THE RIKSBANK AND MONETARY POLICY

Address by Mr. Urban Bäckström, Governor of Sveriges Riksbank,
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A year ago today I had the honour of speaking to the Swedish Economics Association here about the price stability goal. The topics discussed included the background to the goal, the importance of price stability and how the numerical target should be interpreted. With that as a foundation, my address today concerns issues to do with the effects of monetary policy and its design. In the light of those issues I shall then discuss how a central bank operating with a price stability target can act, in principle and in practice. In conclusion I shall consider the significance of this approach in recent years for monetary policy deliberations.

Determinants of inflation - the familiar Phillips curve

The familiar Phillips curve can serve as a starting-point for a discussion of the determinants of inflation in the short and medium run. The terms in which this curve can be described vary somewhat. Their common feature is the notion that the rate of inflation is dependent on two factors; one is the relation between total demand and total supply and the other is expected inflation. In labour market terms the relation between demand and supply is measured as the difference between current unemployment and the level of unemployment that is compatible with constant inflation (NAIRU). In terms of the market for goods, the relevant relationship is the output gap (the difference between the current level of demand and normal capacity utilisation in the economy) that can be combined with an unchanged rate of inflation. To simplify matters, I shall be referring throughout to the description in terms of output levels.

When the output gap is zero, according to this model inflation will be constant and equal to the expected rate of inflation. A reduction of inflation then requires either that output falls below the level represented by normal capacity utilisation or that inflation expectations move down.

Diagram 1 shows registered and estimated inflation in the period 1955-93 on the basis of empirical estimations using measures of the output gap and inflation expectations.[1] It will be seen that the estimations provide a fairly good explanation of inflation in this period. Deviations of varying magnitude do, however, occur from time to time. They may have to do with occasional shocks such as shifts in international prices for primary products, political decisions to adjust taxes and subsidies, or the impact of exchange rate movements via import prices. A further reason why estimated inflation is liable to depart from the registered course may be that the output gap and inflation expectations cannot be pinned down exactly with methods that are mechanical and necessarily retrospective. This is an argument for using a variety of indicators to catch the course of inflation. Still, the simple model and the estimations provide a useful starting point for my account today.

The transmission mechanism - the effects of monetary policy

In order to describe the links between monetary policy and inflation, something should be said about how the actions of a central bank can affect capacity utilisation and inflation expectations. The starting point here is that the Riksbank, like central banks in other industrialised countries, implements monetary policy by controlling short-term interest rates.

This brings us to the transmission mechanism,[2] which describes how changes in the instrumental rate affect the output gap via the development of demand and how this impinges, via market interest rates and the exchange rate, on inflation and expectations, which then elicit other effects, for instance on credit demand and asset prices.

The *interest rate channel* represents the most direct effects of a change in the instrumental rate. Such a change by the central bank has a more or less proportional

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[1]Diagram 1 stems from empirical estimations by Apel, M., 1995, Output gap and inflation in a historical perspective, *Quarterly Review 2*, Sveriges Riksbank, Stockholm. The output gap is calculated with a Whittaker-Henderson filter; advantages and drawbacks of this method were discussed in the Riksbank's inflation report in June 1995. The inflation expectations are assumed to be backward looking, in practice based on a weighted average of trend inflation and the preceding year's inflation.

[2]For a fuller discussion of this concept see e.g. Mishkin, F.S., 1995, Symposium on the monetary transmission mechanism, *J. of Economic Perspectives 9:4*, and other contributions to the same volume.

effect on the short market rates. As the monopoly supplier of base money, the Riksbank is in a position to control the overnight rate and also to influence other short-term lending rates. A rising interest rate increases the cost of short-term borrowing and this strengthens demand for longer loans. At the same time, short-term investment becomes more attractive and drains the supply of longer loans, whereupon longer interest rates also tend to rise. The longer the expected duration of the short rates' higher level, the larger will be the increase in the longer rates.

Higher interest rates strengthen the incentive to save - to postpone consumption. Effects via lower asset prices work in the same direction. In that higher interest rates lower the present value of future yields, prices will fall for both financial and real assets (shares, long bonds, real estate, etc.). Households with shrinking wealth become less prone to consume. The interest rate hike also increases the cost of financing real assets. Firms that are dependent on bank financing are likewise affected. Borrowing in banks and other credit institutions becomes more difficult as well as more costly. The supply of credit dwindles and firms become less able and willing to shoulder debt. They have to cut operations and defer investment. In these ways, higher interest rates lead to decreased demand from firms as well as households. As a result, inflationary pressure eases.

The *exchange rate channel* operates because also the exchange rate is affected by monetary policy. With all else equal, an increase in the instrumental rate normally leads to a stronger exchange rate. In the short run this is because higher interest rates add to the attraction of domestic assets relative to investment in foreign currencies. This in turn generates a capital inflow and increased demand for the domestic currency, which strengthens the exchange rate. In the long run monetary policy is also important for the exchange rate, which by definition is the price of one currency measured in another currency. From this it follows that exchange rates are susceptible to country differences in the rate of inflation. A tighter monetary stance implies lower registered inflation and can also influence inflation expectations, which should show up as a stronger exchange rate. Small changes in expected inflation, or uncertainty about this, may elicit fairly sizeable exchange rate movements. As expected inflation is also conditioned by confidence in budget policy, a direct link exists between the conduct of fiscal policy and the exchange rate.

A stronger exchange rate - an appreciation - has various effects on the economy. Firstly, it makes foreign goods relatively cheaper than domestic products. This strengthens imports and weakens exports. The dwindling demand for domestic goods eases inflationary pressure. Secondly, the cheaper imports entail a direct, one-off fall in the price level. However, the underlying price trend is not affected. Thirdly, falling share prices for firms in the traded-goods sector mean that a stronger exchange rate

affects asset prices and thereby the wealth position of households and the investment propensity of firms. Fourthly, a currency appreciation diminishes demand for credit among firms in the exposed sector. Thus, the result is an easing of demand pressure in the economy.

Besides being affected by demand pressures, inflation is influenced by *inflation expectations*. These expectations refer to future policy in a wider sense than just the design of monetary policy. Other factors also play a part, one being the budget outlook. Unsustainable budget deficits weaken the long-term credibility of price stability, for instance, and thereby affect expected inflation. This expectation mechanism shows that the conditions for monetary policy are influenced by budget policy in ways that differ from the customary effect via demand, which also arises when fiscal policy is tightened or eased.

In so far as there is a risk of prices rising because of an expected future acceleration of inflation, monetary policy must keep inflation down by being designed so that expectations change. In practice this has often called for a period in which demand is restricted. Central banks have been obliged to demonstrate with concrete measures - interest rate increases - that the expectations were unfounded.

Monetary index - aggregate economic impact of transmission mechanism

To obtain an overall - admittedly very approximate - indication of the impact of the instrumental rate on demand via the two main channels of the transmission mechanism (interest and exchange rates), one can construct a so-called monetary index. This provides a measure of the degree to which the monetary conditions have eased or tightened since some arbitrarily chosen date. The actual level of the index is thus generally of no significance.

A monetary index can be constructed in various ways. One method entails calculating *the weighted sum of the number of units by which the real interest rate has changed in relation to a given base period and the percentage change in the real effective exchange rate from the same base period.* The weights for such an index are derived from empirical estimations of the effects on demand that emanate from the real interest rate and the real exchange rate. The estimates for Swedish data differ, depending on the specification of the model and the time horizon. A frequent finding is that an increase of one percentage point in the real interest rate has the same effect on demand as a real appreciation of three to four per cent. In this form the monetary index is expressed in interest index units (divergence from the base period). Starting from estimations of the impact of the interest rate on aggregate demand, the index can also be expressed in demand index units (divergence from the base period). Various

estimations on Swedish data suggest that an increase/decrease of one percentage point in the interest rate lowers/raises demand by between 0.3 and 0.6 per cent one year ahead.[3]

A monetary index for Sweden is presented in *Diagram 2*, based on estimations made at the Riksbank, using 1984:Q1 - 1986:Q4 as the base period.[4] The index is scaled in both demand and interest rate index units (right and left in the diagram). As I indicated earlier, the absolute levels in the diagram should be interpreted very cautiously. Comparisons between nearby periods are warranted, on the other hand, as an approximate indication of the extent to which the monetary conditions (the weighted sum of the real interest rate and the real effective exchange rate) have eased or tightened, expressed either as changes in the real interest rate or in terms of effects on aggregate demand.

A simple model for monetary policy analysis

The preceding discussion of the Phillips curve and monetary policy's effects via the transmission process, expressed as a monetary index, can be formalised in the following simple model, which incorporates the inflation target:[5]

Monetary index = *a* {[Expected inflation + *b* (output gap)] - inflation target}

$$\underbrace{\text{Expected inflation} + b(\text{output gap})}_{}$$

Forecast inflation

where

    a is a positive coefficient that indicates how much the benchmark for the monetary index should be adjusted to allow for a given difference between future forecasted inflation and the rate represented by the price stability target.[6]

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[3]See Hansson, B., 1993, A structural model, in *Monetary Policy Indicators, pp. 55-64*, Sveriges Riksbank, Stockholm.

[4]See note 3.

[5]The underlying assumption in this formalisation is that the zero benchmark for the monetary index represents neutral monetary conditions, that is, a situation which is neither contractive nor expansive. This accordingly requires that the base period chosen for the construction of the index is an instance of such conditions and that the conditions are stable in the whole of the period covered by the index. As indicated earlier, absolute levels on the index presented from Swedish data should be interpreted with caution.

[6]The value of *a* cannot be determined once and for all. A transition from a high- to a low-inflation economy, for instance, may involve a successive reduction in the inflation propensity. The transmission process may also vary over time. Similarly, it is reasonable to suppose that monetary policy reactions of different strengths are needed to bring expectations down as opposed to keeping them in line with the price stability target. It is therefore necessary to make a qualitative assessment in each situation, even though

b is a positive coefficient that tells how much forecast inflation rises when the output gap changes. Various estimations on Swedish data suggest that *b* is between 0.3 and 0.6 percentage points.[7]

The above model is a simplified formalisation of what is usually called the indicator approach. This amounts to incorporating many different indicators in the assessment of future inflation. Notwithstanding these reservations, the model provides a number of important bases for monetary policy.

If demand slackens and inflationary pressure diminishes, an easing of the monetary stance is called for to keep inflation on a path that is congruent with the target. In interest index terms that amounts to lowering the benchmark for the monetary index. The central bank uses its direct policy instrument and lowers the instrumental rate. This may also affect the exchange rate, though to what extent is a priori uncertain. By studying the course of the monetary index the central bank can gauge the stimulus via the instrumental rate in relation to movements in the exchange rate. With all else equal, the more the currency depreciates, the less scope (and need) there will be for interest rate cuts. With a reservation for the uncertainty in the estimations, the index provides a quantitative indication of the trade-off between interest rates and the exchange rate.

If, instead, forecast future inflation rises above the target, then the central bank should tighten its policy (raise the benchmark for the monetary index), both to restrain direct inflationary impulses and to keep the general level of inflation expectations down.

If the value of the currency rises/falls, with all else equal the interest rate should be lowered/raised. The monetary index will then remain constant; the central bank parries the effect on demand that would otherwise be generated and future inflation is aligned with the target. Moreover, exchange rate movements may affect forecast inflation, for instance if a direct price impact from altered import prices influences inflation expectations. If that is judged to be the case, the monetary index benchmark should be adjusted to keep forecast inflation in line with the target. However, efforts should be made to distinguish between temporary and more permanent exchange rate movements. Shifts of a short-run, transient nature ought not to elicit interest rate adjustments. It follows that - even in the abstract terms I am using here - monetary

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known and approximate relationships can be used to simulate a path for adapting the economy and inflation to a given situation.

[7] See note 3.

policy supported by a monetary index can never resort to the fine tuning of monetary conditions.

As indicated earlier, a monetary index cannot be used as a fixed intermediate target between instrumental rate adjustments and the ultimate objective: price stability. It is rather a kind of operative indicator, with a need for a continuous appraisal of the benchmark in the light of forecast inflation, which depends in turn on the tendencies in demand and supply and on inflation expectations.

If monetary policy is aimed at stabilising price movements in accordance with this pattern, it will also help to stabilise demand. The monetary stance is tightened when demand shows tendencies of rising faster than capacity utilisation warrants, just as it is eased when demand falls. This presupposes that inflation expectations are low. Otherwise the central bank may have to resort to additional tightening in order to fulfil the target and establish its credibility. When credibility and price stability exist and are nurtured, conditions will be good for a growth of demand that matches the economy's potential output. Economic development will then be stable, not in the sense that inflation and production cease to vary at all but so that periods of overheating followed by deep setbacks can be avoided.

Monetary policy in practice: late 1992 to early 1996

Starting from the simple model I outlined above, I should now like to discuss the conduct of monetary policy in recent years. Three periods can be distinguished.

Period 1 began with the introduction of a flexible exchange rate in the autumn of 1992. The economy then had a great deal of unutilised capacity, so the risk of inflationary tendencies was limited. Moreover, large parts of the Swedish banking system were experiencing perhaps the worst crisis this century; together with falling asset prices, this was a further curb on demand and inflation risks. But inflation expectations were still relatively high, which had to do with Sweden's unfavourable history of inflation in the 1970s and '80s, uncertainty about the new monetary policy regime and, not least, the troublesome problems with government finance. The expectations and uncertainty were expressed, for example, in a considerable depreciation of the krona, which provided a strong demand stimulus.

From the average level in the first half of 1992 up to the summer of 1994, the instrumental rate was lowered in steps from almost 12 to under 7 per cent, a total of about 5 percentage points. The level of the monetary index (*Diagram 2*) dropped in this period from plus 2.5 to minus 7.5 interest rate units, or by as much as 10 units. There were times when the fall was even greater than this. Measured in this way, the change in the monetary conditions was twice as large as the fall in the nominal interest

rate. This is because the monetary index also incorporates the sizeable depreciation of the krona between the first half of 1992 and the summer of 1994 and the expansionary effect of this on the Swedish economy. This illustrates the importance of taking the exchange rate effect into account. Had Sweden been a closed economy, so that the exchange rate played a less important role, a corresponding demand impulse would have entailed a fall in the real short rate of interest of 10 percentage points. In approximate terms based on historical relationships, it was a matter of a demand impulse of between 3 and 4 per cent of GDP and thus of markedly expansionary monetary conditions.

The result of this monetary stimulus soon materialised in one of the strongest industrial upswings for a long time. In just a few years industrial output rose twice as much as in the whole of the 1980s. Production in other parts of the business sector also picked up, though not to the same extent as in the parts that benefitted from the lower exchange rate. In aggregate, growth was well in line with earlier recoveries.

By degrees we approached *period 2*, which began during 1994. In the first half-year inflation expectations tended to move down and then levelled out; during the summer, surveys showed that more and more groups were again beginning to count on rising inflation. The long bond rate, which in a somewhat longer perspective can be seen as an indicator of inflation risks and general uncertainty, had been rising since the beginning of the year, from just below 7 to almost 12 per cent. The exchange rate had continued to fluctuate at low levels and then weakened still more in the late spring. The output gap was closing in such a way that industry began to generate appreciable inflationary pressure. This was mirrored in producer price increases and higher capacity utilisation. There was an increased risk of difficulties in the coming round of wage negotiations and of the price and wage increases in manufacturing spreading to other sectors, with an acceleration of inflation throughout the economy. In keeping with the model, the time was coming when the monetary conditions would have to be tightened. The output gap was narrowing in a way that generated inflationary tendencies, the currency was weak and inflation expectations were both high and rising.

In view of the low exchange-rate adjusted real interest rate, it was natural that the period of markedly expansionary monetary conditions could not continue indefinitely without risking an acceleration of inflation. Sooner or later there would have to be a realignment. Such an adjustment was initiated by the Riksbank in August 1994 and between then and the beginning of July 1995 the repo rate was raised in a series of steps from 6.92 up to 8.91 per cent.

The task of monetary policy had two components. *One* involved countering the inflationary tendencies that were a direct consequence of the tensions between supply

and demand. The *other* was to work for lower inflation expectations. Meanwhile, the Government and the Riksdag were working on the consolidation of government finance. Their endeavours led up to the presentation of a convergence programme the late spring of 1995. Between them, the budget work and monetary policy led to a curb on the upward tendency in inflation and the beginning of an appreciable fall in inflation expectations in the summer and autumn of 1995. The adjustment comprised an appreciation of the krona as well as a higher instrumental rate and during the autumn of 1995 the monetary conditions became less expansionary.

In the inflation report in November 1995 the Riksbank considered that, in relation to the current picture of inflationary pressure, the monetary conditions had broadly reached a level that was expected to give a rate of inflation in 1996 and 1997 inside the tolerance interval, more precisely between 2.5 and 3 per cent. The assessment started from the given inflation expectations and assumed that economic growth would remain stable. After the report had been presented, however, inflation expectations went on falling, which suggested an increased probability of inflation being brought into line with the price stability target.

Period 3 was gradually approaching and the Riksbank began to examine the conditions for lowering the repo rate. During December, moreover, the impression of weaker international activity was confirmed, with the attendant tendency to dampen growth. Growth below the potential rate reduces capacity utilisation and limits the risk of demand-driven inflation. To this can be added the indications that the inflation propensity of the Swedish economy appears to have fallen, though continued adjustments are needed as regards wage formation in the medium term.

Against this background the Riksbank revised downward the inflation forecast that had been presented in the inflation report in November 1995. An easing of the monetary conditions was considered to be warranted, at the same time as inflation was expected to come into line with the price stability target. An adjustment of the repo rate was accordingly initiated in early January 1996.

Conclusion

In my address today I have referred to a simple model that will hopefully make it easier both to monitor the various indicators more systematically and to gauge their significance for the setting of the instrumental rate. My remarks, however, should not be taken to imply that monetary policy is a simple, mechanical process. The economy changes, relationships are altered and assessments of the future pose particular problems. Methods do not exist for calculating an *exact* value or a path for the monetary conditions that will lead to price stability. This means that *judgmental*

assessments are needed not only to arrive at the outlook for inflation but also to appraise the strength of the monetary impulses.

In the process that precedes monetary policy decisions it is therefore a matter of using a variety of tools and constructing alternative scenarios before finally, in all humility, making judgements in the light of risks and opportunities. It is also these circumstances which prompt the Riksbank, like other central banks, normally to adjust interest rate policy by degrees. Meanwhile, new statistics are assessed for their agreement both with the picture of the course of the economy for which the policy has been designed and with the interpretation of the impact of monetary policy on the economy.

In the next inflation report, to be published on the 4th of March, the Riksbank will be presenting its appraisal of the future outlook for inflation. In that report, as well as in the future conduct of monetary policy, you will hopefully recognise the reasoning I have outlined here.