution**



**The inflation forecast distribution should be skewed if any of the factors is skewed.**

No straightforward method exists for aggregating the distributions for the forecasts in respect of the different factors to produce a single distribution for the inflation forecast. If we assume, for example, a linear relationship between the macro variables and inflation, we could in principle derive the forecast distribution for inflation. Unfortunately, this approach is not feasible, since if several two-piece normal variables are aggregated – in contrast to when the variables have standard Gaussian distribution –, this does not result in any known distribution. However, a reasonable assumption would be that such an aggregation would result in a skewed distribution if the distribution of any of the factors is skewed.<sup>16</sup> We thus use a two-piece normal distribution as an approximation of the unknown distribution function for the inflation forecast.

A remaining key issue concerns how the assessments should be aggregated to form an overall picture of the distribution of the inflation forecast. We have chosen to *assume* that the skewness in the distribution is the sum of the skewness in

<sup>16</sup> A situation whereby different skewnesses cancel each other out when they are aggregated is possible.



the macro variables, weighted according to their importance for future inflation. If, for example, factor 1 has a skewness of  $-0.1$  percentage point, its net contribution to the overall inflation skewness will be  $-0.1$  percentage point multiplied by the weight of the

factor, and so on for all other factors. The construction of these calculations is described in detail in Blix and Sellin (1998). Note that with this method, no assessments of uncertainty and asymmetric risk are required in the inflation forecast distribution but rather these are *derived* from corresponding assessments for the different factors which may be assumed to affect inflation. We have thus developed a method that connects uncertainty and risk assessments in the macro variables to the probability distribution for the inflation forecast.

Whilst the assumptions we have made above result in a statistical approximation, it is important to stress that they are principally based on macro theory. This is perhaps best illustrated by some examples which show that the assumptions are *qualitatively* reasonable. If we first consider the benchmark case in which there is no skewness in any of the macro variables, then our assumption will imply that there will not be any skewness in the distribution for the inflation forecast either. We consider this to be a reasonable property to use as a starting point for the relationship between the macro variables and inflation. If, on the other hand, the estimated consumption carries a downside risk (negative skewness), the assumption will mean that the inflation distribution will also carry a downside risk, since the weight for consumption is typically positive. What happens if we suppose an upside risk in another variable, such as wage trend? Whether or not the sum of consumption skewness and wage skewness results in positive or negative skewness in the inflation forecast distribution depends on two things: the extent of the skewness and their relative importance (weight) for future inflation. This example can also be used to judge whether the inflation skewness is *quantitatively* reasonable.

How are the weights derived? A noteworthy feature of our method is that the weights reflect the importance of the macro variables for inflation. The weights used by the Riksbank are derived from a macroeconomic model that uses changes in the respective macro variables to calculate the effects of inflation twelve and twenty-four months ahead.

The calculations thus result in an inflation forecast distribution reflecting the subjective uncertainty and also the upside and downside risks in the forecasts for

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**We have developed a method that connects uncertainty and risk assessments in the macro variables to the probability distribution for the inflation forecast.**

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**A noteworthy feature of our method is that the weights reflect the importance of the macro variables for inflation.**

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the different factors that contribute to inflation. If the distribution has a high degree of skewness (the upside or downside risk is considerable), this may be cause to revise the original forecast in the main scenario. It is ultimately a question of judgement as to whether or not an extreme event, such as a large fall in demand due to a worsening of the Asian crisis, will affect the main scenario.

## Calculating uncertainty intervals

The starting point for calculating uncertainty intervals for the inflation forecast is the two probability distributions calculated for the inflation forecast for twelve and twenty-four months ahead. We will use the forecast in Inflation Report 1998:4 as an example, since this provides a good illustration of the skewness permitted in the distribution used by the Riksbank. Figure 2 shows the probability distribution for the inflation forecast for a twelve-month and twenty-four-month horizon, December 1999 and December 2000 respectively. The broken line shows the inflation forecast in the main scenario (the mode). We have indicated the uncertainty interval within which inflation was judged to lie with 90 per cent probability. This means that the risk of the inflation outcome being above the upper limit is 5 per cent and the risk of an outcome below the lower limit is 5 per cent.<sup>17</sup>

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**The uncertainty assessment in Inflation Report 1998:4 judged more probable that the inflation forecast was an overestimate of future inflation rather than an underestimate.**

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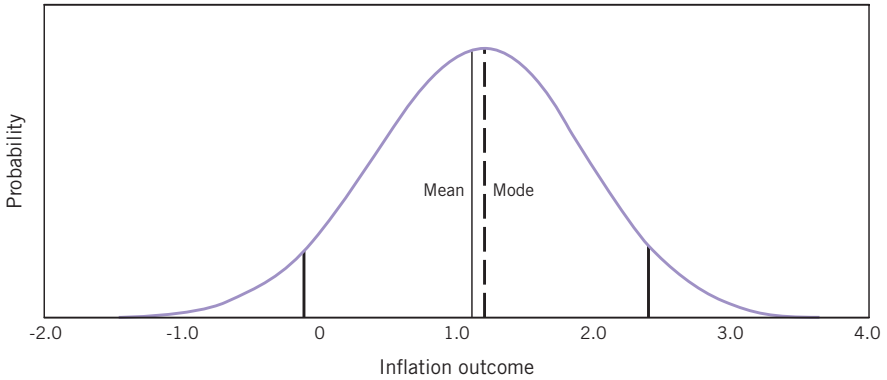
The mean of the distribution for the inflation forecast for twelve months ahead is 0.1 percentage point lower than the mode forecast in the main scenario, whilst it is slightly less than 0.2 percentage points lower for the twenty-four-month forecast. Both distributions are thus characterised by negative skewness.

This reflects the downside risk in the inflation forecasts for both twelve and twenty-four months ahead. From the uncertainty assessment, it was thus judged more probable that the inflation forecast was an overestimate of future inflation rather than an underestimate. The causes of the skewness can be traced to skewness in the distributions of some of the factors that contribute to inflation. Inflation Report 1998:4 summarises the reasons for the skewness as follows: "All in all, the inflation assessment has a downside risk in the form of an international slowdown that is more marked and protracted." (page 42).

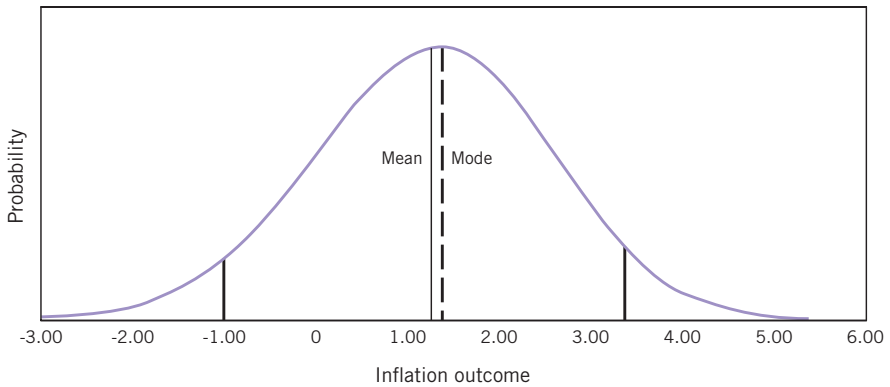
<sup>17</sup> Wallis (1999) criticises the Bank of England for not having symmetric intervals. The implication of this is that, in contrast to the uncertainty intervals used by the Riksbank, the probabilities of the intervals being too high or too low are not the same. This could, for example, lead to intervals of 3 per cent and 7 per cent respectively. See also The Economist (1999).



**Figure 2 a. 90 per cent uncertainty interval for CPI forecast for December 1999**



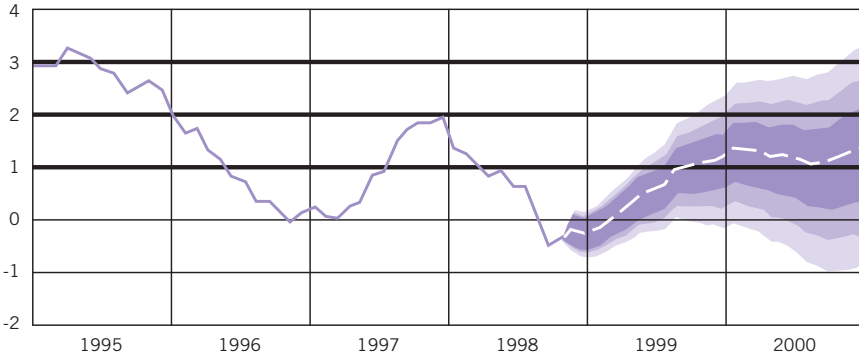
**Figure 2 b. 90 per cent uncertainty interval for CPI forecast for December 2000**



An alternative way of presenting uncertainty intervals is by using a fan chart, as shown in Figure 3. This is based on the distributions in Figure 2, which are shown as cross-sections on the fan chart in Figure 3 at the time horizons December 1999 and December 2000. The outer limits of the fan represent the 90 per cent uncertainty intervals. The 75 per cent and 50 per cent uncertainty intervals are also shown together with the path of the forecast in the main scenario (the broken line). The time interval between the figures for December 1999 and December 2000 is interpolated to produce the fan. This is done by adjusting the intervals upwards monthly by a given factor. The factor must be chosen so that the adjustment lies within the given interval limits for December 1999 and December 2000 respectively. The fan chart has several advantages compared with Figure 2. Firstly, only one diagram is required. Secondly, the entire path of the forecast can be seen and also the actual developments up until the forecast dates. The diagram also illustrates

how the uncertainty develops in relation to the forecast horizon. The width of the uncertainty intervals above the forecast compared with the width of the intervals below the forecast illustrates where the majority of the uncertainty is estimated to be. If the forecast is not judged to carry any asymmetric risk, the intervals above and below the forecast will be of equal size.

**Figure 3. CPI with uncertainty intervals. Annual percentage change**



Source: Inflation Report 1998:4

Another way of illustrating the uncertainty intervals for the inflation forecast is to calculate the probability of the inflation outcome being in a given interval. This can easily be done, since we already know the overall probability distribution for the inflation forecast. Table 2 is taken from Inflation Report 1998:4 and shows the probabilities of inflation outcomes below 1 per cent, between 1 and 2 per cent, between 2 and 3 per cent and over 3 per cent for twelve and twenty-four months ahead.


**Table 2. 12-month CPI inflation. Percentage probability of different outcomes**

Dec.–Dec.	CPI<1	1<CPI<2	2<CPI<3	CPI>3	Total
1999	42	45	12	1	100
2000	41	30	20	9	100

Source: Inflation Report 1998:4

**For the year 2000 the assessment in Inflation Report 1998:4 was that inflation would probably be below the Riksbank target of 2 per cent, under the assumption of unchanged repo rate.**

The probability of inflation lying within the tolerance interval for 1999 was thus judged in December 1998 to be 45+12=57 per cent. There was also considered to be a significant probability (42 per cent) that inflation would be below 1 per cent, whilst the probability of inflation exceeding 3 per cent was judged to



be negligible (1 per cent). The assessment for the year 2000 was similar, that is, that inflation would probably be below the Riksbank target of 2 per cent, under the assumption of unchanged repo rate.

## Summary

In this article, we have presented a new method for deriving a probability distribution for the inflation forecast. This reflects the subjective judgements that have been made regarding uncertainty and asymmetric risk in the factors that are judged to affect inflation. We have also outlined how this method is applied in practice.

The analysis is based on two sorts of assessments. Firstly, an assessment is made of whether uncertainty in the forecast is greater or less than the uncertainty that has historically characterised the particular factor. Secondly, an assessment is undertaken regarding whether there is a greater risk of the forecast in the main scenario underestimating or overestimating future inflation. These assessments are represented in a two-piece normal probability distribution for each factor. The probability distributions are then aggregated to form an overall probability distribution for the inflation forecast, which is used to calculate the uncertainty intervals around the main scenario. This aggregation is carried out using weights to represent the importance of the macro variables for inflation.

The initial work on uncertainty assessments is carried out by the Economics Department and coincides with the preparation of the main scenario. It is natural for economists with expertise concerning a particular factor to make assessments for that specific factor. In order to ensure consistency, the economists meet to bring their assessments into line with each other. The uncertainty and risk assessments made by the Economics Department then function as the basis for discussion by the Executive Board. At this stage, the different assessments of uncertainty can be discussed in very concrete terms, focusing on the factors that are important for inflation. The inflation assessment of the Executive Board may result in the main scenario and the inflation forecast distribution being revised. The final inflation assessment is presented in the Inflation Report of the Riksbank and enables the Riksbank to communicate in a pedagogical manner its view of uncertainty and upside and downside risks for the inflation forecast in the main scenario.



# Appendix

## DEFINITIONS OF COMMON MEASURES OF CENTRAL TENDENCY

Let the distribution be defined as  $f(x)$ . The mean is defined as  $\int_{-\infty}^{\infty} xf(x)dx$ ; the median is the value  $\mu$  such that  $\int_{-\infty}^{\mu} f(x)dx = 0.5$  and the mode is the value  $\mu$  such that  $\left. \frac{\partial f}{\partial x} \right|_{x=\mu} = 0$ .

## TWO-PIECE NORMAL DISTRIBUTION

A standard Gaussian distribution is defined as

$$f(x; \mu, \sigma) = (2\pi\sigma^2)^{-1/2} \exp\left\{-\frac{1}{2\sigma^2}(x-\mu)^2\right\}.$$

The two-piece normal distribution consists of two standard Gaussian distributions having the same  $\mu$  but different standard deviations:

$$f(x; \mu, \sigma_1, \sigma_2) = \begin{cases} C \exp\left\{-\frac{1}{2\sigma_1^2}(x-\mu)^2\right\} & \text{for } x \leq \mu \\ C \exp\left\{-\frac{1}{2\sigma_2^2}(x-\mu)^2\right\} & \text{for } x > \mu, \end{cases}$$

where  $C = k(\sigma_1 + \sigma_2)^{-1}$ ,  $k = \sqrt{2/\pi}$  and  $\mu$  is the mode.  $C$  is an integration constant required to scale the standard Gaussian distributions when they are aggregated.

The probability of outcomes between  $L_1$  and  $L_2$  for the two-piece normal distribution is derived in John (1982) and is

$$pr[L_1 \leq x \leq L_2] = \int_{L_1}^{L_2} f(x)dx = \frac{2\sigma}{(\sigma_1 + \sigma_2)} \left[ \Phi\left(\frac{L_2 - \mu}{\sigma}\right) - \Phi\left(\frac{L_1 - \mu}{\sigma}\right) \right],$$

where  $\Phi(\cdot)$  is the standard normal cumulative distribution and

$$\begin{cases} \sigma = \sigma_1 & \text{if } L_1 \leq L_2 \leq \mu \\ \sigma = \sigma_2 & \text{if } \mu \leq L_1 \leq L_2. \end{cases}$$



The variance is given by

$$\text{var}(x) = (1 - k^2)(\sigma_2 - \sigma_1)^2 + \sigma_1\sigma_2$$

and the skewness (the third central moment) is given by

$$E[(x - \mu)^3] = k(\sigma_2 - \sigma_1)[(2k^2 - 1)(\sigma_2 - \sigma_1)^2 + \sigma_1\sigma_2],$$

which is proportional to  $k(\sigma_2 - \sigma_1)$  since  $2k^2 - 1 > 0$ . Therefore, we will use the simpler expression

$$\gamma \cong \tilde{\mu} - \mu = k(\sigma_2 - \sigma_1)$$

to describe the skewness. The advantage of this is that  $\gamma$  is exactly the difference between the mean and the mode.

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# Market valuation of external position – a new picture of Sweden’s international dependence

BY GUNNAR BLOMBERG AND JOHAN ÖSTBERG  
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*A new valuation method for calculating Sweden’s International Investment Position shows that Sweden’s external position is considerably smaller than has been reported to date. According to the calculations, in which direct investments have been valued at market prices, Sweden’s net debt amounts to around 20 per cent of GDP. This can be compared with the traditional valuation method applied in official statistics, which gives a net debt almost double this amount, corresponding to 38 per cent of GDP. By valuing direct investments at market prices, a new picture of Sweden’s dependence on borrowing abroad emerges.*

The authors have derived two main conclusions from the picture indicated by the new statistics:

- Sweden’s IIP does not pose a problem for the country today: the net debt has been reduced through repayments, and the internal instability which contributed to the accumulation of Sweden’s net debt has largely been ‘solved’.
- Sweden has a large proportion of risk capital, mainly direct investments, in its external position. According to the authors, a high degree of integration in terms of risk capital constitutes an overall advantage.

## The concept of external position

### UNKNOWN ECONOMIC TERM

Although statistics of Sweden’s International Investment Position – external position – have been compiled and published for more than twenty years, the concept is still relatively unknown in Sweden. However, it has for a long time served as an important indicator for many international analysts, such as credit rating institu-

tions and international organisations. In principle, the concept of external position is straightforward. It shows the net external indebtedness of a country, including the external assets and liabilities of all domestic sectors.

The concept of external position has been treated in previous articles in this publication (Quarterly Review 1996:4, "Aspects of Sweden's external debt" by Robert Bergqvist and Tomas Lundberg). The current article presents, among other things, the results of a new valuation model for one of the components – direct investments – and how this can affect the interpretation of the statistics.<sup>1</sup>

## Market valuation of direct investments

### SHORTCOMINGS OF THE CURRENT VALUATION METHOD

One of the most significant components of the Swedish external position is the net external assets and liabilities in the form of direct investments. A direct investment<sup>2</sup> is defined as a holding of shares or participations exceeding 10 per cent of the shareholders' equity or voting power in a foreign company. Holdings of less than 10 per cent of the share capital are classed as portfolio shares, irrespective of whether the shares in the company are listed or not.

The recommendations for compiling and processing balance of payments statistics (Balance of Payments Manual, IMF 1993) support a market valuation of direct investments. However, the recommendations do not specify any particular method that should be selected for this purpose. The lack of a generally acceptable and internationally feasible market valuation method has meant that most countries have instead chosen to report the foreign-owned proportion of shareholders' equity in direct investment companies at book value.

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**Size of shareholders' equity is an unreliable measure of a company's market value.**

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The problem with this practice is that size of shareholders' equity is an unreliable measure of a company's market value. The shareholders' equity in a company is a technical construction for accounting purposes, reflecting the total value of paid-up share capital and cumulative profit/loss, less any dividends paid out to shareholders. This value is normally considerably lower than the market value, that is, the value at which investors would price the company if it were offered for sale in the open stock market.

<sup>1</sup> The account of market valuation of external position in this article is based on preliminary calculations. Definitive calculations will be presented in connection with the official publishing of Sweden's external position in August 1999.

<sup>2</sup> The definition is in accordance with the nomenclature specified by the IMF (International Monetary Fund).

## NEW VALUATION METHOD BASED ON STOCK MARKET PRICES

In order to overcome the current shortcomings in statistics of external position, the Riksbank has devised a new method for the market valuation of direct investments. The method is based on a comparison between stock exchange listed companies and direct

investment companies in terms of profit development and price. As a basis for this comparison, the price/earnings (p/e) ratio is used in listed companies in those markets in which direct investment companies are represented, and the profit development is used in direct investment companies which are reported to the Riksbank. By basing the valuation on stock market pricing, the value of intangible assets, such as goodwill and human resources, is also taken into account. If a number of assumptions are made, the method can also be said to reflect the value that the market would have ascribed to the direct investment companies if they had been offered for sale on the stock market.

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**By basing the valuation on stock market pricing, the value of intangible assets, such as goodwill and human resources, is also taken into account.**

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### P/e method for valuing direct investments

The market value of the direct investments has been calculated for the period 1989-1998. The method is based on the assumption that the relationship between historic price and level of profit in direct investment companies is the same as the price/profit relationship in listed companies. In valuing Swedish direct investment assets abroad, the p/e ratios of 20 different countries are aggregated and weighted according to the book value of the direct investments. The market value is then calculated as the product of the weighted p/e ratio and the total profit generated abroad by the direct investment companies. The market value is, however, never permitted to assume a value lower than the book value of the shareholders' equity in the companies (liquidation value). As shown in the example below, it has not been possible to take differences in the p/e ratios between different industries into account. This is because it has not been possible to obtain data on p/e ratios by country and industry.

#### *Example – market valuation of direct investment assets*

This approach can be illustrated in the following simplified example: Let us assume that Sweden has direct investment assets in only two countries, the USA and the UK. The p/e ratios are 10 and 15 respectively for the stock markets in the two countries the previous year. The book value of the Swedish direct investment assets in the USA is assumed, in this example, to be SEK 90 billion, and in the UK, SEK 10 billion. The weighted p/e ratio will therefore be  $(10 \times 90 + 15 \times 10) / 100 = 10.5$ . Profit for the current year in the direct investment companies will amount to SEK 15 billion. The market value of Sweden's total direct invest-

ment assets in the two countries is calculated as the profit multiplied by the weighted p/e ratio, in this case  $15 \times 10.5 = \text{SEK } 157.5$  billion.

The method uses historical price and profit level data. It would of course be desirable to position the price in relation to the market's expectations of future profit. This poses a problem in that these expectations are not known. Another weakness in the method is that the relationship between profit and price level in the direct investment companies may deviate from the corresponding relationship in the listed companies. We have, however, made the assessment that business operations in the two categories of company do not differ significantly from each other.

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**The total profit trend in the direct investment companies appears to show greater cyclical fluctuations than that in the listed companies.**

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It is also evident that the method may be misleading if the profit cycle in the direct investment companies deviates from that in the listed companies. Studies of profit trend in the two categories of company indicate certain differences.

The total profit trend in the direct investment companies appears to show greater cyclical fluctuations than that in the listed companies. This is because there are fewer direct investment companies, which means that individual companies have a greater impact on the total profit level. A certain displacement of the profit cycles over a period of time has also been observed.

In an attempt to deal with these problems, the method has been supplemented with calculations which use an adjusted p/e ratio, whereby the aggregated profit of the listed companies, that is, 'e', and the profit in the direct investment companies is replaced with trend-typical levels.<sup>3</sup> This is based on the assumption, however, that the market is fully acquainted with the economic situation and long-term profit level in the direct investment companies and listed companies.

The first approach is likely to underestimate the market value during years when the direct investment companies show lower profit levels in relation to the listed companies. Similarly, it may overestimate the market value if the profits in the direct investment companies are higher in relation to those in the listed companies. The reasoning behind this is that it is assumed that the market players are, to a certain extent, able to forecast a long-term profit level that is likely to deviate from the most recently observed (economically cyclical) value. The second approach thus compensates this phenomenon, although the risk of 'overcompensation' must not be overlooked. The way in which the results from the two approaches are aggregated is most significant in extreme economic situations, such as those experienced in Sweden during the crisis years 1992 and 1993. We have chosen to attach equal significance to both approaches.

Inward direct investments (foreign assets in Sweden) are valued in a similar way, the only difference being that the input data in the calculation model is the p/e ratio for the Swedish stock market.

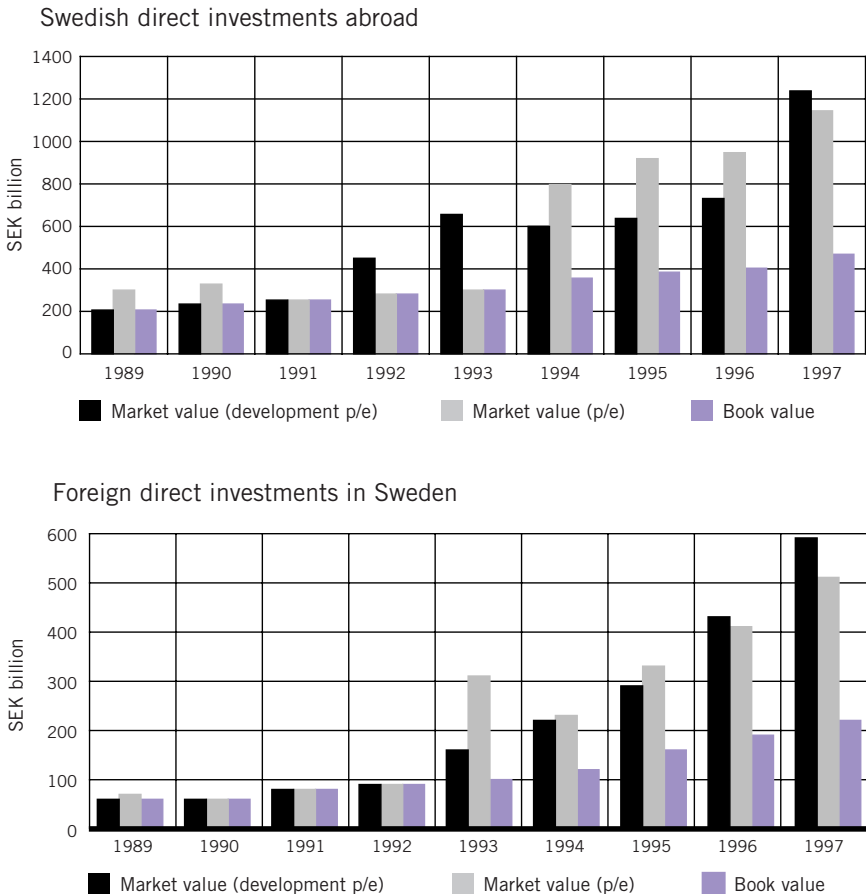
<sup>3</sup> A linear profit trend is estimated for both the listed companies and the direct investment companies using the least-squares method.



## Method not exact

Using the new method, the values for both inward and outward direct investment assets are more than doubled (Diagram 1). It is, however, difficult to verify the results of the selected method, since direct investment companies are very rarely sold as a cohesive unit on a well-functioning market. A valuation based on the p/e ratio can never give an accurate measure of the market value. However, it gives, in all likelihood, a considerably clearer picture of the 'real economic value' of the direct investments and thus of the external position than the current method which records direct investment assets at book value.

**Diagram 1. The size of inward and outward direct investment assets according to different valuation methods**





## CORRECT VALUATION IMPORTANT FOR SWEDEN

For countries with only small direct investment assets and liabilities, such as the USA and Germany, the current practice does not entail any real problems. For other countries with large direct investment commitments, such as Sweden and Spain (Diagram 2), the lack of market valuation of direct investments produces a misleading picture of the size and structure of the external position.

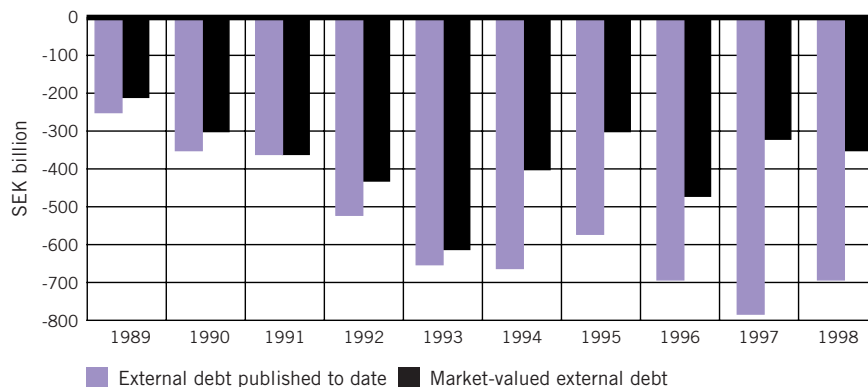
**Diagram 2. Direct investments (book value), net assets in 1996, per cent of GDP**



## MARKET VALUATION GIVES LOWER NET DEBT

According to the official statistics published to date, Sweden stands out as being one of the most indebted countries in the world. According to the most recently published balance of payments statistics, Sweden's net debt amounts to SEK 688 billion, which corresponds to 37.9 per cent of GDP (December 1998). The market valuation of direct investments results in a considerably more favourable picture of Sweden's debt situation. Diagram 3 shows that, according to the new calculations, Sweden's net debt amounted to SEK 357 billion in December 1998, corresponding to 19.7 per cent of GDP.

**Diagram 3. External position before and after market valuation of direct investments**



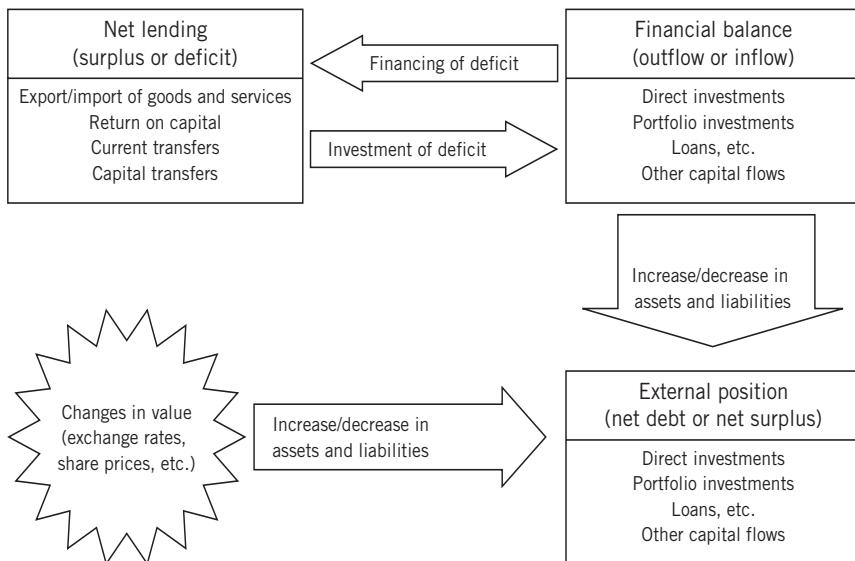
# The size and origin of Sweden's external position

## WHAT AFFECTS THE EXTERNAL POSITION?

Since statistics of Sweden's external position have been misleading to date, it has also been difficult to analyse the reasons for the accumulation of Sweden's external position and the effect of the external position on the national economy. The new valuation method enables these factors to be analysed in more detail. Firstly, however, we would like to give a broad outline of how statistics of the external position can be used and which factors affect the external position.

Apart from providing an on-the-spot account of the extent to which Sweden is indebted and which sectors have external assets and liabilities, the external position can be said to provide a key to the economic policy pursued previously. If the size of the assets deviates strongly from the liabilities, that is, the country displays a significant net debt or net surplus, this may be an indication of past external instability in the economy. A net accumulation of external assets or liabilities arises if the net lending, that is, the sum of the balance on current account and capital transfers, generates a durable surplus or deficit that needs to be invested or financed using cross-border capital. The value of the assets or liabilities may also be affected, however, by fluctuations in exchange rates or changes in the prices of assets.

**Figure 1. Relationship between net lending, capital flows and external position**



## TWENTY YEARS OF CUMULATIVE DEBT

The market valuation method also enables more effective study of how the external position has been affected by changes in values (beside the balance on current account) throughout the years. These changes in values, apart from stock market prices, which have the greatest impact on the external position have arisen as a result of fluctuations in interest and exchange rates. Changes in interest rates, however, despite being significant, have had a lesser effect on the external position. We have thus chosen to disregard the effects of fluctuations in interest rates in this article. In recent years, changes in values have had a very significant effect on Sweden's net debt. However, this has not always been the case.

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**Sweden's external net debt first arose during a period of economic recession in Sweden.**

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In a historical perspective, Sweden's net debt first arose during a period of economic recession in Sweden. During most of the 1970s and 1980s, Sweden displayed a considerable deficit on the current account. The fixed exchange rate applied by Sweden virtually throughout this period, in combination with considerable wage inflation, worsened the competitiveness of Swedish industry. It became more difficult for export firms to maintain their market share and to withstand international competition. At the same time, the deficit in the public sector increased. Sweden was forced to borrow from abroad to cover the costs of current consumption. This was the start of the increase in Sweden's accumulation of the net debt.

During the latter part of the 1990s, however, the development has turned around. Fiscal policy saving measures and floating exchange rates, in combination with a successful monetary policy, have created a surplus on the current account, and thus also in net lending. Accumulated over a longer period of time, net lending is close to zero. Through saving, Sweden has managed to pay off the overconsumption of the 1970s and 1980s in a very short space of time. In spite of this, Sweden – according to the new calculations – still has a net debt of approximately SEK 350 billion.<sup>4</sup>

## DEPRECIATION OF THE KRONA THE SOLE CAUSE OF SWEDEN'S CURRENT NET DEBT

Since the net amortisation of recent years has largely corresponded to the net borrowing of previous years (including interest), the remaining net debt must be explained by taking changes in values into account. We can state that, over a longer period of time, foreign investors have built up considerable holdings of

<sup>4</sup> According to the new calculations of the market-valued external position.

Swedish portfolio shares. Falling interest rates and, above all, rising market prices have contributed to positive changes in the values of these holdings during the 1990s. The overall change in the value of Swedish holdings of foreign portfolio shares has, however, not been as significant. This is because Swedish investments in foreign portfolio shares and interest-bearing securities have been relatively small up until the mid-1990s. It is only in more recent years, when a large part of public savings schemes and public stock savings funds have been replaced more and more by other alternatives, that Swedish investors have built up holdings of foreign securities. The upturn on the international share markets has therefore had less of an impact on the external position than the upturn on the Swedish stock exchange.

Changes in the value of direct investments, however, depict a reverse situation. Swedish direct investments abroad are less recent and involve greater amounts of money than foreign direct investments in Sweden. The changes in value are therefore greater for outward investments than for inward investments. Overall, the changes in the values of direct investments and portfolio investments have cancelled each other out.

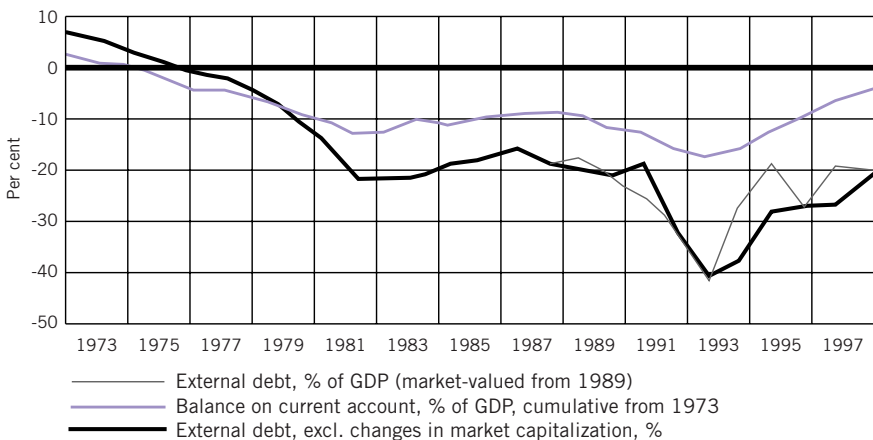
The fact that Sweden, despite the current account surplus of recent years, still has a net debt of just below 20 per cent of GDP (Diagram 4) can be explained by looking to the exchange losses associated with Sweden's borrowing abroad. At the time of the devalu-

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**The fact that Sweden has a net debt of just below 20 per cent of GDP can be explained by looking to the exchange losses associated with Sweden's borrowing abroad.**

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**Diagram 4. Market-valued external position, changes in value and cumulative balance on current account**



ations that were carried out during the 1980s, and during the transition to a floating exchange rate in 1992, a large proportion of Sweden's net borrowing was denominated in foreign currency. When the krona depreciated, the burden of debt also increased, denominated in Swedish krona. A large part of Sweden's current net debt appears thus to be a result of the devaluation policy carried out in previous years.

## Implications of the external position

### NO NORM FOR AN ACCEPTABLE LEVEL OF EXTERNAL POSITION

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**If external borrowing leads to increased real investments, it is probable that the country will be able to tolerate a higher net debt than if foreign borrowing goes to consumption alone.**

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We have thus stated that Sweden's net debt, after market valuation, lies at a level which is around half that recorded in official statistics. The issue then is whether it is possible to specify a level beyond which a country's net debt is considered to be a problem. It might be said that as long as the net debt does not

increase out of proportion to the size of the economy, then the situation is under control. In practice, however, it is not possible to specify a guideline value for external position. The net debt is more likely to be a problem if it is related to internal instability, such as a large and increasing national debt. If external borrowing leads to increased real investments, it is probable that the country will be able to tolerate a higher net debt than if foreign borrowing goes to consumption alone. An example of the first scenario is Sweden's investments in infrastructure, principally the railway system, at the end of the nineteenth century, financed by extensive net borrowing abroad. At the beginning of this century, Sweden's net debt was very large. As a result of the rapid growth which ensued in the country, Sweden was able to pay off this debt in a few decades. Whether or not the net debt constitutes a problem is a matter of judgement, and the overall economic situation of the country, including demographic factors and relative growth potential, must be taken into account.

### SWEDEN'S NET DEBT NOT A PROBLEM TODAY

What was the situation at the beginning of the 1990s? As shown from the new picture of the development of Sweden's external position presented in this article (Diagram 4), Sweden's net debt reached its highest level in relation to GDP in 1993. One might, of course, consider the extent to which this constituted a seri-

ous problem. Foreign analysts of Sweden, mainly credit rating institutions, viewed the rapid growth in the net debt with concern, since it was linked to internal instability, including a large and increasing budget deficit.<sup>5</sup>

In our assessment, Sweden's net debt of 19.7 per cent of GDP (reported after revaluation of the direct investments) should not entail any destabilising effect on the economy. The following factors have been taken into consideration in this assessment:

- Increased saving in the Swedish economy has, since 1994, resulted in a large, recurring surplus in the current account. This has contributed to a considerable reduction in Sweden's net debt.
- The changes implemented in Sweden's economy through budgetary cuts and a monetary policy with an inflation target have also considerably reduced the risk of the net debt once again soaring due to internal instability.

An international comparison is made more difficult by the fact that only a few countries report external position with all components valued at market prices. A comparison of the external position of different countries using the current valuation method (book values of shareholders' equity in respect of direct investments) is not particularly useful, since some countries have net assets in the form of direct investments, whilst other countries have net debts. In the first case, the external position (if it is a net debt) would be overestimated, whilst in the second case, it would be underestimated, provided that the market value is higher than the book value of shareholders' equity in the direct investment companies. This would be a reasonable assumption to make in view of the upturn on international stock exchanges in recent years.

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**An international comparison is made more difficult by the fact that only a few countries report external positions with all components valued at market prices.**

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### COMPOSITION OF EXTERNAL POSITION

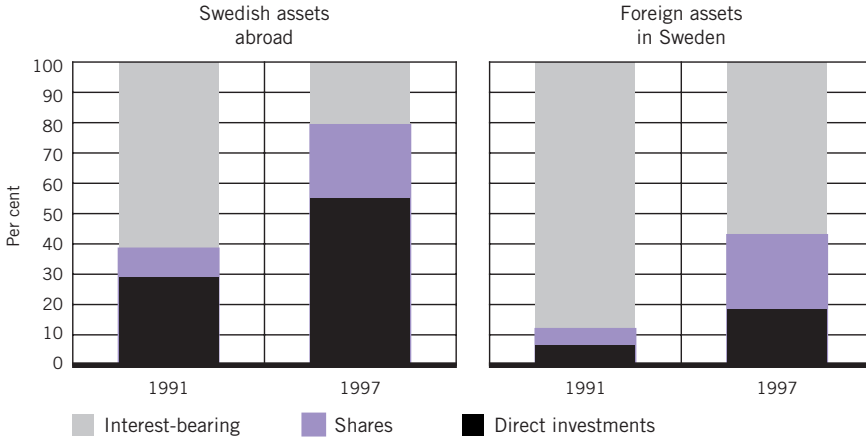
A market valuation of direct investment stocks also entails a change in the mutual relationship between the different components of the external position. A market valuation of direct investment stocks has the advantage that it permits a fairer comparison between the size of different components of the external position.

The composition of the external position, that is, the size of assets and liabili-

<sup>5</sup> The external debt was presented at this time in accordance with the previous valuation principles, which made it more difficult to assess the real value of the external debt.

ties, and the financial instruments that the assets and liabilities are invested in, is highly significant to the interpretation of the country's debt situation. Diagram 5 shows the considerable change in the composition of assets and liabilities that has taken place during the 1990s.

**Diagram 5. Direct investments, portfolio shares and interest-bearing investments as a proportion of Sweden's assets and liabilities in 1991 and 1997, per cent**



In the beginning of the 1990s, both assets and liabilities were dominated by interest-bearing instruments. This dominance was most pronounced on the liability side, where almost 90 per cent consisted of interest-bearing liabilities and only around 10 per cent consisted of foreign investments in Sweden in the form of direct investments and portfolio shares. As shown in the diagram, the proportion of risk capital (the sum of direct investments and portfolio shares) increased strongly up until 1997. It should be borne in mind that interest-bearing liabilities and assets are affected by short-term loans such as repo-financed securities transactions. Repo transactions increased strongly during 1992 and have therefore magnified the interest-bearing positions. The situation portrayed in Diagram 5 is therefore likely to be an underestimation of the movement towards an increased proportion of risk capital in Sweden's external position.

#### FROM FINANCING THE CURRENT ACCOUNT DEFICIT THROUGH BORROWING ...

It is not possible to make fair comparisons further back in time, since market valuation of direct investments has only been undertaken since 1989. Foreign exchange controls, which were abolished in 1989, were, from the mid-1970s to the end of the 1980s, directed at financing the current account deficit through



long-term borrowing abroad. These circumstances, together with the fact that foreign direct investments in Sweden were only moderate, therefore meant that Sweden's external position during this period consisted almost exclusively of interest-bearing borrowing.

Sweden's external assets are influenced by the fact that the Swedish business sector has been largely internationalised for a long time. On the assets side, direct investments constituted 30 per cent of assets in 1991. In view of the fact that foreign exchange controls were restrictive in respect of other types of investments abroad, it is reasonable to assume that the corresponding proportion during the 1970s and 1980s was higher.

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**Sweden's external assets are influenced by the fact that the Swedish business sector has been largely internationalised for a long time.**

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... TO FINANCIAL INTEGRATION IN TERMS OF RISK CAPITAL

During the 1990s, Sweden's external position has undergone a radical change in that the proportion of risk capital has doubled in terms of Swedish assets abroad and has increased fourfold in terms of liabilities. This increased proportion of risk-bearing capital in the external position is a result of a large flow of investments in both directions and the growth in value which followed the upturn on the stock exchange in the 1990s.

From primarily showing how the current account deficit of previous years was financed, Sweden's external position is currently reflecting the financial integration in terms of risk capital. Increased cross-border investments with increased diversification of risks for asset management companies, partly owing to the internationalisation of pension saving, has meant that the proportion of investments in portfolio shares has increased on both the liability and asset side. Increased internationalisation of business and, especially during recent years, a trend towards mergers between major international companies, including several Swedish groups, has meant that direct investment shares have also increased on both the liability and asset side.

Furthermore, when it comes to risk capital, inward and outward investments are not entirely separate. To the contrary, they are highly integrated, since foreign portfolio investments are often directed at Swedish companies with large direct investment assets abroad. Similarly, a number of company mergers in recent years have led to Swedes owning portfolio shares in foreign companies which, in turn, have significant direct investment assets in Sweden.<sup>6</sup>

<sup>6</sup> Stora-Enso and AstraZeneca are examples of such mergers.



## HIGH DEGREE OF INTEGRATION IN TERMS OF RISK CAPITAL

### — IS THIS A GOOD THING?

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**Sweden is a country with large gross positions in terms of risk-bearing capital.**

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Sweden is a country with large gross positions in terms of risk-bearing capital. Swedish industry has historically been internationalised to a high degree, with substantial assets in the form of direct investments abroad.

Direct investments abroad were especially extensive at the end of the 1980s, when the development was spurred on by uncertainty regarding Sweden's relationship to the EC and the desire for greater integration in this respect. Whilst the extensive investments abroad were favourable for the investor companies, they have at times reflected uncertainty in the view of Swedish economic policy.

During the 1990s, a distinct change has taken place in this development. The krona ceased to be overvalued, a low inflation regime gained a footing during the 1990s through the change of course in monetary policy, and a balanced budget has been restored. Together with Sweden's membership in the EU in 1995, this has changed foreign investors' view of Sweden in a positive direction. The strong increase of foreign direct investments in Sweden during the 1990s can therefore be interpreted as an effect of these changes.

However, the positive turnaround must not be exaggerated and taken as a pretext that all of the problems have been overcome. The considerable flow of investments from abroad during the 1990s and the mergers between foreign and Swedish companies in recent years have given rise to apprehensions concerning the consequences of an increased level of international ownership. The relocation abroad of management functions and head offices which has occurred in the case of several major companies indicates that the structural prerequisites for business are not favourable in all respects.

But on the whole, we have made the basic assessment that this change towards greater integration in terms of risk capital is favourable for Sweden. A high degree of integration in terms of direct investment capital permits a closer exchange of know-how, management skills, etc, as well as improving market adjustment and utilising synergy effects in development and manufacturing. If Sweden had not managed to attract foreign investors during the 1990s, or if Swedish industry had not become involved in the development of recent years in favour of mergers of international groups, then this would overall have placed Sweden in a less favourable position.

# Why Sweden has changed its stabilisation policy regime

BY VILLY BERGSTRÖM\*  
*Deputy Governor of Sveriges Riksbank.*

*It is obvious to everyone that we live in a different economic world than we did ten years ago. Ten years ago, registered unemployment was 1.3 per cent and inflation around 7 per cent. Now, inflation is non-existent while total registered unemployment is over 9 per cent. Three questions present themselves:*

- *Why has such a drastic change in the economy taken place?*
- *What characterises the new economic conditions?*
- *Are there alternatives to the policies now being pursued?*

## Background

In principle, Sweden had applied a fixed exchange rate since the second world war. However, in practice, the exchange rate was not particularly fixed after the mid-1970s. From autumn 1976 to autumn 1982, Sweden devalued five times.

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**From autumn 1976 to autumn 1982, Sweden devalued five times.**

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As from autumn 1982, after a series of devaluations, the policy of devaluation of the krona was meant to cease. However, during the years 1985 to 1987, a gradual depreciation of the krona took place. The krona was dragged down by the fall of the dollar which occurred at that time, since foreign exchange policy had been partially “dollarised” ever since Sweden joined the currency basket in 1977.

Due to the double weighting of the dollar in the currency basket against which the krona was pegged, the krona fell by an average of around 10 per cent between 1985 and 1987, since the dollar depreciated by around 40 per cent against major currencies during this period.

\* Villy Bergström would like to thank the Economics Department for their help and Staffan Viotti for his valuable comments.



In autumn 1992, the fixed exchange rate was abandoned and the krona immediately fell by 11.5 per cent. Thereafter, up until autumn 1993, the krona fell further, and the total fall in the exchange rate to its lowest position on 13 December 1993 was 31.5 per cent.

It should be noted in this context that the starting point for the fall in the value of the krona in November 1992 was a cost level that was approximately 25 per cent lower, measured in common currency, than it had been in 1976.

This was a failure for stabilisation policy. This can be illustrated by comparing the average wage of an industrial worker in 1975 and 1994. In 1975, an industrial worker earned SEK 27 per hour on average while in 1994, the hourly wage was SEK 95.

However, if the 1975 hourly wage is recalculated at the 1994 price level, it would have a real value of SEK 107 in 1994. Thus, twenty years of trade union struggle, when nominal wages rose by an average of 6.9 per cent per year, resulted in a decrease in real wages of SEK 12 per hour.

This was not only a failure for trade union wage policy, but just as much a failure for the Government's stabilisation policy.

How could things have gone so badly?

## Stabilisation policy activism

The large devaluation of 16 per cent that the newly-appointed Palme Government carried out in October 1982 can be described as an offensive devaluation, in addition to that which had taken place in 1981. As a result of the 10 per cent devaluation in 1981, the cost situation had been somewhat normalised and the competitiveness of Swedish industry restored.

The aim for Sweden was to get off to a flying start. This was also the case, as there was an upswing in the USA at that time, the start of an exceptionally long period of economic prosperity.

The Social Democratic Government considered that their relations with the trade union movement were so good that the Government would be able to manage the 'aftercare' of the devaluation. Necessary follow-up measures would be needed to prevent the benefits of devaluation being eaten up by wage and price inflation. Domestic demand needed to be tightened to allow export-based industry to grow. Sweden would "save and work its way out of the crisis", as the social-democratic crisis programme put it in the 1982 election campaign.

However, between 1982 and 1992 the hourly cost of labour for an industrial worker rose in round figures by between 8 and 11 per cent per year. As inflation

expectations were clearly well rooted in the labour market, the aftercare of devaluation was a failure.

As already noted, the effects of the rapid rise in costs were softened first by the size of the devaluation and then by the fall in value of the dollar, which *de facto* depreciated the Swedish krona between 1985 and 1987.

What did the Government then do to stabilise wage and price developments after 1982?

A list can be compiled of the Government's attempts to stabilise wage increases. This list demonstrates measures in a corporative spirit, based on the idea that the Social Democratic Government could make a stabilisation of prices possible by working closely together with the trade unions.

1. In spring 1983, the Government launched an inflation norm of 4 per cent for 1984. The outcome was 8 per cent.
2. In spring 1984, a crisis package was presented with a price freeze and a rent freeze and a norm of 3 per cent inflation in 1985. The outcome was 7.4 per cent.
3. In 1984, the "foreign loan norm" was launched, namely that the state should not borrow abroad to finance the deficit in the current account.
4. In 1985, a tax-based income policy was introduced. National income tax was to be reduced by SEK 2 billion if the Swedish Metalworkers Union and the Swedish Engineering Employers Association concluded an agreement with wage increases of at most 5 per cent.
5. In 1982, 1984, 1985 and 1986, negotiations and discussions were held regarding taxes and collective agreements between the Government and various constellations of labour market organisations.

Some of these measures were inspired by the so-called norm debate. This was to establish firm norms in economic policy in order to stabilise inflation at a low level. The most important norm was naturally the fixed exchange rate, although the Government had regularly accommodated cost crises by devaluing to counteract unemployment and falling profits when costs soared.

No sanctions were tied to the inflation norms of 1983 and 1984. However, the foreign loan norm in itself constituted a sanction, as it meant that the State could not borrow from abroad to finance current account deficits caused by a cost crisis. Private capital flows needed to be generated. This would require high interest rates in Sweden compared with other countries in order for the private sector in Sweden to be willing to risk borrowing in foreign currency.

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**Between 1982 and 1992, the hourly cost of labour for an industrial worker rose in round figures by between 8 and 11 per cent per year.**

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The industrial sector had been competitive for a long time, although public expenditure rose at a rapid rate as well. This led to the labour market overheating. Registered unemployment was down to 1.3 per cent in 1989 and 1.5 per cent in 1990. Unemployment in Mälardalen, the region around Lake Mälaren, was 0.5 per cent.

It is evident that no wage formation system could operate under such conditions. Labour market researchers, such as Bertil Holmlund in Uppsala, argued at that time that NAIRU, the unemployment level consistent with constant inflation, was between 2.5 and 3 per cent, which today appears to be very low.

The stabilisation policy problems accumulated towards the end of the 1980s. The Government encountered a crisis situation in 1990 and introduced a prohibition on strikes, together with a number of restrictive measures such as a wage freeze, a rent freeze and a freeze on local government tax increases. The Government announced that Sweden was to apply for membership of the EU. On 15 February, the Minister of Finance, Kjell-Olof Feldt, resigned, and the Government then lost a vote in the Riksdag on the prohibition against strikes.

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**The events of winter 1990 were the last attempts to pursue interventional stabilisation policy according to the traditional Keynesian approach.**

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It can probably be said that the events of winter 1990 were the last attempts to pursue interventional stabilisation policy according to the traditional Keynesian approach. The “corporative” cooperation policy had failed. The fact that the end of the road was reached in February 1990 was actually a result of the Government’s own actions in the latter half of the 1980s and its inability to restrict demand.

## Towards a new stabilisation policy

The credit market had been gradually deregulated during the 1980s. Foreign exchange control began to be dismantled in 1986 and was abolished entirely in summer 1989.

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**Foreign exchange policy changed course when the krona was pegged to the trade-weighted currency basket and linked to the ECU at Whitsun 1991.**

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Foreign exchange policy formally changed course when the krona was pegged to the trade-weighted currency basket and linked to the ECU at Whitsun 1991. It was an important signal to the foreign exchange market that the change, which was expected, took place *without* a depreciation of the krona. On the contrary, the krona was linked to the ECU at a rate somewhat above the central exchange rate in the interval that applied when it was linked to the currency basket.



A number of measures had heralded a formal change of course in stabilisation policy. The most important document that marked a new direction was the Government budget statement of January 1991, in which the Minister of Finance and the Government wrote that combating inflation was to be given precedence over other policy goals.

This decision was reflected in the budget with a 40 per cent reduction of appropriations for relief work. In spring 1991, unemployment rose month by month and it was clear that the Government was not giving priority to full employment in the same way as before.

This was the first major change of course in stabilisation policy. Now it was combating inflation that was important, by means of a fixed exchange rate. The change

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**Now it was combating inflation that was important, by means of a fixed exchange rate.**

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was well prepared by experiences of previous failures and by the intellectual debate on stabilisation policy that had begun in the USA during the 1970s. The results of a number of research projects in the USA questioned the possibilities of economic policy to stabilise employment through interventions. These results were disseminated to Sweden, partly by the economics group affiliated to SNS Economic Policy Group.

However, the credibility of the old policy had also diminished as a result of the stagflation of the 1970s after the first oil crisis, when Sweden, perhaps to a greater extent than other countries, sought to overcome a downturn in the economy by introducing a number of expansionary measures to keep up demand. Production grants and stock production grants are examples of such measures.

Traditional Keynesian demand-based policy thus fell into disrepute, both on theoretical grounds and due to the experiences of the 1970s. But what happened in the 1970s was a supply shock, caused by a sharp rise in

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**Keynesian policy was applied in the wrong situation. All the same, these experiences contributed to the fall in popularity of Keynesian policy.**

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oil prices, rather than a demand shock. Measures to stimulate demand and stock production grants were hardly the right methods in dealing with this disturbance. Keynesian policy was applied in the wrong situation. All the same, these experiences contributed to the fall in popularity of Keynesian policy.

From the beginning of 1991, a price stability goal was applied. This was given priority over full employment. The means was a fixed exchange rate. Employers and trade unions would be forced to bear the consequences of excesses in wage formation. The exchange rate was to be maintained. So, if wage costs rose beyond the scope created by the growth of productivity and price rises on inter-

national markets, unemployment would be allowed to rise. The state would no longer accommodate economic disturbances, neither by devaluations nor by public expenditure.

The period from January 1991 to November 1992 does not warrant any detailed comment. A fixed exchange rate and free movement of capital are hardly compatible, however, and there are several examples of how such regimes have collapsed: Scandinavia and the United Kingdom in autumn 1992, the EU's ERM system in 1993, Mexico in 1994–95, South-East Asia in 1997, Russia in 1998 and Brazil in 1999.

With free movement of capital, it is instead necessary to adopt a floating exchange rate and an inflation target (or a money supply target). The only feasible alternatives would be an irrevocable linking of the currency by a “currency board arrangement” or a fully implemented monetary union.

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**In January 1993, the Riksbank announced an inflation target of 2 per cent inflation  $\pm$ 1 percentage point. The target was to be achieved in 1995.**

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In January 1993, the Riksbank announced an inflation target of 2 per cent inflation  $\pm$ 1 percentage point. The target was to be achieved in 1995.

This was the second major realignment of stabilisation policy. Sweden established an inflation target and, at the same time, accepted a floating exchange rate. This had been forced on Sweden by international developments with deregulation of the capital markets, including Sweden, and not least by the failed attempts at corporative co-operation and stabilisation policy interventions. The Government could now look back on 15 years of unsuccessful stabilisation policy. The reconstruction of stabilisation policy took place between 1993 and 1995 and thus took three years.

In respect of the failed defence of the krona, it should in all fairness be noted that experiences of free capital movements were not especially extensive in Sweden at this stage. The Government and the Riksbank, as well as economists and political analysts in Sweden, had at this time only limited knowledge about the conditions for economic policy in a globalised world.

## The new stabilisation policy regime

The goal for monetary policy was formulated by the Riksbank itself in January 1993. Inflation was to be maintained at 2 per cent per year with a tolerance interval of  $\pm$ 1 percentage point. The goal is symmetric. It is just as important to bring inflation up to 2 per cent when actual inflation is under 2 per cent as it is to bring down inflation when it is higher than the target.

This formulation may appear simple but it raises a large number of practical issues, the answers to which are far from simple:

1. How is inflation to be measured: by the CPI, the GDP deflator, or some other measure of price movements?
2. Shall the Riksbank have other objectives besides price stability?
3. Shall policies be directed at controlling the money supply or inflation directly?
4. How is confidence to be established in the Riksbank's policy and expectations of low inflation?

### I. MEASURES OF INFLATION

The objectives of the Riksbank have been expressed as follows in legislation:

*“The objective of the Riksbank’s operations shall be to maintain price stability. In addition, the Riksbank shall promote a safe and efficient payment system.”*

The first objective has thus been defined in concrete terms by the Riksbank. The second objective, stability in the payment system, requires monitoring of the “infrastructure” in the payments system and of the major institutions that constitute a potential systemic risk for the payments system. The second objective is less well known, although no less significant, and will continue to be managed by the Riksbank even if Sweden joins the monetary union, the EMU.

The Riksbank has opted to measure inflation by the consumer price index, CPI. This measure has certain disadvantages, although it has the overt advantage of being relatively well known among the general public, who understand “inflation” as a trend-based reduction in the value of money, measured in terms of the CPI.

The CPI has the disadvantage that the measure itself is influenced by the policy pursued by the Riksbank. If inflation is low and risks turning into deflation, the economy needs to be stimulated. The Riksbank then reduces the instrumental rate to increase activity and capacity utilisation in the economy.

However, the first thing that happens is that inflation falls further or even becomes deflation as interest rates fall and housing costs become lower. These are namely included in the CPI. There is a certain time lag before the level of activity and inflation is influenced in the right direction. This can lead to misjudgements of the policy pursued by the Riksbank.

A further example of a problem associated with using the CPI is that, if the Government tightens fiscal policy by introducing a VAT increase, then the CPI rises, as VAT has a direct effect on prices.



Tightening monetary policy and increasing the interest rate to counteract rises in inflation due to a VAT increase is not always the most appropriate course of action. In time, the increase in VAT will dampen demand and lower the level of activity and capacity utilisation. Thus inflation will also be dampened by the increase, although this takes place by means of an increase in prices – providing that inflation expectations are not affected. If this is the case, a different outcome will result. But such measures, changes in interest rates and taxes, normally result in one-off effects on the price level.

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**CPI movements must be interpreted and analysed carefully when formulating monetary policy.**

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This shows that CPI movements must be interpreted and analysed carefully when formulating monetary policy. Temporary effects on the price level should not initiate changes

in monetary policy. The Riksbank is therefore studying a number of other indexes that do not have the weaknesses of the CPI in the aspects taken up here.

A harmonised index, HICP, is being designed for the entire EU area and is already being used by the European Central Bank, ECB. HICP does not take changes in interest rates into account, but it does include indirect taxes and subsidies.

Another index, UNDI<sub>X</sub>, measures the underlying inflation by, in addition to excluding the effects of interest rates, also excluding the direct effects of indirect taxes.

By studying such indexes and comparing with the CPI, the Riksbank can obtain a good understanding of temporary effects of economic policy which are not likely to give rise to monetary policy changes.

However, this means that the Riksbank should be able to say in advance whether inflation will deviate from the 2 per cent target due to such temporary effects.

## 2. SHOULD THE RIKSBANK HAVE OTHER OBJECTIVES BESIDES INFLATION?

With regard to stabilisation policy, the Riksbank has one task by law, namely to strive for a stable price level, which the Riksbank interprets as 2 per cent inflation. The fact that the Riksbank does not aim at constant prices is primarily because prices and especially wages display downward inertia. It would therefore be difficult to change relative prices and relative wages if the price level remained constant on average. The Riksbank would also be forced to carry out a deflationary policy on repeated occasions if constant prices were the objective.

Moreover, we know that quality improvements, which are reflected in rising



prices, are not measured correctly by different price indexes. A particular (low) measured level of inflation can in fact correspond to price stability, if the fact that technical development which is continually improving the quality of goods and services is taken into account.

Monetary policy operates with a considerable time lag. The predominant view is that changes in monetary policy have maximum effect six to eight quarters afterwards.

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**Changes in monetary policy have maximum effect six to eight quarters afterwards.**

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This entails significant difficulty with regard to conducting monetary policy, as well as to evaluating policy that has been implemented.

Monetary policy must therefore be formulated taking into account an assessment of inflation one to two years ahead. The Riksbank therefore conducts regular inflation forecasts for this time horizon. Monetary policy is thus governed by an intermediate goal, namely the inflation forecasts.

It would be unreasonable to attempt to bring inflation directly back to 2 per cent if it were suddenly to rise considerably above this level. This would require a drastic reduction in *capacity utilisation* and a corresponding worsening in the *labour market situation*.

The Riksbank thus weighs the situation on the labour market and real economic activity in its assessments. In the short term, a trade-off exists between stability of the inflation rate and stability in the real economy. An unremitting and abrupt stabilisation of the rate of inflation around 2 per cent may therefore lead to temporary economic instability in real terms.

For this reason, the target horizon is defined as between one and two years. During this period, the Riksbank endeavours to gradually meet the inflation target by steering inflation towards 2 per cent, guided by the inflation forecasts which have been made for the period.

In the long run, however, there is no trade-off between inflation and employment. A low, stable inflation provides the prerequisites for fast growth and high employment,

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**A low, stable inflation provides the prerequisites for fast growth and high employment.**

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according to experiences from earlier periods, such as the first two decades after the war. We are now seeing a development that seems to confirm this hypothesis.

It can therefore be said that employment and capacity utilisation directly affect the monetary policy of the Riksbank to the extent that compliance with the inflation target is achieved gradually within a period of two years. This is to avoid too large fluctuations in the real economy, in employment and in capacity utilisation in general.

However, unemployment and capacity utilisation affect inflation and are therefore also included as components of inflation forecasts. These factors thus play an indirect role in the monetary policy formulated by the Riksbank.

The *exchange rate* does not constitute a target of Riksbank policy although it does affect inflation both directly and indirectly. An appreciation of the exchange rate will produce, all things being equal, an immediate dampening effect on import prices. As import prices are included in the CPI, inflation will thus also be reduced.

The exchange rate affects inflation indirectly by affecting demand. A higher real exchange rate reduces exports and thereby reduces the level of activity, with a certain time lag. This indirect effect tends to reduce inflation in the slightly longer term.

Supply is also affected in the long term by the exchange rate, as this (initially) affects import and export prices, and then gradually spreads to other prices and wages.

By affecting inflation directly and indirectly, the exchange rate plays a role in the formulation of monetary policy by the Riksbank in those cases when a change in the exchange rate is expected to be, or proves to be, durable.

The Riksbank is also studying different measures of changes in the *money supply* and *bank lending*. These quantities have varying degrees of covariation with inflation, but with a fairly long time lag.

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**Capacity utilisation, inflation expectations and the exchange rate are the most important determining factors underlying inflation forecasts.**

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All in all, it can be said that capacity utilisation, inflation expectations and the exchange rate are the most important determining factors underlying inflation forecasts. This summarises the main content of the stabilisation

policy regime that was established after 1992. On 1 January 1999, the Riksbank was made formally autonomous of political influence and has since then been governed by an Executive Board of six members. Consequently, conditions for the dealings of the Bank have been altered to a certain extent.

### 3. SHALL MONETARY POLICY CONTROL THE MONEY SUPPLY OR INFLATION DIRECTLY?

Some central banks, previously the German Bundesbank and now the European Central Bank, ECB, have a policy of a money supply target, although this is somewhat unclear. These banks endeavour to meet the inflation target by trying to control the expansion of the quantity of money. In fact, there are considerable similarities between the two methods of targeting the money supply and targeting inflation.



The instrument used by the central banks is the repo rate, which can be varied to affect the money supply or inflation. However, the money supply, just as inflation, cannot be directly controlled by the repo rate. When a central bank targets the money supply or inflation, it works in both cases with an intermediary target, since inflation control is based on an inflation forecast which may deviate from the actual inflation, in the same way as growth of the money supply can deviate from inflation.

In practice, the difference between the two approaches is negligible. Banks with an inflation target also study changes in the money supply when preparing inflation forecasts. Banks which claim to have a money supply target deviate from this without ceremony when it clearly leads in the wrong direction in view of the inflation forecasts that the banks also work with.

#### 4. CONFIDENCE

Publishing an inflation forecast has a lot of advantages. The general public can see how the bank assesses inflation one to two years ahead, how well founded the forecast is, and how policy is conducted in relation to the forecast that has been made.

The task of the Riksbank, i.e. to maintain a fixed value of money, has been laid down by the Swedish people through a Riksdag decision. To this end, the Riksbank has been

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**The Riksbank cannot conduct a policy that is against the will of the people.**

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granted a certain level of autonomy, known as autonomy of means. Naturally, the Riksbank cannot conduct a policy that is against the will of the people. The Riksbank has been assigned its task by the Swedish nation through legislation passed by the Riksdag. This mandate may be changed at any time by the Riksdag.

The Riksbank is directly accountable to the Riksdag for its policy by presenting an account of its policy twice a year to the Parliamentary Standing Committee on Finance. The possibility of sanction of the Riksdag is to replace a member of the Executive Board each year, as the members of the Executive Board have varying periods of office. The Chairman and Vice-Chairman of the Governing Council of the Riksbank follow the work of the Executive Board by having the right to attend and speak at board meetings.

Democratic tradition is thus followed, whereby delegation of power is accompanied by a possibility of holding to account. By the Riksbank being open about its objectives, forecasts and the assessments that have been made by the Executive Board, confidence can be established in Riksbank policy among politicians, investors and the general public.

## 5. ARE THERE ALTERNATIVES?

Sweden has thus fundamentally changed its stabilisation policy. From aiming at full employment as the highest priority, policy has been realigned to create stability. Low inflation is to constitute the economic environment in which full employment shall be restored.

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**Full employment is aimed at through long-term economic growth.**

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The target of “price stability” has been delegated to an autonomous Riksbank instead of, as was previously the case, fiscal and monetary policy being co-ordinated by the Government to achieve both full employment and price stability. Full employment is aimed at through long-term economic growth.

Sweden is not alone in changing its approach to economic stabilisation policy. A similar change of course has taken place in country after country (in fact, this took place very late in Sweden), whereby the deregulation of the financial markets nationally and internationally has played a crucial role.

Sweden’s economic successes during this century are the result of an openness towards the rest of the world, a large foreign trade, and the growth of large multinational companies. It would not have been possible to adopt a completely different approach other than the liberalisation of foreign exchange legislation and the capital market without this involving very large costs for Sweden. It can therefore be said that no feasible alternatives to the new approach to economic policy have existed.

However, this also suggests that when the present economic system changes, then Sweden will follow the tide. No economic policy regime lasts forever. At least five distinct regimes/epochs have existed in Sweden this century.

Between 1873 and 1931, the gold standard applied in Sweden. This was suspended during the first world war and up until 1924, when Sweden reverted to the standard at 1914 price levels following a brutal deflation process.

The gold standard was an international monetary system with the free flow of gold between the countries, whereby the individual currencies were rigidly fixed in terms of gold. The construction of the system meant that the entire system had a deflationary tendency. Countries expanding too heavily lost gold reserves and were forced to tighten their policy, whilst countries conducting a tight policy were able to accumulate gold without sanction.

France and the USA accumulated gold by conducting a tight demand policy, and this led to large difficulties for other countries, such as the UK, which lost reserves. Consequently, all countries started to pursue a tight policy, and this led to unemployment. Finally, the UK was forced to break away from the gold stan-



dard in 1931, which eased the depression there compared to in the USA and France. Sweden followed the example of the UK and also broke away from the gold standard. In Sweden, the depression was also relatively mild.

After the collapse of the gold standard, Sweden embarked on an interesting experiment between the years 1931 and 1937, an experiment that was similar in several ways to the current policy of the Riksbank. The objective of the Riksbank was formulated by the Government, stating that the Riksbank was to use all available means to “maintain the domestic purchasing power of the Swedish krona”. The Riksbank sought to achieve a constant price level – referred to in modern terminology as “price level targeting”.

With an inflation target, a central bank endeavours to return to the targeted inflation rate when deviations occur from this rate. With a price level target, the central bank “inherits” previous failures in their attempts to recover the targeted price level. This is a harder deed than aiming for an inflation target, when the Bank needs only to look ahead. A price level target instead forces the Riksbank to look back in order to restore the price level to its target, and this can generate deflation and low capacity utilisation.

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**A price level target forces the Riksbank to look back in order to restore the price level to its target, and this can generate deflation and low capacity utilisation.**

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The Bretton Woods System, set up after the second world war, was essentially a gold standard, since the central bank of the USA redeemed dollars at a fixed gold price and the currencies of the member countries were fixed in relation to the dollar.

The difference in comparison with the interwar years was that an international organisation, International Monetary Fund (IMF), now existed which assisted member countries experiencing problems in their current account with credit. Exchange rate adjustments were permitted to accommodate fundamental changes in the competitive situation. The Bretton Woods System was therefore an international system for fixed, though adjustable, exchange rates.

Keynesian economics also reached its peak in terms of its effect on the world economy. Economic stabilisation policy, i.e. fiscal policy and monetary policy, were coordinated with the aim of achieving full employment and stable prices through discretionary activism. In the majority of countries, the governments bore complete responsibility for economic policy, but in the USA, the Federal Reserve had greater independence from the government (the President and the Congress) than in Europe.

However, the Bretton Woods System also displayed a bias, just as the gold

standard had done in the interwar years. Deficits in the current account compelled a tightening of policy. Current account surpluses, on the other hand, were not subject to any sanctions. Keynes, who had been involved in constructing the system, wanted to introduce symmetry into the system and proposed that member countries should introduce a customs duty on imports from countries with a surplus in their balance of payments on current account. The proposal was opposed by the USA and was rejected.

The Bretton Woods System collapsed in 1971 for reasons totally unrelated to restrictive policy tendencies. USA revoked the convertibility of the dollar in terms of gold following a period of strong expansive fiscal and monetary policy, partly to finance the Vietnam war. Confidence in the dollar fell and the central banks worldwide began to exchange their dollar assets for gold.

After the collapse of the Bretton Woods System, the Swedish krona was linked to the Deutschmark zone in 1976. The following year, the Riksbank began to stabilise the krona in relation to a currency basket, an index in which currencies were primarily weighted according to the shares of the different countries in Swedish foreign trade (except for the dollar, which was given a double weighting). In 1991, the krona was unilaterally linked to the ECU, the calculating unit within the EU at that time.

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**In contrast to the circumstances under the Bretton Woods System, individual countries were now free to devalue their currency on their own account.**

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In contrast to the circumstances under the Bretton Woods System, individual countries were now free to devalue their currency on their own account. Activism of stabilisation policy was at its peak. The highest priority goal was full employment. The disciplinary

factor that the Bretton Woods System had represented through the international agreements on currency stability no longer existed.

International inflation accelerated. Inflation became the norm and inflation expectations were built into national economies. Sweden devalued the krona five times from autumn 1976 to autumn 1982. Stabilisation policy was unilaterally aimed at full employment, without taking inflation much into account.

This unclear regime, with alternating foreign exchange policy goals and, for the part of Sweden, unconnected to any particular system, such as the ERM, collapsed in 1992, when the krona was permitted to find its market value, following several heroic attempts to uphold the fixed exchange rate norm. By January 1993, the Riksbank had formulated the current regime, namely to stabilise inflation at 2 per cent.

This entails that Sweden has now entered its fifth stabilisation policy regime.



In all likelihood, this will probably not be the last. National economy is a changing process. Different regimes are associated with differ-

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**Each system has hidden weaknesses  
which are revealed sooner or later.**

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ent problems which after a while, often after a decade or so, compel a change of regime. Each system has hidden weaknesses which are revealed sooner or later.

Let us briefly summarise the shifts between the different regimes that have applied in Sweden. The gold standard collapsed due to its deflationary bias. The participating countries did not manage to overcome unemployment since the effects of accumulating and losing gold reserves were asymmetric.

Sweden's seven years of "price level targeting" were replaced by price regulation and preparations for the second world war, which was imminent.

The Bretton Woods System was dissolved through actions taken by the USA and beyond the control of Sweden.

The unclear regime which followed in Sweden brought about accelerated inflation and a greater degree of unprincipled economic policy activism. This ended in a policy crisis in 1990. The durability of the then prevailing regime was also undermined by the deregulations that had been carried out in an increasing number of areas during several years.

The current regime in Sweden has been in force for six years, and appears to be successful in terms of its main objective of stabilising prices. Its weakness, however, is lingering unemployment.


It is not possible to predict what will happen with this regime in the future. However, if we look to the whole of the EU as a common area in terms of monetary policy, of which Sweden is a part (apart from the single currency), there is a danger that weaknesses similar to those in the epoch of the gold standard will become apparent. The "stability pact", which is honoured also by Sweden, entails that sanctions may be applied against countries which accumulate a budget deficit greater than 3 per cent of GNP. There are no sanctions, however, against countries which continually have a budget surplus.

On a couple of occasions during the post war period, Sweden has amassed a budget deficit exceeding 10 per cent of GNP. Other countries too have at times had a deficit far greater than 3 per cent of GNP.

At the same time, monetary policy is delegated to an independent central bank, ECB, which is rather vague in formulating its objectives and does not report its assessments openly, but which has price stability as its goal.

Whilst the issue of the destabilising international movements of capital remains to be solved, international co-operation is currently being developed to promote clearer regulations and controls.





This regime may have inherent weaknesses that have not yet become apparent. It is conceivable that it will stabilise prices and public finances more than the real economy and employment. The present construction with the European Central Bank, a single currency, one interest rate for the whole area and with the stability pact has not yet been put to the test in a crisis.

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**Nobody knows which constellation of governments will be in power in EU countries and which disturbances will affect the countries within the EU.**

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On the other hand, the policy conducted within the regulatory framework of the regime may fail. The current economic policy regulations are based on the notion that prosperity and welfare are best achieved by exploiting the benefits of a market economy.

However, nobody knows which constellation of governments will be in power in EU countries and which disturbances will affect the countries within the EU. The regime may be broken up by erroneous economic policy.

As stated previously, Sweden has now entered its fifth stabilisation policy regime. No regime will last forever.



# Notices

## SEK 7.6 billion to the Treasury


The Governing Council of the Riksbank has decided to propose to the Riksdag that, of the Bank's net revenue in 1998, SEK 7.6 billion be transferred to the Treasury. The Riksbank Act prescribes that the allocation of the Riksbank's net revenue is determined by the Riksdag, while the Governing Council makes the proposals to the Riksdag.

## Termination of premium bond operations

The Riksbank has decided to wind up its premium bond operations. This means that prize stamping, safe custody and trading with premium bonds in the second-hand market ceased as of 30 April 1999.

The background is a decision in principle that the Riksbank's activities shall concentrate on its role as an authority. The Riksbank considers that premium bond trading in a competitive, commercial market is not compatible with its role as an authority.

In the light of this, the eight local offices were closed to the general public by 1 June 1999. These offices are located in Stockholm, Mölndal, Malmö, Jönköping, Linköping, Örebro, Härnösand and Luleå. The decision does not affect the activities at the branch offices that are directed towards banks, the post office and trade.



## JP Bank terminates its primary dealership

The Riksbank has accepted a request from JP Bank to terminate its function as a primary dealer on behalf of the Riksbank in the money and bond market. The decision took effect as of 9 March 1999. The Riksbank's primary dealers are as follows:

### **Eleven in the foreign exchange market:**

ABN AMRO Bank N.V., Amsterdam and Stockholm, Chase Manhattan Bank N.A., London, Citibank N.A., London, Crédit Agricole Indosuez, London and Stockholm, Swedbank (FöreningsSparbanken AB), HSBC Midland, London, MeritaNordbanken, SEB, Svenska Handelsbanken, UBS AG, London and Zurich, Unibank, Copenhagen.

### **Eight in the money and bond market:**

ABN AMRO Bank N.V., Stockholm, Danske Bank Consensus, E. Öhman J:or Fondkommission AB, FöreningsSparbanken AB, MeritaNordbanken, SEB, Svenska Handelsbanken, Unibank, Copenhagen.

## Foreign shares valued at SEK 574 billion

Swedish investors' holdings of foreign portfolio shares and mutual fund shares amounted to SEK 574 billion at the end of 1998. Compared with the end of 1997, holdings have increased by SEK 170 billion. This is shown by an annual survey of Swedish ownership of foreign portfolio shares carried out by the Riksbank. The largest portion of the shareholdings, around 38 per cent, is invested in the USA.

## Tumba Bruk printed euro notes as trial run

Euro notes have been printed by Tumba Bank on a trial basis in accordance with the specifications of the European Central Bank for technical comparisons of notes printed in different countries. The aim is to incorporate all the security features that modern notes require. Euro notes have to comply with security standards that are more rigorous than those for current notes.



# Monetary policy calendar

**1997.01.02** The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.5 per cent as of 3 January 1997.

**1997.04.01** The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.5 per cent (unchanged).

**1997.07.01** The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.5 per cent (unchanged).

**1997.10.01** The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.5 per cent (unchanged).

**1997.12.11** The *fixed repo rate* is increased by the Riksbank Governor from 4.10 to 4.35 per cent as of 17 December 1997. Due to the Christmas and New Year holidays, the repo rate set on 16 December will apply for four weeks until 14 January 1998.

**1998.01.02** The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.5 per cent (unchanged).

**1998.04.01** The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.5 per cent (unchanged).

**1998.06.04** The *fixed repo rate* is lowered by the Riksbank Governor from 4.35 per cent to 4.10 per cent as of 9 June 1998.

**1998.07.01** The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.0 per cent as of 2 July 1998.

**1998-11-03** The *fixed repo rate* is lowered by the Riksbank Governor from 4.10 per cent to 3.85 per cent as of 4 November 1998.

**1998-11-12** The Riksbank lowers its *deposit and lending rates*, in each case by 0.5 percentage points, as of 18 November 1998, thereby setting the deposit rate at 3.25 per cent and the lending rate at 4.75 per cent.

**1998-11-24** The *fixed repo rate* is lowered by the Riksbank Governor from 3.85 per cent to 3.60 per cent as of 25 November 1998.

**1998-12-15** The *fixed repo rate* is lowered by the Riksbank Governor from 3.60 per cent to 3.40 per cent as of 16 December 1998.

**1999-01-04** The *reference (official discount) rate* is confirmed by the Riksbank Governor at 1.5 per cent as of 5 January 1999.

**1999-01-05** The *fixed repo rate* is confirmed by the Riksbank Governor at 3.40 per cent. The decision is extended on 29 January 1999 to apply until 17 February 1999.

**1999-02-12** The *fixed repo rate* is lowered by the Riksbank Governor to 3.15 per cent as of 17 February 1999.

**1999-02-12** The Riksbank lowers its *deposit and lending rates*, in each case by 0.5 percentage points. The deposit rate is set at 2.75 per cent and the lending rate at 4.25 per cent. The decision takes effect on 17 February 1999.

**1999-03-25** The *fixed repo rate* is lowered by the Riksbank Governor to 2.80 per cent as of 31 March 1999.

**1999-03-25** The *fixed repo rate* is lowered by the Riksbank Governor from 3.15 per cent to 2.90 per cent as of 31 March 1999.

**1999-04-01** The *reference (official discount) rate* is confirmed by the Riksbank Governor at 1.0 per cent as of 6 April 1999.

# Statistical appendix

Statistics from Sveriges Riksbank are to be found on the Internet (<http://www.riksbank.se>). Dates of publication of statistics regarding the Riksbank's assets and liabilities including foreign exchange reserves plus financial market and the balance of payments statistics are available on the homepage of the International Monetary Fund, IMF (<http://dsbb.imf.org>). Dates of publication can also be obtained from the Information Centre at Sveriges Riksbank.

Daily capital market interest rates (Table 13), daily overnight and money market interest rates (Table 14) and daily krona exchange rates (Table 16) can be ordered from the Information Centre at Sveriges Riksbank via e-mail: [info@riksbank.se](mailto:info@riksbank.se), fax: +46 8 787 05 26 or phone: +46 8 787 01 00.

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## 1

## Riksbank's assets and liabilities

## Assets. Period-end stock figures. SEK million

		Foreign exchange	Government securities	Lending to banks	Fixed assets	Other	Total
1997	July	102 787	56 152	43	1 203	17 374	177 559
	Aug	101 005	56 172	1 156	1 205	18 467	178 005
	Sept	109 393	56 203	1 375	1 210	13 358	181 539
	Oct	116 233	56 677	2 349	1 218	9 805	186 282
	Nov	103 904	57 007	1 048	1 224	27 495	190 678
	Dec	90 228	53 811	4 118	1 242	37 347	186 746
1998	Jan	92 654	54 081	3 464	1 245	35 780	187 224
	Feb	78 329	53 672	192	1 182	54 429	190 265
	March	82 954	43 335	9	1 186	58 587	188 532
	April	103 679	35 651	102	1 193	50 208	193 294
	May	107 781	36 828	1 504	1 199	41 432	191 205
	June	106 248	35 808	4	1 207	45 601	191 205
	July	110 112	36 052	1 014	1 215	39 078	190 274
	Aug	115 613	37 526	71	1 222	32 992	189 885
	Sept	130 597	34 885	19	1 230	21 222	190 414
	Oct	127 619	35 118	756	1 237	26 450	193 641
	Nov	124 234	34 784	4 664	1 248	28 015	195 406
	Dec	113 464	35 576	2 265	1 151	43 594	198 614
1999	Jan	113 875	36 086	1	1 162	44 617	195 757
	Feb	142 998	32 862	730	1 094	38 977	216 678
	March	130 172	33 376	1 997	1 104	52 872	219 538

## Liabilities

		Notes and coins in circulation	Riksbank liquidity bills	Bank deposits in the Riksbank	Capital liabilities	Other	Total
1997	July	73 583	–	1 016	32 239	70 721	177 559
	Aug	75 182	–	59	32 239	70 525	178 005
	Sept	74 320	–	955	32 239	74 025	181 539
	Oct	74 783	–	2 849	32 239	76 411	186 282
	Nov	75 889	–	76	32 239	82 474	190 678
	Dec	82 795	–	1 967	32 239	69 745	186 746
1998	Jan	77 559	–	114	32 239	77 312	187 224
	Feb	76 621	–	925	32 211	66 257	190 265
	March	76 680	–	392	32 211	65 998	188 532
	April	76 417	–	220	32 211	70 195	193 294
	May	77 096	–	1 460	37 162	75 487	191 205
	June	77 669	–	951	37 162	75 547	191 205
	July	78 002	–	66	37 162	75 044	190 274
	Aug	79 203	–	1 665	37 162	73 175	189 885
	Sept	78 275	–	3 377	37 162	71 600	190 414
	Oct	78 991	–	120	37 162	77 368	193 641
	Nov	79 633	–	50	37 162	78 561	195 406
	Dec	86 268	–	1 679	37 162	73 505	198 614
1999	Jan	81 539	–	653	37 162	76 403	195 747
	Feb	80 470	–	95	49 848	86 265	216 678
	March	81 609	–	1 188	49 848	86 893	219 538

## 2

## Money supply

## End-of-month stock

	SEK million		Twelve months change in per cent		
	M0	M3	M0	M3	
1997					
Jan	67 503	791 513	Jan	5.3	7.4
Feb	67 490	783 635	Feb	5.8	7.4
March	68 683	807 482	March	7.4	6.5
April	67 473	788 247	April	5.4	4.3
May	67 527	794 077	May	5.1	4.1
June	68 101	807 112	June	4.7	5.3
July	66 763	791 753	July	5.0	3.2
Aug	68 623	804 033	Aug	4.0	4.6
Sep	68 118	799 854	Sep	3.7	2.1
Oct	68 556	799 604	Oct	5.7	3.4
Nov	69 762	807 415	Nov	4.6	1.3
Dec	74 380	826 242	Dec	3.0	1.3
1998					
Jan	70 751	821 712	Jan	4.8	3.8
Feb	70 434	806 800	Feb	4.4	3.0
March	69 560	802 877	March	1.3	-0.6
April	70 181	807 368	April	4.0	2.4
May	70 783	814 796	May	4.8	2.6
June	71 118	829 968	June	4.4	2.8
July	71 369	835 079	July	6.9	5.5
Aug	73 042	835 199	Aug	6.4	3.9
Sep	71 954	838 568	Sep	5.6	4.8
Oct	73 041	846 579	Oct	6.5	5.9
Nov	73 929	852 805	Nov	6.0	5.6
Dec	78 139	843 416	Dec	5.1	2.1
1999					
Jan	74 940	855 180	Jan	5.9	4.1
Feb	74 621	855 448	Feb	5.9	5.8



### 3 Interest rates set by the Riksbank

Per cent

	Date	Repo rate	Deposit rate	Lending rate		Date	Discount rate
1996	06-26		5.25	6.75	1993	01-05	9.00
	07-03	5.90				04-02	7.00
	07-17	5.70				07-02	6.00
	07-31	5.55				10-08	5.00
	08-14	5.40			1994	01-04	4.50
	08-21		4.75	6.25		07-04	5.50
	08-28	5.25				10-04	7.00
	09-11	5.15			1995	07-04	7.50
	09-25	5.05				10-06	7.00
	10-09	4.95			1996	01-03	6.00
	10-23	4.80				04-02	5.50
	10-30	4.60	4.25	5.75		07-02	4.50
	11-27	4.30				10-02	3.50
	12-11		3.75	5.25	1997	01-03	2.50
	12-18	4.10			1998	07-02	2.00
1997	12-17	4.35			1999	01-05	1.50
1998	06-10	4.10					
	11-04	3.85					
	11-18		3.25	4.75			
	11-25	3.60					

### 4 Capital market interest rates

Effective annualized rate for asked prices. Monthly average, per cent

		Bonds issued by:				Housing (Caisse)		
		Central government						
		3 years	5 years	7 years	9-10 years	2 years	5 years	
1997	April	5.47	6.27	6.51	7.24	5.28	6.78	
	May	5.38	6.09	6.33	6.99	5.20	6.62	
	June	5.27	5.92	6.15	6.80	5.09	6.41	
	July	5.13	5.64	5.86	6.44	5.04	6.09	
	Aug	5.33	5.82	6.00	6.53	5.24	6.27	
	Sep	5.26	5.70	5.86	6.38	5.15	6.13	
	Oct	5.42	5.76	5.86	6.22	5.36	6.19	
	Nov	5.57	5.88	5.98	6.30	5.56	6.42	
	Dec	5.46	5.71	5.77	6.03	5.55	6.29	
	1998	Jan	5.15	5.33	5.49	5.65	5.56	5.81
		Feb	5.02	5.19	5.36	5.53	5.37	5.63
		March	4.95	5.06	5.18	5.35	5.27	5.44
April		4.88	4.99	5.05	5.21	5.16	5.31	
May		4.83	4.98	5.04	5.20	5.08	5.25	
June		4.46	4.70	4.79	4.97	4.70	4.96	
July		4.36	4.61	4.71	4.88	4.58	4.88	
Aug		4.39	4.60	4.66	4.80	4.68	4.99	
Sept		4.37	4.56	4.63	4.79	4.72	5.15	
Oct		4.35	4.53	4.68	4.75	4.71	5.30	
Nov		3.94	4.19	4.47	4.59	4.18	4.79	
Dec		3.64	3.86	4.12	4.25	3.89	4.46	
1999	Jan	3.38	3.59	3.87	4.02	3.59	4.14	
	Feb	3.36	3.67	4.01	4.18	3.52	4.13	
	March	3.39	3.80	4.25	4.44	3.55	4.29	
	April	3.12	3.53	3.99	4.25	3.26	3.99	

## 5

## Overnight and money market interest rates

## Monthly average, per cent

		Repo rate	Inter-bank rate	SSVX			Company certificates	
				3 months	6 months	12 months	3 months	6 months
1997	Jan	4.10	4.20	3.76	3.81	3.90	3.95	4.00
	Feb	4.10	4.20	3.93	4.00	4.11	4.13	4.20
	March	4.10	4.20	4.13	4.23	4.42	4.34	4.43
	April	4.10	4.20	4.03	4.15	4.52	4.24	4.35
	May	4.10	4.20	4.09	4.20	4.57	4.30	4.40
	June	4.10	4.20	4.05	4.15	4.44	4.28	4.37
	July	4.10	4.20	4.06	4.21	4.40	4.36	4.46
	Aug	4.10	4.20	4.17	4.33	4.40	4.45	4.60
	Sep	4.10	4.20	4.11	4.25	4.63	4.37	4.53
	Oct	4.10	4.20	4.23	4.41	4.78	4.49	4.68
	Nov	4.10	4.20	4.31	4.51	5.13	4.59	4.79
	Dec	4.19	4.29	4.42	4.70	5.06	4.70	4.99
1998	Jan	4.35	4.45	4.41	4.55	4.82	4.67	4.59
	Feb	4.35	4.45	4.33	4.51	4.71	4.56	4.73
	March	4.35	4.45	4.48	4.56	4.72	4.68	4.76
	April	4.35	4.45	4.47	4.58		4.66	4.76
	May	4.35	4.45	4.49	4.51		4.67	4.23
	June	4.18	4.28	4.20	4.20	4.26	4.39	4.38
	July	4.10	4.20	4.11	4.11		4.29	4.30
	Aug	4.10	4.20	4.19	4.23		4.37	4.39
	Sept	4.10	4.20	4.19	4.18	4.26	4.36	4.36
	Oct	4.10	4.20	4.20	4.18		4.36	4.34
	Nov	3.83	3.93	3.82	3.75		4.00	3.96
	Dec	3.51	3.61	3.45	3.51	3.53	3.65	3.69
1999	Jan	3.40	3.50	3.27	3.25		3.45	3.46
	Feb	3.30	3.40	3.14	3.16		3.31	3.35
	March	3.14	3.24	3.13	3.18	3.17	3.30	3.33
	April	2.90	3.00	2.87	2.90		3.04	3.07

# 6

## Treasury bills and selected international rates

### Annualized rate. Monthly average, per cent

		3-month deposits					6-month deposits				
		USD	DEM	EUR	GBP	SSVX	USD	DEM	EUR	GBP	SSVX
1997	Jan	5.58	3.13		6.47	3.76	5.67	3.14		6.66	3.81
	Feb	5.50	3.19		6.35	3.93	5.60	3.19		6.49	4.00
	March	5.62	3.29		6.42	4.13	5.79	3.30		6.54	4.23
	April	5.81	3.25		6.48	4.03	5.99	3.29		6.74	4.15
	May	5.80	3.20		6.54	4.09	5.97	3.26		6.72	4.20
	June	5.77	3.16		6.77	4.05	5.89	3.22		6.91	4.15
	July	5.72	3.16		7.05	4.06	5.81	3.23		7.24	4.21
	Aug	5.69	3.28		7.25	4.17	5.82	3.42		7.37	4.33
	Sep	5.67	3.34		7.29	4.11	5.80	3.48		7.43	4.25
	Oct	5.73	3.65		7.36	4.23	5.80	3.78		7.46	4.41
	Nov	5.83	3.78		7.71	4.31	5.87	3.89		7.77	4.51
	Dec	5.89	3.76		7.69	4.42	5.94	3.84		7.77	4.70
1998	Jan	5.62	3.57		7.57	4.41	5.67	3.67		7.57	4.55
	Feb	5.61	3.53		7.53	4.33	5.63	3.62		7.52	4.50
	March	5.63	3.54		7.53	4.48	5.67	3.72		7.55	4.56
	April	5.66	3.63		7.47	4.47	5.71	3.73		7.46	4.58
	May	5.66	3.61		7.47	4.49	5.73	3.72		7.45	4.51
	June	5.67	3.56		7.70	4.20	5.72	3.66		7.74	4.20
	July	5.64	3.55		7.77	4.11	5.72	3.63		7.83	4.11
	Aug	5.63	3.51		7.70	4.19	5.68	3.59		7.69	4.23
	Sept	5.47	3.50		7.45	4.19	5.39	3.56		7.33	4.18
	Oct	5.18	3.48		7.05	4.20	4.97	3.45		6.83	4.18
	Nov	5.24	3.56		6.79	3.82	5.06	3.51		6.55	3.75
	Dec	5.14	3.26		6.27	3.45	5.00	3.22		5.97	3.51
1999	Jan	4.88		3.04	5.74	3.27	4.89		2.99	5.52	3.25
	Feb	4.87		3.02	5.38	3.14	4.93		2.97	5.25	3.16
	March	4.89		2.98	5.26	3.13	4.97		2.93	5.17	3.18
	April	4.87		2.63	5.17	2.87	4.94		2.62	5.12	2.90

## Krona exchange rate: theoretical ECU index, TCW-weighted index and MERM-weighted index; selected exchange rates

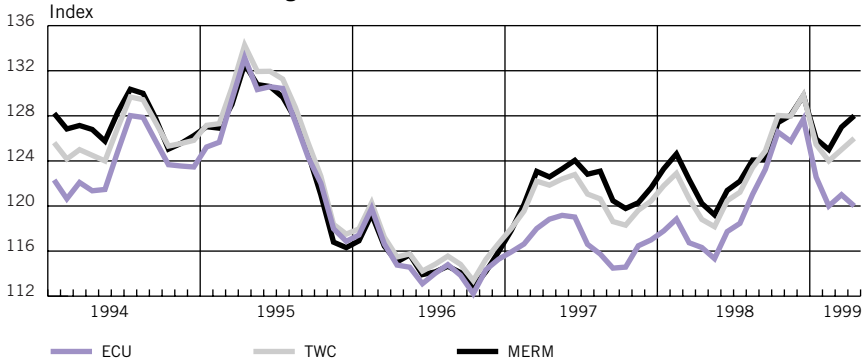
Annual and monthly averages; annual highs and lows

		ECU-index	TCW-index	MERM-index	SEK per			USD per	
					USD	100 DEM	100 JPY	DEM	JPY
1997	Jan	115.93	118.02	117.84	7.06	440.02	5.99	1.60	117.83
	Feb	116.63	119.55	120.15	7.40	442.22	6.02	1.67	122.93
	March	119.00	122.20	123.07	7.65	450.95	6.25	1.70	122.57
	April	118.83	121.85	122.56	7.68	449.31	6.12	1.71	125.56
	May	119.17	122.40	123.29	7.67	450.73	6.46	1.70	118.61
	June	119.02	122.79	124.05	7.74	448.77	6.78	1.73	114.29
	July	116.60	121.06	122.82	7.81	436.41	6.78	1.79	115.24
	Aug	115.74	120.63	123.09	8.00	433.89	6.78	1.84	117.88
	Sept	114.49	118.62	120.47	7.70	430.56	6.38	1.79	120.73
	Oct	114.58	118.36	119.78	7.57	430.99	6.26	1.76	120.96
	Nov	116.47	119.62	120.29	7.56	436.58	6.04	1.73	125.18
	Dec	116.99	120.44	121.51	7.78	438.03	6.01	1.78	129.49
1998	Jan	117.79	121.66	123.30	8.01	441.26	6.20	1.82	129.50
	Feb	118.84	122.89	124.62	8.08	445.30	6.43	1.81	125.69
	March	116.74	120.65	122.35	7.97	436.38	6.18	1.83	129.00
	April	115.32	118.81	120.23	7.82	431.37	5.93	1.81	132.13
	May	115.33	118.17	119.21	7.69	433.42	5.70	1.77	134.96
	June	117.73	120.47	121.38	7.91	441.36	5.62	1.79	140.15
	July	118.46	121.22	122.20	7.98	444.30	5.68	1.80	140.63
	Aug	121.04	123.41	124.08	8.13	447.30	5.48	1.79	144.68
	Sept	123.25	124.88	124.68	7.91	464.26	5.88	1.70	134.57
	Oct	126.56	128.03	127.40	7.85	479.02	6.49	1.64	120.78
	Nov	125.74	127.97	128.06	7.99	475.49	6.64	1.68	120.35
	Dec	127.70	129.83	129.79	8.05	482.79	6.86	1.67	117.24
1999	Jan	122.57	125.46	125.95	7.82	464.45	6.92	1.69	113.16
	Feb	120.37	124.00	125.18	7.95	455.54	6.82	1.75	116.72
	March	120.81	125.43	127.09	8.22	457.34	6.87	1.80	119.64
	April	120.50	125.73	127.88	8.32	455.88	6.97	1.83	119.72

Note. The base for the ECU index is the central rate with the ECU on 17 May 1991; for the Merm-weighted and the TCW index it is 18 November 1992.

## 8

## Nominal effective exchange rate



Note. The base for the ECU index is the central rate with the ECU on 17 May 1991; for the MERM-weighted and the TCW index it is 18 November 1992.

## 9

## Forward foreign exchange market

## Forward net position with authorized currency dealers. SEK million, period ends

		Non-bank public		Bank abroad	Riksbank	Total
		Resident (1)	Non-resident (2)	Net (3)	Net (4)	(1+2+3+4)
1998	Jan	-212 998	-22 001	140 364	- 262	- 94 897
	Feb	-186 583	-18 304	119 476	1 382	- 84 029
	March	-192 115	-19 175	142 227	5	- 69 058
	April	-186 239	-17 669	122 320	397	- 81 191
	May	-174 575	-47 495	133 608	0	- 88 462
	June	-220 387	-23 274	112 675	0	-130 986
	July	-218 997	-22 052	129 587	0	-111 462
	Aug	-284 131	-27 586	201 845	0	-109 872
	Sept	-239 370	-26 312	178 740	0	- 86 942
	Oct	-283 253	-29 446	157 158	0	-155 541
	Nov	-304 235	-26 910	158 008	0	-173 137
	Dec	-274 469	-16 164	129 535	0	-161 098
1999	Jan	-251 675	-11 774	189 845	0	- 73 604

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