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The article provides a fundamental discussion of the Riksbank's monetary policy framework, its monetary policy analysis and the possibilities to improve the material underpinning the Bank's decisions. The newly undertaken changes to the Riksbank's methods are described. It should, however, be stressed that this is not a question of changing the Bank's monetary policy strategy.

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Basel II is the commonly used term for the new framework for capital requirements on banks. It will supersede the present Capital Accord. In Sweden and other EU countries the new framework will be implemented on 1 January 2007. The introduction of Basel II will have noticeable effects, which is why there is a need to provide short guidance on the main issues. The text focuses on overarching issues.

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Jan Alsterlind and Hans Dillèn

Monetary policy expectations can be measured in various ways. One way is to measure repo rate expectations. Another approach is to use the rates for treasury papers with different maturities to calculate the forward interest rate curve. Due to the existence of term premia, however, the short forward rates are not a direct reflection of expectations about the short-term market rate; one needs to gauge the size of these premia. The different measures have their particular advantages and drawbacks, thus there is something to be said for combining the alternative measures.

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The Riksbank's interest rate management is the operational component of its monetary policy process. Through its interest rate management, the Riksbank implements the Executive Board's monetary policy decisions by influencing the market's shortest interest rate, the overnight rate. The aim of this article, besides elucidating how monetary policy is implemented in practice, is to further clarify the connection between the steering of interest rates and the Riksbank's payment system.

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■ Thoughts on how to develop the Riksbank's monetary policy work

BY LARS HEIKENSTEN

Lars Heikensten is Governor of Sveriges Riksbank. This article is based on a speech he made to the Economics Association on 22 February 2005.

I believe that most people would agree that inflation-targeting has worked well. Since inflation-targeting was introduced, Sweden has gone from being a high-inflation economy to an economy with low inflation and stable wage increases, higher GDP growth and improved stability of the economy. Nevertheless, there is always good reason to consider how monetary policy can be developed and improved. To this end, I will discuss how the Riksbank's monetary policy work has been developed. I would like start with the Riksbank's monetary policy framework and its monetary policy analysis. It will be followed by a description of the methodological changes that we are now introducing. However, let me already in the introduction stress that we are not contemplating changes in the Bank's monetary policy strategy.

The Riksbank's inflation targeting policy today

AN EXPLICIT TARGET AND A CLEAR INTELLECTUAL FRAMEWORK

The Riksbank's decision in 1993 to let its policy be guided by an inflation target was a fairly new approach at the time.¹ The idea had only really been tried in three other countries before (New Zealand, Canada and the United Kingdom). An inflation target has considerable advantages over the methods of conducting monetary policy under a floating exchange rate that have been tried before, e.g. a target for the growth rate of money. Communication becomes simpler when the operational target agrees with the final one. In addition, an explicit target facilitates a stabilisation of inflation expectations and enables policy to be evaluated. The inflation target also has the advantage of capturing all important variables

An inflation target has considerable advantages over monetary policy under a floating exchange rate.

¹ See Heikensten, L., "Behind the Riksbank's massive walls – establishing the inflation targeting policy 1995–2003", Sveriges Riksbank Economic Review 3, 2003, 45–80, for a more in-depth account of the analytical framework for monetary policy and how it was developed up to 2003.

in one single variable. The inflation forecast is influenced not only by interest rates but also by an assessment of credit developments, the exchange rate and other factors of significance to demand.

The Riksbank's target for the inflation rate is an annual increase in the CPI of 2 per cent ± 1 percentage point.

The monetary policy objective laid down by Parliament is to maintain price stability. The Riksbank has operationalised this objective in the shape of a quantitative target for the inflation rate: the annual increase in the consumer price index, CPI, should be 2 per cent. Around this target is a tolerance band of ± 1 percentage point, the purpose of which is both to make clear that inflation from time to time will deviate from 2 per cent and that the Riksbank's ambition is to limit such deviations.

Since the effects of monetary policy are exerted with a certain lag the Riksbank must adopt a forward-looking approach and base its interest rate decisions on a forecast of future developments. Before each decision, therefore, we prepare forecasts of factors such as inflation developments and the business cycle over the next two years. Since December 2000 we have often found reason to supplement the forecasts two years ahead with a qualitative assessment of the longer term.

The Riksbank works with a simple policy rule: If inflation is forecast to be above target one to two years ahead we normally raise the repo rate, and vice versa.

We have also worked with a simple policy rule: If inflation is forecast to be above target one to two years ahead we normally raise the repo rate, and vice versa if the forecast is below target. We have not followed this rule mechanically, of course. That is exactly why the word "normally" is always included in the formulation of the policy rule. It is a rule that on average provides a good description of the Bank's policy.

The policy rule was introduced in 1997, primarily due to a desire to make policy even more transparent. The studies available at the time, all of which are uncertain, indicated that interest rate adjustments tended to have their largest impact on inflation in this time perspective. For my part I also considered it important to focus the difficult forecasting work on the time perspective that was deemed to be the most essential for monetary policy and not become too involved in discussions about a more uncertain future. This argument was strengthened in my opinion when the Riksbank's decision-making process became a collective undertaking. With a less explicit rule and an entirely flexible time horizon our discussions would have risked focusing – more than would have been desirable – on the choice of time perspective, at the cost of a discussion about what we actually know about the present and what we believe about developments over the coming two years.

CONSIDERATION OF REAL DEVELOPMENTS

Allow me also to say a few words about the background to the clarification of the principles for monetary policy that the Riksbank decided on at the start of 1999. When the inflation target was established in 1993 we understood even then that it could not be applied mechanically. That was intimated, among other things, in a statement that the target was not to begin to apply fully until 1995, in order thereby to cushion the effects of the inflationary impulses that were predicted during 1993 and 1994 following the krona's fall and the change in indirect taxes. There were also several occasions during the latter half of the 1990s when policy was not conducted slavishly on the basis of CPI forecasts. That was because it was obvious that it could result in absurd consequences. For example, the rate cuts in 1996 and 1997 had caused a decrease in the CPI via housing costs. This could have resulted in the claim that interest rates should have been lowered further, as a direct consequence of the fact that they had only just been cut sharply. However, it was not until the turn of the year 1998/1999 that the Riksbank developed a coherent, explicit approach to these issues. It had been preceded by a long discussion, where the main idea had been to change from the CPI to a different index, in which the components that fluctuated most due to temporary reasons would be excluded. However, the more we discussed this the clearer it became that there was no index that always provided the best picture of inflationary pressures in the economy. For this reason we opted instead for an approach whereby we, in connection with each decision, would make it as clear as possible what considerations were guiding policy at the time. This would enable our actions to be evaluated in a better way than before.

The clarification states that monetary policy should normally be centred on bringing inflation to target one to two years ahead. It also identifies two cases when the Riksbank may depart from this rule: transitory effects on inflation and large deviations from the target. By transitory effects is meant that some particular factors affect the forecast of inflation one to two years ahead, but that the effects are expected to dissipate without the need for any monetary policy action. By large deviations from the target is meant that inflation has deviated so much from the target that there may be reason to bring it back to target over a longer period than the normal two-year horizon. A faster return to target could give rise to undesired fluctuations in output and employment, for example.

At the start of 1999 the Riksbank decided on a clarification of the principles for monetary policy.

The clarification states that monetary policy should normally be centred on bringing inflation to target one to two years ahead but may in certain cases depart from that rule.

This approach has often led us to focus our monetary policy analysis on the inflation measure UND1X.

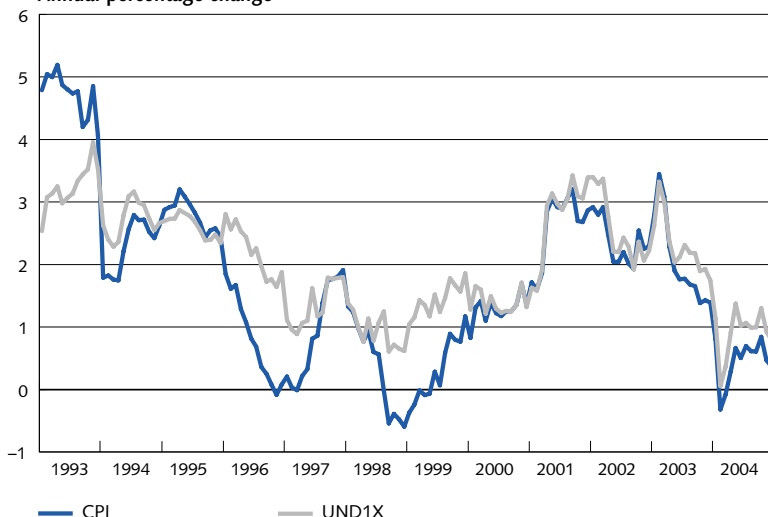
In practice this approach has often led us to focus our monetary policy analysis and discussion on the inflation measure UND1X, as there is generally always reason to disregard the effects on inflation of indirect taxes and subsidies as well as of changes in interest rates. In some situations we have also decided to study inflation measures from which other price changes have been excluded, e.g. in spring 2001, when the prices of a number of goods such as electricity, heating oil, petrol, telecommunications and different kinds of food rose; and 2003, when it was primarily fluctuations in electricity prices that had a very sharp impact on inflation for a period.

INFLATION AND INFLATION EXPECTATIONS IN LINE WITH THE TARGET

From the beginning of 1995 up to today the CPI inflation has averaged 1.4 per cent and UND1X inflation 1.8 per cent.

The result of the Bank's policy can be illustrated in different ways. Let me begin with the most obvious gauge, the inflation outcome. If we start with the date that was set in the original decision – the beginning of 1995 – CPI inflation up to today has averaged 1.4 per cent. If we instead go back to January 1993, when the new policy was announced, the same figure is 1.7 per cent. If we focus on UND1X, the underlying measure that guided policy especially in recent years but also during a large part of the period 1996–1999, the corresponding figures are 1.8 and 2.0 per cent, respectively (see Figure 1).

Figure 1. Different measures of inflation
Annual percentage change



Sources: Statistics Sweden and the Riksbank.

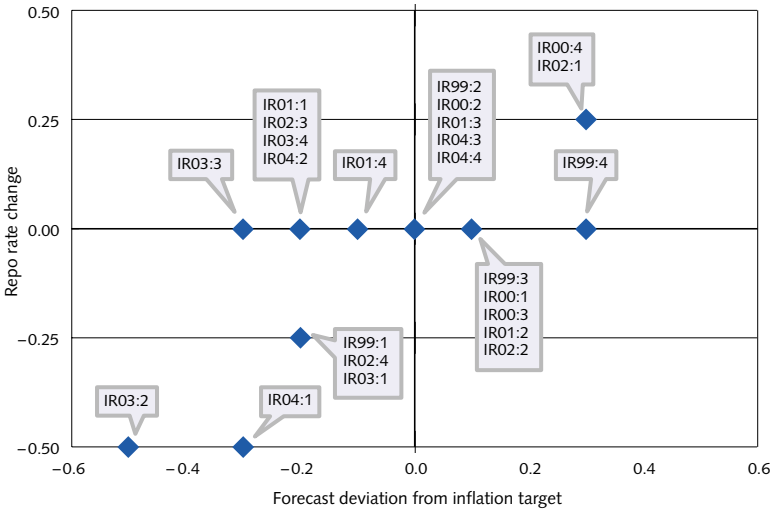
Whether this constitutes a good result or not is open to discussion, of course. Allow me here to simply say that when the target was adopted, and as an observer outside the Bank, I thought like many others that it would be very difficult to bring inflation down sustainably to a level around 2 per cent. What is particularly interesting in this context is that it has proved possible to establish a regime with a low inflation rate, close to the target, and to combine it with firm economic growth, which over these years has averaged almost 3 per cent a year, compared with about 2 per cent during the two previous decades. If anything, economic growth also appears to have become more stable since the inflation target was introduced.²

It has proved possible to establish a regime with a low inflation rate and to combine it with firm economic growth.

Another way to assess policy is to study whether we have acted in the way that we say we will, i.e. followed our policy rule. Figure 2 shows our interest rate adjustments on the vertical axis and our inflation forecasts' deviation from the target two years ahead on the horizontal axis. As we can see there is a clear relationship between forecast deviations from target and our decisions, but there are also points in Figure 2 that deviate from the average behaviour. These points chiefly relate to the forecasts we produced when we chose not to counter the effects of energy prices on inflation. So it seems that we have essentially acted in line with how we have said we will normally act.

There is a clear relationship between forecast deviations from target and our decisions.

Figure 2. Repo rate decisions and inflation forecasts, 1999-2004
Per cent

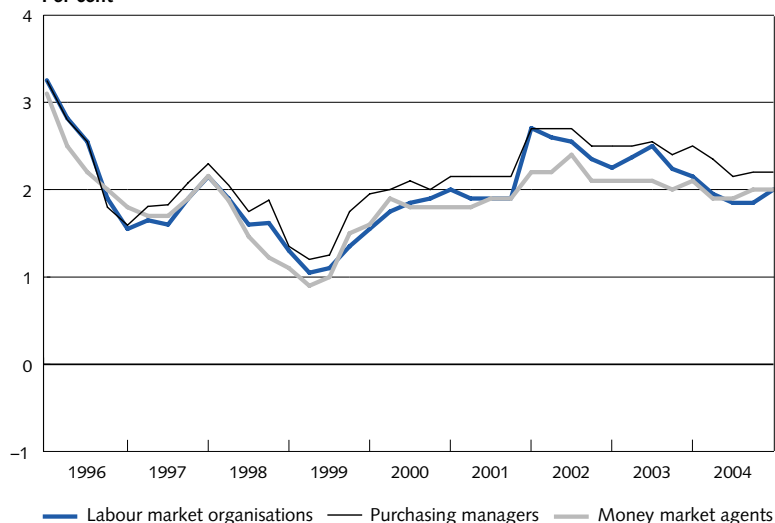


Source: The Riksbank.

² The volatility, measured as the standard deviation of GDP growth, was 1.9 percentage points during the period 1970–1992. Since 1995 the corresponding standard deviation has been 1.3 percentage points.

Yet another way to evaluate the result of our policy is to investigate whether it is credible. The most important factor here is that inflation expectations two years ahead and beyond have been firmly anchored to our target since the regime was stabilised in 1997–1998. That conclusion holds up fairly well regardless of the method used (see Figure 3).

Figure 3. Different agents' expectations of inflation two years ahead
Per cent



Source: Prospera.

Our ambition to be transparent derives, among other things, from a desire to avoid unnecessary movements or unease in the financial markets.

Our ambition to be transparent derives, among other things, from a desire to avoid unnecessary movements or unease in the financial markets. To illustrate our performance in this regard the Riksbank has conducted a number of studies over the years, of which some have been published.³ The picture we have received is that our policy has essentially been intelligible and that it has not resulted in any sharp fluctuations in financial prices that could have been avoided. International comparisons as well as surveys and similar studies that have been carried out by external analysts in the media, for example, confirm that the Bank's monetary policy communication has worked fairly well. However, this does not mean – and I want to stress this – that there are no examples of episodes when our communication in my opinion could have been better.

³ See Andersson, M., Dillén, H. & Sellin, P., "The yield curve and the Riksbank's signalling", Sveriges Riksbank Economic Review 3, 2002, 5–19.

My conclusion is that the Bank's policy in the past ten years has worked well. Nonetheless there is of course every reason to reflect on whether the analysis that we carry out and the framework that we follow in our monetary policy work could be improved. That is the aim of the rest of the article.

My conclusion is that the Bank's policy in the past ten years has worked well.

Some thoughts on how to develop the Riksbank's monetary policy work

METHODOLOGICAL ASPECTS

Let me begin by addressing an issue that is of a rather technical or methodological nature, but that, as we also shall see, has a number of further consequences: the choice of repo rate on which the inflation forecast is based.

Since 1996 the Riksbank's Inflation Reports have presented overall assessments of the economy and inflation that have served as a guide for policy. From the fourth Report in 1997 these have included numerical, relatively detailed forecasts. The published forecasts have consistently been based on the assumption of an unchanged repo rate, above all because forecasts arrived at in that way make it easy to motivate changes in policy. Before a monetary policy decision the Bank makes clear whether it expects inflation to deviate from the target or not, given the current interest rate level. If the forecast is above or below target it shows clearly that there is reason to consider whether the repo rate needs to be changed.

Since late 1997 the Riksbank has presented numerical detailed forecasts of the economy and inflation based on the assumption of an unchanged repo rate.

The framework applied by the Riksbank has been the established practice in inflation-targeting countries. But as early as the mid-1990s the Reserve Bank of New Zealand, for example, opted for a different method, publishing forecasts based on the interest rate path that they thought gave the best target fulfilment. Our academic advisers have also repeatedly said that we should prepare forecasts based either on how the market expects interest rates to evolve or that we, as in New Zealand, should work out what interest rate path is consistent with reaching the inflation target.⁴

Against this background we at the Riksbank have of course discussed over the years the question of what importance we should attach to different interest rate assumptions in our internal work and when we publish forecasts. When making decisions we have also had many other kinds of model-based estimates and scenarios to go on than those published.

⁴ See, for example, Svensson, L., "Monetary Policy and Real Stabilization" in *Rethinking Stabilization Policy*, A Symposium Sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, August 29–31, 2002, 261–312.

Moreover, from October 1999 until March 2003, our Inflation Report contained boxes in which we published estimates based on a survey of market expectations of the repo rate.⁵ The estimates were seldom given any great significance in the monetary policy debate, however.

So what are the points of attaching greater importance to, and also publishing forecasts based on, other interest rate assumptions than a constant repo rate? There are chiefly two:

Publishing forecasts based on other interest rate assumptions has two advantages; the first has to do with comparability and the possibilities to assess our forecasts.

The first point has to do with comparability and the possibilities to assess our forecasts. As things currently stand the Riksbank's forecasts can be difficult to compare with others, since other forecasters do not normally base their forecasts on an unchanged policy rate. This risks confusing those that monitor the Riksbank and compare our forecasts with others in, for example, the media. So it is possible that an interest rate assumption that is more consistent with the market's view of how the interest rate will develop could make our communication easier in certain situations. That is especially true of course if there is a large deviation between the assumption of an unchanged repo rate and a more realistic assumption of the rate's path. What is clear in any case is that ex post assessments of forecasts of economic and inflation developments become generally easier if they are based on an assumption that better reflects the interest rate expectations of market players.

The second has to do with the fact that it becomes easier to produce consistent forecasts and scenarios.

The other point has to do with the fact that it becomes easier to produce consistent forecasts and scenarios. This is particularly important when preparing estimates and developing scenarios in a somewhat longer-term perspective than the usual two years, which can sometimes be valuable in order, for example, to show the effect on inflation of shocks that are judged to be temporary. The assumption of a constant repo rate becomes generally more unrealistic the longer the forecast horizon is extended. When the difference between the market's view of the future repo rate and the assumption of an unchanged repo rate has been large, it has also been complicated to link assumptions about short-term interest rates to a reasonable picture of, for instance, future long-term rates, since long-term rates depend on expectations of how short-term rates will evolve.

Up till the end of 2004 the Riksbank has chosen to highlight forecasts based on an unchanged repo rate.

Up to the end of 2004 the Riksbank has chosen to highlight forecasts based on an unchanged repo rate; this has basically worked well, not least in terms of communication. Little by little, however, the Bank's monetary policy work has evolved to the extent that there are now sufficient analytical resources with which to deepen the discussion in this area. The

⁵ The only exceptions were Inflation Report 2001:1 and 2001:2 when no such estimates were published, since market expectations largely coincided with the assumption of an unchanged repo rate.

approach used so far has also, as the Bank's analysis has developed, felt like a bigger restriction in the internal work than before. The perceptions of how the Riksbank acts seem also to have become so well established that the communication risks of presenting forecasts with different interest rate scenarios appear smaller today than before. I should also mention here that a couple of other inflation-targeting countries with which we have an extensive professional exchange – the UK and Norway – have recently begun to attach much greater importance to forecasts based on other assumptions than a constant policy rate and that this appears to have worked well.

We are now able to make use of our development work. In the first Report of this year we published forecasts based on implied forward rates, a measure that may not be exactly the same as market expectations of the future repo rate, due, among other things, to maturity premiums, but that nevertheless are a reasonable approximation. It does not really matter that much whether one chooses to condition the forecast on implied forward rates, surveys that attempt to give a more direct reading of market expectations, or some other fairly reasonable assumption about future monetary policy. We have chosen, however, to use implied forward rates, since this is a relatively simple way to get a fairly reasonable idea of future monetary policy. What is important to underline, though, is that the paths we publish on the basis of implied forward rates should not be taken as a sign of our own judgement of the future path of the repo rate. Experience also shows that the situation often changes so that the actual repo rate path turns out to be a different one than that implied by forward rates. Allow me also to stress that we as usual presented a forecast on the assumption of an unchanged repo rate for the sake of maintaining continuity and transparency in our analysis.

In the first Report of this year we published forecasts based on implied forward rates.

COMMUNICATION

One advantage of using implied forward rates is, as I just mentioned, that it becomes more meaningful to produce forecasts over a longer time frame. It also makes it easier to estimate and present scenarios that can illustrate some of the problems that we face. Allow me to consider two different issues, both of which have come to the fore in recent years, and thereby show how our developed methods can be used to improve primarily our communication but also our own understanding of the problems we have to address.

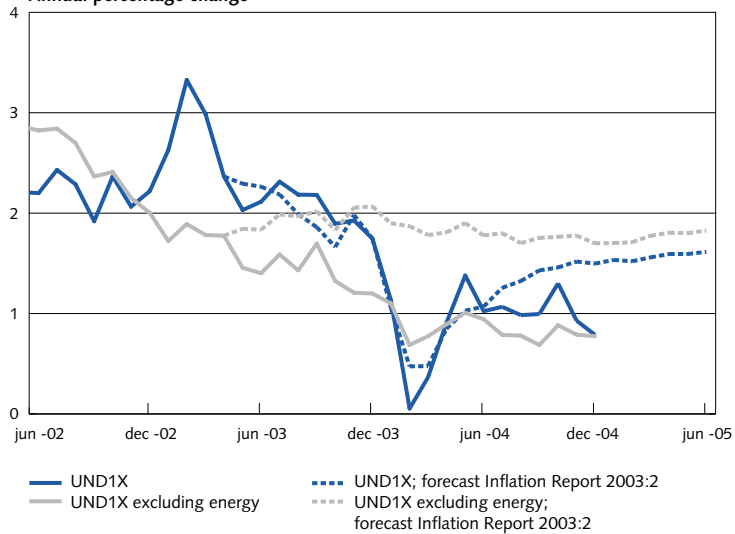
Using implied forward rates makes it more meaningful to produce forecasts over a longer time frame and easier to present some of the problems we face.

This relates to situations when there have been particular shocks to the inflation outlook that we have judged to be of a temporary nature.

The first relates to situations when there have been particular shocks to the inflation outlook that we have judged to be of a temporary nature. Perhaps the best example of this is 2002 to 2003, when electricity prices suddenly began to rise to record-highs as a result of lower water levels in Sweden and Norway as well as colder weather than usual. There was reason to believe that the electricity prices would fall back and that this would then also have a marked impact on inflation. We thus followed the strategy that we had established in our clarification from 1999, and explained that policy should disregard the temporary effects of the fluctuations in electricity prices. On this particular occasion it was appropriate to calculate an alternative measure of inflation, UND1X excluding energy, and this measure was therefore used as a basis for policy.

Figure 4 gives a fairly good idea of the nature of the decision facing us. Inflation was driven up at the start of 2003, when electricity prices rose, and then fell again during the latter half of 2003 and 2004 when the rise in electricity prices dropped out of the inflation data. If we instead look at UND1X excluding energy the picture is considerably less dramatic. When we looked ahead to forecast developments the picture also proved very different depending on whether we focused on UND1X or on the same measure excluding energy prices. That the outcome for UND1X excluding energy did not turn out exactly as we expected is a different matter, attributable to imported inflation turning out lower and productivity proving higher than anticipated. However, that does not take away from the fact that we essentially made the right assessment about electricity price developments.

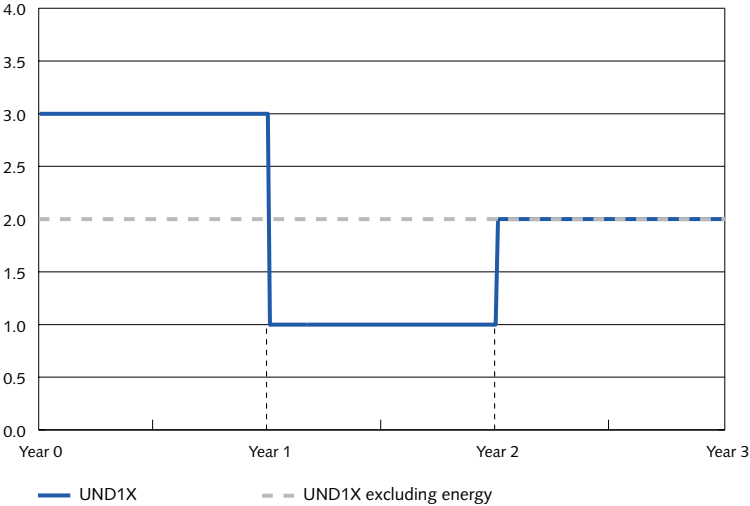
Figure 4. Inflation with and without energy prices
Annual percentage change



Sources: Statistics Sweden and the Riksbank.

This problem could also have been described with a forecast of inflation in a longer time frame. Let me illustrate this line of thought with a stylized example (see Figure 5). The developments in energy prices were expected to contribute first to inflation being above target and then to the expectation that it would be clearly below target one to two years ahead. If we look at UND1X excluding energy prices this measure was projected to be roughly in line with the target over the entire forecast period. With a forecast that only extends over the first two years it is not evident that inflation will gradually return to being in line with the target. One possibility then is to show a measure that excludes the energy prices and on the basis of this measure explain why the Bank does not want to counter the shock. Another is to extend the forecast horizon somewhat. That illustrates more clearly that the fluctuations are not expected to have a lasting effect on inflation.

Figure 5. A schematic outline of inflation developments with and without energy prices
Per cent



Source: The Riksbank.

There is reason to underscore that this way of working, where we extend the time horizon, does not of course mean that we can escape the truly difficult question: is the rise or fall in inflation temporary and what is the conclusion for monetary policy? But the point is that once you have put your foot down on this issue you can presumably sometimes explain your conclusions more clearly if you describe how you expect the situation to develop in the longer run.

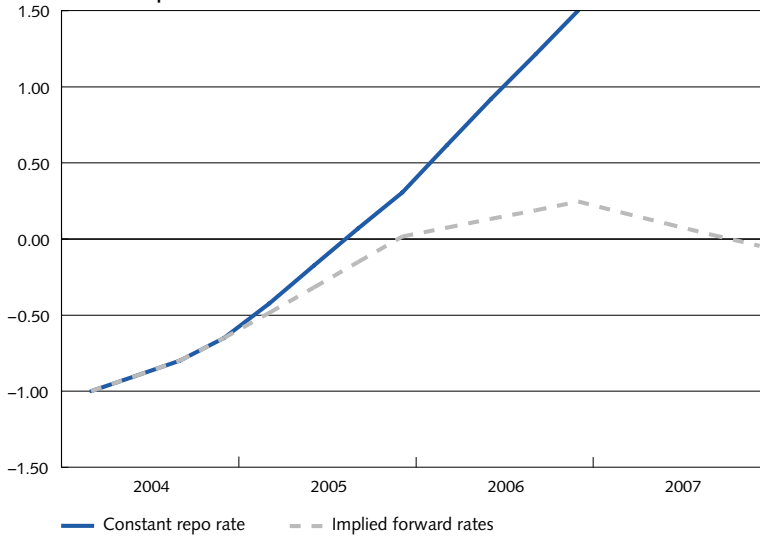
Extending the time horizon does not mean that we can escape the truly difficult question: is the rise or fall in inflation temporary and what is the conclusion for monetary policy?

Another issue has to do with how alternative interest rate paths can be used to illustrate the choices facing monetary policy.

The other issue has to do with how alternative interest rate paths can be used to illustrate the choices facing monetary policy. Let me use the Riksbank's interest rate decision in December 2004 as an example. On that occasion we left the rate unchanged despite the fact that inflation was forecast to be below our target of 2 per cent during the greater part of the next two years. With inflation forecast to be so low during such a large part of the forecast period it would have been possible to justify a further rate cut. But there were also arguments in the opposite direction. The most important was that demand was already growing markedly faster than the economy was deemed capable of sustaining in the long run. The vigorous growth was anticipated to continue and so it was not weak demand that was causing the low inflation. Instead, the low inflation was being caused by unexpectedly high productivity and unexpectedly low price increases for imported goods, something that in itself could be expected to further stimulate growth in the period ahead. An additional factor was that the repo rate was already at an unusually low level, which could partly explain the increase in households' debt burden and the continued rise in housing prices. Even though debt levels were not deemed to be a threat to financial stability, another rate cut could have further fuelled house price inflation and indebtedness. That in turn could have given rise to future problems when monetary policy eventually would most likely have to be tightened. None of these arguments in themselves were the key factor in deciding to leave the repo rate unchanged, but taken together they indicated nevertheless the need for a certain measure of caution.

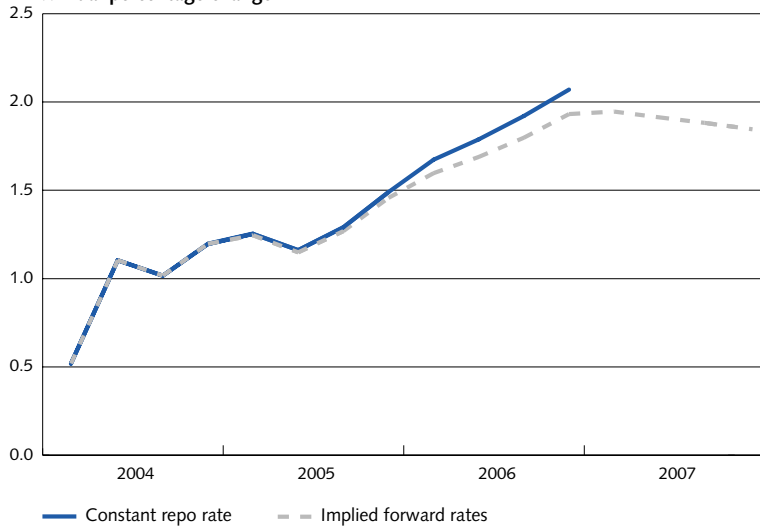
In this kind of situation it can be interesting to consider how different future paths for the interest rate can be expected to affect both the real economy and inflation. Figure 6 shows resource utilisation in two different cases: one based on an unchanged repo rate and another on the implied forward rates that applied during the autumn of 2004. At that time the implied forward rates were indicating that the repo rate would be raised very shortly and that it would then rise to levels around 4.5 per cent in the longer term. Resource utilisation picks up in both cases, turning positive after about a year. But if the repo rate is raised according to the implied forward rate at the time, resource utilisation drops, turning negative again during 2007, whereas it remains positive throughout the whole period covered by the example if the rate is held constant. The situation also differs somewhat between the two alternatives when it comes to inflation (see Figure 7). With last autumn's implied forward rate, inflation never reaches the inflation target, while, with an unchanged repo rate, it can be expected to overshoot the target just beyond the traditional two-year horizon.

Figure 6. Output gap
Per cent of potential GDP



Source: The Riksbank.

Figure 7. UND1X-inflation
Annual percentage change



Source: The Riksbank.

What this example illustrates is that an unchanged repo rate entailed a continued rise in resource utilisation, which in turn drove up inflationary pressures beyond the two-year horizon. At the same time, the forecast based on the market's assessment of the future repo rate shows that there did not have to be any hurry to begin to hike rates. A repo rate path consistent with implied forward rates led in this example to inflation never reaching the target.

Alternative scenarios can increase our understanding of the consequences of different options.

Examples like this can of course never give an exact answer to when the repo rate should be adjusted. What they can do is increase our understanding about the consequences of different options. In this case they can help us to narrow down a number of reasonable scenarios for policy a few quarters ahead. And in this particular example an unchanged repo rate was certainly one such reasonable option for a period.

The conclusions for monetary policy of both the usual main scenario and the estimates based on implied forward rates can generally be expected to be the same.

Allow me for safety's sake to emphasise that the conclusions for monetary policy of both the alternative forecasts – the Inflation Report's usual main scenario and the estimates based on implied forward rates – can generally be expected to be the same. Regardless of whether we reason on the basis of the simple policy rule, which relates the forecast of inflation one to two years ahead – under the assumption that the repo rate is held constant – to the current decision, or whether we study forecasts based on implied forward rates, for example, we can reach the conclusion that it was reasonable to leave the repo rate unchanged in December and that the repo rate sooner or later will need to be raised. The point is that paths derived from different interest rate assumptions make it possible to some degree to quantify and weigh up various monetary policy options against each other.

The monetary policy communication can be made easier if the forecast horizon is extended.

So, to sum up it is easy to see that the monetary policy communication can be made easier in various ways if the forecast horizon is extended. The new methods that have been developed can also facilitate the creation of alternative scenarios to more clearly understand and communicate the considerations facing the Bank.

CONDUCTING MONETARY POLICY

I should like to conclude by mentioning a third perspective. This does not concern methodology for forecasting, or how monetary policy is communicated, but how policy is actually conducted.

From time to time the view is expressed in the general debate that monetary policy should be conducted in a more “pragmatic” manner, more like the Federal Reserve in the United States. It is not always easy to understand exactly what this entails, but one thought appears to be that the Riksbank has in some way bound itself too tightly to the framework

that we and many other inflation-targeting countries abide by. Even though, when looking back over the past ten years of monetary policy, I cannot see any situation where we have been curbed by our analytical framework and thereby made some tangible error in our policy, I believe this issue is worth discussing.

Let me just take this opportunity to note that my impression is that there has been a convergence process within the central bank world. Countries that have conducted a more “pragmatic” policy like that in the United States, which is less governed by clearly-described principles have been working on making more information publicly available and establishing a clearer framework for their policy. At the same time, inflation-targeting countries have been discussing in greater depth the various problems that sometimes prevent policy from following the simplest principles.

The Riksbank’s approach to new monetary policy issues or problems is, as has been pointed out earlier, that we keep to a relatively well-specified framework. This is our starting point when considering the monetary policy stance to be taken. If, for instance, we wish to deviate from the usual policy rule, we can do so, but we then make the requirement of ourselves that we can motivate this on the basis of the framework we use and the flexibility we apply. It is difficult to see any reason to change this system. In my opinion, it has served us well and forced us to improve our thinking with regard to tackling the various problems that arise.

The new analysis and forecasting methods do not change the framework for our monetary policy. We still have the same target, the same ambition to achieve this target in two years and the same arguments for taking real developments into account when deciding the details of the policy. However, we now have new data on which to base our decisions and new opportunities for communicating them.

The Riksbank’s approach to new monetary policy issues is to keep to a relatively well-specified framework and motivate possible deviations.

The new analysis and forecasting methods do not change the framework for our monetary policy.

Conclusion

Let me try to summarise my message here. I believe that most people agree that inflation-targeting has worked well on the whole. We know that since inflation-targeting was introduced, Sweden has gone from being a high-inflation economy to an economy with low inflation and stable wage increases. The lower inflation rate has not led to weaker output growth; GDP growth has on average been higher under the new regime. It also appears that, if anything, the real stability of the economy has improved.

Nevertheless, there is always good reason to consider how monetary policy can be developed and improved. To this end, I have discussed how the Riksbank's monetary policy work can be developed.

This has included what could be termed technical improvements; for instance, greater use of other assumptions than an unchanged repo rate and an extended forecast horizon when producing and presenting data. The advantage of using, for example, implied forward rates as a basis is that they can often be a more realistic assumption than an unchanged interest rate. This can in turn allow more and better alternative scenarios, which can illustrate different aspects of monetary policy including the consequences for inflation and resource utilisation over a longer time horizon.

It has also included the Riksbank's communication. Working with a longer time horizon provides a better overview of the effects of temporary influences on inflation. Scenarios containing different assumptions regarding the repo rate and using a longer time horizon can also contribute to a clearer illustration of the considerations monetary policy has to take into account with regard to balancing inflation against real economic aspects. I have also discussed this.

The primary advantage of supplementing the assumption of an unchanged repo rate with alternative interest rate paths and making longer-term forecasts is that it makes it easier to explain the monetary policy message. The simple policy rule – which involves interest rate decisions being based on inflation normally being returned to the target one to two years ahead – will continue to provide a good guide to our actions. The guidelines in the clarification from 1999 will thus continue to form the basis of our monetary policy. When the decisions need to take account of other information than that significant for inflation one to two years ahead, the new working method should make it easier to understand how this is done.

Discussing an entire interest rate path can also create the conditions for a more balanced discussion of monetary policy. This can involve when we intend to change our monetary policy stance and how quickly we should proceed. What will happen if we wait a while before changing the interest rate? This type of consideration is probably more important than detailed discussions about tenths of a percentage point in a forecast.

In conclusion, I have also mentioned the fundamental framework that governs monetary policy. This is mainly because it is sometimes claimed in the general debate that the Riksbank and other inflation-targeting countries have bound themselves too tightly to a particular model and that a more "pragmatic" policy system would give better results. My conclusion is that our method of working is sufficiently flexible to manage

Supplementing the assumption of an unchanged repo rate with alternative interest rate paths and making longer-term forecasts makes it easier to explain the monetary policy message.

Discussing an entire interest rate path can also create the conditions for a more balanced discussion of monetary policy.

the necessary balance. As I see it, there are major advantages to a system like ours, with a clear target, publication of the background data, a policy rule, etc. It provides our activities with stability, both at the staff level and in the Executive Board's discussions and communications. We are also forced to systematically examine all new ideas and issues that arise against the framework we apply, which has proved an intellectually fruitful exercise.

However, what I have tried to show here is that the methods we now use can sometimes enable us to produce more interesting data for monetary policy and to describe our considerations in a more pedagogical manner. They can make it easier to demonstrate the flexibility of the inflation-targeting regime we work with. Whether this will then have an impact on the monetary policy debate in Sweden, and ultimately on the policy conducted, is a very difficult question that only the future can answer. One consolation for those who wish for an answer is that they can form an opinion of how the Executive Board develops its view of monetary policy through the Inflation Reports, speeches and the minutes of the monetary policy meetings published.

■ Basel II – the new framework for bank capital

BY GÖRAN LIND

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Basel II is the commonly used term for the new framework for capital requirements on banks.¹ It will supersede the present Capital Accord, agreed by the Basel Committee in 1988 and sometimes called Basel I. In Sweden and other EU countries the new framework will be implemented on 1 January 2007. The corresponding EU directive reflects Basel II, but includes a number of amendments, some small, others larger.²

A lot of descriptive and analytical material has already been written on the technical aspects of Basel II, such as on risk measurement methods. But since the introduction of Basel II will have noticeable effects even for those of us who are not risk experts, there is a need to provide short and non-technical guidance on the main issues. That is the aim of this article. Hence, the text focuses on overarching issues rather than technicalities.

Why change from Basel I to Basel II?

In most countries, the law requires banks to hold a certain amount of capital, primarily in the forms of share capital and some quasi-capital debt instruments. The history of capital requirements shows a step-wise development towards increasingly sophisticated approaches.

The traditional requirement is that banks must hold a *minimum amount* of capital,³ both to provide a cushion against losses and to discipline the bank's owners. Some countries also apply a *leverage capital ratio* of, for instance, 4 per cent of a bank's total assets as a backstop to ensure that the amount of capital stays in line with the size of the balance

¹ The full name is "International Convergence of Capital Measurement and Capital Standards – a Revised Framework"; June 2004, the Basel Committee on Banking Supervision, BIS.

² The EU Directive is called "Re-casting Directive 2000/12/EC of the European Parliament and of the Council of 20 March 2000 relating to the taking up and pursuit of the business of credit institutions and Council directive 93/6/EEC of 15 March 1993 on the capital adequacy of investment firms and credit institutions". It is sometimes called the Capital Requirements Directive (CRD), or alternatively, CAD III. While Basel II is mainly intended to apply only to internationally active banks, CAD III will cover all banks as well as other credit institutions and securities firms in EU member states.

³ For instance, a bank established in the EU must have a minimum capital of 5 million euro.

sheet and thus with the risks. *Risk-based capital ratios* of at least 8 per cent for credit risk were formalised in the 1988 Capital Accord, and capital requirements for market risks were added in 1996. This is sometimes called the Basel Capital Accord or Basel I, for short.

With a risk-based ratio, different categories of borrower (in the case of credit risk) are assigned different risk weights, set in relation to the likelihood of the borrower not fulfilling his loan obligation. The capital requirement is then calculated as the amount of the loan multiplied by the risk weight times 8 per cent.⁴ The Capital Accord is based on a relatively small selection of weights. The same risk weight is applied to all loans to companies and to individuals, with one exception – for loans to individuals collateralised by their own house or apartment there is a lower requirement. Obviously, such a crude categorisation does not reflect the risk that a particular borrower actually poses for the bank. A highly creditworthy company, say Volvo, would in practice represent a much smaller risk than, say, a recently started restaurant.

Since the Capital Accord was adopted, there have been significant developments in the theory and practice of measuring and managing risks. Moreover, new financial instruments, such as credit derivatives, have improved banks' ability to handle and mitigate risks. In recent years there has also been a rapid development towards larger and more complex banking groups with broader operations, both across the financial sector and across countries. The difference between internationally active large banks and local banks has grown.

Thus, a thoroughly revised framework for capital requirements was called for. In order to keep pace with developments, such a framework should contain:

- A closer relationship between the risk and the capital required in each case. Referring to the example mentioned above, a loan to Volvo should have a much lower capital requirement than a loan to the restaurant. Since the costs to the bank for acquiring the capital⁵ should, in principle, be covered by the interest paid on the loan, the lower capital requirement would translate into a lower borrowing rate for Volvo.
- Different rules for banks that are more as opposed to less advanced in the management of risk and capital. Banks with less complex risks

There have been significant developments in the measurement and management of risks and new financial instruments have improved banks' ability to mitigate risks.

Thus a revised framework for capital requirements was called for.

⁴ One example: an unsecured 500 million krona loan to a company would carry a risk weight of 100 per cent under the Capital Accord. The capital requirement would thus be: 500 million \times 100 % \times 8 % = 40 million. Assuming that the annual cost of share capital is 15 per cent, the capital requirement would then cost 6 million krona a year.

⁵ The annual cost for this is generally estimated to be around 15 per cent. Investors in share capital demand a high yield to cover the presumed high volatility in share values plus the risk of total loss.

may use simpler rules. More advanced banks will be allowed to use more advanced alternatives, which put heavier burdens on them but lead to a closer relationship between the risk and the capital requirement and are thus more in line with the bank's own estimates of risk.

- Explicit capital requirements also for operational risk, in addition to credit and market risks. Operational risk factors are important for banks and should be taken into account in a revised capital framework.
- A broader framework that includes both quantitative and qualitative requirements on banks as well as requirements for public disclosure of some bank information. Such a broader approach to supervision would act as a basis for the monitoring of banks' risk management by banks, supervisory agencies and the general public.

Thus, there are several reasons for replacing the current capital rules by Basel II. The following is overarching and therefore perhaps the most important.

As banking instruments and operations have changed significantly, the regulations need to be updated.

To be effective, banking regulation cannot conflict unduly with the way banks actually conduct their business. Regulations that are too standardised or do not reflect realities will be an expensive hindrance because banks then need to operate double systems – one to provide the supervisors with the requisite information and the other for the bank's own management, for which the supervisory requirements have become inadequate. Banking instruments and operations have changed significantly since the inception of the present capital requirements, so an updated regulation is needed. Besides, the supervisors need a more flexible system to improve their capability to supervise banks with markedly different structures. In the new world of sophisticated banks and complex banking operations, supervisors have encountered growing difficulties with traditional, often insufficiently penetrating, methods of supervision.

Basel II reflects developments already underway

As a matter of fact, many banks have already implemented important parts of Basel II on their own initiative, in particular by improving systems for the management, measurement and mitigation of risks. Some banks have actually developed their risk measurement and management systems further than hitherto required by the supervisors because they see the new systems as useful instruments for better decision-making and hence lower losses. Under Basel II, internal bank systems that are found adequate by the supervisors may also be used to calculate a bank's statutory capital requirements. The possibility of reducing capital requirements

will be an additional incentive for the banks to optimise methods, portfolios and risk-taking.

Many features of Basel II have already been incorporated in supervisory methods. For instance, the concept of “risk-based supervision”, whereby supervisors focus on the main risks in the banking system (often the larger banks and problem banks) and on the main risk-drivers within each bank, is being increasingly adopted by supervisors.

Hence, Basel II could be seen as a framework that formalises some practices which the most advanced banks and supervisors are already using. But Basel II also incorporates a number of areas in which further development is warranted, for instance the measurement and management of operational risk. In such cases, Basel II could be seen as an instrument for furthering development.

Supervisors are increasingly adopting the concept of “risk-based supervision”.

Hence, Basel II could be seen as a framework that formalises some existing practices.

Why do banks need to be regulated?

Before discussing the Basel II framework in more detail, let us consider the basic question of the rationale for regulating and supervising banks in the first place. Would not banks develop more quickly and provide better and cheaper services if they did not have to carry the burden of resource-consuming, restrictive and costly regulations? Are there legitimate reasons for regulating and supervising banks more than other financial and non-financial institutions?

The answer lies in the banks’ multiple roles, which are highly important and beneficial for the economy as a whole:

- They provide payment services.
- They intermediate capital by providing a range of savings instruments and extending various forms of credit to borrowers.
- They handle and transform risks.

Banks have multiple roles.

Some of these functions are by their very nature particularly vulnerable to disturbances. For instance, loans usually have a longer duration than deposits. Hence, in certain situations a bank may lose a large proportion of its deposits rather quickly while its loans remain outstanding. Such a situation may impose a severe liquidity shortage on the bank, which may ultimately collapse. Another example: The daily turnover of payments between the Swedish banks comprises very large amounts. A disturbance in the payment system – whether of a technical nature or due to one bank’s failure to honour its obligations to the system on time – can quickly spread to other banks and even destabilise the overall financial system.

Some banking functions are particularly vulnerable.

Banks have a dominant role in some financial functions.

In some of the functions, banks have a monopoly or dominant role, with few alternatives. Only banks may receive deposits that are protected by the Deposit Guarantee Scheme. Banks have a dominant role in lending to small and medium-sized companies. Banks and their affiliates have a dominant role in the payments system. Thus, in many cases a bank customer has just a limited possibility of obtaining similar services from non-banks.

These three factors – that certain banking activities are intrinsically vulnerable, that even minor disturbances can threaten overall financial stability through contagion, and that the banks are the dominant providers of some key services – form the rationale for regulating banks and for doing so partly differently from other companies. That being said, all regulations should ideally pass a cost/benefit test. The total benefit to society of any regulation must exceed its total cost to society. This includes direct financial as well as other costs and benefits. A substantial potential cost to society is the expense of having to deal with a crisis in the financial system. Since an individual bank has no commercial reason to take this systemic cost into account, society has to ensure, e.g. through regulation and monitoring, that banks do not behave in ways that unduly increases the systemic risk.

Reasons for using capital requirements as a regulatory tool

The importance of the regulatory requirements lies in the “special nature” of banks.

There are many good reasons why banks, as well as non-banks and non-financial companies, should maintain an adequate risk-related amount of capital. However, the “special nature” of banks makes it more important to have regulatory requirements for the capital in banks than in other companies. Capital is needed:

- To reduce the risk that volatility in bank earnings, e.g., stemming from macroeconomic developments, leads to bankruptcy.
- Because in the event of a bank failure, equity capital is hit first, thereby reducing the residual cost to other parties, including tax-payers.
- To encourage prudence among bank owners because more of their own capital is at stake.
- Because, although capital requirements should not prevent banks from taking risks, the cost of capital for covering risks will lead to a more risk-aligned pricing of risks and to a considered strategy for taking risks.

- Because capital requirements will promote the development of common, “integrated”, management processes and policies within a bank group – across entities, countries, risks, and operations.

Normally, large and internationally active banks do more than comply with the minimum 8 per cent level for capital adequacy. The banks themselves, their market counterparties and rating agencies have found it prudent for such banks to maintain capital ratios at 10 per cent or more. This will certainly continue to be the case under Basel II.

The structure of Basel II

Given the discussion above, we can draw some conclusions about the desired structure and content of a revised framework for capital requirements:

- It should link capital requirements closely to actual risks.
- It should encompass all material risks to banks.
- It should reflect the different operations, organisations and degrees of “sophistication” of different banks.
- It should provide incentives for in-bank developments that lead to “better management” and thus reduce the risk of bank failures. But it should also provide enhanced powers for supervisors to act against identified weaknesses in the management of banks.

To satisfy these demands, Basel II has become multifaceted.

It is built on *three pillars*:

- Pillar 1 encompasses the capital requirements for credit risk, market risk and operational risk.
- Pillar 2 contains the “supervisory review process”, which outlines the demands on banks’ management of risks and capital and defines the roles and powers of the supervisors.
- Pillar 3 sets out demands on banks for public disclosures. These shall include quantitative as well as qualitative information, in particular about a bank’s management of risks and capital.

Under pillar 1, banks may choose from different alternatives, depending on their “level of advancement”. For credit risk, Standardised Approach is the simplest level,⁶ rather like the present Basel I but containing more risk weights, all fixed by the authorities. Banks may increase the range of risk

Banks may choose from different alternatives depending on their “level of advancement”.

⁶ In fact, there is even a simplified version of the Standardised Approach, intended for little advanced banking systems. In this version there are fewer alternatives, e.g. for risk weights, than in the Standardised Approach.

weights set by the supervisors by using credit risk assessments from acknowledged rating agencies, such as Moody's, Standard & Poor's, Fitch and so on.⁷ The next level in pillar 1 is called "Internal Ratings Based" (Approach). In the IRB, the risk weights and thus the capital requirements are partly based on the individual bank's internal estimates. There is also an advanced form of IRB, in which an even larger part of the capital requirements is influenced by the banks' own calculations.

For market risks, there is also a simple and an advanced alternative to choose from. The treatment of market risk has not changed from the present Capital Accord to Basel II.

For operational risk, there are three alternatives, called Basic Indicator Approach, Standardised Approach and Advanced Measurement Approaches, AMA.

In every case banks have an incentive to move to a more advanced level since the required capital will then be more closely aligned with the bank's actual risk. In most situations this implies a lower capital requirement. However, when a bank opts for a more advanced alternative it has to prove that it has accurate and well-tested systems for its management, in particular for the management of risks and capital. Thus, a lower capital requirement for such banks would be matched by a lower risk of bank failure; in other words, this is fully in line with the objective of Basel II – that capital requirements reflect actual risks.

Basel II is more than capital requirements – pillars 2 and 3

Basel II includes rules for banks' management of risks and capital, supervisors, and public disclosures of information.

One of the major achievements in relation to Basel I, which was purely quantitative, is that Basel II also includes comprehensive rules for (i) banks' management of risks and capital, encompassing all material risks, not just those covered by the capital requirements under pillar 1, (ii) supervisors, who may demand additional capital or restrict operations in individual banks, and (iii) public disclosures of bank information. Basel II is intended to exert pressure so that the whole bank is managed in an integrated fashion, with good corporate governance. It also forces supervisors to develop processes to understand and monitor in depth how each bank actually operates. Some of these important "non-quantitative" components of Basel II are discussed below.

⁷ For instance, in the absence of rating a non-financial company is assigned a risk weight of 100 per cent; if a rating exists, however, the risk weight for the same company could be 20, 50, 100, or 150 per cent, depending on the rating class.

STRONGER CORPORATE GOVERNANCE

Basel II calls for stronger corporate governance of banks. Banks' Boards of Directors must set the overall strategies for risks and capital, besides deciding which systems for risk management and controls are to be used in the bank. In addition, they must regularly monitor the bank's compliance with these systems and strategies. The CEO and other members of the management team are to apply the systems in the daily operations of the whole banking group and must report regularly to the Board – in particular when the rules have been violated. The bank's governance is supported by a strong internal audit function, which monitors not only compliance but also the validity of systems and controls. The audit function should report directly to the Board to reduce the risk of it being influenced by the management it monitors.

Boards of Directors must set overall strategies, decide systems for risk management and control and regularly check the bank's compliance with these systems and strategies.

Is stronger governance in banks a good thing? Yes, indeed. Many bank failures stem from lax or unwitting bank directors who gave the managers and operational experts too much leeway without taking an overall view on strategies and risks. Nick Leeson claims to have convinced Board members in Barings Bank that he had found a low-risk source of revenue in the derivatives market, which would provide high and sustained profits to the bank each year. Any member of a bank Board ought to know that risk and yield are closely linked.

BROADER ROLE FOR SUPERVISORS

Under Basel II the role of supervisors will be broader than at present. Among other things, they will:

- Endorse and validate individual banks' systems for risk, capital and internal audit.
- Check the actual application of these systems throughout the bank.
- Assess all material risks including concentration, and interest rate risk in the banking book.
- Assess risk in relation to available capital, and take corrective action when needed, including requiring additional capital for individual banks.

The revised and augmented role for supervisors under Basel II is a necessary development for several reasons. The increasing complexity of banking operations, instruments and organisations means that traditional supervision, such as focussing on individual transactions, is no longer effective, or indeed, feasible. Also, developments in financial instruments

The increasing complexity of banking operations makes the augmented role of supervisors necessary.

and markets have made it possible for banks to shift their risks as well as their assets and liabilities more rapidly than before. Even if they were to receive somewhat enlarged resources, supervisors would not be able to monitor the banks with a commensurate frequency.

The Basel II approach to this is three-pronged: (i) giving more responsibility to banks themselves to strengthen internal corporate governance; (ii) giving more powers to supervisors to ensure that banks establish robust management systems and operate in accordance with the rules, not only as they are written but also in line with their spirit; and (iii) giving external stakeholders increased means to analyse banks. Through this approach, it is hoped, supervisory work will be facilitated and supported by the bank's internal monitoring as well as by the monitoring conducted by external stakeholders. Taken together, this should mean that each bank's behaviour is scrutinised on a broad and frequent basis.

MARKET DISCIPLINE THROUGH PUBLIC DISCLOSURES

Academicians have been advocating for a long time that more of the supervision of banks should be left to market participants. Their reasoning is that market participants have an interest in identifying, analysing and publicising findings of positive or negative developments in a bank. That should elicit a reaction from various parties, for instance so that depositors start withdrawing their money. The mere risk of such repercussions would – the argument goes – lead bank managers to act with more forethought. A repeated proposal from academe is that banks should be obliged to issue debt instruments that are priced and traded on a liquid public market. Shifts in the market perception of a bank would immediately result in movements in the price of the debt instrument and thus signal the condition of the bank.

Basel II seeks to increase market discipline by requiring banks to publish more substantive and frequent information.

Basel II does not include this idea of issuing debt, but seeks to increase market discipline by requiring banks to publish more substantive and more frequent information than today about their risks, capital and other aspects. Banks must not only publish the actual numbers but also explain their strategies, management methods and governance structures. The only secrets a bank may keep in this regard are those which are close to the bank's internal business strategy.

Supporting market discipline by information disclosures is an important part of Basel II. At present, rules and practices on bank disclosures vary greatly between banks and also between countries. Many countries' supervisors demand far fewer and less detailed disclosures from banks than is presently the case in Sweden and even here requirements fall short of the desired degree of transparency. Whether or not more disclosures

will in fact lead to better market discipline depends to a very high degree on the recipients of the information. Investors, analysts and others must be prepared to scrutinise it carefully and publish their unbiased views. Banks' counterparties should be ready to react to it. The disclosure instrument will then influence the banks' behaviour as intended. Successfully implemented, this would provide a highly useful complement to the regular supervision, since, unlike investors and analysts, the authorities neither can nor should be involved in the operations of banks on an ongoing basis.

Challenges when drafting the new rules

In drafting the Basel II framework, the Basel Committee faced the dilemma that while similar rules should apply to all countries and all banks to ensure fair competition, countries and banks also need some differentiation for local circumstances. A solution was found by making the Basel II framework apply the same basic rules to all but with a large number of "options" whereby individual countries can adapt their own rules if they can show they have good reasons for doing so. For instance, if a country can demonstrate that the losses its banks have suffered from real estate loans are much smaller than those of other countries' banks, then it will be allowed to use an "option" of reduced risk weights for real estate loans.

Another dilemma when constructing Basel II was that banks differ. Imagine a small local savings bank with simple deposit and lending operations on the one hand and an international mega bank with a global presence and some extremely sophisticated financial services on the other. How can you construct regulations that cope with the complexity of the latter without placing an unreasonable burden on the former? That is why Basel II provides different layers of complexity from which banks can choose. Advanced and large banks are expected, by the market and by supervisors, to apply the advanced risk management methods. A bank with non-complex operations may use a simple and less expensive system.

A general challenge in rule-making is to produce something that does not rapidly become obsolete on account of rapid developments in the financial field. Basel II is drafted flexibly so that future changes, such as new financial instruments, new activities and so on, can be incorporated without having to change the basic structure. Basel II aims to give banks a high degree of freedom in the way they operate or may operate in the future, but has some built-in restraints to ensure at least a basic level of capital, such as minimum "floors" on the capital requirements even

The Basel II framework applies the same basic rules to all, but with a large number of "options".

Banks can choose from different layers of complexity.

Basel II is drafted flexibly to allow for future changes.

when a bank's temporary situation could be seen to justify an even lower level of capital.

In all three examples above, the solution included providing more flexibility in the rules and for the banks. Note, however, that this approach does have side-effects. For instance, a flexible application of rules may distort preconditions for fair competition on a level playing field. Rule flexibility may also lead to "supervisory arbitrage", whereby banks seek to identify instruments, operations or jurisdictions where the rules are less strict. Such arbitrage towards less regulated areas may increase banks' vulnerability to destabilising incidents.

Controversial issues

In the public debate, various parties have criticised aspects of Basel II. These criticisms differ in kinds. Some focus on the macroeconomic side effects, others on the structural effects, and others again on issues of competition and fairness. A number of the most hotly debated issues are summarised below.

- **Procyclicality:** Larger risk weights and higher capital requirements may restrict bank lending when it is most needed in cyclical downturns and lead to excessive lending at cyclical peaks. That could exacerbate cyclical swings. When constructing Basel II there was a need to balance this cyclical effect with the need to create rules that are truly risk-sensitive. A mix of partial solutions was adopted, such as requiring banks to assess the creditworthiness of borrowers over a period that includes good times as well as cyclical downturns. Banks would then hold a cushion of extra capital in good times. It may also be that the fears of large swings in lending are exaggerated since it is in the interest of banks to extend loans to creditworthy borrowers even in macroeconomic downturns. That being said, the structure of Basel II itself – which aims for a closer link between capital requirements and actual risks in lending – will indeed tend to lead to more procyclicality in lending than the present Basel Capital Accord. That is one of the issues on which a balance must be struck between financial system stability and other macroeconomic aims.
- **Loans to small and medium-sized companies (SMEs):** Such loans may in many cases look more risky, for instance due to the limited size of such enterprises' capital. However, in many countries, the development of SMEs is important for overall economic growth. SMEs and politicians have expressed concern that high capital

requirements in Basel II might reduce lending to SMEs and also make it more expensive. The Basel Committee considered the issue further and noted that the risk from lending to SMEs was lower in practice than indicated by share capital and tangible assets. For instance, the owners, who in many cases are also the managers, of SMEs usually assume an added financial responsibility for their firms and are often prepared to supply other funds when needed to prevent a payment failure. Another aspect is that lending to a large number of fairly small SMEs implies a high degree of diversification in a bank's portfolio and this reduces the risk of major total losses to the bank. These and other considerations induced the Basel Committee to reduce the risk weights and thus the capital requirements on loans to SMEs under certain conditions. As in the case of procyclicality, in its treatment of the SMEs, Basel II had to strike a balance between a more technically-oriented risk weight assessment and the overarching macroeconomic aspects.

- **Large banks:** Some have argued that Basel II will favour large banks⁸ because they are more likely to adopt the advanced risk management methods and thus benefit from lower capital requirements. It is probably correct that more large than smaller banks will adopt the advanced methods. Huge fixed costs are involved in setting up advanced risk management systems, while the operational costs are limited. Hence, once a bank has invested in a sophisticated system, it can make substantial savings in costs for capital requirements and these savings might be used to buy small banks. But that need not necessarily happen. Small banks compete with much more than the price for their services, for instance with their local presence and knowledge about customers. It is also evident in practice that owners of many small banks, such as savings banks and cooperative banks, require a lower yield on their capital than the owners of listed banks.
- **Non-banks:** "Basel II favours non-banks". The notion here is that institutions which avoid capital requirements will be in a favourable position to compete with the banks. My view is that Basel II will rather improve the competitive situation of banks in certain operations since capital requirements will be more closely related to risk. For instance, banks may be able to regain some lending to highly creditworthy companies, which earlier went to the securities markets because the capital requirements were too high in relation to the

⁸ To be more precise, this discussion is about complex versus non-complex banks, rather than large versus small banks. A large bank conducting few and uncomplicated operations may introduce an advanced risk measurement and management approach fairly easily and at limited cost.

actual risk. In fact, Basel II will alter the current incentives for lending – for instance, some borrowers will become more welcome and others less so in certain banks, depending on their risk profiles. Basel II will also strengthen the incentives for more risk-aligned pricing. Competition among banks and between them and other financial institutions will be altered – e.g. for operations that are favoured or disfavoured by introducing Basel II. All this is generally welcome because a better allocation of risks and capital will promote financial stability and economic efficiency. However, some negative side-effects are unavoidable, for instance during the transitional phase.

- **Emerging market:** “Too expensive for emerging markets”. The argument is that less rich countries cannot adopt Basel II because of the high costs for introducing risk management systems in banks and more efficient but resource-consuming supervision. But this argument ignores some important aspects. Firstly, the simpler measurement methods of Basel II are far less expensive and better adapted to countries with less complex banking activities. Secondly, good risk management in banks and effective supervision will pay for themselves by reducing the incidence of bank failures. Dealing with a major banking crisis is many times more expensive than the cost of almost any risk management system. Hence, before implementing Basel II, countries should focus on introducing a framework of sound practices for the “basics” of regulation, supervision and bank management. Having done that, a country should adopt the Basel II alternative that suits the situation of its banking system (small or large; simple or sophisticated; national or cross-border) and risk structures.
- **Advantages for large banks:** “Large banks from developed countries will have competitive advantages in emerging markets and developing countries”. For instance, external ratings from major international rating agencies are much more frequent in developed countries. Hence, goes the argument, a bank from a developed country will get lower capital requirements. However, there is a fallacy in this line of reasoning. The fact that there are more ratings in a bank’s home country will not benefit it in the host country. If a borrower has no rating, the standardised risk weight will be the same for the international bank as for the local bank.

A conceivable situation is that the national authorities only allow their banks to apply the simpler measurement methods of Basel II, while an international bank from another country might be allowed in its home country to apply the advanced methods on a consolidated basis for all its entities. The host authorities in the less developed

country then have a choice – accept that the bank may use the advanced methods also in the host country or demand that it applies the simpler methods to its local subsidiary. This is a matter for negotiation between the two countries. Requiring all banks, local or international, to apply the same simple Basel II approach in a country would create a level playing field in a regulatory sense. However, it would also stifle the beneficial influence on the local banks from the introduction of better risk management methods.

- **Risk of herding behaviour:** This risk relates to Basel II's implementation rather than to its structure. The concern is that too much supervisory harmonisation in the implementation of Basel II, or “voluntary harmonisation” by the banks themselves, might lead to excessively similar risk management systems, which will reinforce cyclical swings and increase the risk of systemic disturbances. However, studies on banks⁹ which are already operating similar systems indicate that banks in fact assume different risk attitudes to the same companies, for sound economic reasons. Hence the impact in the event of any herding might not be as large as feared. Nonetheless, it would be unfortunate if there was a far-reaching standardisation of, for instance, risk measurement systems. It might happen under certain circumstances that all these systems would produce misleading risk estimates and thereby threaten the banks.
- **Supervisory capture:** Under Basel II, supervisors will have the task of endorsing a bank's methods and processes, e.g. for managing risk and capital. The supervisors will also monitor the planned functioning of these methods and systems. Some have expressed worries that once a supervisory authority has endorsed a specific process or method, the authority will be less inclined to express criticism of the process or method since this would implicitly criticise its earlier approval.

Of course, this worry can be neither confirmed nor rejected until Basel II has been up and running for some time. Still, the implementation of Basel II clearly will (and is intended to) increase the demands on supervisors' skills and integrity and it is crucial that the supervisory agencies are provided with the resources and other means to meet these demands. “Supervisory capture” is not a new issue and present rules for supervisors deal with it. For instance, some countries apply

⁹ Jacobson, T., Roszbach, K. & Lindé, J., (2003), Internal Rating Systems, Implied Credit Risk and the Consistency of Banks' Risk Classification Policies, Sveriges Riksbank, Working Paper No. 155, December, (www.riksbank.com/research/roszbach).

rules that make the supervisory authority legally liable for taking adequate and timely action to deal with weaknesses in banks.

Hence, there seem, at least in my view, to be reassuring answers and partial solutions to the controversial issues mentioned above. Nonetheless, the whole process of shaping and implementing Basel II has benefited and will continue to benefit from such critical and legitimate scrutiny. If Basel II is to receive broad acceptance and also to function better, all potential weaknesses and side-effects of the framework, be they on the banks or on other parts of the economy, must be identified, analysed and discussed. Partial solutions may be found for some of these weaknesses and side-effects, e.g. by adapting Basel II. In other cases, however, the contradictions between Basel II and other objectives, such as macroeconomic developments, may not be fully solvable but at least a discussion will clarify the nature of the conflict.

Operational risk issues¹⁰

Basel II has three levels for measurement of operational risks, designed to match the sophistication of a bank's operations.

The present capital requirements are calculated solely for credit and market risks, although the credit risk component implicitly includes operational risk. Basel II also has explicit capital requirements for operational risk. Many, including the managers of most large international banks, see these risks as significant and thus important to manage. However, many kinds of operational risk are very difficult to measure with a view to providing a basis for capital requirements. Operational risks include frequent events that have little impact on a bank, such as the daily miscounting – intentional or otherwise – by the bank's numerous cashiers. But they also include highly infrequent events that can have a major impact, such as an earthquake or an act of terrorism. How are such disparate risk categories to be reconciled in a measurement system? Basel II has three levels for the measurement of operational risks, designed to match the sophistication of a bank's operations:

- **Basic Indicator Approach:** The magnitude of a bank's operational risk and thus its capital requirement is calculated as a fixed proportion of the bank's net interest income and non-interest income, measured as the average over the last three years.
- **Standardised Approach:** All of a bank's operations are categorised and given fixed risk weights in proportion to the amount allocated to

¹⁰ In Basel II, operational risk encompasses events caused by individuals, systems and "nature". This covers a wide range of events, from miscalculations to fraud or IT-system breakdowns. It also includes fires, natural disasters and terrorist actions. Also legal risks are included.

each category. The overall capital requirement is the sum of the requirements for all the categories.

- **Advanced Measurement Approaches, AMA:** In keeping with the advanced methods for the calculation of credit and market risks, the capital requirement is based on the bank's internal system for the measurement and management of operational risk.

Depending on the choice of measurement method, the above will provide a crude, or a more advanced, estimate of a bank's operational risks. What matters much more than the actual amount prescribed by the capital requirement, however, is that the bank management will be forced to develop a system to identify, measure, manage and, not least, mitigate the operational risks of the bank. In fact, now that bank managements are focusing more on operational risk issues as a result of Basel II, they increasingly acknowledge that these risks need to be dealt with in a structured manner.

Conclusion – the role of Basel II in the regulatory framework

- Some degree of regulation and supervision of banks is beneficial to society as a whole because banks on their own may not take external considerations fully into account. On the other hand, excessive regulation is not desirable because it stifles development and diversity in the banks. Moreover, all regulation should ideally be constructed so that it steers banks towards a behaviour that is beneficial for society, while not restricting development.
- Basel II tries to achieve these goals by closely linking capital and risks; by strengthening corporate governance in banks; by giving supervisors more instruments to address weaknesses in banks; and by increasing market discipline. To a much greater extent than hitherto, Basel II will enable banks to be flexible in using their own methods and systems, when adequate, to fulfil the regulatory requirements.
- The implementation of Basel II will increase the financial stability of banks as well as of financial systems. This is beneficial for macroeconomic growth in general.

The implementation of Basel II

As already noted, Basel II will come into effect on 1 January 2007. It must be implemented by the internationally active banks in all G10 countries and by all banks, credit institutions and also securities firms in every EU member state. For all other countries it is a voluntary undertaking but

Basel II will come into effect on 1 January 2007 in all G10 countries and in all EU member states.

many countries around the world have already declared an intention to apply the new rules. A country may decide to limit the choice of alternatives in Basel II for its own jurisdiction. For instance, the USA have stated that only the most advanced approaches for risk measurement and capital requirements will be accepted for their banks, and thus only the country's ten to twenty largest international banks¹¹ will be allowed to use Basel II. Some countries will allow their banks only to use the simple approaches of Basel II, since they acknowledge that their banks and other circumstances will not (yet) be ready for the advanced alternatives.

Implementing Basel II in all countries which have decided to adopt it is a huge process. It involves, among other things, new legislation, new working processes and additional staff skills in the supervisory authorities and central banks, bilateral negotiations between countries which have common cross-border banking groups and, not least, setting up and running complex systems and procedures in banks.

As in many other countries, an intensive process has now been set in motion in Sweden to prepare for implementation on the planned date.

As in many other countries, an intensive process has now been set in motion in Sweden to prepare for implementation on the planned date. Banks are compiling the information they need to estimate different risk factors, and are building and testing the systems needed to run the risk management. They are also preparing applications to the supervisors for using various measurement and management systems for risk and capital. The supervisors are bracing themselves to process these applications, for instance by formulating manuals and check-lists. An added layer of complexity in the process comes from banks that have a cross-border presence. A bank's home country supervisors must coordinate the application process with the supervisors of the bank's host country/countries. Ideally, a bank should only have to apply to one country's authority and get a coordinated response from it. However, particularly if the bank's subsidiary or branch is large in the host country, the supervisors of that country may wish to make their own scrutiny of the bank's applications and this may complicate the coordination.

At the time of writing, the legislative process is still underway in Brussels. Even if an EU Directive is agreed on as planned in the near future, a rapid process in the individual member states will be needed in order to transform the new EU directive into national legislation so that implementation may start on 1 January 2007.

¹¹ Between them, these banks cover close to 100 per cent of all US banks' operations abroad. All other US banks will be subject to other forms of regulation and supervision.

■ Monetary policy expectations and forward premia

BY JAN ALSTERLIND AND HANS DILLÉN

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Monetary policy expectations can be measured in various ways. Survey data can be used to measure repo rate expectations but this has the drawback that the data are rather infrequent. Another approach is to use the rates for treasury paper with different maturities to calculate the forward interest rate curve. Such implied forward rates have the advantage that they can be computed on a daily basis. Due to the existence of term premia, however, the short forward rates are not a direct reflection of expectations about the short-term market rate. In order to judge the extent to which the implicitly calculated short forward curve does mirror expectations of the shortest market rate, one needs to gauge the size of these premia. As the different measures have their particular advantages and drawbacks, there is something to be said for combining alternative measures of monetary policy expectations.

Monetary policy expectations

Monitoring and analysing monetary policy expectations – market expectations of the future level of the repo rate – is of interest for the Riksbank for a number of reasons. For one thing, in its Inflation Report the Riksbank now includes an alternative forecast of inflation, given that the repo rate will follow the path of the forward curve, which is assumed in turn to reflect the market's repo rate expectations.¹ It is also of interest to analyse the extent to which the market's monetary policy expectations and thereby the yield curve are affected by events in Sweden and the rest of the world, including monetary policy decisions and statements by members of the Riksbank's Executive Board.² The impact of monetary policy decisions

The impact of monetary policy decisions is dependent on the extent to which the decisions affect monetary policy expectations.

¹ In order to make this assumption less sensitive to temporary market movements, a 15-day average of the forward curve is used. For a fuller discussion of this assumption, see the box on pages 52–54 in Inflation Report 2005:1, Sveriges Riksbank.

² For a more comprehensive analysis of how various events, including monetary policy decisions and statements, affect the Swedish yield curve, see Andersson, Dillén & Sellin (2001).

is dependent on the extent to which the decisions affect monetary policy expectations.

Different methods for measuring monetary policy expectations are liable to produce different messages.

As indicated above, a relationship exists between monetary policy expectations and interest rates. A common way of measuring these expectations is therefore to use prices of fixed-income instruments. Another, more direct way of measuring these expectations is to use survey data. Monetary policy expectations can also be derived from forecasts published in market letters or in reports. However, different methods for measuring monetary policy expectations are liable to produce different messages. A notable difficulty is that the existence of various premia complicates the interpretation of monetary policy expectations measured via market rates. This warrants a closer look at the relationship between these expectations and interest rates.

The yield curve, forward rates and the expectations hypothesis

The yield curve shows interest rates for investments with different maturities.

The basis for deriving market expectations of future monetary policy from fixed-income instruments is the yield curve, which in simple terms can be said to show interest rates for investments as a function of their maturities. Fixed-income instruments with a variety of issuers are traded in the money and bond markets. However, the rates for treasury paper have a distinctive status and are often used as benchmarks because treasury securities do not carry the credit risk associated with, for example, the interbank market or corporate bonds. Moreover, the high turnover for treasury paper should lead to a low liquidity premium. Yield curves for T-bills and T-bonds are therefore used so that the premia investors require as compensation for credit and liquidity risks are disregarded as far as possible when measuring monetary policy expectations of the future repo rate.

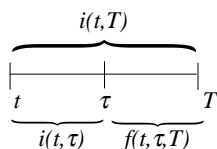
An interest rate contracted for a period in the future is known as the forward rate.

The yield curve also contains information about forward rates for different dates and maturities. Financial market participants sometimes have an interest in agreeing in advance on the interest rate for, say, a loan with a specified maturity that is to start in a year's time. In principle, a forward contract can then be drawn up, specifying the interest rate for the future investment. The contracted future rate is known as the forward rate. A forward rate, $f(t, \tau, T)$, is the rate agreed at time t for a loan or an investment starting at a future time τ and maturing at time T . The forward rates quoted in the market may not include all horizons and maturities.³

³ In Sweden, the market in Forward Rate Agreements (FRAs) for a three-month deposit rate, Stibor (Stockholm Inter Bank Offer Rate), is relatively liquid. Contracts are made for maturities up to two years but are traded on fixed dates (IMM days) every third month. Rates on T-bills normally differ to some extent from interbank rates. All this means that further processing is needed before FRAs can be taken to represent T-bill rates.

However, ordinary spot rates from the yield curve can be combined to give implied forward rates.⁴

THE RELATIONSHIP BETWEEN SPOT RATES WITH DIFFERENT MATURITIES AND THE FORWARD RATE



i = spot rate f = forward rate

As monetary policy analysis tends to focus on forward rates with a maturity, $T - \tau$, that is very short, it is customary to omit the maturity date T . The notation $f(t, \tau)$ can accordingly be read as the overnight rate agreed at time t for time τ .

What is it, then, that determines the level of the forward rate $f(t, \tau)$?

The expectations hypothesis holds that the forward rate, $f(t, \tau)$, represents the expected future level of a very short rate, for example the repo rate. This hypothesis accordingly implies that the forward rate does not differ systematically from the subsequent outturn of the spot rate.⁵

The expectations hypothesis holds that the forward rate represents the expected future level of a very short-term rate, for example the repo rate.

The Swedish forward curve over time

The curve for forward interest rates shows how the forward rate, $f(t, \tau)$, varies with the horizon $\tau - t$. Thus, according to the expectations hypothesis, the forward curve represents the expected future path of a short-term interest rate, often interpreted as the repo rate. To what extent does this interpretation of the forward curve hold in practice?

In a neutral phase of the economic cycle, with no expectations that short-term rates will rise or fall, the expectations hypothesis calls for an entirely horizontal forward curve. It follows that the hypothesis posits a yield curve that is flat on average over a longer period that includes cyclical ups as well as downs and stable long-term inflation expectations.

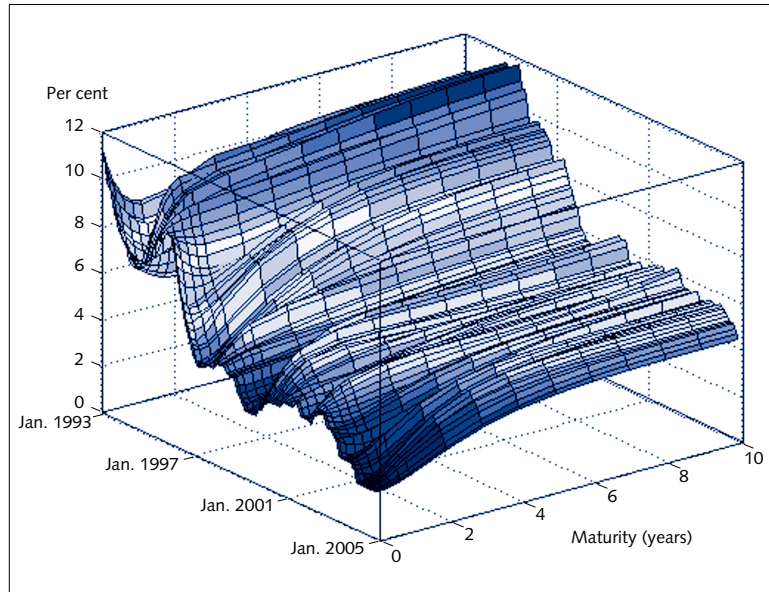
In a neutral phase of the economic cycle, the expectations hypothesis calls for a horizontal forward curve.

⁴ Svensson (1995) gives $i(t, T) (T-t) = i(t, \tau) (\tau-t) + f(t, \tau, T) (T-\tau)$ where $t \leq \tau \leq T$. In this formulation, $f(t, \tau, T)$ denotes a forward rate that at time t is an agreed rate as of a future time τ for a loan with a maturity of $T - \tau$. The terms $i(t, \tau)$ and $i(t, T)$ denote continuously defined rates at time t for zero-coupon bonds maturing at times τ and T , respectively. According to the formula, there is nothing to prevent the construction of forward rates for long maturities as well.

⁵ The interest rates have been calculated with the extended Nelson & Siegel method, see Svensson (1995). This is done to facilitate comparisons between interest rates with different maturities. Some of the yield on a T-bond comes in the form of coupon payments, which means that two bonds with the same maturity may not generate the same cash flow. Moreover, the conventional interest quotations for T-bills and T-bonds are not entirely comparable; T-bill rates are normally expressed in simple annual terms, T-bond rates in effective annual terms. As T-bond quotations are affected by coupon payments, when analysing the yield curve it is appropriate to make an adjustment for such effects and use a single convention for the expression of interest rates.

The appearance of the forward curve since 1993 is shown in Figure 1.⁶

Figure 1. The Swedish forward rate curve 1993-2004
Per cent, monthly average



Source: The Riksbank.

In practice, since 1993 the forward curve has taken various shapes but it has mostly sloped upwards.

From Figure 1 it will be seen that in practice the shape of the Swedish forward curve has varied since 1993; it has had a downward slope in some periods but mostly its slope has been upwards to a varying degree.

According to the expectations hypothesis, a rising forward curve implies that the market foresees a future increase in short rates, while a downward slope implies expectations that short rates will fall. From Table 1 it will be seen that, whichever period one chooses, the average slope of the forward curve, measured as the ten-year forward rate less the repo rate, has been between 2.0 and 2.3 percentage points.

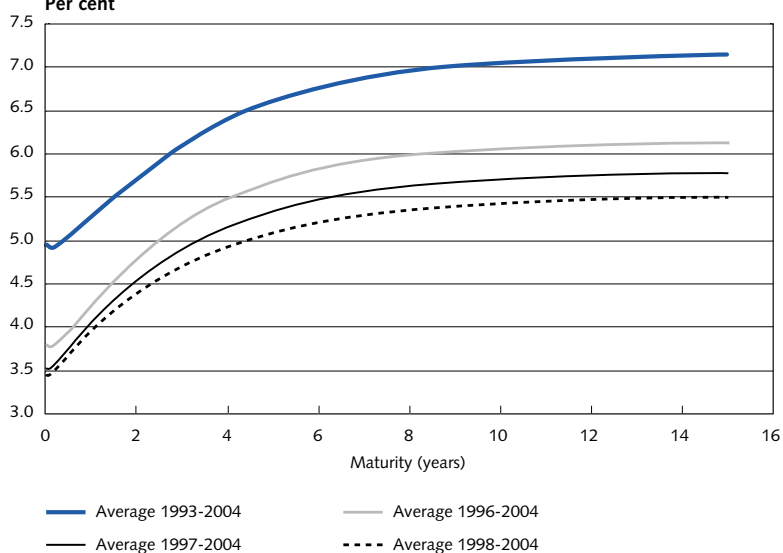
⁶ In Figure 1 the forward rates are expressed in continuously discounted terms. A continuously compounded rate (i^c) relates to an effective annual rate (i^e) in accordance with $i^c = \ln(1+i^e)$, where $\ln(x)$ denotes the natural logarithm of x .

TABLE 1. AVERAGE DIFFERENCE BETWEEN FORWARD RATES AND THE REPO RATE IN SELECTED YEARS
PERCENTAGE POINTS

Average difference between forward rate and repo rate	Average for			
	1993	1996	1997	1998
3 months	0.0	0.0	0.1	0.1
6 months	0.1	0.2	0.3	0.3
9 months	0.2	0.3	0.4	0.4
12 months	0.4	0.5	0.6	0.5
2 years	0.8	1.0	1.1	1.0
3 years	1.2	1.4	1.4	1.3
4 years	1.5	1.7	1.7	1.6
5 years	1.7	1.9	1.9	1.7
6 years	1.9	2.0	2.0	1.8
7 years	2.0	2.1	2.1	1.9
8 years	2.0	2.2	2.1	1.9
9 years	2.1	2.2	2.2	2.0
10 years	2.1	2.3	2.2	2.0

Source: The Riksbank.

Figure 2. Average forward rate curves for selected periods
Per cent



Source: The Riksbank.

What conclusions can be drawn from the Swedish forward curve?

Although the slope of the forward curve does not differ much between the periods, it is the years after 1998 that are most relevant here. By then, the inflation targeting policy had presumably gained sufficient credibility to warrant the assumption that expectations of long-term inflation were in line with inflation's targeted rate. In this period, interest rates have been formed under a uniform monetary policy regime and should therefore be unaffected by the initial problems with credibility that characterised the early years of inflation targeting.⁷ The period is also sufficiently long to include downward as well as upward cyclical phases. Even so, the average forward curve since 1998 has an upward slope. One explanation could be that, on average, money market participants have expected repo rate increases. Another could be that the expectations hypothesis is not entirely correct and that, as discussed later, the forward curve includes term premia. A combination of these two explanations is, of course, also conceivable.

There are, however, many indications that since 1998 and at least for somewhat longer periods, market participants have forecast repo rate increases (see Table 2).

**TABLE 2. SURVEY-BASED EXPECTATIONS OF REPO RATE ADJUSTMENTS *
NUMBER OF INCREASES AND NUMBER OF DECREASES/NO CHANGE OUT OF TOTAL NUMBER OF MEASUREMENTS**

		3 months	6 months	12 months	24 months
Increases	Prospera			17 out of 26	25 out of 26
	SME	37 out of 87	45 out of 87	72 out of 87	
Decreases/no change	Prospera			9 out of 26	1 out of 26
	SME	50 out of 87	42 out of 87	15 out of 87	

* SME's surveys go back to 1997 and Prospera's to mid 1998. The data run to February 2005 and represent the average of the survey responses.

Sources: Prospera, SME Direkt (SME) and the Riksbank.

The expectations hypothesis seems to be partially at fault, which means that the forward curve cannot be translated directly into expectations of the shortest interest rate.

From Table 2 it will be seen that for the longer run, survey data indicate that market participants have mostly forecast increases, which could help to explain why, on average, the slope of the forward curve is positive. However, in the shorter run (three and six months), forecasts of repo rate increases are more or less balanced by decreases, yet even the short segment of the curve has a clearly positive slope. This observation indicates that the forward curve can include a considerable element of term premia, so we shall now take a closer look at that. As the expectations hypothesis accordingly seems to be partially at fault, the forward curve cannot be translated directly into expectations of the shortest interest rate.

⁷ For an analysis of this, see Dillén & Hopkins (1998).

Premia complicate the interpretation of forward rates

According to the expectations hypothesis, the return market participants require on fixed-income securities is the same for long and short maturities. This assumption is probably not a particularly close approximation of reality. Some investors, for instance, may prefer certain maturities to others. This means that bonds with different maturities are not perfect substitutes and investors will demand additional compensation for positions outside their normal horizon. The impact of this compensation on the difference between short and long interest rates will depend on the participants' relative strengths. Investors are commonly perceived as preferring short maturities. For positions with longer maturities, they will then require additional compensation in the form of a term premium.

For positions with longer maturities, investors require additional compensation in the form of a term premium.

Measuring premia

The average slope of the forward curve can be seen as a rough indication of the existence of premia but it does not tell us much about any variations or systematic movements in these premia. That requires a deeper analysis. A common procedure in the academic literature is to define what is known as the excess return on a forward investment. This return is the additional yield that comes from buying a future investment today in the form of a forward contract compared with the actual future repo rate. Thus, the six-month excess return on the repo rate is the forward curve's implied repo rate six months ahead less the actual repo rate six months later. If the expectations hypothesis is correct, the excess return should then average out to zero.⁸ This can be investigated with the aid of the regression:⁹

The excess return is the additional yield that comes from buying a future investment in the form of a forward contract compared with the actual future repo rate.

$$xr(\tau) = \alpha(\tau) + \varepsilon(\tau)_{i+\tau} \quad (1)$$

where $xr(\tau)$ is the excess return τ periods into the future. Given the expectations hypothesis, the excess return will average out to zero. The constant $\alpha(\tau)$ in the regression should then not differ significantly from zero and the interference term $\varepsilon(\tau)$ should have a random distribution. In the cases where the constant does differ significantly from zero, it can be interpreted as a measure of the average term premium. Note, however,

⁸ Comparisons of forward rates and outturns usually assume rational expectations. Given the expectations hypothesis, this means that in the long run the forward rate should on average predict the repo rate. Any systematic difference between the forward rate and the repo rate is then taken to indicate the existence of a term premium.

⁹ This presentation of the hypothesis follows Piazzesi & Swanson (2004).

that the constant $\alpha(\tau)$ will include any substantial forecasting errors. The results are presented in Table 3.

TABLE 3. EXCESS RETURN*

τ days	$\alpha(\tau)$	Stand. error	t -value	DW	Number of observations
30	0.0525	0.0155	3.8641	2.0904	83
60	0.1165	0.0329	4.9291	1.1754	82
90	0.1877	0.0576	5.3349	0.9219	81
120	0.2642	0.0809	5.6239	0.6626	80
150	0.3439	0.1078	5.7747	0.5272	79
180	0.4668	0.1426	5.8407	0.4668	78

* The measurements were made at mid-month (as close as possible to the 15th) using data with overlapping observations. This has been corrected for by calculating the standard error in accordance with the Newey-West method. DW is the Durbin-Watson statistic. The opening period in the data sample is January to June 1993 and the sample ends with December 2004.

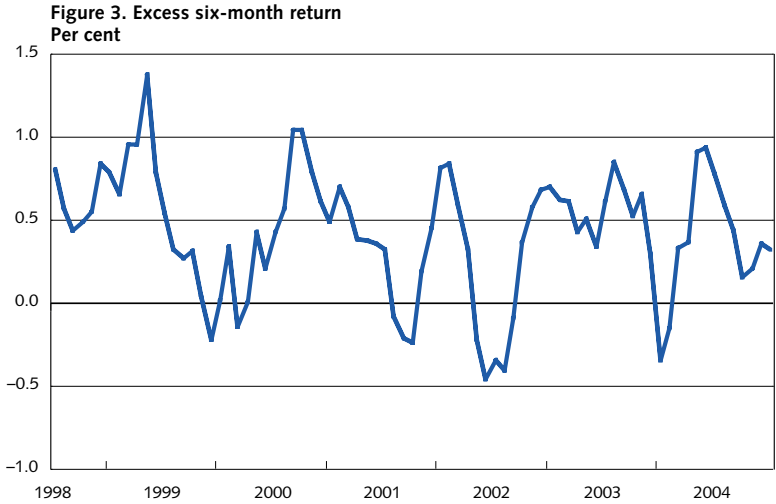
Table 3 shows that the constant, $\alpha(\tau)$, in regression (1) is positive and significantly different from zero in every case and that it grows with the time horizon τ . At six months, the term premium measured in this way has been about 47 basis points on average since 1998. This can be taken to indicate that, on average, the implied forward rate has overestimated the actual repo rate by 47 basis points. During the period studied here, however, SME's survey data for six months have had an average forecasting error of about 30 basis points and this error may have led to some increase in the value of the constant.¹⁰

Interpreting the constant in regression (1) as the term premium presupposes that, on average, the market participants' repo rate forecasts were correct. However, the period since 1998 is probably too short for the occasional overestimations of the repo rate to be balanced by underestimations. Terrorist attacks in September 2001 illustrate that the element of negative economic shocks has outweighed the positive shocks. As a result, repo rate cuts have outnumbered increases, so repo rate forecasts have overestimated the outturn more often than they have underestimated it. The period has admittedly included downward as well as upward cyclical phases but resource utilisation has been negative on average and inflation below 2 per cent. It is therefore not unreasonable that market participants have been more prone to forecast economic recoveries and, as a natural consequence, repo rate increases. That money market participants have overestimated the future repo rate on average does not, as mentioned, necessarily mean that they have not used all the relevant

¹⁰ For the two-year horizon, Prospera's survey data have a forecasting error of almost 1 percentage point. The sample is too small to support far-reaching conclusions but this does indicate that on average during the period, market participants' repo rate forecasts were on the high side. That makes it questionable to analyse excess returns for horizons of more than six months.

information; it is rather that the element of negative economic shocks has predominated in this period.

Table 3 also shows that the term premium can vary considerably. Measured in this way, in the normal case with a standard error of 0.14, a six-month term premium could range from 20 to 70 basis points. The fairly substantial variation in the excess return is also evident from Figure 3.



Source: The Riksbank.

It will be seen from Figure 3 that a high level for the excess return often persists. An expression of this is the non-random distribution, particularly for the longer maturities, of the interference terms in regression (1).¹¹ It is not easy to distinguish between correlated forecasting errors and a variation in the term premium over time as explanations for this; a combination of the two cannot be ruled out.

The complication of forecasting errors, which can affect both the level of and the variation in measurements of the term premium, calls for a cautious interpretation of the excess return. It then seems natural to look for a supplement to the excess return as a measure of term premia. It may also be of interest to obtain a picture of the term premia's importance for horizons beyond six months.

The complication of forecasting errors calls for a cautious interpretation of the excess return.

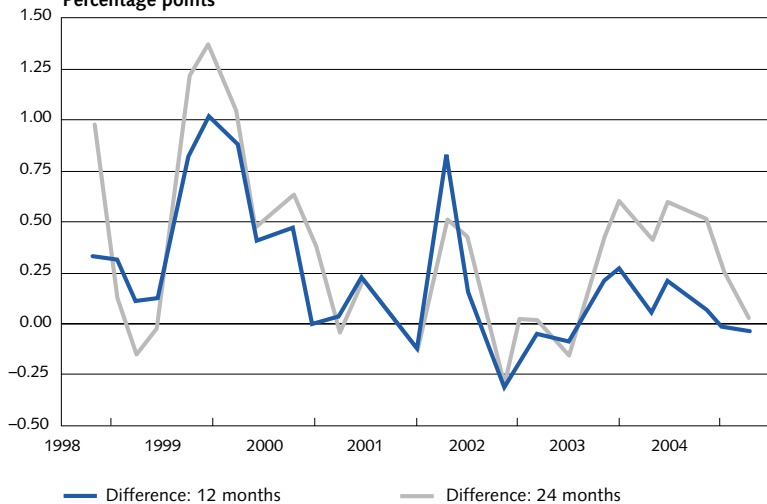
¹¹ An indication of this is the low values of the Durbin-Watson (DW) statistic in Table 3.

Gauging term premia from survey data

Survey data have the advantage of providing concrete estimates of market expectations of the future repo rate without requiring an adjustment for term premia.

Market participants' repo rate expectations can be measured directly from survey data. The surveys, which often poll market analysts, report responses to direct questions of the type: What do you believe the repo rate will be in, for example, six months' time? For some time now the Riksbank has commissioned such surveys from Prospera and, earlier, Statistics Sweden. Similar surveys are also conducted regularly by other agents, such as SME and Reuters. These surveys have the major advantage of providing concrete estimates of market expectations of the future repo rate without requiring an adjustment for term premia. As the data provide a direct estimate of the expected repo rate, it is natural to use the surveys to decompose the forward rate into the expected repo rate and the term premium. The surveys map monetary policy expectations up to two years ahead and are therefore a valuable complement to the excess return when estimating term premia. Moreover, surveys avoid the problems with forecasting errors that are associated with indirect measures such as the excess return and they also provide a time-varying measure of term premia. Figure 4 shows the difference between forward rates and Prospera's survey responses for 12 and 24 months respectively.

Figure 4. Difference between forward rates and expectations of rates 12 and 24 months ahead as surveyed by Prospera
Percentage points



Sources: Prospera and the Riksbank.

There is close agreement at present between survey responses and implied forward rates, which suggests that the term premium is small. However, the forward rates have exceeded the survey-based expectations for 12 and 24 months by, on average, 20 and 40 basis points.¹² These figures provide an estimate of the term premia's average size.

There is close agreement at present between survey responses and implied forward rates, which suggests that the term premium is small.

TABLE 4. DIFFERENCE BETWEEN REPO RATE EXPECTATIONS DERIVED FROM FORWARD RATES AND FROM SURVEYS, RESPECTIVELY, FROM DECEMBER 1997 (SME) AND AUGUST 1998 (PROSPERA) TO FEBRUARY 2005

	SME's surveys			Prospera's surveys	
	3 months	6 months	12 months	12 months	24 months
Mean	0.09	0.14	0.12	0.22	0.37
Standard deviation	0.13	0.22	0.33	0.25	0.32
Minimum	-0.19	-0.41	-0.68	-0.31	-0.29
Maximum	0.46	0.71	0.99	0.82	0.98

As expected, the difference between the forward rate and survey responses seems to grow from one year to two years, which is consistent with the observation that the slope of the forward curve is positive on average. Compared with the other measures of the term premium, however, this measure is considerably lower for both the three- and the six-month horizon. However, this comparison may be misleading: when allowance has been made both for the variation in the excess return at six months and for the probability that forecasting errors tend to push the measure up, the differences between the two measures become non-significant. Moreover, survey-based expectations have the advantage of making it possible to estimate term premia at 12 and 24 months.

Problems with surveys as indicators of market expectations

While surveys avoid the problems associated with term premia, they have problems of their own. One problem has to do with semantics: when asked what level of the repo rate they expect, respondents can state the level they believe is most probable as opposed to the mathematical expectation, which also takes less probable outturns into account.¹³ The expectations hypothesis, which is a common foundation for the analysis of interest rates, is based on the mathematical expectation. A case in point is a money market participant who is asked what repo rate the Riksbank will set at a future monetary policy meeting. He or she may state that the Riksbank is expected to leave the repo rate unchanged and

One problem with survey-based expectations is semantic, another is that the statistical sample is often small.

¹² The results are markedly affected by three observations around the turn of 1999; excluding these, the average differences at 12 and 24 months are 0.13 and 0.26, respectively.

¹³ The most probable value can be said to correspond to a typical value.

Analysts are usually polled for surveys and may interpret information differently from active market participants.

then add that there is still a substantial risk of the Riksbank adjusting the rate. This qualification denotes a risk that may not show up in the survey data but will still be priced in the market. Another problem with survey data is that the statistical sample tends to be small, so that the results are more likely to be distorted by extreme responses. As surveys are conducted relatively infrequently, they are often unable to catch major unforeseen events that can be assumed to have altered repo rate expectations.

The difference between forward rates and survey-based expectations has been discussed here in terms of term premia. A reservation should be made, however, for the observation that there have been periods when this difference was negative. While a negative term premium is not inconceivable, there is a rather strong view that it ought to be positive. The negative difference between forward rates and survey-based expectations can have to do with measurement problems connected with surveys (semantic difficulties, extreme responses, etc.) but it can also stem from a sampling effect if the measured expectations of the respondents differ from those of dealers in Swedish fixed-income securities. Surveys usually poll analysts, who do not necessarily interpret information in the same way as active market participants. For example, domestic developments may carry more weight for an analyst than for those who participate in the international financial markets. The latter are no doubt influenced to a greater extent by international economic developments. The strong co-variation between Swedish and international bond rates suggests that this is the case. Negative differences between forward rates and survey responses were particularly characteristic of the period around the turn of 2002. This possibly had to do with effects of the international stock-market fall, which helped to push international bond rates down in that period.

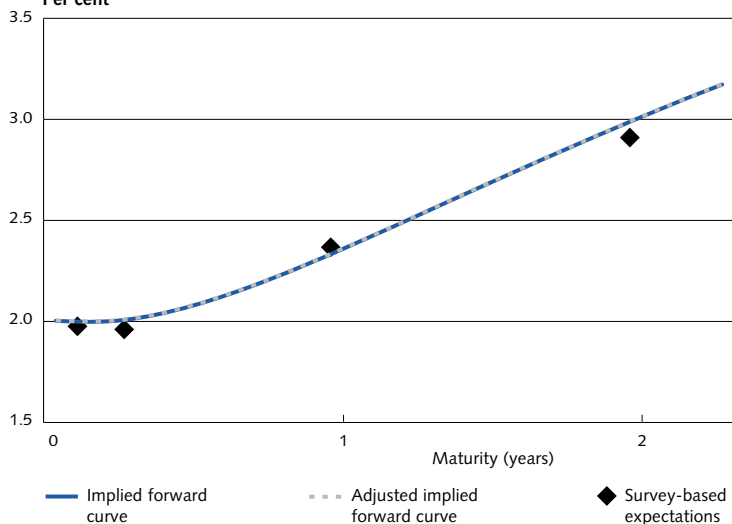
Measures of the term premium can be used to adjust forward rates

The measures of the term premia that are obtained residually as the difference between forward rates and survey responses can be used in turn to adjust the implied forward rates. One way of doing this is presented by Peacock (2004) in the Bank of England quarterly bulletin.¹⁴ A variant of Peacock's method is shown in Figure 5.¹⁵ It will be seen that when these measurements were made, the differences between survey responses and

¹⁴ See Peacock (2004).

¹⁵ The measures of the expected rate are from SME's February survey of repo rate expectations up to one year and from Prospera's February survey of these expectations two years ahead. The term premium is then measured as the difference between the forward rate and the survey result. A functional relationship is fitted to the observed premia and can then be used to adjust the whole of the forward curve.

Figure 5. Implied forward curve without and with an adjustment for forward premia based on surveys by SME and Prospera
Calculated 16 February 2005
Per cent

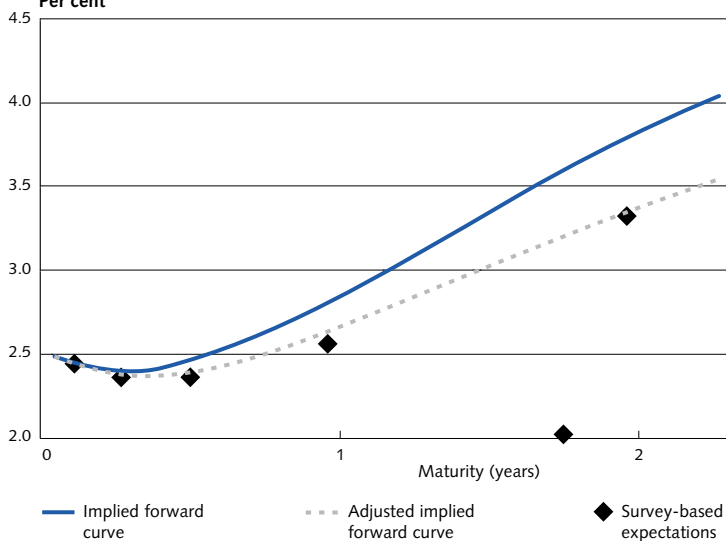


Sources: Prospera, SME and the Riksbank.

forward rates were negligible. No sizeable adjustment of forward rates is therefore called for in this case.

But this is not the normal situation. The same analysis just over a year ago would have shown a two-year term premium of about 50 basis points. This indicates a corresponding adjustment of the implied forward curve for a two-year horizon, as shown in Figure 6.

Figure 6. Implied forward curve without and with an adjustment for forward premia based on surveys by SME and Prospera
Calculated 3 March 2004
Per cent



Sources: Prospera, SME and the Riksbank.

Both survey data and forward rates should be used

The periodically large difference between forward rates and survey responses underscores the difficulty in measuring interest rate expectations.

Under all circumstances, the periodically large difference between forward rates and survey responses underscores the difficulty in measuring interest rate expectations. Whether monetary policy expectations are based on surveys or on forward rates, the results should be interpreted with caution. Another question is the extent to which measures of monetary policy expectations are able to predict the future path of the repo rate. In practice, one often has to rely on forward rates because relevant survey data showing how monetary policy expectations are affected by various events are normally not available. One should bear in mind, however, that forward rates are also affected by term premia, which can be large and volatile in periods of financial unrest. Survey-based expectations are therefore a more robust measure of monetary policy expectations and useful for checking against.

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■ The Riksbank's management of interest rates – monetary policy in practice

By ANNIKA OTZ

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The Riksbank's interest rate management is the operational component of its monetary policy process. Through its interest rate management, the Riksbank implements the Executive Board's monetary policy decisions by influencing the market's shortest interest rate, the overnight rate. Knowledge of how the Riksbank steers interest rates is thus important for those wishing to gain a more in-depth understanding of the Bank's monetary policy.

A previous article¹ in this journal explained the Riksbank's interest rate management in the light of the traditional approach for inflation targeting given in textbooks, coupled with a comparison with the system used by the US Federal Reserve. The aim of this article, besides elucidating how monetary policy is implemented in practice, is to further clarify the connection between the steering of interest rates and the Riksbank's payment system.

Fundamental conditions for the Riksbank's management of interest rates

The banks' borrowing or deposit requirement overnight constitutes the essence of the Riksbank's management of interest rates.

Interbank payment transactions require a common payment system.

When banks need to borrow or deposit funds in kronor, they can do so with each other at different maturities. The most interesting maturity, which constitutes the essence of the Riksbank's ability to influence interest rates, is the banks' borrowing or deposit requirement *overnight*.

Banks' need to borrow funds from, or deposit funds with, each other overnight stems from the payments that occur between them during the day. But in order for banks to be able to carry out these payment transactions at all, a common *payment system* is required.

¹ Mitlid & Vesterlund (2001).

THE RIKSBANK'S PAYMENT SYSTEM – A PREREQUISITE FOR STEERING INTEREST RATES

When households and companies pay their bills they do so through the bank in which they hold their accounts. The bank then forwards the payment to the recipient's account. If this account is held in a different bank the process requires a payment system, that is to say, an infrastructure that makes it possible to forward a payment from one bank to another. In Sweden the Riksbank provides such a payment system, called RIX.²

Payments in RIX are made in Swedish kronor only and go via the participant banks' accounts at the Riksbank. Those banks that do not participate in RIX have to go through the participant banks.

To ensure that payments can be made smoothly in RIX the Riksbank gives participants the opportunity to borrow interest-free funds from the Bank during the day, known as intraday credit. The banks can do so on condition that they have provided sufficient eligible assets to the Riksbank.

The payments in RIX are processed one by one, known as real-time gross settlement, when payers have sufficient funds in their accounts or adequate collateral to obtain intraday credit.

The Riksbank provides a payment system, called RIX.

The Riksbank gives participants the opportunity to borrow interest-free funds if required, known as intraday credit.

DEPOSITS AND LOANS AT THE RIKSBANK SET THE BOUNDARIES FOR THE OVERNIGHT RATE

Before the payment system closes, the banks' accounts in RIX must be balanced. That means that banks with intraday credit at the end of the day have to finance this in some way. Likewise, banks with a surplus in their Riksbank accounts have to make sure that they deposit these funds.

Banks can resolve this by turning to the overnight market or by borrowing or depositing funds at the Riksbank *overnight*, that is to say, by making use of the Riksbank's *marginal lending and deposit facilities* (the Riksbank's standing facilities). In other words banks can extend their loans overnight (through the marginal lending facility) or deposit funds overnight (through the deposit facility) at the Riksbank at interest rates announced in advance.

The lending rate is 150 basis points higher than the deposit rate (see Figure 1). This interest rate differential creates an incentive for banks to borrow from, and deposit with, each other at a rate of interest between the Riksbank's deposit and lending rates, thereby setting the boundaries for the overnight rate.³

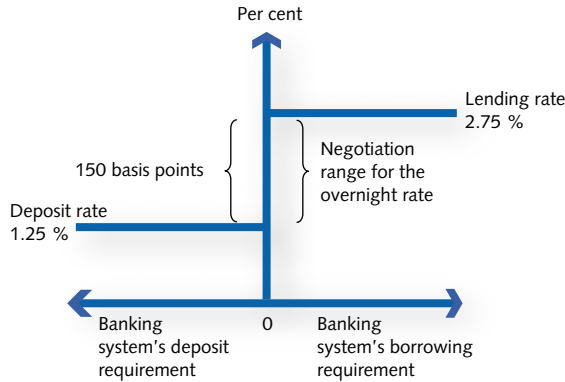
Banks can turn to the overnight market or make use of the Riksbank's marginal lending and deposit facilities.

The lending rate is 150 basis points higher than the deposit rate, creating an incentive for banks to borrow from and deposit with each other.

² The Riksbank's payment system RIX is a hub of the Swedish payment infrastructure. For more information, see Sveriges Riksbank (2004a).

³ Banks usually have a liquidity plan that extends over a longer period than overnight. Nevertheless, the overnight market is important for banks to be able to manage the deficits and surpluses that arise in their payment flows on particular days.

Figure 1. The Riksbank's deposit and marginal lending facilities (standing facilities)



Note. Interest rate levels as at 29 April 2005.

The Riksbank's mode of procedure

The Riksbank wants the overnight rate to be close to and stable around the repo rate.

The Riksbank's steering of the overnight rate is not only aimed at bringing it within the interest rate corridor, however; the Riksbank also wants it to be *close to and stable around* the Bank's key interest rate – the repo rate. In other words the Riksbank wants the overnight rate to be predictable over the coming week and not to fluctuate within the interest rate corridor. That is because the Bank wants to give clear signals for longer-term market rates. Since short-term market rates (up to six months or so) represent an average of the expected overnight rate at the respective maturities, a fluctuating overnight rate could give rise to unnecessary volatility at these maturities. This could also create undue speculation over why the overnight rate is lying closer to the ceiling or the floor of the interest rate corridor. A sharply fluctuating overnight rate could therefore be misinterpreted as monetary policy signalling.

The first step towards achieving a stable overnight rate is to minimise the banking system's need to borrow or deposit funds through the standing facilities.

So how does the Riksbank ensure a stable overnight rate? The first step is to ensure that the banking system's need to borrow or deposit funds through the standing facilities is minimised. Before going into this in more detail, we need to look briefly at how the banking system's borrowing or deposit requirement vis-à-vis the Riksbank changes. The easiest way to explain this is to take a simplified picture of what happens when the public varies its demand for banknotes and coins.

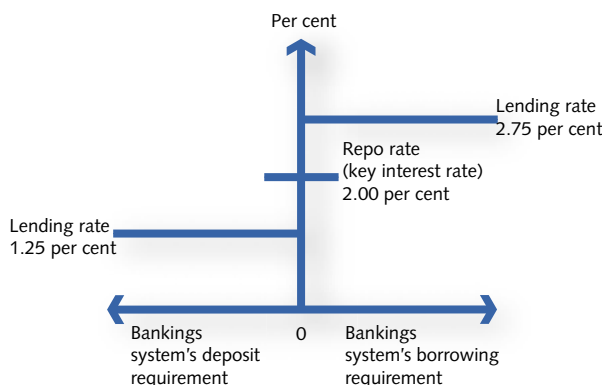
When people demand more banknotes and coins they withdraw them from banks, which in turn acquire the corresponding amount of banknotes and coins from the Riksbank. However, the banks have to pay for these notes and coins, which essentially means that they incur a liabili-

ty in relation to the Riksbank.⁴ If public demand for notes and coins drops, the banks instead return the corresponding amount of notes and coins to the Riksbank, thus decreasing their liability vis-à-vis the Riksbank.

Currently, the banking system as a whole has a borrowing requirement.⁵ In the absence of any Riksbank measures the banking system would borrow funds at the Bank's lending rate (the marginal lending facility) and the market's overnight rate would thereby be close to the lending rate. However, the Riksbank wants the overnight rate to be in the very middle of the interest rate corridor. For that reason the Riksbank has an arrangement whereby the banking system in the first place can borrow funds at the repo rate. This is done as follows: Every week the Riksbank forecasts the quantity of notes and coins that will be demanded by the public. From this forecast, the Riksbank can interpret how much the banks will want to borrow in conjunction with the Riksbank's *repo transaction* (repo)⁶. Through this repo the Riksbank satisfies the banking system's borrowing requirement and also signals the level at which it wants the overnight rate to be in the week ahead (see Figure 2).

The Riksbank has an arrangement whereby the banking system in the first place can borrow funds at the repo rate.

Figure 2. The Riksbank's official interest rates



Note. Interest rate levels as at 29 April 2005.

⁴ On condition that the banks can provide sufficient eligible assets to the Riksbank.

⁵ The banking system can just as well have a deposit requirement at the Riksbank. That is because the Riksbank's demand for assets to conduct monetary and exchange rate policy may exceed both the public demand for banknotes and coins and the Riksbank's capital. For example, under a fixed exchange rate, appreciation pressures may force the Riksbank to purchase such large volumes of foreign currency that the banking system as a whole needs to deposit funds at the Riksbank.

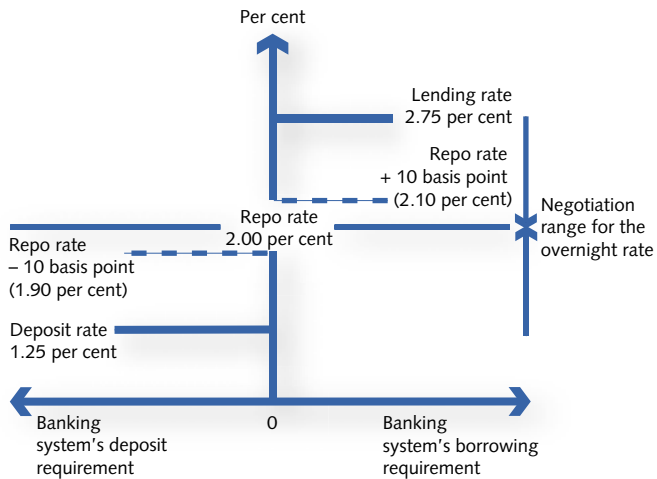
⁶ See step 2 for a description of a repo transaction (repo).

To prevent the overnight rate from fluctuating within the interest rate corridor, in spite of the repo, the Riksbank carries out fine-tuning operations.

Since the Riksbank's repo is based on a forecast for the following week the banking system's actual borrowing requirement will vary from day to day. That means that on certain days the banking system may need to avail of the Bank's standing facilities to borrow or deposit funds, and if the amounts are large this could cause the overnight rate to fluctuate within the interest rate corridor in spite of the repo. To prevent this from happening, the Riksbank carries out *fine-tuning operations*. These operations involve meeting the banking system's borrowing or deposit requirement on a particular day at a rate of interest that is 10 basis points above or below the repo rate.

In short, the Riksbank steers interest rates by providing standing facilities through which it can fix the market's overnight rate in the interest rate corridor. By means of weekly repo transactions and (almost) daily fine-tuning operations the Riksbank ensures that the overnight rate is anchored close to the repo rate (see Figure 3).

Figure 3. Negotiation range for the overnight rate



Note. Interest rate levels as at 29 April 2005.

The Riksbank's practical implementation of monetary policy

So what happens step by step when the Riksbank steers interest rates?

STEP 1. FORECAST OF THE SIZE OF THE MONETARY POLICY REPO

Every Tuesday the Riksbank forecasts how large the banking system's borrowing requirement⁷ in relation to the Riksbank will be on average in the coming week, that is to say, from Wednesday to Wednesday. The forecast is based on an estimate of changes in the Bank's assets and liabilities (the balance sheet).

The Riksbank's assets comprise the gold and foreign exchange reserve, which, besides gold, consists of securities denominated in foreign currency and receivables from the International Monetary Fund (IMF). In addition, the Bank's assets are composed of other assets⁸ as well as lending to banks, which, in simplified terms, is due to the banks obtaining notes and coins from the Riksbank. Thus, in principle, the item "lending to banks" should equal the item "banknotes and coins in circulation". However, in order to be able to intervene in the foreign exchange market and to generate as high a return as possible on its assets, the Riksbank has chosen to exchange some of its claims on the banking system for foreign currency.

The Riksbank's liabilities largely comprise banknotes and coins in circulation as well as capital. In addition, the Bank's liabilities are composed of deposits from banks and other liabilities⁹ (see Figure 4).

The forecast is based in practice on the item "banknotes and coins in circulation".

FIGURE 4. THE RIKSBANK'S BALANCE SHEET (ADJUSTED) AS AT 31 DECEMBER 2004

Assets	SEK million	Liabilities	SEK million
Gold and foreign exchange reserve	162 649	Banknotes and coins in circulation	108 894
Lending to banks		Deposits from banks	
Monetary policy repos	16 473	Deposit facility	86
Marginal lending facility	2	Other liabilities	9 836
Other assets	3 205	Capital (incl. financial result for the year)	63 513
Total	182 329	Total	182 329

Note: The item "Monetary policy repos" includes fine-tuning operations (net).

Source: The Riksbank.

It is relatively easy to forecast changes in the Riksbank's assets because generally speaking these items are influenced by the Bank's own deci-

⁷ In cases where the banking system as a whole has a deposit requirement and thus needs to deposit funds during the week the Riksbank issues certificates (instead of implementing a monetary policy repo), which means that the Riksbank pays weekly interest to the banking system for the deposited funds.

⁸ Other assets include accrued interest income and fixed assets.

⁹ Other liabilities include liabilities denominated in foreign currency and revaluation accounts.

sions. This applies first and foremost to changes in the gold and foreign exchange reserve that are connected to sales or purchases of foreign currency, which as a rule derive from intervention in the foreign exchange market.

As regards the liability side it is generally only changes in the volume of banknotes and coins in circulation, that is to say, public demand for notes and coins, that needs to be forecast. This demand follows a clear and stable seasonal pattern, making the item “banknotes and coins in circulation” relatively easy to estimate. In the run-up to major holidays such as Christmas, demand increases sharply.

The other items on both the asset and liability side display only very small, predictable changes, for example payments to the State in connection with the allocation of the Riksbank's profits, which affects the Bank's capital, financial result and lending in Swedish kronor to the banking system.

When the changes in all the items have been estimated and summed up, the Riksbank can see how the banking system's average total borrowing or deposit requirement at the Bank over the coming week will change compared with the week before. In practice, this normally means that only the item “banknotes and coins in circulation” needs to be forecast. If the borrowing requirement has grown, the Bank increases the size of the monetary policy repo and vice versa (see step 2).

Figure 5 shows how the different items in the balance sheet contribute to the banking system's total borrowing requirement at the Riksbank. The example is based on the Bank's balance sheet as at 31 December 2004.

FIGURE 5. CALCULATION OF THE BANKING SYSTEM'S TOTAL BORROWING REQUIREMENT AT THE RIKSBANK AS AT 31 DECEMBER 2004

	SEK million
Banknotes and coins in circulation	108 894
Deposit facility	86
Other liabilities	9 836
Capital	63 513
Gold and foreign exchange reserve	– 162 649
Marginal lending facility	– 2
Other assets	– 3 205
Banking system's total borrowing requirement at the Riksbank and size of the monetary policy repo (or banking system's total deposit requirement and size of the Riksbank's certificate issue)	16 473

Source: The Riksbank.

When the changes in all the items have been estimated, the Riksbank arrives at the banking system's borrowing or deposit requirement.

STEP 2. IMPLEMENTATION OF THE MONETARY POLICY REPO

Having arrived at the liquidity forecast and calculated the banking system's average total borrowing or deposit requirement¹⁰ the Riksbank implements a monetary policy repo (or issues certificates).

The Riksbank's repo¹¹ is designed in the same way as an ordinary repo instrument in the financial markets.¹² Repos in the financial markets are sale and purchase agreements whereby one party agrees to sell a security to another party and to repurchase the security at a predetermined price on a specific future date. The price of a repo is represented by the repo rate, that is to say, the lending rate over the maturity of the repo.¹³

As a rule, the monetary policy repo has a maturity of one week, from Wednesday to Wednesday. Thus, once a week the Riksbank buys securities from the banks and simultaneously agrees to resell them to the banks a week later.

As a rule, the monetary policy repo has a maturity of one week.

When the repo matures, the banks pay interest (the repo rate) on the past week's "loans". At the same time, the Riksbank implements a new repo, giving the banks the opportunity to renew their "loans" and thereby "borrow" from the Riksbank for another week. The size of the "loans" from the Riksbank may vary from week to week, however, depending on the Riksbank's forecast (see Step 1).

Because the repo in most cases has a maturity of only one week the Riksbank can change the repo rate each week.¹⁴ In other words, one could say that over time the banking system borrows funds at a variable rate of interest from the Riksbank but that the rate is fixed for one week at a time.

So the starting point for the monetary policy repo is the banks' borrowing requirement in relation to the Riksbank. The fact that the repo is basically constructed as a purchase of securities in exchange for capital is a purely technical issue. The Riksbank could just as easily grant ordinary loans with a maturity of one week in return for interest, with securities as collateral for the loans.

The starting point for the monetary policy repo is the banks' borrowing requirement in relation to the Riksbank.

¹⁰ It is usual to say that the banking system has a structural liquidity deficit or liquidity surplus, therefore indicating how much liquidity the Riksbank needs to provide or absorb in the market. This terminology creates some confusion, however, since the Riksbank neither provides nor absorbs liquidity in the market. For that reason it is more correct to say that the banking system has a borrowing or deposit requirement at the Riksbank.

¹¹ The term "repo" is short for repurchase agreement.

¹² Strictly speaking, the Riksbank's repo in this case is a "reverse repo" since the Riksbank first buys securities and subsequently sells them back. A repo is when a party first sells and then repurchases securities.

¹³ The repo rate for a repo instrument in the financial markets should not be confused with the Riksbank's repo rate, which is in this case the Bank's key interest rate.

¹⁴ In practice, the repo rate is adjusted in connection with the Bank's pre-announced monetary policy meetings, which as a rule are held eight times a year. Extra meetings may be called, as was the case when the repo rate was cut after the terrorist attack in New York on 11 September 2001.

Whether the banking system needs to borrow or deposit funds at the Riksbank has no significance for the ability to steer interest rates.

If the banking system instead has a deposit requirement the Riksbank issues certificates. A Riksbank certificate is a debt instrument that represents a short-term claim on the Riksbank. The Riksbank sells these certificates to banks for a period of one week. When the certificates mature, the Riksbank repays the funds plus interest – the repo rate – to the banks.¹⁵

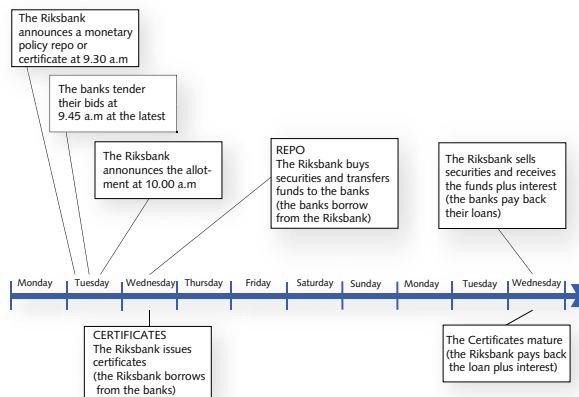
The banking system as a whole currently has a borrowing requirement at the Riksbank, which is why the description will focus on the monetary policy repo. Whether the banking system needs to borrow or deposit funds at the Riksbank has no significance, however, for the Riksbank's capability to steer interest rates.

The terms and conditions of the repo (or certificate issue) are announced every Tuesday at 9.30 a.m., covering the type of transaction (monetary policy repo or certificate issue), maturity, repo rate, and the minimum and maximum bids. The process is carried out in the form of an auction whereby the banks notify the Riksbank of how much they need to borrow. There is no obligation to submit a bid, however.

The banks must tender their bids to the Riksbank before 9.45 a.m. An allotment is then made according to a percentage share that is calculated on the basis of the Riksbank's intended size of the repo and its proportion of the banks' total bid volume. If, for example, the intended size of the repo is 50 per cent of the total bid volume, each bank will be able to borrow 50 per cent of its tendered bid. If the banks' bids fall short of the intended size the Riksbank fine-tunes the borrowing requirement.

The Riksbank announces the result of the repo at 10.00 a.m. Figure 6 shows the different steps involved in the implementation of a repo transaction. The figure also shows the steps in a certificate issue.

Figure 6. Schedule for the Riksbank's monetary policy repo or issue of certificates



¹⁵ From July 1994 to May 1997 the Riksbank issued certificates as the banking system as a whole had a deposit requirement at the Riksbank. Since then the banking system has had a borrowing requirement.

STEP 3. IMPLEMENTATION OF THE FINE-TUNING OPERATIONS

The banking system's actual daily borrowing or deposit requirement at the Riksbank may differ from the Bank's forecast for the average requirement over the week. That means that the banking system may need to borrow or deposit funds through the standing facilities.

Since the Riksbank wants a stable overnight rate, the Bank therefore carries out fine-tuning operations.

Those banks that have a borrowing or deposit requirement at the end of the day, and that have not managed to resolve this in the overnight market, will call the Riksbank after 4.20 p.m. to ask whether the Bank is offering fine-tuning. The Riksbank has details of both individual banks' account balances in RIX and of the banking system's total position in relation to the Riksbank. If the requested amount can be matched by another bank the Riksbank asks the enquiring bank to contact other banks. If there are no matching positions at the other banks the Riksbank performs a fine-tuning operation equal to the requested amount or parts thereof with the enquiring bank.

If, for example, the banking system as a whole has a borrowing requirement of 100 and the Riksbank is contacted by a bank with a borrowing requirement of 150, the Riksbank will only perform fine-tuning operations for 100. That is because a different bank (or several banks between them) needs to deposit 50, and the banks are thereby expected to balance this out in the overnight market.

The Riksbank performs fine-tuning operations between 4.20 p.m. and 4.40 p.m. as it is not until 4.20 p.m. that the Riksbank has full details of the banking system's borrowing or deposit requirement.¹⁶

Simple, market-oriented operational framework

The Riksbank's operational framework has a relatively simple design and is very similar to that employed by other central banks.

It is reasonable to ask, of course, whether it is possible to simplify the framework further. It is likely, for example, that an even narrower interest rate corridor would be able to achieve a stable overnight rate. The question, though, is how narrow the corridor can become before the shortest-term market, that is the overnight market, ceases to function as the incentives for the banks to borrow and deposit funds with each other disappear. In such a situation, the banks will decide to borrow and deposit funds at the Riksbank only. Since the Riksbank strives for a market-oriented operational framework, alternative solutions have been rejected in favour of the current framework, which evidently works well.

If there are no matching positions between the banks the Riksbank performs a fine-tuning operation.

Since the Riksbank strives for a market-oriented operational framework, the current solution which evidently works well was the evident choice.

¹⁶ The banks can return banknotes up to this time.

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■ Notices

Preview of Tumba Bruk museum

On 22 March 2005 the Riksbank offered a preview of Tumba Bruk museum's newly renovated premises. Tumba Bruk paper mill was founded in 1755 and celebrates its 250th anniversary this year. The mill premises will now become a museum. Paper for banknotes was manufactured here on behalf of the Riksbank until a few years ago, when these operations were taken over by the American company Crane AB.

Three buildings will house exhibitions showing the history of banknotes, paper manufacturing and life at the paper mill. Tumba Bruk museum was founded in connection with the Riksbank donating the buildings to the National Property Board and commissioning the Royal Coin Cabinet to build up and run a new museum.

Executive Board visits Jämtland

The Executive Board of the Riksbank visited Jämtland county on 7–8 April. They held a meeting in Östersund and made a number of study visits in the region, including a visit to Trångsviken outside Östersund.

The Riksbank has located some of its meetings outside of Stockholm in recent years with the purpose of providing greater opportunity to discuss economic developments with representatives of various sectors and regions in the country, and to obtain views on the Riksbank's activities.

Commemorative banknote – 250th anniversary of the Tumba Bruk paper mill

To celebrate the 250th anniversary of the Tumba Bruk banknote paper mill Sveriges Riksbank is issuing a commemorative banknote with the denomination 100 kronor. The note has been furnished with modern security features but has an old design. The motif on the face of the note is 'Mother Sweden', according to the pattern used on notes at the end of the 19th century. The main motif on the reverse of the note is an old blueprint of Tumba Bruk and a picture of paper manufacture from the 18th century.

The note will be issued in a limited edition of 100,000 and will be delivered in a folder. The sales price is SEK 150. The price of the banknote has been set with a view to covering marketing and other sales costs. The official issuance date is 26 May, when the Post Office will also be marking the 250th anniversary of Tumba Bruk by issuing a commemorative stamp.

The commemorative banknote can be ordered as of 2 May on the Bank's website, www.riksbank.se, or by telephone at +46 8 787 02 50. The note will also be on sale at the Royal Coin Cabinet in Stockholm. Other wholesale dealers will also be able to buy the note for further sale.

■ Monetary policy calendar

- 2002-03-18** The *repo rate* is increased by the Riksbank from 3.75 per cent to 4.0 per cent as of 20 March 2002. The *deposit rate* is accordingly adjusted to 3.25 per cent and the *lending rate* to 4.75 per cent.
- 04-25 The *repo rate* is increased by the Riksbank from 4.0 per cent to 4.25 per cent as of 2 May 2002. The *deposit rate* is accordingly adjusted to 3.5 per cent and the *lending rate* to 5.0 per cent.
- 06-28 The *reference rate* is confirmed by the Riksbank at 4,5 per cent for the period 1 July 2002 to 31 December 2002.
- 11-15 The *repo rate* is lowered by the Riksbank from 4.25 per cent to 4.0 per cent as of 20 November 2002. The *deposit rate* is accordingly set at 3.25 per cent and the *lending rate* to 4.75 per cent.
- 12-05 The *repo rate* is lowered by the Riksbank from 4.0 per cent to 3.75 per cent as of 11 December 2002. The *deposit rate* is accordingly set at 3.0 per cent and the *lending rate* to 4.5 per cent.
- 2003-01-01** The *reference rate* is confirmed by the Riksbank at 4.0 per cent for the period 1 January 2003 to 30 June 2003.
- 03-17 The Riksbank decides to lower the *repo rate* from 3.75 per cent to 3.50 per cent, to apply from 19 March 2003. Furthermore, the Riksbank decides that the *deposit* and *lending rates* shall be adjusted to 2.75 per cent and 4.25 per cent respectively.
- 06-05 The Riksbank decides to lower the *repo rate* from 3.50 per cent to 3.00 per cent, to apply from 11 June 2003. Furthermore, the Riksbank decides that the *deposit* and *lending rates* shall be adjusted to 2.25 per cent and 3.75 per cent respectively.
- 06-30 The *reference rate* is confirmed by the Riksbank at 3.0 per cent for the period 1 July 2003 to 31 December 2003.
- 07-04 The Riksbank decides to lower the *repo rate* from 3.0 per cent to 2.75 per cent, to apply from 9 July 2003. Furthermore, the Riksbank decides that the *deposit* and *lending rates* shall be adjusted to 2.00 per cent and 3.50 per cent respectively.

- 2004-01-01** The *reference rate* is confirmed by the Riksbank at 3.0 per cent for the period 1 January 2004 to 30 June 2004.
- 02-06 The Riksbank decides to lower the *repo rate* from 2.75 per cent to 2.50 per cent, to apply from 11 February 2004. Furthermore, the Riksbank decides that the *deposit* and *lending rates* shall be adjusted to 1.75 per cent and 3.25 per cent respectively.
- 03-31 The Riksbank decides to lower the *repo rate* from 2.50 per cent to 2.00 per cent, to apply from 7 April 2004. Furthermore, the Riksbank decides that the *deposit* and *lending rates* shall be adjusted to 1.25 per cent and 2.75 per cent respectively.
- 06-30 The *reference rate* is confirmed by the Riksbank at 2.0 per cent for the period 1 July 2004 to 31 December 2004.
- 2005-01-01** The *reference rate* is confirmed by the Riksbank at 2.00 per cent for the period 1 January 2005 to 30 June 2005.

■ Statistical appendix

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Statistics from Sveriges Riksbank are to be found on the Internet (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 website of the International Monetary Fund (IMF) (dsbb.imf.org). Dates of publication are also available on www.riksbank.se.

1 Riksbank's assets and liabilities

ASSETS. PERIOD-END STOCK FIGURES. SEK MILLION

		Gold	Lending to banks	Fixed assets	Other	Total
2003	July	18 210	15 601	158 042	1 723	193 576
	Aug	18 210	17 186	161 861	3 642	200 899
	Sept	18 210	15 206	161 340	2 444	197 200
	Oct	18 210	14 971	163 016	1 198	197 395
	Nov	18 210	15 669	165 571	3 901	203 351
	Dec	18 030	23 825	143 076	10 445	195 376
2004	Jan	18 029	15 901	146 891	12 110	192 931
	Feb	18 029	14 887	146 551	11 828	191 295
	March	19 130	14 509	151 951	11 897	197 487
	April	19 129	14 975	150 885	12 255	197 244
	May	19 129	10 001	149 736	2 866	181 732
	June	17 719	10 760	146 234	3 182	177 895
	July	17 718	10 635	153 528	2 897	184 778
	Aug	17 718	10 801	150 035	2 800	181 354
	Sept	18 095	10 269	150 885	2 718	181 967
	Oct	18 095	10 405	147 908	2 807	179 215
	Nov	18 095	11 063	150 093	2 706	181 957
	Dec	17 392	17 002	145 256	5 935	185 585
2005	Jan	16 436	11 101	145 391	5 725	178 653
	Feb	15 952	10 210	147 097	5 575	178 834
	March	16 558	12 016	148 366	5 503	182 443
	April	16 558	11 042	155 500	5 858	188 958
	May	16 558	11 286	152 090	5 966	185 900

LIABILITIES. PERIOD-END STOCK FIGURES. SEK MILLION

		Notes and coins in circulation	Capital liabilities	Debts to monetary policy counterparties	Debts in foreign currency	Other	Total
2003	July	100 055	50 556	100	2 939	39 926	193 576
	Aug	101 644	50 556	69	7 247	41 383	200 899
	Sept	100 136	50 556	89	4 933	41 486	197 200
	Oct	99 987	50 556	58	6 483	40 311	197 395
	Nov	100 779	50 556	18	7 416	44 582	203 351
	Dec	108 940	50 556	540	3 653	31 687	195 376
2004	Jan	101 954	80 697	64	8 408	1 808	192 931
	Feb	100 615	80 697	61	7 774	2 148	191 295
	March	100 295	80 697	98	6 079	10 318	197 487
	April	100 863	80 697	68	4 769	10 847	197 244
	May	102 008	65 317	95	3 099	11 213	181 732
	June	102 858	65 317	190	4 159	5 371	177 895
	July	102 747	65 317	37	10 883	5 794	184 778
	Aug	102 979	65 317	280	6 821	5 957	181 354
	Sept	102 670	65 317	79	8 900	5 001	181 967
	Oct	102 821	65 317	25	5 326	5 726	179 215
	Nov	103 297	65 317	101	6 557	6 685	181 957
	Dec	108 894	65 317	613	7 448	3 313	185 585
2005	Jan	104 438	65 317	36	5 817	3 045	178 653
	Feb	103 557	65 317	94	6 453	3 413	178 834
	March	104 269	65 317	640	3 021	9 196	182 443
	April	103 876	65 317	31	10 138	9 596	188 958
	May	103 760	65 317	378	6 490	9 955	185 900

2 Money supply

END-OF-MONTH STOCK

		SEK million		Percentage 12-month change		
		M0	M3	M0	M3	
2002	Jan	89 737	1 031 807	Jan	6.4	7.4
	Feb	88 950	1 014 905	Feb	5.5	7.1
	March	89 998	1 033 020	March	5.6	6.5
	April	88 666	1 049 030	April	2.6	7.6
	May	88 818	1 025 757	May	2.4	4.3
	June	89 383	1 053 910	June	2.4	4.1
	July	88 631	1 037 162	July	2.2	6.1
	Aug	89 945	1 051 986	Aug	2.6	6.7
	Sept	89 567	1 061 341	Sept	1.9	5.2
	Oct	89 461	1 051 867	Oct	0.7	2.9
	Nov	90 465	1 068 389	Nov	0.6	2.8
	Dec	95 866	1 086 057	Dec	-0.9	4.5
2003	Jan	90 122	1 085 994	Jan	0.4	5.3
	Feb	90 505	1 072 732	Feb	2.9	5.7
	March	91 966	1 092 435	March	2.2	5.8
	April	92 334	1 095 256	April	4.1	4.4
	May	92 346	1 097 622	May	4.0	7.0
	June	92 296	1 106 661	June	3.3	5.0
	July	91 608	1 090 284	July	3.4	5.1
	Aug	93 324	1 109 725	Aug	3.8	5.5
	Sept	92 451	1 113 021	Sept	3.2	4.9
	Oct	92 364	1 114 967	Oct	3.2	6.0
	Nov	93 070	1 107 251	Nov	2.9	3.6
	Dec	98 481	1 119 288	Dec	2.7	3.1
2004	Jan	93 087	1 109 798	Jan	3.3	2.2
	Feb	92 465	1 117 521	Feb	1.0	4.2
	March	92 399	1 116 429	March	0.5	2.2
	April	92 653	1 130 152	April	0.3	3.2
	May	93 032	1 132 356	May	0.7	3.2
	June	94 732	1 115 232	June	2.6	0.8
	July	92 962	1 115 661	July	1.5	2.3
	Aug	94 355	1 126 118	Aug	1.1	1.5
	Sept	93 992	1 147 939	Sept	1.7	3.1
	Oct	93 657	1 149 171	Oct	1.4	3.1
	Nov	95 163	1 161 064	Nov	2.2	4.9
	Dec	98 239	1 171 100	Dec	-0.2	4.6
2005	Jan	95 017	1 159 519	Jan	2.1	4.5
	Feb	94 810	1 165 283	Feb	2.5	4.3
	March	95 494	1 156 351	March	3.3	3.6
	April	94 646	1 171 557	April	2.2	3.7

3 Interest rates set by the Riksbank

PER CENT

	Date of announcement	Effective from	Repo rate	Deposit rate	Lending rate	Period	Reference rate ¹
2002	03-19	03-20	4.00	3.25	4.75	2002:2hå	4.50
	04-26	05-02	4.25	3.50	5.00	2003:1hå	4.00
	11-15	11-20	4.00	3.25	4.75	2003:2hå	3.00
	12-05	12-11	3.75	3.00	4.50	2004:1hå	3.00
2003	03-18	03-19	3.50	2.75	4.25	2004:2hå	2.00
	06-05	06-11	3.00	2.25	3.75	2005:1hå	2.00
	07-04	07-09	2.75	2.00	3.50		
2004	02-06	02-11	2.50	1.75	3.25		
	03-31	04-07	2.00	1.25	2.75		

¹ 1 July 2002 the official discount rate was replaced by a reference rate, which is set by the Riksbank at the end of June and the end of December.

4 Capital market interest rates

EFFECTIVE ANNUALIZED RATES FOR ASKED PRICE. MONTHLY AVERAGE. PER CENT

		Bond issued by:				Housing institutions	
		Central Government					
		3 years	5 years	7 years	9-10 years	2 years	5 years
2004	Jan	3.22	4.00	4.46	4.65	3.39	4.35
	Feb	3.04	3.86	4.42	4.55	3.19	4.19
	March	2.72	3.53	4.16	4.31	2.85	3.86
	April	2.77	3.75	4.40	4.55	2.88	4.09
	May	2.96	3.97	4.55	4.68	3.09	4.36
	June	3.01	4.03	4.60	4.72	3.11	4.40
	July	2.86	3.88	4.45	4.57	2.95	4.22
	Aug	2.75	3.85	4.29	4.42	2.83	4.05
	Sept	2.80	3.90	4.26	4.37	2.86	4.02
	Oct	2.68	3.75	4.13	4.25	2.75	3.84
	Nov	2.56	3.60	4.01	4.13	2.62	3.69
	Dec	2.34	3.33	3.76	3.90	2.38	3.38
2005	Jan	2.62	3.16	3.58	3.84	2.25	3.20
	Feb	2.53	3.10	3.51	3.76	2.70	3.12
	March	2.55	3.20	3.61	3.86	2.73	3.22
	April	2.43	2.97	3.35	3.58	2.61	3.31

5 Overnight and money market interest rates

MONTHLY AVERAGE. PER CENT

	Repo rate	Interbank rate	Treasury bills			Company certificates		
			3-month	6-month	12-month	3-month	6-month	
2002	Jan	3.75	3.85	3.74	3.81		3.94	3.97
	Feb	3.75	3.85	3.87	3.99		4.01	4.14
	March	3.84	3.94	4.09	4.29	4.64	4.27	4.43
	April	4.00	4.10	4.25	4.41		4.52	4.69
	May	4.25	4.35	4.29	4.48	4.79	4.64	4.79
	June	4.25	4.35	4.28	4.42	4.71	4.88	5.00
	July	4.25	4.35	4.26	4.37		4.89	4.95
	Aug	4.25	4.35	4.19	4.29	4.43	4.83	4.87
	Sept	4.25	4.35	4.17	4.21	4.29	4.82	4.84
	Oct	4.25	4.35	4.07		4.14	4.67	4.64
	Nov	4.15	4.25	3.91	3.84	3.93	4.20	4.19
	Dec	3.85	3.95	3.66	3.68	3.77	3.97	3.95
2003	Jan	3.75	3.85	3.65			3.90	3.88
	Feb	3.75	3.85	3.61	3.40	3.55	3.85	3.79
	March	3.64	3.74	3.40	3.36	3.35	3.64	3.57
	April	3.50	3.60	3.42			3.62	3.59
	May	3.50	3.60	3.18	2.96		3.43	3.37
	June	3.16	3.26	2.81	2.71	2.61	3.03	2.94
	July	2.82	2.92	2.68			2.87	2.82
	Aug	2.75	2.85	2.71	2.81		2.88	2.90
	Sept	2.75	2.85	2.71	2.73	2.91	2.88	2.92
	Oct	2.75	2.85	2.73			2.89	2.93
	Nov	2.75	2.85	2.72	2.75		2.88	2.93
	Dec	2.75	2.85	2.69	2.70	2.83	2.86	2.87
2004	Jan	2.75	2.85	2.60			2.77	2.74
	Feb	2.59	2.69	2.46	2.38	2.47	2.59	2.59
	March	2.50	2.60	2.27	2.23	2.28	2.43	2.40
	April	2.10	2.20				2.15	2.18
	May	2.00	2.10	1.99	2.07	2.33	2.15	2.23
	June	2.00	2.10	1.98	2.07	2.38	2.15	2.24
	July	2.00	2.10				2.15	2.24
	Aug	2.00	2.10	2.03	2.13		2.15	2.25
	Sept	2.00	2.10	2.00	2.13		2.15	2.26
	Oct	2.00	2.10				2.16	2.27
	Nov	2.00	2.10	2.03	2.12		2.14	2.25
	Dec	2.00	2.10	2.00	2.05		2.12	2.16
2005	Jan	2.00	2.10				2.10	2.12
	Feb	2.00	2.10	1.97			2.06	2.08
	March	2.00	2.10	1.97	1.99	2.08	2.06	2.07
	April	2.00	2.10				2.06	2.08

6 Treasury bill and selected international rates

MONTHLY AVERAGE. PER CENT

		3-month deposits				6-month deposits			
		USD	EUR	GBP	SSVX ¹	USD	EUR	GBP	SSVX ¹
2002	Jan	1.74	3.28	3.94	3.74	1.85	3.28	4.04	3.81
	Feb	1.81	3.30	3.94	3.87	1.94	3.33	4.08	3.99
	March	1.91	3.34	4.03	4.09	2.15	3.45	4.23	4.29
	April	1.87	3.39	4.06	4.25	2.11	3.47	4.26	4.41
	May	1.82	3.40	4.05	4.29	2.01	3.56	4.26	4.48
	June	1.79	3.41	4.06	4.28	1.93	3.52	4.27	4.42
	July	1.76	3.34	3.94	4.26	1.82	3.40	4.07	4.37
	Aug	1.69	3.28	3.90	4.19	1.69	3.31	3.91	4.29
	Sept	1.73	3.24	3.88	4.17	1.71	3.18	3.89	4.21
	Oct	1.71	3.20	3.88	4.07	1.67	3.08	3.87	
	Nov	1.39	3.07	3.88	3.91	1.40	2.96	3.89	3.84
	Dec	1.33	2.86	3.92	3.66	1.34	2.81	3.92	3.68
2003	Jan	1.27	2.76	3.88	3.65	1.29	2.69	3.87	
	Feb	1.25	2.63	3.65	3.61	1.25	2.51	3.59	3.40
	March	1.19	2.47	3.56	3.40	1.17	2.39	3.50	3.36
	April	1.22	2.48	3.54	3.42	1.20	2.41	3.48	
	May	1.20	2.35	3.53	3.18	1.16	2.25	3.49	2.96
	June	1.03	2.09	3.55	2.81	1.00	2.02	3.48	2.71
	July	1.04	2.08	3.38	2.68	1.05	2.04	3.37	
	Aug	1.05	2.09	3.43	2.71	1.11	2.12	3.52	2.81
	Sept	1.06	2.09	3.60	2.71	1.10	2.12	3.70	2.73
	Oct	1.08	2.09	3.72	2.73	1.12	2.12	3.87	
	Nov	1.08	2.10	3.88	2.72	1.17	2.17	4.07	2.75
	Dec	1.08	2.09	3.93	2.69	1.15	2.13	4.08	2.70
2004	Jan	1.04	2.03	3.96	2.60	1.10	2.06	4.11	
	Feb	1.03	2.02	4.08	2.46	1.09	2.03	4.19	2.38
	March	1.02	1.97	4.21	2.27	1.07	1.95	4.34	2.23
	April	1.06	1.99	4.30		1.19	2.01	4.45	
	May	1.16	2.03	4.44	1.99	1.44	2.08	4.63	2.07
	June	1.41	2.06	4.69	1.98	1.72	2.13	4.91	2.07
	July	1.54	2.06	4.77		1.80	2.13	4.93	
	Aug	1.66	2.06	4.86	2.03	1.87	2.11	4.98	2.13
	Sept	1.85	2.06	4.84	2.00	2.01	2.14	4.93	2.13
	Oct	2.01	2.10	4.80		2.15	2.13	4.85	
	Nov	2.24	2.12	4.77	2.03	2.42	2.16	4.81	2.12
	Dec	2.44	2.12	4.76	2.00	2.65	2.16	4.78	2.05
2005	Jan	2.60	2.10	4.75		2.85	2.15	4.77	
	Feb	2.76	2.09	4.79	1.97	2.98	2.13	4.84	
	March	2.95	2.09	4.87	1.97	3.21	2.14	4.95	1.99
	April	3.07	2.08	4.83		3.31	2.11	4.88	

¹ Treasury bills.

7 Krona exchange rate: TCW index and selected exchange rates

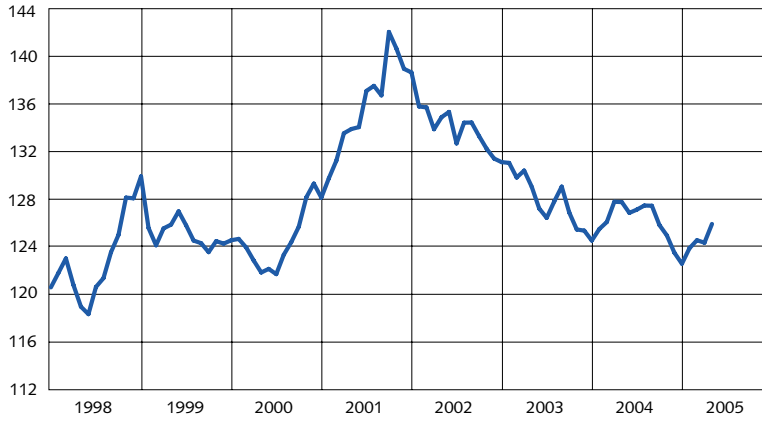
MONTHLY AVERAGE

		SEK					
		TCW index	EUR	GBP	USD	JPY	CHF
2002	Jan	135.7390	9.2292	14.9642	10.4398	0.0788	6.2594
	Feb	135.6543	9.1869	15.0223	10.5603	0.0791	6.2179
	March	133.8096	9.0600	14.7064	10.3396	0.0789	6.1690
	April	134.8265	9.1331	14.8742	10.3105	0.0788	6.2300
	May	135.2764	9.2236	14.6763	10.0519	0.0796	6.3300
	June	132.6093	9.1190	14.1612	9.5591	0.0774	6.1959
	July	134.3652	9.2705	14.5199	9.3400	0.0791	6.3380
	Aug	134.3777	9.2524	14.5486	9.4641	0.0795	6.3235
	Sept	133.2278	9.1735	14.5449	9.3504	0.0775	6.2617
	Oct	132.1625	9.1053	14.4489	9.2793	0.0749	6.2156
	Nov	131.3311	9.0785	14.2485	9.0655	0.0746	6.1869
	Dec	131.0292	9.0931	14.1771	8.9458	0.0732	6.1861
2003	Jan	130.9609	9.1775	13.9590	8.6386	0.0727	6.2767
	Feb	129.7272	9.1499	13.6813	8.4930	0.0711	6.2358
	March	130.3167	9.2221	13.5031	8.5298	0.0720	6.2777
	April	128.9566	9.1585	13.2756	8.4370	0.0704	6.1248
	May	127.1076	9.1541	12.8520	7.9229	0.0676	6.0426
	June	126.3154	9.1149	12.9638	7.8108	0.0660	5.9211
	July	127.6987	9.1945	13.1295	8.0807	0.0681	5.9417
	Aug	128.9600	9.2350	13.2074	8.2825	0.0697	5.9957
	Sept	126.7679	9.0693	13.0143	8.0861	0.0703	5.8616
	Oct	125.3358	9.0099	12.9077	7.6966	0.0703	5.8195
	Nov	125.2370	8.9908	12.9783	7.6831	0.0703	5.7642
	Dec	124.3958	9.0169	12.8514	7.3632	0.0682	5.8001
2004	Jan	125.3707	9.1373	13.1985	7.2493	0.0681	5.8343
	Feb	125.9654	9.1814	13.5574	7.2599	0.0682	5.8367
	March	127.6783	9.2305	13.7500	7.5243	0.0694	5.8922
	April	127.6519	9.1711	13.7941	7.6501	0.0711	5.9008
	May	126.7383	9.1312	13.5751	7.6061	0.0679	5.9248
	June	127.0144	9.1422	13.7711	7.5332	0.0688	6.0193
	July	127.3590	9.1954	13.8041	7.4931	0.0685	6.0222
	Aug	127.3415	9.1912	13.7313	7.5444	0.0683	5.9753
	Sept	125.7140	9.0954	13.3500	7.4484	0.0677	5.8943
	Oct	124.8272	9.0610	13.1085	7.2557	0.0666	5.8730
	Nov	123.3656	9.0036	12.8863	6.9390	0.0662	5.9155
	Dec	122.4392	8.9786	12.9405	6.7030	0.0646	5.8495
2005	Jan	123.7464	9.0538	12.9620	6.8996	0.0668	5.8527
	Feb	124.4271	9.0839	13.1666	6.9778	0.0665	5.8614
	March	124.2160	9.0860	13.1189	6.8755	0.0654	5.8669
	April	125.8007	9.1650	13.4189	7.0796	0.0660	5.9230
	May	126.6878	9.1942	13.4357	7.2482	0.0679	5.9511

Note. The base for the TCW index is 18 November 1992. TCW (Total Competitiveness Weights) is a way of measuring the value of the krona against a basket of other currencies. TCW is based on average aggregate flows of processed goods for 21 countries. The weights include exports and imports as well as "third country" effects.

8 Nominal effective TCW exchange rate

INDEX: 18 NOVEMBER 1992=100



Note: TCW (Total Competitiveness Weights) is a way of measuring the value of the Swedish krona against a basket of other currencies. TCW is based on average aggregate flows of processed goods for 21 countries. The weight includes imports, exports as well as "third country" effects.

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