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The current situation for monetary policy

Opening remarks to the Parliamentary Standing
Committee on Finance on 23 March 2000

BY GOVERNOR URBAN BÄCKSTRÖM

In my opening remarks to the Committee six months ago, I noted that the Swedish economy was developing impressively. Growth was stronger than many had counted on, and inflationary pressure was moderate. New jobs were being created and unemployment was falling.

Since then the economy has definitely continued to impress. Forecasters have had occasion to revise their assessments of activity successively upwards.

GDP growth in 1999 amounted to 3.8 per cent and the number of new jobs totalled almost 90,000 – the highest figure in thirty years. This has been accompanied by sur-

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pluses on the current account and government finances. Moreover, the upward revisions refer mainly to growth and employment. Forecast inflation has not been adjusted upwards to the same extent, which is a testimony of the good circle at present in the Swedish economy.

Inflation in the past three years

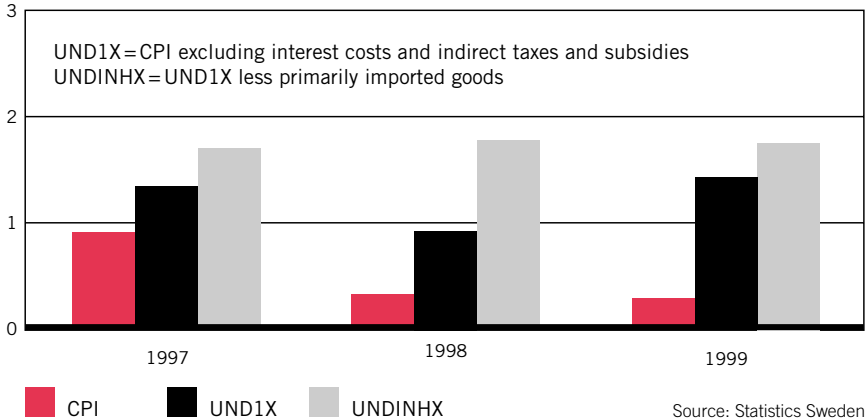
Measured in terms of the consumer price index (CPI), inflation has in fact been exceptionally low for three years; the average annual level has been 0.5 per cent. This level for the period as a whole is made up of CPI increases of 0.9 per cent for 1997, 0.4 per cent for 1998 and 0.3 per cent for 1999.

This means that the rising demand pressure in the Swedish economy in recent years has not shown up in higher CPI inflation. Contrary effects have come from other factors. To clarify this, we can take a look at inflation's constituents.

From Diagram 1 it will be seen that in the past three years, underlying domestic inflation (UNDINHX)¹ has been almost continuously in the vicinity of the 2 per cent inflation target.

Figure 1. Inflation during 1997 until 1999

CPI and two measures of underlying inflation
Per cent



Just the prices of coffee, petrol and domestic heating oil lowered the price level in Sweden by almost half a percentage point.

The pressure from domestic demand has been countered, however, by a weak international price trend. This is evident from the path of UND1X inflation, which also includes prices on imported goods. The main explanation for the weak development of import prices in this period is the crisis that began in Asia in the autumn of 1997. It can be mentioned that towards the end of 1998, just the prices of coffee, petrol and domestic heating oil lowered the price level in Sweden by almost half a percentage point.

Because of the long lag before monetary policy changes elicit effects, parrying this impact from import prices would have required the Riksbank to identify the Asian crisis' damping consequences for commodity prices long before they actually occurred.

¹ As an indicator of inflation, the UNDINHX index has merits as well as drawbacks, as I have pointed out on many occasions. Besides excluding imported goods, the index has a tendency to eliminate prices for domestic goods and thereby disregard inflation effects from important structural factors. But it does serve to illustrate the extent to which domestic demand pressure contributes to inflation's path.



But the weak development of import prices is not the only explanation. Inflation in this period was lowered still further by changes in interest expenditure as well as in indirect taxes and subsidies.

On several occasions I have shown the Committee how monetary policy exerts direct effects on CPI inflation through house mortgage interest expenditure. Reducing the interest rate, in order to stimulate demand and thereby hold inflation around the target, has the initial effect of lowering the CPI because house mortgage interest expenditure decreases. This effect continues until after households have renewed the loans at the new, lower interest rate. The greater part of the difference between the CPI and UNDI_X in Diagram 1 is due to this interest rate effect.

The Riksbank has considered the possibility of using some other index for targeting monetary policy but we concluded that there are grounds for continuing with the CPI as the overriding policy target. Among other things, the index is well known and relatively comprehensive.

In the light of the problems I mentioned and the ensuing discussion, the Riksbank has chosen to present a clearer description of how the CPI target is to be interpreted. Deviations should be permissible if the CPI change figure is influenced by transitory factors (for example, changes in indirect taxes and subsidies or household interest expenditure) or if bringing inflation promptly back to the targeted level would be costly for the real economy. The magnitude of these factors is to be stated in advance by the Riksbank. In this way, the members of your Committee, as well as other observers, will be in a better position to assess the Riksbank and the policy we implement. For each decision it is clear which transitory factors the Riksbank has chosen to disregard in the formation of policy.

These clarifications are essentially a codification of the approach that the Riksbank has applied to the formation of monetary policy in recent years, although any deviations from the target were then discussed less precisely. In the period from 1997 to 1999 the path of inflation was affected to a large extent by transitory price movements that the Riksbank considers should be of secondary importance for monetary policy. Policy has therefore focused on the underlying or core rate of inflation as measured by UNDI_X; this averaged 1.2 per cent, with constituent annual rates in these three years of 1.4, 0.9 and 1.4 per cent.

The Report that has been submitted to the Committee today contains an appendix that is intended to serve as a foundation for the Committee's evaluation of the implementation of monetary policy and its outcome in the period 1997 to 1999. This is something that the Committee requested earlier.

Let me now consider the implementation of monetary policy in the course of 1999.



Monetary policy in the past year

The early months of 1999 were marked by continued effects of the Asian crisis on the world economy, with weaker international demand. In order to prevent this from leading to a weaker economic trend in Sweden and thereby a lower path for inflation, the Riksbank reduced the repo rate twice, in February and March, bringing it down to 2.90 per cent.

The situation stabilised during late spring and summer. The relatively relaxed monetary policy that had been implemented for a number of years – both in Sweden and many other parts of the world economy – played an important part in the improvement that occurred during 1999 and contributed to more positive economic forecasts.

It was then important for the Riksbank to take timely action so as not to have to implement a more pronounced monetary tightening and economic retardation to cope with rising inflationary pressure at a later stage. A process was therefore initiated in November that amounts to successively taking our foot off the monetary ‘accelerator’. As the repercussions of the Asian crisis and the turbulence in the financial markets in the autumn of 1998 subsided, a strong economic stimulus from monetary policy was no longer required. In November 1999 and February this year the repo rate was therefore increased by a total of 0.85 percentage points.

The strong growth of demand in recent years has been accompanied by paths for underlying and trend inflation that have been weaker than earlier relationships seemed to suggest.

The analytical and monetary challenges that confronted the Riksbank during 1999 were not minor. The strong growth of demand in recent years has been accompanied by paths for underlying and trend inflation that have been weaker than earlier relationships seemed to suggest. A number of reasons have

been put forward as to why these relationships may have changed:

- One reason may be that when inflation has been brought down to a low level, price and wage setting behaviour is different. Households as well as firms in Sweden count on inflation remaining low.
- Another reason may be increased competition, for instance due to deregulations, globalisation and e-commerce.
- A third reason may be that our assessments of resource utilisation are faulty and the actual level is lower than we have assumed to date. Economic growth can then be higher for a time, without generating increased price pressure.



- A fourth reason may be a higher productivity trend and an ability to produce more goods and services without generating increased prices; in other words, a higher potential growth rate. This could lead to higher growth being feasible for longer without inflation taking off.

There are arguments in favour of each of these explanations, but the empirical support is not clear-cut.

The issue of potential growth and higher productivity has recently attracted particular attention in the light of economic developments in the United States, for example. Productivity growth in Sweden has improved but we do not yet have any notable evidence that potential growth has risen as it has in the American economy.

The issue of potential growth and higher productivity has recently attracted particular attention in the light of economic developments in the United States, for example.

An expected increase in trend productivity can also affect components of demand. The prospect of higher corporate profits leads to higher share prices for listed companies. Besides prompting companies to step up investment and improving the supply of venture capital, the appreciation of shareholdings may make households feel wealthier and stimulate consumer demand. The strong upward stock market trend in Stockholm in recent years may be a sign that players have incorporated expectations that economic growth in Sweden will be appreciably higher than earlier.

The relative paths of supply and demand in the Swedish economy and the development of the inflation propensity are obviously central issues in the assessment of inflation. If supply and demand develop at the same rate, no inflationary pressure will build up. This is what seems to have happened for a time in the United States. But there is, of course, a risk of one of them predominating and that would alter the conclusions for monetary policy.

The questions about trend productivity and other matters that may have altered the relationship between growth and inflation are one of several elements of uncertainty in the Riksbank's forecasting work. When constructing assessments and material for decisions it is therefore important to check what is happening and be alert to any signs of changes that should be taken into account.

The current assessment

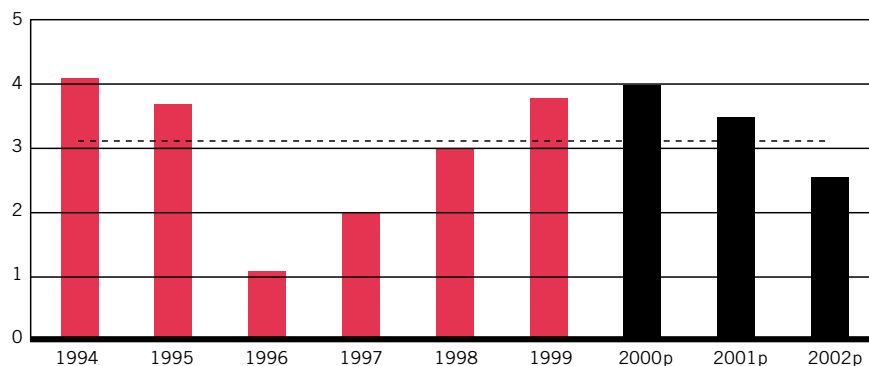
The Inflation Report we are publishing today presents a picture of the Swedish economy that remains bright, with good growth and moderate, though rising, inflation.

The Inflation Report we are publishing today presents a picture of the Swedish economy that remains bright, with good growth and moderate, though rising, inflation. External economic prospects have gone on improving. It is above all GDP growth in the US economy that continues to be remarkably positive but it also looks as though growth in the euro area and the United Kingdom could be higher than assumed earlier. International consumer prices, however, are not expected to move up to the same extent. Less relaxed monetary policy among a number of central banks and a growing pressure from international competition are judged to hold external prices back. But partly because the krona is not expected to appreciate quite as rapidly as we counted on earlier, import prices to producers are now assumed to be somewhat higher. On account of strong competition, however, we do not foresee a full pass-through to consumer prices. Domestic demand is also expected to be stronger than we foresaw in the December Report, notwithstanding the subsequent repo rate increase of 0.5 percentage points. Rising asset prices and increased household wealth are also contributing to the growth of private consumption. Moreover, the strong economic activity and good stock market trend should contribute to a favourable development of investment.

The Riksbank foresees GDP growth rates of 4.0 per cent this year, 3.5 per cent in 2001 and 2.6 per cent in 2002. These are high rates compared with the

Figure 2. GDP growth between 1994 and 2002

Per cent



----- Mean 1994–2002

Sources: Statistics Sweden and Sveriges Riksbank Inflation Report 2000:1



1970s and 1980s. By itself, the upward revision of GDP growth implies that unutilised resources in the economy are brought into production more quickly.

The strong economic activity points to a higher rate of wage increases in the coming years. At the same time, it is possible that changes in the labour market will hold wage

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increases down. A growing proportion of wage increases is being allocated locally, for example. Moreover, inflation expectations among labour market organisations are still in line with the target. This means that, as we have seen in recent years, a real wage increase can be secured without such a large increase in nominal wages. Historically high real wage increases in recent years should likewise contribute to a moderate development of wages.

Against this background, we judge that the level of nominal wages can move up at an annual rate of just over 4 per cent. This is marginally less than foreseen in the December Report. In the longer run, however, wages cannot go on rising at this rate because they would then exceed the room that now looks like being provided by the probable trend for productivity growth. One illustration of this is that in the coming one to two years, underlying domestic inflation will be somewhat above 2 per cent, though this is countered by downward effects from import prices.

In our main scenario we judge that overall inflation prospects are in line with the target one to two years ahead, but that UNDI_X inflation will be marginally above the target at the end of the period. With an unchanged repo rate, UNDI_X inflation is expected to be 1.6 per cent one year ahead and 2.1 per cent after two years.

The transitory factors that the Riksbank should disregard in the formation of monetary policy are judged to be small in the coming one to two years.

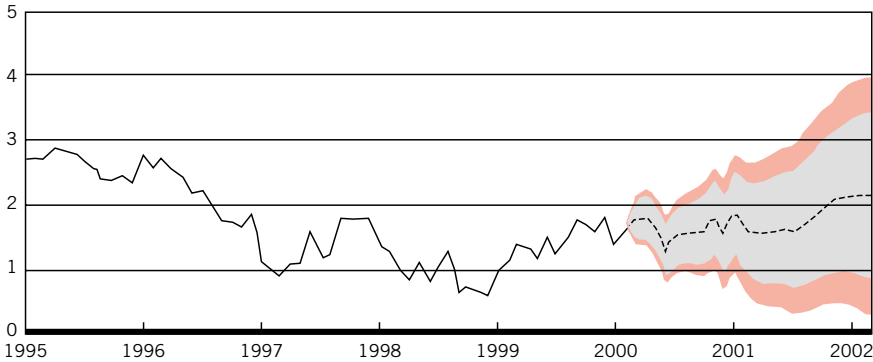
Moreover, the Riksbank considers that the risk spectrum for inflation is balanced. In other words, the risks of inflation being higher and lower, respectively, than in the main scenario are equal.

On the one hand, inflation could be lower than in our main scenario if there is a marked correction to American stock markets or if deregulations and trade liberalisation have greater effects than we have allowed for. On the other hand, inflation could be higher if oil prices do not fall at the rate we assume or if the growth of demand, instead of slackening at the end of the forecast period as we foresee, remains strong.

The strong economic activity and gradually growing inflationary pressure point to a future need for a further repo rate increase. The timing and size of the

Figure 3. UND1X forecast with uncertainty intervals

Percentage 12-month change



Sources: Statistics Sweden and Sveriges Riksbank Inflation Report 2000:1

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increase are considered in the light of, for example, new information and its significance for the Riksbank's overall inflation assessment. Our current assessment is that in the greater part of the coming one to two years, inflation is expected to be below 2 per cent. This speaks in favour of leaving the repo rate unchanged for now.



Macroeconomic dependence on demographics: a key to better forecasting

BY THOMAS LINDH


Swedish Institute for Futures Studies and Uppsala University Department of Economics.

It is well known that the retirement of the post-war baby boom generation around the year 2010 is set to place a major strain on the Swedish economy, and similar problems are anticipated throughout the industrialised world at around the same time. However, the picture of the future painted by the current age distribution of the population is more multifaceted and valuable than this: inflationary factors, the current account balance and other macroeconomic variables are also affected. In Sweden we can use empirical estimations of the relationships between demographics and the macroeconomy to predict that, despite a shortage of labour, the next ten years will be a decade of strong growth and low inflationary pressure that can be used to prevent and prepare for the stresses on the economy after 2010 when the macroeconomic climate takes a turn for the worse.

Research results from the last decade suggest that variations in the age structure of the population are an underestimated factor in the development of an economy, especially given that population change is easy to predict and so an excellent forecasting tool. Our

economic behaviour and resources in the form of both non-human and human capital vary widely over our lifetimes, and so changes in the relative sizes of different age groups affect the whole economic equilibrium. The well known life-cycle effects on saving coincide with growth effects, budget balance effects, investment effects and structural shifts in the composition of the supply of, and demand for, goods and services – and so on. The major breakthrough of recent years is an understanding that, taken together, this complex interplay results in relatively stable correlations between developments in age distribution and a wide variety of

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macroeconomic variables, including economic growth, inflation and the current account balance. This has therefore opened up new opportunities to use population projections to construct more reliable future scenarios.

This article describes in some detail the background to the variations seen in age distribution and sketches a brief history of how economists have viewed population change. Against this background the article discusses various interpretations and problems of recent empirical research results before looking at how these results are colouring the outlook for the Swedish economy over the next few decades.

Background

Demography has always played a key role in economic theory. Some, like Malthus (1798), have emphasised the unrelenting pressure of population growth on finite resources, while others, like Smith (1791), have focused on the positive effects of population growth on technological and economic development. In general the pessimistic Malthusian view has prevailed, earning economics its tag “the dismal science”.

The idea behind the Malthusian model is that any improvement in the average standard of living will lead to more children being born and, above all, surviving to adult age. On account of decreasing returns to scale, this population growth will then push living standards back down to subsistence level. Smith’s more optimistic view derives from his concern with specialisation and the division of labour as the most important source of productivity growth through increasing returns to scale. Population growth makes for larger markets, which feature greater scope for specialisation, and so promotes productivity growth.

We know today that the impact of population growth hangs on which part of the population is growing fastest.

Experience since Smith and Malthus published their works has confirmed parts of both prophecies, optimistic and pessimistic. We know today that the impact of population growth hangs on which part of the population is growing fastest: if it is the economically active/working population, Smith is right; if it is the inactive/dependent population, Malthus is right.

What neither could foresee is how economic and social development would impact on population change. Industrialisation is associated with a dramatic shift in population development known as the demographic transition, where the mortality rate among children in particular falls rapidly on the strength of improvements in health care, hygiene and material standards. While Smith and Malthus could have observed this process in its initial phase, the unexpected side of the



demographic transition, which remains difficult to explain, is that this decrease in mortality is followed by a decrease in fertility as well.¹

However, what we do know is that the demographic transition results in the rapid broadening of the base of the population pyramid through an increase in survival, with the proportion of children and young people in the population growing rapidly. Figure 1 uses Sweden's extraordinary population statistics to follow variations in birth and death rates from as far back as the mid-18th century. The death rate exhibits a clear downward trend from the beginning of the 19th century through to the 1950s when it slowly starts to climb again in line with an increase in the average age of the population.

The birth rate climbed during the second quarter of the 19th century before beginning to fall gradually from the middle of the century. The momentum built up through the baby boom that followed the Napoleonic wars meant that there were more fertile adults during the second quarter of the century, resulting in continued growth in the proportion of children in the population. The decline in the birth rate accelerated between the two world wars before fertility soared again, reaching its peak in 1945. This was followed by a downward trend through to the late 1990s when the birth rate exceeded the death rate for the first time since 1809.

The gap between births and deaths that began to open up in the early 19th century meant strong population growth and a rapid decrease in the average age of the population. The growing pressure on resources led in the first instance to widespread poverty and land clearance, political unrest and, eventually, reforms of the political and economic system. The population pressure also opened the floodgates for the mass emigration to America in the 1870s, with Sweden exporting almost a quarter of its population over the next half a century, primarily from the younger part of the working population.

Sweden's population structure at the beginning of the 20th century was similar to that of the developing world today: the typical pyramid shape with a broad base due to a high proportion of children in the population.

We can also see that there has been a decline in the volatility of birth and death rates, especially in the case of mortality. Nevertheless, fertility continues to fluctuate widely in the medium term, which means that the age distribution of the population will to some extent exhibit periodic fluctuations as baby boom and baby bust cohorts succeed each other in the different age groups. At the same

¹ According to Galor & Weil (1999) the most important research goal in the theoretical growth literature is to find a theoretical explanation of the demographic transition that also encompasses the previous Malthusian phase.

time, the base of the population pyramid has narrowed and its middle swollen to leave Sweden's current population better described as an onion than a pyramid.

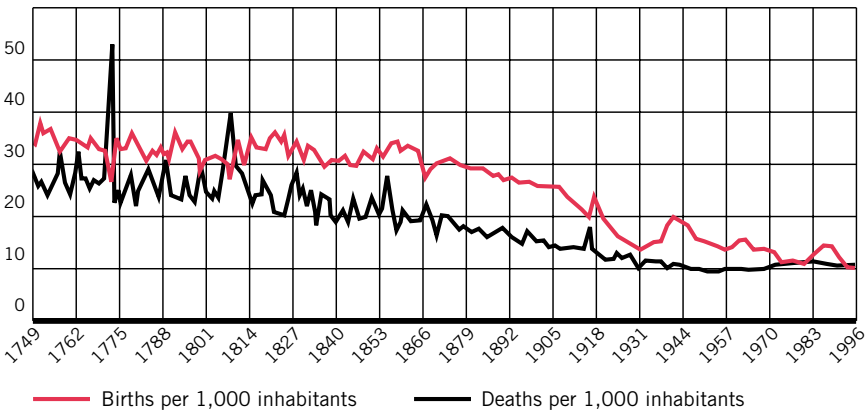
Most demographers are expecting the world's population to peak at around 15 billion at some point after the middle of the current century.

Almost the whole world appears to have undergone this same demographic transition; we can at the very least see its initial phase, with falling mortality and then gradually also falling fertility. Some nations in sub-Saharan

Africa may possibly be an exception to the rule, but even there we now seem to be seeing signs of the transition starting. Figure 2² shows that global population growth was even faster than exponential until about 1960, reflecting an almost Malthusian progression whereby economic development results in ever faster population growth. Although the estimates of population density during previous eras on which these figures are based are associated with considerable uncertainty, it is clear that population growth through to the 17th century fluctuated widely but must have been very modest on average. The world's population reached the billion mark in the early 19th century, and we can then see how growth levelled off around 1960 as the demographic transition kicked in on a global scale and began to fall in the 1990s. Most demographers are expecting the world's population to peak at around 15 billion at some point after the middle of the current century.

The economic development we have seen since the demographic transition is actually closer to Smith's vision than that of Malthus, though only in the longer

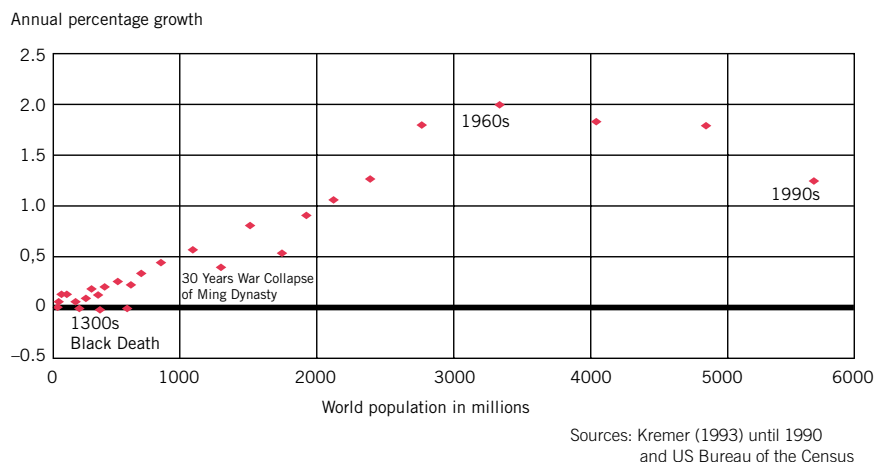
Figure 1. Swedish fertility and mortality rates over the last 250 years



Source: Statistics Sweden

² The data for Figure 2 are taken primarily from Kremer (1993) who adapts an endogenous growth model to population growth over the last million years. The exception is the figure for the 1990s, which is taken from the US Bureau of the Census.

Figure 2. World population versus annual growth rate estimates from 1 million BC to 2000 AD



term. The first phase of the demographic transition, when the number of children and young people increased rapidly, in many ways served to confirm the doom-laden Malthusian prophecy: poverty, starvation and child labour are all phenomena associated with this phase. The situation in the late 19th century made a deep impression on both Wicksell (1901) and Keynes (1923). Wicksell was a committed neo-Malthusian and viewed the restriction of birth rates as a key condition for improvements in welfare, although he stressed as early as in his 1901 lectures in Lund that the age structure of the population has a major impact on the formation of capital and interest rates in an economy.

The rapid slide in birth rates between the two world wars and experience from the depression years led to a shift in economic thought away from Malthus in favour of Smith. Thus Keynes (1937) points to the importance of population growth in sustaining investment and aggregate demand. The development of the Swedish welfare state has also been strongly influenced by Myrdal & Myrdal (1934), who warned of the consequences of a long-term decline in the population.³

³ Myrdal (1940) analysed the importance of age structure for investment. Hansen (1939) cited the key role of population growth in avoiding depressions as one of the fields most acutely in need of research, but then came the war and economists had other more pressing problems to get to grips with.



Demographics and economics since the Second World War

In the 1950s the debate split into two trains of thought: the development economists were almost Malthusian in their emphasis on the difficulty of supplying a growing population with capital (Coale & Hoover 1958), while Boserup (1965) broke new ground by using historical studies to demonstrate that population pressures have actually been the driving force behind much of the technological development seen in agriculture.

The ageing of the population in the industrialised world prompted a focus on saving behaviour and the associated social security issues. Modigliani & Brumberg (1954) and Bentzel (1959) made lasting contributions by analysing variations in saving over the economic life-cycle. Samuelson (1958) developed a simple model with two overlapping generations (OLG model) as a tool for analysing issues relating to the design of pension systems. Easterlin (1961) put forward the hypothesis that large cohorts encountering difficult conditions in the labour market adapt their fertility accordingly, but also analysed in more general terms how economic growth ties in with demographic changes in the USA. Becker (1962) developed a model for investment in human capital over the economic life-cycle.

The OLG models have been developed into one of the key tools available to macroeconomists, and highly sophisticated generalisations (Lee 1994) are now available for analysing issues relating to social security systems. The insight that a large proportion of social redistribution is actually redistribution over the life-cycle has led to welfare analysis based on “generational accounting”⁴, which allows for the fact that the effects of redistribution on individuals must be analysed in terms of developments in their lifetime income. However, OLG models remain difficult to use unless a stable age structure is assumed, and the generational accounting models are highly sensitive to the stylised assumptions that they necessitate.⁵

Nevertheless, there is evidence that age variations of the magnitude seen in the industrialised countries should have a dramatic impact on macroeconomic relationships.

Nevertheless, there is evidence that age variations of the magnitude seen in the industrialised countries should have a dramatic impact on macroeconomic relationships. For example, Blomquist and Wijkander (1994) find that the relationship between interest

⁴ Kotlikoff & Leibfritz (1998) summarise international research in the field.

⁵ Since debts and income have to be estimated well into the future, the results are particularly sensitive to the assumptions made about growth and real interest rates; see Olsson (1995) and Haveman (1994) for a critical appraisal.



rates and investment at macro level can be inverted, since lenders and savers react differently to movements in interest rates and the relationship between these groups changes in line with the age structure. Even Wicksell (1901) touched on this issue informally.

To sum up, population change in the industrialised world during the post-war period has been viewed primarily as an issue of ageing that needs to be addressed through the social security system. The optimistic Smithian view of population growth impacting positively on economic growth has once again taken a back seat, while the Malthusian doomsday view of the population explosion has again come to dominate the development literature.

Studies of micro and macro data have pointed in different directions, and there are technical difficulties in measuring the impact of age distribution on the economy. This has led to considerable uncertainty as to the role of demographics in macroeconomic development. For example, Bosworth et al (1991) point out that the decline in the overall US savings ratio in the early 1980s reflects a decrease in the savings ratios for all the age groups and so cannot be explained by demographic changes holding the savings ratio for each age group is constant. A model where a drop in demographically determined saving has knock-on effects on, say, real interest rates and growth rates would provide a much better explanation of the actual changes in saving. One step in this direction was taken by Fry & Mason (1982), who integrated economic growth into saving models in the form of a “variable rate-of-growth” model and so solved some of the stability problems which previous estimations of demographic saving effects had run into.

In the mid-1980s empirical interest in population change among macroeconomists was almost non-existent, even though large volumes of research into the saving effects of age structure were still being generated – see, for example, Bentzel & Berg (1983). But by the late 1980s the discussion of demographic effects on the macroeconomy had regained its momentum as more and more research results began to suggest broadly stable correlations between the age distribution of the population and macroeconomic variables other than saving. Before we discuss the empirical relationships in greater detail, this might be a good time to look more closely at the macroeconomic effects that we should expect to see as a result of variations in the population’s age structure.

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AGE EFFECTS

For there to be any point at all in discussing the effects of age distribution on the economy, two important fundamental assumptions must be made:

1. The age composition of the population varies. A stable population where the relative size of each age group is constant would not generate any observable effects, and a constant factor would not provide any useful information anyway.
2. The age composition of the population covaries with key economic variables such as economic growth, inflation, saving and investment in a predictable manner. In theory there is every reason to expect this to be the case.

Figures 3–5 illustrate how the age structure of the Swedish population has changed since 1860 and present projections for how it is set to develop over the next 50 years. From completely dominating the population, children and young people have rapidly reduced in number relative to the rest of the population. The proportion of the population under the age of 30 has halved, primarily on account of decreasing fertility. The 15–29 age group has also declined, but is more stable because it is the most mobile group – the one on which immigration and emigration have the greatest impact. Although the size of the 30–49 age group – those supporting children – fluctuates considerably, this is around a relatively stable mean of around 25 per cent of the population. In contrast, the middle aged have doubled their share of the population since 1860. Yet the most striking change is the growth in the proportion of the population aged 65 and over - from less than 6 per cent in 1860 to around 18 per cent today. Although this figure is set to decrease over the next few years on account of the low birth rates seen in the 1930s, forecasts suggest that it will then climb again to around 25 per cent. Particularly strong growth will be seen in the over-75s due to the constant rise in average life expectancy.

The age structure of the population is extremely slow-moving: people grow only one year older for each year that passes.

The age structure of the population is extremely slow-moving: people grow only one year older for each year that passes. Although immigration and mortality affect the size of each group, their impact is moder-

ate and does not vary that widely. This is why even projections based on different assumptions will prove highly reliable forecasts of actual population change. Repercussions on the economy via fertility are recognised as being difficult to model but have a limited impact on distribution as a whole until the cohorts in



Figure 3. Children and young people as a percentage of the population

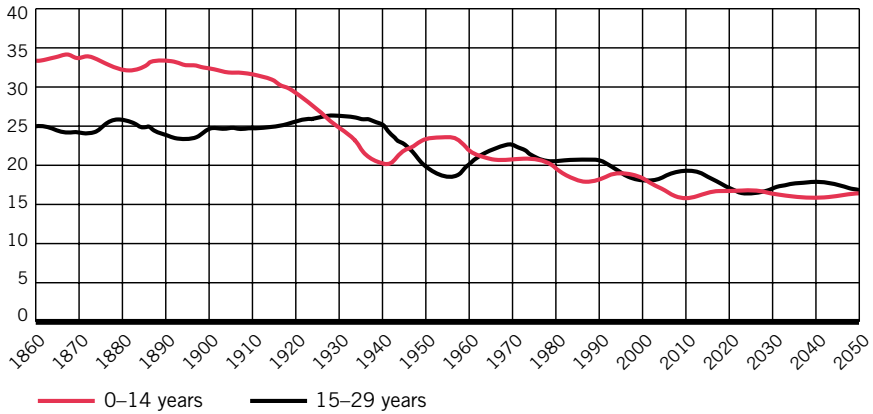
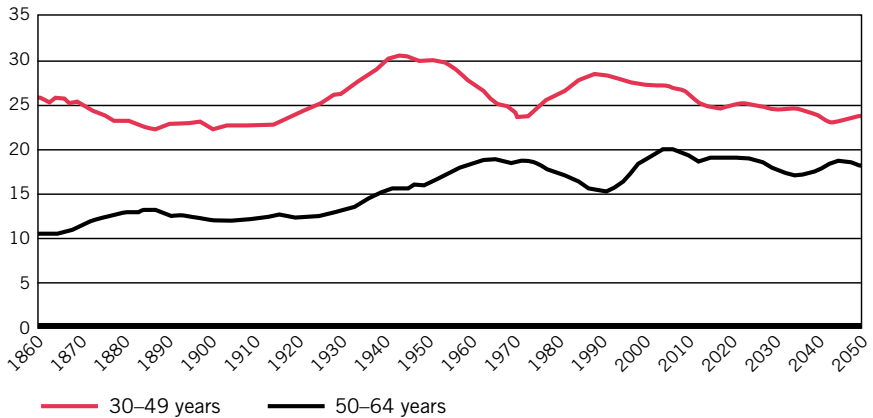


Figure 4. People in early and late middle age as a percentage of the population



question reach fertile age. This means that the proportions of different age groups in the population are very much exogenous variables, or at least predetermined in relation to the contemporary economic climate. Given that they can also be predicted for a considerable time ahead, they are almost ideal forecasting variables. The slow rate of change means that we need relatively long time series for our estimations, but also implies that the effects of changes are persistent.

As a result, the value of age distribution as a forecasting variable actually depends only on whether behavioural changes over the economic life-cycle are sufficiently stable and can be summarised in a usable way.



The stages of the economic life-cycle

Although the individuals within an age group will behave in very different ways and have very different needs and resources, the economic life-cycle means that the average individuals in each age group will differ in a largely predictable way.

Although the individuals within an age group will behave in very different ways and have very different needs and resources, the economic life-cycle means that the average individuals in each age group will differ in a largely predictable way, and in some age intervals their behaviour will be relatively stable.

Obviously children are economically dependent on their parents and cannot be expected to prioritise their consumption in the same way as adults. However, this also applies to most young adults: they may no longer be dependent on their parents but many are students or earn very low incomes. Their consumption patterns also are quite distinct from those of more mature adults, they are much more mobile and, at least when it comes to young men, they are more inclined towards criminal and other risky behaviour.

However, as we all know, youth is only a temporary phenomenon. By around the age of 30 most have begun to start families, acquire capital goods, borrow to buy cars and houses and generally settle down. The next stage, reached around the age of 50, is when the children have flown the nest, the loans have been repaid and, in many cases, incomes are reaching their peak. Money is set aside for retirement and unforeseen expenses, much of it ending up in equity funds and other financial assets. Towards the end of working life, experience is at its greatest and higher incomes are matched by higher productivity.

But eventually we retire and no longer contribute directly to the production of goods and utility. We still consume, but lower incomes generally mean that saving declines or turns into dissaving as nest eggs are broken into. These days many of

those retiring are still fit and healthy, so it is only after another decade or so that health and residential care become important factors.

Large groups of experienced people who no longer need to invest large amounts of time in children, who pay the highest rates of tax and who make relatively little use of the public health and social security systems, should boost growth and curb inflation since they also save large amounts of money.

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savings of large middle-aged groups make it easier for businesses to source capital – indeed those in middle age are also much more likely to be entrepreneurs in their own right.

Nor is it difficult to grasp that the investment we make in children (which appears partially only as costs in the national accounts) is a burden on growth at the time it is made, although we need to bear in mind that it is actually an essential investment in future growth. With the current Swedish system, large groups of pensioners will derive their income from current tax revenue and will eventually also require extensive health and residential care, which naturally places an additional strain on the economy, however well they may have earned these rights in the past. Even if they have saved money to meet these costs during their working life, these savings still need to be liquidated when the bills come to be paid.


Estimation of age effects on key macroeconomic variables

Changes in the age structure of the population have far-reaching implications for the *entire* economy, with the various partial effects both neutralising and amplifying each other. Therefore, when estimating the effects on specific variables, a reduced model is estimated and structural interpretations of the parameters should be avoided. This means that the value of models like this to make predictions is primarily an empirical issue of whether the relationships observed historically are sufficiently stable.

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Changes in institutional factors, such as the monetary policy regime, may very well alter these relationships. However, to predict the impact of such changes we need to know exactly which equilibrium mechanisms are interacting. In practice it is difficult to identify the mechanisms through which age distribution acts in macro data, although we can find a few clues.

Previous debate on population effects was very much dominated by Malthus' extremely long-term perspective, where the key variable was the rate of population growth rather than variations in age distribution. The life-cycle and Easterlin hypotheses were important exceptions but served to prove the rule. Since different age groups have different impacts and the distribution between these groups



varies constantly (and does not feature any simple parameterisable form), our estimations actually should take account of the entire age distribution pattern, which is not practicable.

Correlations between the effects of different age groups make it difficult to isolate the impact of a particular group.

Correlations between the effects of different age groups make it difficult to isolate the impact of a particular group. The literature often draws a distinction between *cohort effects*, which characterise those born in specific years, and *age effects*, which are the same for a given age group irrespective of the year of birth. Effects that derive from the shared experience of individuals within a particular birth cohort, such as the special psychological and political atmosphere prevailing while the post-war baby boom generation was growing up, are not directly transferable to those born in the 1960s, the next large age group. If we wanted to discuss the effects that could be expected when the baby boomers hit middle age in the 1990s, we would ideally try to eliminate any factors relating to the special experience of that generation.

There are also *period effects*, which are conditional upon the particular institutional and international environment ruling at a given point in time. Unfortunately this distinction becomes unclear as soon as we begin to take account of the interaction between the different age groups and social development in general. The relative sizes of the different cohorts will affect a given cohort in different ways, all depending on the societal effects of the other surviving cohorts. To distinguish an age-specific effect, other things being equal, from cohort-specific effects is often tricky. Since year of birth plus age equals the specific point in time, it is theoretically impossible to identify cohort, period and age effects separately in a linear regression. There are ways around this, but these are always dependent on various assumptions.

Finally, there is the issue of whether these effects that are entirely plausible in theory are sufficiently substantial and regular in practice to have a noticeable impact. Time after time this has proved to be the case, although we do not yet fully understand the details of how these age distribution effects act. To paint the clearest possible picture of the current status of research in the field, it may now be best to discuss the different variables separately, even though they may often have an intimate relationship with each other.

SAVING AND CONSUMPTION

Although considerable scepticism still abounds, more and more studies, for example Kelley & Schmidt (1996), have been able to demonstrate robust relationships



between the dependency ratio⁶ and saving. Recently Higgins & Williamson (1997) and Higgins (1998) have been able to demonstrate extremely strong relationships between saving and age distribution in East and Southeast Asia and a selection of other countries all around the world.

The reason for the remaining scepticism is that studies of micro data have struggled to verify the predictions of the life-cycle hypothesis: it has often been found that the elderly save far more than the predictions would suggest. There are many speculative but disputed explanations for this, covering everything from altruistic behaviour by elderly people wanting to share with their children (Weil 1994) to the hypothesis that the elderly are simply not in sufficiently good health to sustain their previous levels of consumption (Börsch-Supan 1992). However, the argument is not that saving is in no way dependent on age structure, rather that this dependence may take a form other than that assumed by the simplistic life-cycle hypothesis.

Another problem is measuring actual saving. Besides the general difficulties encountered in measuring directly how income breaks down between consumption and saving, the intergenerational distribution systems that result in unfunded pension rights lie completely outside the standard measures of savings. Miles (1999) shows in a simulation study that this can explain many differences between the conclusions of macro and micro studies.

It is also worth noting that the actual ex post saving observed may be quite different to the planned ex ante household saving that the life-cycle hypothesis seeks to explain. Nevertheless, even OECD data can be used to demonstrate age distribution effects on saving; they may not be as strong as those in the developing world but they are still statistically significant. As a result, the question mark hangs over not so much whether saving is affected by the age structure of the population as whether it is consumption smoothing by individuals that underlies the age effects observed (Bosworth 1993).

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⁶ Dependency ratios define the proportion of the population that needs to be supported by the working population. As a rule, relatively rough measures of the working population are used, such as all those aged between 15 and 64, and sometimes a distinction is drawn between young (children) and elderly dependants.

GROWTH AND INVESTMENT

Considering the interest shown in age effects on saving, it is strange that age effects on the growth process have been largely neglected. Strange because the neoclassical growth model (Solow 1956, Swan 1956) assumes that growth in the economy is directly dependent on only two *observable* variables: the aggregate savings ratio and growth in the labour force. Both these variables in turn are quite obviously dependent on variations in age structure. Empirically, the growth accounting literature has attempted to take account of the age structure of the labour force by weighting the labour force in each age group according to average wages in that group – see, for example, Denison (1985). The idea is that this takes account of differences in the efficiency of each age group. The impact of these individual adjustments is relatively modest.

However, for a number of reasons adjustments like this will be misleading in terms of their overall impact. For one thing, they do not take account of the effects of a large age group transmitted via capital formation and the cost of capital. They are also misleading in terms of the overall impact transmitted via the labour force. Even if the labour market featured completely open competition with perfect substitutes we would not expect wages to reflect the average productivity of an age group. Theoretically it is the marginal individual's productivity that determines wage levels, but in practice we also need to take account of the complex relationships between age groups, contractual problems and imperfect competition.

There is much to suggest that, on entering the labour market, a large cohort can expect lower wages than a small cohort.

There is much to suggest that, on entering the labour market, a large cohort can expect lower wages than a small cohort, which provides a greater incentive to be better trained and more productive than a smaller cohort.

Ohlsson (1986) has demonstrated a mechanism of this kind based on Sweden's baby boom generation.

However, empirical studies that attempt to estimate the overall impact of changes in age structure on economic growth have begun to emerge over the last decade. The first was McMillan & Baesel (1990), a study based on US macro data that also estimates effects on other variables, such as inflation. A follow-up study applying the same methodology to Australian data was conducted by Lenehan (1996). The first study using Swedish data was Malmberg (1994), who employed a new methodology using age groups that provides a better opportunity to take account of the overall variation in age distribution.

Lindh & Malmberg (1999a) studied a panel of OECD countries on the basis of age groups. It is primarily the 50–64 age group that has positive effects on



growth, while the over-65s have a negative effect. This is not unexpected, but the methodology used in previous studies has not been able to distinguish this relationship since the working population is treated as homogeneous. Lindh (1999a) estimates the growth relationship on the basis of this selection simultaneously with saving without any notable change in the outcome.

Brander & Dowrick (1994) look at a global selection of countries using panel techniques but with a dependency ratio for age distribution. Bloom & Williamson (1998) focus on the Far East and Bloom & Sachs (1998) on Africa, with *growth* in the working population as a key demographic variable. Few would be surprised to learn that a correlation can be found between age distribution and growth; what is surprising is the sheer strength of this correlation. Around half of the variation in growth since the last war – especially trend variation – is explained by changes in age distribution. However, it is not possible to draw any clear conclusions from these studies as to the mechanisms behind this growth effect. Although we know that variations in the labour force (above all the effective labour force where experience and human capital accumulated over a working life also play a major role) are a factor, this is not the only factor. Variations in saving also have a part to play but, as demonstrated in, for example, Higgins (1998), there is a separate influence via investment that also plays a major role and impacts on the current account balance and similar variables. For natural reasons, household formation is a key factor behind investment in real property. Investment in real property during the post-war period correlates very closely with the relative number of young adults in the population. Higgins also puts forward the hypothesis that the influx of young adults into the labour force stimulates investment in order to keep capital intensity at the optimum level.

For natural reasons, household formation is a key factor behind investment in real property.

However, Lindh & Malmberg (1999b) find using OECD data that business investment is much more closely correlated with changes in the relative number of people aged around 50. At least two hypotheses can be formulated to explain this, one on the demand side and one on the supply side. The demand side explanation builds on the hypothesis put forward by Griliche (1969) that skilled labour is complementary to capital equipment: if skilled labour is concentrated in the older part of the labour force, an increase in the size of this group will lead to higher capital investment. The supply side explanation builds on an empirical observation, namely that at around the age of 50 most people switch their asset portfolio from real assets (their homes) to financial assets (equities and bonds). This makes it easier for businesses to source capital and so results in higher investment, which in turn boosts economic growth and further accelerates growth in investment.

Besides these largely obvious explanations of the growth effects, there are also several other conceivable mechanisms. Lindh & Malmberg (1999a) find, for example, that the age effects on growth change if control variables for trade and inflation are included. This suggests that parts of these effects could conceivably be transmitted through current account effects, changes in import and export patterns and the underlying inflationary pressure in the economy. Many would probably also consider it likely that effects can be transmitted through the changes in the demands made of the public sector and the budget balance that arise when a large cohort (which makes a net contribution to the public sector in late middle age through high tax payments and low benefits) retires and begins to consume from the pension rights it has accrued.

Age distribution may also have a significant relationship with technological development.


Age distribution may also have a significant relationship with technological development. If a new technology demands a new training profile in the basic formal education system, it will not have its full breakthrough until sufficient numbers of young people have been trained to use it. If the birth cohorts in education are small, this process will take longer.

The growth effect is therefore in all likelihood a complex phenomenon where various different mechanisms interact to transmit the very powerful impact of age distribution.

WEALTH AND ASSET VALUES

Wicksell was one of the first to draw attention to wealth creation being an age-related phenomenon. Although this is pretty obvious, very little research has been conducted into the question of how wealth distribution, wealth composition and asset values are affected by changes in age distribution.

Real interest rates depend on the economy's resources in terms of both physical and human capital, the return on available investments, and households' saving behaviour. These factors will vary in line with demographic factors and so it is reasonable to assume that real interest rates will also vary with changes in age structure. Let us focus on saving behaviour for a moment. Over our lifetime most of us start off as borrowers, with some then becoming net lenders during middle age and then gradually running down their assets during retirement. Of course there are exceptions to the rule, but on balance this is a fair summary of the empirical evidence. In a simple model of consumption borrowing we would therefore see interest rates rising when borrowers dominate the population and falling when lenders dominate.




Among the first to get to grips with this were McMillan & Baesel (1988), who looked at the real rate of interest on US Treasury bills and government bonds between 1954 and 1984 and used the ratio between the 35–64 age group and the rest of the population as a measure of net savers relative to net consumers. They found that this variable had a statistically significant negative effect on real interest rates. Using this simple model they predicted a downward trend in real interest rates from a peak of 5–10 per cent in the mid-1980s to negative levels today. Although this has proved exaggerated, this simple model does seem to have captured the general direction in which rates have moved. However, it was not until the much noted study of house prices in the USA and their relationship with the baby boom by Mankiw & Weil (1989) that the dependence of asset prices on age structure came to the fore.

Their results, which predicted massive drops in real house prices in the USA during the 1990s, sparked off heated debate and met with widespread scepticism (see debate in *Regional Science and Urban Economics* 1991). The criticism is partly justified: the empirical analysis is at best bold and the authors have many reservations about the interpretation of the results in their original article. Although the actual effects were not as dramatic as predicted – a 47 per cent drop in real house prices during the course of the decade – subsequent research has nevertheless found a link between demographics and property prices.

Research into the influence of age structure on other asset prices is at a much earlier stage. Although it is some time since Shorrocks (1982) reported clear differences in portfolio composition between different age groups, a dearth of reliable longitudinal data has meant that research has not advanced much beyond confirming that, on average, there is a clear tendency for younger households to give relatively high priority to liquid assets and for the portfolios of the middle aged to be dominated by real assets which are then exchanged at around the age of 50 for higher proportions of financial assets that tend to become more liquid (bonds and bank deposits) once again during old age. This has been demonstrated using Swedish data by, for example, Pålsson (1996) and using US data by Poterba & Samwick (1997). This is consistent with risk aversion growing with age but can also be explained by the increasing risk of death making long-term investment less and less attractive. The liquidity behaviour of the young is probably due to the limited availability of credit, which necessitates saving ahead of purchases of capital goods, and will therefore vary with the economic and institutional climate, but research in this area is still largely in its infancy.

A logical extension of this argument is that age distribution impacts very generally on the relationship between supply and demand. Bakshi & Chen (1994)



report results based on long US time series which suggest that the average age of the population impacts on share price indices. Poterba (1998) also finds effects but does not consider them to be robust. Brooks (2000) discusses the issue against the background of the implications it has for funded pensions. Large cohorts may have problems finding buyers when they come to realise their savings and so obtain a significantly lower return on their capital than assumed today. However, again much research is needed before any safe conclusions can be drawn, especially when it comes to the impact of the globalisation of the capital markets, which might be expected to diversify away this risk.

One well known element of the life-cycle hypothesis is that, other things being equal, older people will tend to be wealthier but begin to run down their wealth after retirement.

Another aspect of the age dependence of wealth formation is its impact on economic equality. One well known element of the life-cycle hypothesis is that, other things being equal, older people will tend to be wealthier but begin to run down their wealth after

retirement. However, the data is not unambiguous on this point. Although cross-sectional data indicates that wealth peaks at the age of 60, this is in part a cohort effect. Each generation reaching retirement age to date has generated a higher lifetime income than the previous generation and so accumulated more wealth. As mentioned above, it seems as if individuals continue to amass wealth well into retirement. Income peaks earlier at around the age of 50. As a result, variations in age composition will affect measures of distribution equality such as the Gini coefficients for income and wealth distribution. Higgins & Williamson (1999) find that large proportions of the population in middle age push income distribution in the direction of greater equality.

Miles (1999) argues that these post-retirement savings are primarily a result of accrued unfunded pension rights being viewed as income rather than part of an individual's wealth. With life expectancy on the rise, it is not unreasonable to continue to save from pension income to even out consumption over our remaining lifetime if we believe that the return on our own wealth is higher than growth in pension benefits, particularly with a view to meeting increased expenditure in areas such as health care. However, we cannot rule out the possibility of the continued accumulation of wealth by pensioners being explained by a bequest motive. If unfunded pension rights are included as wealth, the result should be a far more equal distribution of wealth.



LABOUR MARKET


It is well known among labour market researchers that, for example, employment type, wages, search behaviour and education/training depend on an individual's age, sometimes on account of cohort effects (for example, education/training) but also on account of pure age effects (for example, entrepreneurs are older since they need time to accumulate experience and capital – see Lindh & Ohlsson (1996). Since for various reasons the young are more mobile in the labour market, it is natural to expect higher levels of unemployment in these groups. For women, it is natural for participation in the labour force to fall during the years when fertility is at its peak. However, age distribution has often been ignored in a macro context. There are of course exceptions: for example, in the USA the official estimates of NAIRU (non-accelerating inflation rate of unemployment) are adjusted to take account of the demographic composition of the labour force (Stiglitz 1997). It has long been debated whether this adjustment should in fact be made, but new results (Shimer 1998) now suggest that it is crucial. However, Phillips curves and similar macroeconomic relationships are generally discussed without taking account of age distribution.

Recent years have also brought intense discussion of the way that the wage differential between skilled and unskilled labour is tending to increase. Many have wanted to explain this with competition from low-income countries undermining demand for

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unskilled labour in the industrialised world. However, an older labour force will automatically result in a tendency for the differential to increase since the wage profile of the skilled labour force rises much more steeply over the economic life-cycle. Nevertheless, how the different age groups interact in the labour market is still largely unknown.

Shimer (1999) demonstrates using data from various US states that an increased influx of young workers is associated with lower overall unemployment (despite higher unemployment rates among these young workers themselves) and higher participation in the labour force. This is above all the result of lower unemployment and higher participation on the part of the *older* groups in the labour force – it seems as if these groups are complements in production. These results suggest that simple intuitive arguments in this area can be seriously misleading. For example, the Easterlin hypothesis – that young people in large cohorts encounter a tougher labour market and so reduce their fertility – runs into trouble because this effect is also associated with an *increase* in the wages of



young people (although it is possible that the education-related premium will still fall). Macunovich (1998) points out that time worked and participation in the labour force are endogenous variables in these relationships, which means that rising wages for young people could also be a result of more young people entering higher education (Mellander 1999) and so depressing the supply of young unskilled workers.

INFLATION

Many macroeconomic problems concern the issue of how inflationary pressure should be weighed against unemployment, GDP growth, and so on. Even if it may seem surprising at first glance, inflationary pressure too is dependent on the age structure of the population. Empirically it is possible to verify a very close correlation between inflation and age structure, as confirmed by Lindh & Malmberg (1998, 2000) on the basis of an OECD selection and by McMillan & Baesel (1990) and Lenehan (1996) on the basis of time series for the USA and Australia respectively. In these estimations, young pensioners have the greatest upward impact on inflationary pressure while the 30–49 age group has the greatest downward impact (although older pensioners also have a downward impact).

Against the background of the discussion above, this is not unexpected since the effects on aggregate demand of net savers and net consumers should lead to an increase in inflationary pressure. Whether or not monetary policy allows this to impact on actual inflation is an empirical issue. Fair & Dominguez (1991) find strong demographic effects on demand for money in a study that also estimated the relationships between age structure and a number of other macroeconomic variables, including demand for durable consumer goods.

Lindh (1999b) looks more closely at the relationship between growth and inflation on the one hand and age distribution on the other using Swedish post-war data, finding that changes in age distribution can explain much of the trend changes in both inflation and potential GDP growth during the 1990s. Forecasts of GDP growth and inflation 3–5 years ahead based on data through to the beginning of the 1990s have proved just as accurate as conventional forecasting methods looking just 1–2 years ahead. The forecasting model is also stable if data for the turbulent 1990s is included. The part of GDP growth that is explained by variations in age distribution is very closely correlated to conventional measures of potential GDP.

When it comes to inflation, statistically age distribution again seems to contain the same information about future inflation as a number of leading indicators. Since age structure can be predicted far further ahead than leading indicators, this



opens up whole new opportunities for inflation forecasting. Although the latter part of the 1990s brought a tendency to underestimate inflation, this could be interpreted as the Riksbank's monetary policy proving successful in actually *propping up* inflation in the face of the deflationary pressure predicted by the age structure, primarily on account of the 65–74 age group currently decreasing in size.

The exact mechanism behind these inflation effects cannot be identified from these macro models. A number of different effects on both the supply side and the demand side are conceivable. Positive growth effects from high numbers in middle age will naturally serve to dampen inflationary pressure, but at the same time there is also a positive effect on investment demand that will amplify inflationary pressure. On the other hand, the savings ratio also rises and so the relative level of consumption drops and helps to depress demand. The decrease in the proportion of young pensioners is contributing to positive current account effects since this group has a positive relationship with investment and a negative relationship with saving. A current account surplus means net lending to abroad, which will either restrict the domestic money supply or strengthen the currency. This in turn should lead to a further reduction in the inflationary pressure in the economy. It is of course entirely possible that monetary policy can be used to neutralise the inflation effect and so the correlations we see in the data simply mean that this has not been done systematically. There is no denying that the age structure of the population has played a very minor role in monetary policy debate and scarcely been taken into account in the formulation of monetary policy to date.

Herbertsson & Zoega (1999) demonstrate in a study of a global selection of countries that many of the age structure's current account effects seem to be transmitted through the budget balance. In other words, economies with high numbers of people in dependent age groups will report budget deficits and also low domestic saving, which will ultimately lead to borrowing abroad and a current account deficit. This is of course not an inevitable consequence since the government can opt instead to raise taxes and cut public spending, but this can be difficult in a situation where there is a growing need for public spending. At the very least, the empirical tendency we can see in the data does not contradict this hypothesis.

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THE OUTLOOK FOR SWEDEN

Finally it may be worth summarising the conclusions drawn by Malmberg & Lindh (2000) in a report recently presented to Sweden's Expert Group on Public Finance. Empirical studies in recent years have found that five key macroeconomic variables have a close relationship with demographic changes: the savings ratio, the investment ratio, the current account balance, inflation and GDP growth. These relationships can therefore be used in conjunction with population projections to formulate broad-based forecasts of Sweden's economic performance in the 21st century.

These forecasts assume that the statistical relationships do not change too drastically and that the population projections are largely accurate. Should, for example, the "new economy" – or IT technology – have a dramatic impact on productivity relationships, this would affect the basis of these forecasts. We cannot say much about the likelihood of this at present, but, even in an IT-based economy, it will be people who make up the labour force and people who demand the goods and services produced, and their behaviour and resources will continue to vary according to age. Technological development and institutional changes will affect the mechanisms through which the age structure impacts on the economy, but how important these changes will be in quantitative terms is difficult to predict. The relationships on which these forecasts are based have been relatively stable throughout the post-war period; if they remain stable during the first part of the 21st century, we can expect Sweden's economy to perform as follows:

Growth will be very strong over the next decade before slowing rapidly between 2010 and 2020.

but backed up by a decline or stagnation in the numbers of children and pensioners.

- Deflation will prevail over the next decade but a new demographic inflationary impulse will kick in after 2015. The reason for this is that numbers of young pensioners – the group that fuels inflation – will first decrease and then increase again.

The current account will run a substantial surplus over the next decade before deteriorating markedly between 2010 and 2020.

- Growth will be very strong over the next decade before slowing rapidly between 2010 and 2020. This is principally the result of growth in the 50–64 age group,
- The current account will run a substantial surplus over the next decade before deteriorating markedly between 2010 and 2020. Again the reason lies with the proportion of young pensioners in the population.



- The main cause of these movements in the current account is changes in the savings ratio, which will be high over the next decade before dropping back as the post-war baby boom generation moves into the young pensioners group.
- However, the investment ratio will remain high for a further decade since young pensioners have a positive impact on this variable.

The demographic changes underlying these developments relate primarily to cohorts born prior to 1975 and so we can be relatively certain that the population projections for the older age groups on which these macroeconomic forecasts are based will prove correct. Of course there is much speculation that average life expectancy will increase to more than 100 in the near future on account of advances in medicine and biotechnology, and this would undoubtedly have the potential to affect the population projections for the oldest part of the population. However, historical experience suggests that, over a period of 10–20 years, changes in average life expectancy are a gradual affair without any sudden leaps.


Nevertheless, economic policy may affect the mechanisms that transmit the demographic impulses to the economy. For example, it is likely that the demographic deflationary impulse will result in a relatively easy monetary policy on the part of the Riksbank to maintain its 2 per cent inflation target. This would amplify the growth impulse and the increase in the investment ratio, while saving would probably fall, so reducing the current account surplus.

Conclusions

Should Sweden choose to participate in European Monetary Union (EMU), one important issue for future stability in terms of demographic forecasting would be changes in the age structure in other EMU countries. In broad terms, northern Europe is relatively homogeneous while southern Europe is lagging a few years behind. This entails a clear

risk of tensions arising in the formulation of the European Central Bank's monetary policy if demographic change is exerting inflationary pressure in one half of the euro area and deflationary pressure in the other. However, we do not currently know how the formation of the monetary union will impact on the historical correlations on which this conclusion is based.

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Continued research into how future macroeconomic performance will be affected by the demographic changes we are currently facing has the potential to provide a significantly better basis for policy decisions.

major fluctuations in numbers of both schoolchildren and available teachers. The resultant variations in expenditure will have repercussions via the budget balance and macroeconomic relationships that cannot fail to impact on education policy – and examples like this can then snowball with implications for research policy, regional policy and social policy to name but a few.

Continued research into how future macroeconomic performance will be affected by the demographic changes we are currently facing has the potential to provide a significantly better basis for policy decisions. This applies not only to economic policy in its narrowest sense but also to policy in general. For example, schools will be hit hard by




References

- Bakshi, Gurdip S. & Zhiwu Chen (1994), “Baby Boom, Population Aging, and Capital Markets”, *Journal of Business*, 67(2), 165–202.
- Becker, Gary S. (1962), “Investment in Human Capital: A Theoretical Analysis”, *American Economic Review*, 52, 9–49.
- Bentzel, Ragnar (1959), “Några synpunkter på sparandets dynamik” [Viewpoints on the Dynamics of Saving], *Uppsala Universitets Årsskrift*, 1959:9.
- Bentzel, Ragnar & Lennart Berg (1983), “The Role of Demographic Factors as a Determinant of Savings”, in *The Determinants of National Saving and Wealth*, eds. Modigliani, F. & R. Hemming, MacMillan, London.
- Blomquist, N. Sören & Hans Wijkander (1994), “Fertility Waves, Aggregate Savings and the Rate of Interest”, *Journal of Population Economics*, 7, 27–48.
- Bloom, David E. & Jeffrey G. Williamson (1998), “Demographic Transitions and Economic Miracles in Emerging Asia”, *World Bank Economic Review*, 419–455.
- Bloom, David E. & Jeffrey D. Sachs (1998), “Geography, Demography, and Economic Growth in Africa”, *Brookings Papers on Economic Activity*, 1998:2, 207–273.
- Boserup, Ester (1965), *The Conditions of Agricultural Growth: The Economics of Agrarian Change under Population Pressures*, Aldine Press, Chicago, Illinois.
- Bosworth, Barry, Gary Burtless & John Sabelhaus (1991), “The Decline in Saving: Evidence from Household Surveys”, *Brookings Papers on Economic Activity*, 1:1991, 183–241.
- Bosworth, Barry J. (1993), *Saving and Investment in a Global Economy*, The Brookings Institution, Washington, D.C.
- Brander, James A. & Steve Dowrick (1994), “The Role of Fertility and Population in Economic Growth – Empirical Results from Aggregate Cross-National Data”, *Journal of Population Economics*, 7(1), 1–25.
- Brooks, Robin (2000), “What Will Happen to Financial Markets When the Baby Boomers Retire?”, Working Paper of the International Monetary Fund, No. 18, Washington, D.C.
- Börsch-Supan, A. (1992), “Saving and Consumption Patterns of the Elderly. The German Case”, *Journal of Population Economics*, 5, 289–303.
- Coale, A.J. & E.M. Hoover (1958), *Population Growth and Economic Development in Low-Income Countries*, Princeton University Press, Princeton, New Jersey.
- Denison, Edward F. (1985), *Trends in American Economic Growth, 1929–1982*, The Brookings Institution, Washington, D.C.

- Easterlin, Richard A. (1961), "The American Baby Boom in Historical Perspective", *American Economic Review*, 51(5), 869–911.
- Fair, Ray C. & Kathryn M. Dominguez (1991), "Effects of the Changing US Age Distribution on Macroeconomic Equations", *American Economic Review*, 81(5), 1276–1294.
- Fry, Maxwell J. & Andrew Mason (1982), "The Variable Rate-of-Growth Effect in the Life-cycle Saving Model", *Economic Inquiry*, 20, 426–442.
- Galor, Oded & David N. Weil (1999), "From Malthusian Stagnation to Modern Growth", *American Economic Review*, 89(2), 150–154.
- Griliches, Zvi (1969), "Capital-Skill Complementarity", *Review of Economics and Statistics*, 51, 465–468.
- Hansen, Alvin H. (1939), "Economic Progress and Declining Population Growth", *American Economic Review*, 29(1), 1–15.
- Haveman, Robert (1994), "Should Generational Accounts Replace Public Budgets and Deficits?", *Journal of Economic Perspectives*, 8(1), Winter, 95–111.
- Herbertsson, Tryggvi Thor & Gylfi Zoega (1999), "Trade Surpluses and Life-cycle Saving Behaviour", *Economics Letters*, 65(2), 227–237.
- Higgins, Matthew (1998), "Demography, National Savings, and International Capital Flows", *International Economic Review*, 39(2), 343–369.
- Higgins, Matthew & Jeffrey G. Williamson (1997), "Asian Demography and Foreign Capital Dependence", *Population and Development Review*, 23(2), 261–293.
- Higgins, Matthew & Jeffrey G. Williamson (1999), "Explaining Inequality the World Round: Cohort Size, Kuznets Curves, and Openness", Staff Report No. 79, Federal Reserve Bank of New York, New York.
- Kelley, Allen C. & Schmidt, Robert M. (1996), "Saving, Dependency and Development", *Journal of Population Economics*, 9(4), 365–386.
- Keynes, John Maynard (1923), *A Tract on Monetary Reform, The Collected Writings of J.M. Keynes*, Vol. IV, McMillan, Cambridge University Press, Cambridge.
- Keynes, John Maynard (1937), "Some Economic Consequences of a Declining Population", speech at the 30th Anniversary of the Eugenics Society.
- Kremer, Michael (1993), "Population Growth & Technological Change: One Million BC to 1990", *Quarterly Journal*, 108(3), 681–716.
- Kotlikoff, Laurence J. & Leibfritz, W. (1998), "An International Comparison of Generational Accounts", Working Paper No. 6447, National Bureau of Economic Research, Cambridge, Massachusetts.
- Kuznets, Simon (1960), "Population Change and Aggregate Output", in *Demo-*

- graphic and Economic Change in Developed Countries*, Princeton University Press, Princeton, New Jersey.
- Lee, Ronald D. (1994), "The Formal Demography of Population Aging, Transfers, and the Economic Life-cycle", in *Demography of Aging*, eds. Martin, Linda G. & Samuel H. Preston, National Academy Press, Washington, D.C., 8–49.
- Lenehan, A.J. (1996), "The Macroeconomic Effects of the Postwar Baby Boom: Evidence from Australia", *Journal of Macroeconomics*, 18(1), 155–169.
- Lindh, Thomas (1999a), "Age Structure and Economic Policy – The Case of Saving and Growth", *Population Research and Policy Review*, 18 (3), 261–277.
- Lindh, Thomas (1999b), "Medium-term Forecasts of Potential GDP and Inflation Using Age Structure Information", *Sveriges Riksbank Working Paper Series*, No. 99, Stockholm.
- Lindh, Thomas & Bo Malmberg (1998), "Age Structure and Inflation – A Wickselian Interpretation of the OECD Data", *Journal of Economic Behavior and Organization*, 36 (1), 17–35.
- Lindh, Thomas & Bo Malmberg (1999a), "Age Structure Effects and Growth in the OECD, 1950–90", *Journal of Population Economics*, 12(3), 431–449.
- Lindh, Thomas & Bo Malmberg (1999b), "Age Structure and the Current Account – A Changing Relation?", Working Paper 1999:21, Uppsala University Department of Economics.
- Lindh, Thomas & Bo Malmberg (2000), "Can Age Structure Forecast Inflation Trends", *Journal of Economics and Business*, January/April, 52(1/2), 31–49.
- Lindh, Thomas & Henry Ohlsson (1996), "Self-employment and Windfall Gains: Evidence from the Swedish Lottery", *Economic Journal*, 106(439), 1515–1526.
- Macunovich, Diane J. (1998), "Relative Cohort Size and Inequality in the United States", *American Economic Review*, 88(2), 259–264.
- Malmberg, Bo (1994), "Age Structure Effects on Economic Growth: Swedish Evidence", *Scandinavian Economic History Review*, 42(3), 279–295.
- Malmberg, Bo & Thomas Lindh (2000), "40-talisternas uttåg – en ESO rapport om 2000-talets demografiska utmaningar" [The Exodus of the Forties Generation – A Report to the Expert Group on Public Finance on the Demographic Challenges of the 21st Century], *Government Office Report Series*, 2000:13, Fritze, Stockholm.
- Malthus, Thomas (1798), *An Essay on the Principle of Population*, 1986, W. Pickering, London.
- Manchester, Joyce (1989), "The Baby Boom, Housing, and Loanable Funds", *Canadian Journal of Economics*, 22(1), 128–149.

- Mankiw, N. Gregory & David N. Weil (1989), "The Baby Boom, the Baby Bust, and the Housing Market", *Regional Science and Urban Economics*, 19, 235–258.
- McMillan, Henry M. & Jerome B. Baesel (1988), "The Role of Demographic Factors in Interest Rate Forecasting", *Managerial and Decision Economics*, 9, 187–195.
- McMillan, Henry M. & Jerome B. Baesel (1990), "The Macroeconomic Impact of the Baby Boom Generation", *Journal of Macroeconomics*, 12(2), 167–195.
- Mellander, Erik (1999), "The Multi-Dimensional Nature of Labor Demand and Skill-Biased Technical Change", Working Paper 1999:9, Office of Labour Market Policy Evaluation, Uppsala.
- Miles, David (1999), "Modelling the Impact of Demographic Change upon the Economy", *Economic Journal*, 109 (452), 1–36.
- Modigliani, Franco & F. Brumberg (1954), "Utility Analysis and the Consumption Function: An Interpretation of Cross-section Data", in *Post-Keynesian Economics*, ed. Kurihara, K.
- Myrdal, Alva & Gunnar Myrdal (1934), *Kris i befolkningsfrågan (Crisis in the Population Question)*, Bonnier, Stockholm.
- Myrdal, Gunnar (1940), *Population, a Problem for Democracy, The Godkin Lectures, 1938*, Harvard University Press, Cambridge, Massachusetts.
- Ohlsson, Rolf (1986), *Högre utbildning och demografisk förändring [Higher Education and Demographic Change]*, Ekonomisk-historiska föreningen, Lund.
- Olsson, Hans (1995), "Generationsräkenskaper" [Generational accounts], Report to the Expert Group on Public Finance, Government Office Report Series, 1995:70, Fritzes, Stockholm.
- Poterba, James M. (1998), "Population Age Structure and Asset Returns: An Empirical Investigation", Working Paper No. 6774, National Bureau of Economic Research, Cambridge, Massachusetts.
- Poterba, James M. & Andrew A. Samwick (1997), "Household Portfolio Allocation over the Life-cycle", Working Paper No. 6185, National Bureau of Economic Research, Cambridge, Massachusetts.
- Pålson, Anne-Marie (1996), "Does the Degree of Relative Risk Aversion Vary with Household", *Journal of Economic Psychology*, 17, 771–787.
- Samuelson, Paul A. (1958), "An Exact Consumption-Loan Model of Interest with or without the Social Contrivance of Money", *Journal of Political Economy*, 66, 467–482.
- Shimer, Robert (1998), "Why Is the US Unemployment Rate So Much Lower?", *NBER Macroeconomics Annual*, 13–61.

- 
- Shimer, Robert (1999), “The Impact of Young Workers on the Aggregate Labor Market”, Working Paper No. 7306, National Bureau of Economic Research, Cambridge, Massachusetts.
- Shorrocks, Anthony F. (1982), “The Portfolio Composition of Asset Holdings in the United Kingdom”, *Economic Journal*, 92, 268–284.
- Smith, Adam (1791), “An Inquiry into the Nature and Causes of the Wealth of Nations”, 4th edition, Basil.
- Solow, Robert M. (1956), “A Contribution to the Theory of Economic Growth”, *Quarterly Journal of Economics*, 70(1), 65–94.
- Stiglitz, Joseph (1997), “Reflections on the Natural Rate Hypothesis”, *Journal of Economic Perspectives*, 11(1), 3–10.
- Swan, Trevor W. (1956), “Economic Growth and Capital Accumulation”, *Economic Record*, 32, 334–361.
- Weil, David N. (1994), “The Saving of the Elderly in Micro and Macro Data”, *Quarterly Journal of Economics*, 109(1), 55–81.
- Wicksell, Knut (1901), *Lectures on Political Economy, Vol. 1: General Theory*, translation 1935, Routledge & Sons, London.



Swedish housing finance and the euro

BY MARGARETA KETTIS AND LARS NYBERG

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One of the ideas behind European Monetary Union (EMU) is to create a more efficient market for goods and services that features growing competition and gives consumers better products at lower prices. This article discusses how the introduction of EMU and the euro may impact on the Swedish mortgage market and its funding. One important conclusion is that competition is in all likelihood set to intensify, so promoting the emergence of new and more cost-effective forms of distribution and new forms of funding that make more efficient use of the institutions equity capital.

The last decade has brought a radical transformation of the environment in which the Swedish mortgage institutions operate.


way, and products have improved. A whole host of factors underlies these changes: housing policy has changed, the credit market has been deregulated, currency controls have been lifted, the property market and financial services sector have had to ride out a major crisis, international capital adequacy rules have been introduced for both banks and mortgage institutions, and the Swedish regulatory framework has been harmonised with EU rules.

Today the mortgage institutions find themselves in a market featuring open competition and rapidly more price-conscious customers.

scraps of credit they might be given. The mortgage institutions funded their oper-

The last decade has brought a radical transformation of the environment in which the Swedish mortgage institutions operate: competition has increased, customer needs and wishes have come into the spotlight in a new

The pressure for internal change at the mortgage institutions has been considerable. 15 years ago they operated under a protective umbrella of special regulations, and customers were simply grateful for whatever



ations by selling bonds to Sweden's insurance companies and the state pension funds (AP funds), which had limited alternative investment options in the prevailing regulatory climate. Today the mortgage institutions find themselves in a market featuring open competition and rapidly more price-conscious customers. They are also being forced to turn increasingly to the international capital markets as a source of funding.

Competition for customers

EMU is generally expected to result in greater competition. When it comes to the market for residential mortgage loans, this should mean that borrowers can expect a broader range of products and suppliers coupled with lower rates of interest.

As a standardised and relatively simple financial product, mortgages should export well. However, there has been limited cross-border activity to date. One reason is proba-


As a standardised and relatively simple financial product, mortgages should export well.

bly that the mortgage market focuses primarily on household customers, who are difficult to reach without a local distribution network. The mortgage market is also stockaded with national rules and idiosyncrasies that are difficult for foreign players to get to grips with and prove a hurdle when they look to export their products. Differences include the ways in which property mortgages work and the availability of tax relief on borrowers' mortgage interest payments.

For borrowers, the single currency means that the interest rates offered by lenders in different countries are directly comparable. The single currency quite simply makes it easier to assess which institution in the euro area is offering the best terms. This can reasonably be expected to have implications for competition and cross-border activity in the longer term.

However, Sweden is not currently participating in EMU, and so, for the time being, any player wishing to move into the Swedish market will probably need to offer loans denominated in kronor. Borrowers would have little reason to take out euro-denominated mortgages because they would then be exposed to fluctuations in exchange rates. This limits international competition to players who really actively want to sell their products in Sweden. It would be quite another matter if Sweden were to participate in EMU: Swedish consumers and businesses would then be able to borrow in euro without any exchange rate exposure, and so the number of potential lenders would increase substantially.

Whether the mortgage institutions are operating within or outside the euro area, contact with prospective customers is the key to success, and so access to a



What impact the Internet may have in this context remains to be seen, but mortgages are undeniably a standardised product that is well suited to sales over the Internet.

local distribution network remains a must. What impact the Internet may have in this context remains to be seen, but mortgages are undeniably a standardised product that is well suited to sales over the Internet. It is clear that the new technology has the poten-

tial to help increase transparency and competition even in the traditionally slow-moving household market. It is already possible to use the Internet to find the cheapest mortgages available, and increased use of services like this will further stimulate competition. Special websites are now under construction where consumers can find out within minutes just how much they can borrow against a property and be offered alternative financing from a variety of institutions around Europe. This type of marketing can reasonably be expected to prove significantly cheaper than traditional personnel-intensive branch-based sales, and in the longer term it is doubtful whether mortgage customers will be willing to pay for branch-based distribution networks.

Thus customers stand to gain considerably from a combination of new Internet technology and access to competing products across a large currency union.

However, competition is not just pushing down distribution costs. Given that funding costs are the dominant item of expenditure in their profit and loss accounts, mortgage institutions must find efficient ways of borrowing.

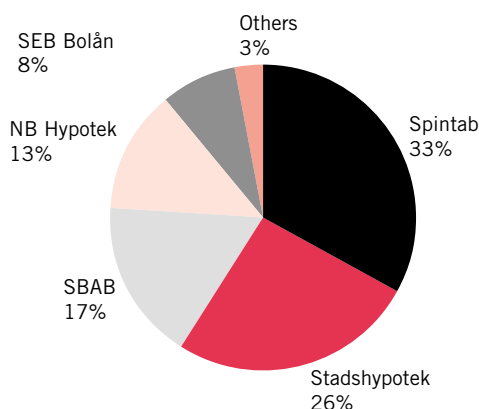
Traditional mortgage funding

Sweden's mortgage institutions fund their operations primarily through the issue of bonds and money market instruments. In December 1999 the total outstanding stock of these securities totalled SEK 823 billion, of which SEK 137 billion was denominated in foreign currencies.¹ The market is dominated by five companies that together account for 97 per cent of borrowing (see Figure 1); four are subsidiaries of banks, while the fifth, SBAB, is government-owned.

Until the end of the 1980s the mortgage institutions' funding options were restricted by currency controls that made it difficult, if not impossible, to borrow abroad. At the same time, mortgage institution funding was favoured by a special prioritisation system whereby the banks and insurance companies were forced to invest some of their assets in mortgage bonds. Since the currency controls and pri-

¹ Of this SEK 137 billion, EU currencies accounted for SEK 56 billion and other currencies, primarily the US dollar and Japanese yen, for the rest.

Figure 1. Swedish mortgage institutions' borrowings in the securities market (bonds and money market instruments), percentage breakdown 1999



Source: Sveriges Riksbank

orisation system were abolished, the mortgage institutions have effectively been in the same position as any other type of business when it comes to finding a market for their bonds: they have to compete for capital against all the other borrowers in the market.

Until the end of the 1980s the mortgage institutions' funding options were restricted by currency controls that made it difficult, if not impossible, to borrow abroad.


Since the end of the 1980s the insurance companies and the AP state pension funds have scaled down their holdings of mortgage bonds.² During this period, an increasing proportion of these bonds were being held abroad. Foreign investors are currently estimated to account for around 20 per cent of the Swedish mortgage institutions' bond loans.³ Some international borrowing has taken place in Europe, primarily London, but the bulk of the money is put up by investors in the USA and Japan. Some of this credit is denominated in kronor, but by far the most part is borrowed in foreign currencies and converted into kronor through currency swaps.⁴

Does the single European currency mean that investors in continental Europe will show more interest in Swedish mortgage bonds? It is difficult to see why: Swedish bonds are unlikely to become more attractive simply because they are being issued in

² The AP funds held around 21 per cent of the total stock of mortgage bonds in December 1999, compared with 35 per cent at the end of 1989. Over the same period the insurance companies reduced their holdings from 27 to 24 per cent.

³ This estimate assumes that most bonds issued by the mortgage institutions in foreign currencies are held by foreign investors.

⁴ Foreign investors' holdings of bonds denominated in kronor account for around 7 per cent of the outstanding bond stock.



Today the mortgage institutions have to compete for capital against all the other borrowers in the market.

euro rather than French francs or German marks. Of course there is an advantage for the Swedish institutions in being able to issue bonds in a currency that is the domestic currency of all the different countries participating in EMU, since this increases the size of the potential market for each loan. But this advantage is limited in scope, and the cost of swaps cannot be budgeted out of the equation for as long as Swedes continue to want to borrow in kronor; only when Sweden joins the euro area will these costs disappear.

The ability to borrow in the European market in competition with other companies naturally demands good creditworthiness in the form of a high credit rating, but also requires an extensive network of contacts.

The ability to borrow in the European market in competition with other companies naturally demands good creditworthiness in the form of a high credit rating, but also requires an extensive network of contacts – a base of institutional investors who are familiar with the borrower and can assess his performance. Gaining the confidence of an investor base of this kind is a painstaking and long-term process: each new lender needs to be acquainted with the borrower's name, business, history and risk profile. In practice, this often means that relevant portfolio managers at the lender meet representatives of the borrower for a presentation of its operations. These meetings may then lead to the portfolio managers requesting authority from above to open a position. In a worst-case scenario the managers may then encounter some rule stipulating that investments may be made only in certain European countries or subject to some other restriction. Only when these obstacles have been overcome can the investor begin to buy the bonds issued by the borrower.

It is easy to understand that this process takes time and will not be any different just because a large currency union has been created, regardless of whether Sweden is participating or not. As mentioned above, the bulk of the Swedish mortgage institutions' foreign borrowing has been outside Europe, and so they have not focused on building up an investor base in the euro area in the same way as in other parts of the world.

The volume of corporate bonds issued in Europe has increased since the introduction of the euro 18 months ago, even if this development has been facilitated by the reduced availability of government bonds, forcing investors to hunt around for alternatives. It is interesting to note that Swedish companies that have issued bonds denominated in euro – including Ericsson, Volvo and Birka Energi – have succeeded in their intentions and found a market for their bonds in parts of Europe where few investors had previously shown an interest for Swedish bonds.



Funding costs and balance sheet structure

The starting point for any discussion of the value of different sources of funding tends to be the Modigliani-Miller theorem which states that a company's chosen method of financing has no bearing on its market value.⁵ According to the assumptions underlying this theorem, changes in the way a company is financed amount to no more than transfers of risk between its financiers: any decrease in one financier's risk exposure and so his required rate of return will be matched by an increase in other financiers' risk exposure and required rate of return. This would suggest that a mortgage institution can neither increase its value nor reduce its funding costs simply by changing the way it funds its operations.

However, in practice Modigliani & Miller's model of a perfect and frictionless corporate finance market has its shortcomings. For example, the picture changes once the impact of corporate taxation is taken into account.⁶ In tax terms, equity capital is a relatively expensive source of financing since dividends are paid from taxed earnings, while the interest charges payable on debt can be deducted from taxable income. A company that can reduce its level of equity capital relative to debt therefore has an opportunity to increase its value. This would suggest that a mortgage institution should be able to cut its overall funding costs by using means of financing that lead to a reduction in the level of equity required by investors.⁷

The Modigliani-Miller theorem can also be affected if new forms of financing enable a company to reach new investors or secure more favourable pricing of its debt instruments for some other reason, such as greater transparency.

The Swedish mortgage institutions have traditionally borrowed directly against their own balance sheet, that is to say loans are secured against their overall assets rather than specific assets. Solid balance sheets coupled with good transparency and self-imposed exposure limits have enabled them to convince rating bodies and lenders of their creditworthiness.

Borrowing directly against their own assets allows the mortgage institutions greater flexibility in the practical management of their financial structure. Furthermore, they can issue larger loans and this way make it easier to ensure regular trading and good liquidity for each loan. This has, for example, been the case

⁵ See Modigliani, F. & M. Miller, "The Cost of Capital, Corporation Finance and the Theory of Investment", *American Economic Review*, June 1958.

⁶ See Modigliani, F. & M. Miller, "Corporate Income Taxes and the Cost of Capital", *American Economic Review*, June 1963.

⁷ However, there comes a point when the substitution of equity capital with debt financing no longer reduces the company's funding costs, since lenders will begin to demand higher risk premiums once the proportion of debt reaches a certain level. This is because overly low levels of equity capital increase the risk of the company failing, which can be a costly business.

with the “benchmark” bonds issued in the Swedish market. Substantial volumes and good pricing for domestic loans have helped the mortgage institutions to compete successfully in the international bond market.

The traditional form of borrowing requires a not insignificant level of equity capital or some form of guarantee from the institution's owners/shareholders.

However, this traditional form of borrowing requires a not insignificant level of equity capital or some form of guarantee from the institution's owners/shareholders. The institutions that currently borrow directly in the international capital markets have capital

ratios well above the statutory minimum of 8 per cent (see Table 1). Tier 1 ratios are also high, reflecting investors' demands for "genuine" equity capital. Only SEB Bolån, which does not itself borrow in foreign currencies, has a capital ratio approaching the statutory minimum.

Table 1. Swedish mortgage institutions' capital ratios, 1999

	Total	Tier 1
Nordbanken Hypotek	11.4 %	10.0 %
SBAB	9.5 %	6.5 %
SEB Bolån	8.4 %	4.7 %
Spintab	16.0 %	11.4 %
Stadshypotek	12.0 %	12.0 %

Source: Mortgage institutions' annual reports

Mortgage institutions in other countries make widespread use of other types of debt instruments. The following looks at two such instruments and the impact they can have on a mortgage institution's capital/assets ratio and funding costs. One interesting issue is of course whether these forms of funding have features that make investors willing to accept lower levels of equity capital than is the case with the traditional Swedish form of mortgage funding.

Securitisation⁸

One form of mortgage funding that has its origins in the US market is securitisation. This involves separating a given loan stock and the associated collateral from an institution's other assets and transferring them to a separate company known as a special-purpose vehicle (SPV) whose activities are effectively limited to managing the assets acquired. The transfer is financed through the issue of

⁸ Securitisation is a term that can have different meanings in different contexts and be used for a number of different phenomena in the financial markets. For a more detailed review of the various kinds of securitisation, see, for example, Blåvarg, M. & P. Lilja, "Securitisation – A Future Form of Financing?", Sveriges Riksbank Quarterly Review, 3/1998.



bonds. In many cases the original lender will continue to service the loans in that the original lender will collect interest payments and effecting coupon payments, but this can in principle be performed by another party.

The purity of the SPV's assets greatly assists prospective investors in assessing the quality of its mortgage stock. Their risk assessment is also facilitated by the way that the SPV's operations are limited to the pas-

The purity of the SPV's assets greatly assists prospective investors in assessing the quality of its mortgage stock.

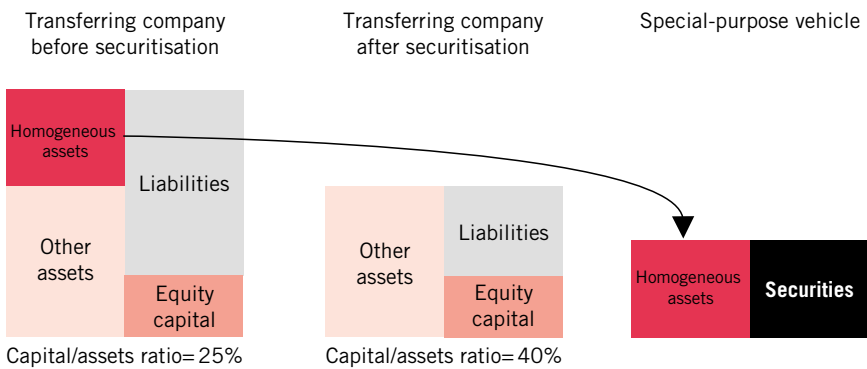
sive management of the assets it acquires. Reinforcing the link between investors' loans and the underlying assets' credit risk in this way decreases the uncertainty about the level of risk exposure assumed, which means that investors require that the SPV hold less equity capital than the original mortgage institution. It may be enough for the SPV to have equity capital of a few per cent of assets, compared with the 10 per cent capital ratio that the Swedish mortgage institutions consider to be the minimum needed when borrowing directly in the international capital markets. The risk buffer can instead be provided by, say, taking out credit insurance cover or giving the SPV a larger mortgage stock than it actually paid for. Given that the SPV has a clearly defined risk profile and does not have any activities beyond holding these specific loans, it is also reasonable for the company to be exempted from the statutory capital adequacy requirements that apply to the mortgage institutions themselves.

The impact of securitisation on the need for equity capital is illustrated in the simplified balance sheets shown in Figure 2. For the transferring company, the transaction brings an increase in its capital/assets ratio – it has the same amount of equity capital as before but fewer assets – and so it should now be in a position to reduce its equity capital.⁹ If this happens, the proportion of debt relative to the total asset stock – including both the assets retained and the assets sold to the SPV – will be higher than before the securitisation process. This in turn means that the total asset stock can be funded more cheaply, since debt financing is taxed less heavily than equity capital. Thus increased use of securitisation as a means of funding allows mortgage institutions to reduce their overall buffer of equity capital and so also increase their return on equity.

Overall funding costs may also fall as a result of the improved transparency prompting investors to accept a lower risk premium on the securitised bonds than on traditional mortgage bonds.

⁹ How far it can be reduced depends, among other things, on the risk associated with its remaining assets. However, whether this risk is higher or lower than the assets sold to the SPV, the risk borne by its equity capital will still be less than before these assets were transferred.

Figure 2. Illustration of the impact of securitisation on the balance sheet



If the securitisation process is to have real credibility, the legal structure must assure investors that the SPV will not subsequently change the nature of its operations or in some other way change its risk profile. In principle this structure can be achieved by a separate regulation of SPVs, but it is most common for investors to be protected under civil law, primarily through the SPV's memorandum and articles of association and the terms of the bond contract. In many countries investors are given added protection through the appointment of a trustee to look after their interests and represent them in various legal contexts. In the USA government guarantees are also available for the credit risk associated with mortgage loans.

Securitisation of mortgages has not taken off in Sweden to date.

However, the securitisation of mortgages has not taken off in Sweden to date. One reason is that Swedish SPVs come under the same legislation and so the same capital adequacy rules as the mortgage institutions themselves. This means that the regulatory structure requires a larger capital base than investors. Instead the mortgage institutions have used SPVs registered outside Sweden and so not covered by the statutory capital ratio requirements.

Another reason is that securitisation often involves extensive administrative and legal work that makes it relatively costly to set up an SPV. Nor have the mortgage institutions been able to issue bonds with as low coupons as hoped. This in turn may be attributable to the market being immature, the issues being small in both number and size, and the bonds therefore being relatively illiquid. Another explanation may be found in the regulatory framework: financial institutions investing in securitised bonds face tougher capital adequacy requirements than they would with normal mortgage bonds, so making the banks and other finan-



cial institutions that would be expected to make a market in these bonds reluctant to include them in their portfolios.

In 1998 the Ministry of Finance published a report proposing a number of changes in the Swedish regulatory framework in a bid to facilitate securitisation.¹⁰ The proposed legislation would exempt SPVs from both the statutory capital adequacy

Securitisation may be one way for Sweden's mortgage institutions to streamline their expensive equity capital and so help to lower their overall funding costs.

requirements and government supervision. No regulation of SPVs whatsoever is recommended, which means that they could in principle engage in any business they wished.¹¹ As in many other countries, protection for investors would instead be built into the contracts between the SPV and its bondholders. According to the Ministry, the final bill can be expected during the course of this year.

Thus securitisation may be one way for Sweden's mortgage institutions to streamline their expensive equity capital and so help to lower their overall funding costs. If EMU brings stiffer competition in the mortgage market as expected, the need to fund mortgages cheaply will probably become more acute and so it would not be unreasonable to expect interest in securitisation to increase.

In the USA the rise of securitisation has come not only as a consequence of higher required rates of return on equity but also because the various parts of the mortgage lending process can be separated and managed more efficiently. This process will normally involve several different elements, including preparing the loan, running credit checks, setting the terms of the loan, funding the loan, servicing the loan (collecting interest and repayments), managing credit risks and risk-taking. With traditional mortgage lending, the whole process is handled by the lender; with securitisation, the different elements can be separated out and handled by different institutions, providing scope for specialisation. For example, customer contact has traditionally been in the hands of a network of local branches, but the administration of interest and repayments can be handled more efficiently and cheaply by larger units. The different companies involved in the lending process can therefore concentrate on the things they do best and assume the level of risk that best suits their particular portfolios, which is an efficient set-up in terms of both cost and risk.

As discussed above, stiffer competition may result in a growing market for securitisation. However, the causal link could be the other way round, with better

¹⁰ See "Bättre förutsättningar för värdepapperisering" [Better Conditions for Securitisation], Government Office Report Series, Ds 1998:71.

¹¹ However, the SPV must be operated as a limited liability company or incorporated association.

As discussed above, stiffer competition may result in a growing market for securitisation.

access to securitisation leading to fiercer competition. This has been the case in Australia, where the mortgage market was deregulated in the 1990s. Legislation to facilitate securitisation lowered the market's previously high entry barriers, paved the way for new players and brought down the cost of mortgages to homeowners by as much as 2 percentage points.

Gilt-edged mortgage bonds

Mortgage institutions in Denmark and Germany finance their operations primarily through bonds that have been made particularly safe investments by special regulations. Among other things, the protection conferred means that holders of these bonds have priority rights to certain loans and the associated collateral if the institution fails.¹² Rather than having to compete with other creditors, these bondholders have preferential rights to the cash flows generated by the earmarked mortgages and associated collateral.

Regulations on the quality of the collateral and government supervision also play a major role with these special bonds, called *Realkreditobligationer* in Denmark and *Hypotheken Pfandbriefe* in Germany. The regulations also impose some restrictions on the activities in which the issuing institutions may engage.¹³

Gilt-edged mortgage bonds can be viewed as a form of conditional securitisation.

These mortgage bonds can be viewed as a form of conditional securitisation. Under normal circumstances the mortgage institution handles every stage in the mortgage lending process, the bondholder receives a return reflecting interest and repayments on the bonds on the same basis as other financiers, and there is no direct link between the bonds and the cash flows generated by specific assets. However,

¹² In Denmark bondholders have special preferential rights to clearly defined series of assets with the associated mortgages. In Germany bondholders have preferential rights to a registered pool of mortgages whose contents may vary over time.

¹³ The history of both forms of funding dates back to the end of the 18th century, with the need to create an efficient capital market being the key to their emergence in both countries. In Germany these bonds are the result of a gradual process of development that began with an Order in Council of Frederick William the Second of Prussia in 1767, while the Danish bonds have their origins in a specific event – the Great Fire of Copenhagen in 1795. The blaze destroyed much of the city and triggered a demand for capital that was difficult to meet because most of the companies insuring the properties affected went under. The solution to this surge in demand for capital was instead a system of investment in real property where the mortgage institutions came to form the link between those with an excess of capital and those with a shortage of capital. The foundations of this system remain in place to this day, for example in the way that the Danish mortgage banks are specialist institutions that are governed by special legislation and boast the exclusive right to issue *Realkreditobligationer*. See Ladekarl, J., “Basic Safeguard Measures in a Bond-financed Mortgage Credit System”, Danmarks Nationalbank, June 1996.



if the institution fails, certain loans and the associated collateral are removed from the balance sheet and handled as part of a separate scheme, so establishing a direct link between the credit risk associated with the underlying assets and the risk associated with the bonds themselves.¹⁴

The Dano-German model for mortgage funding has attracted more and more attention in recent years, largely because the bonds are given special treatment in the EU's directives. Among other things, this special status means that member states may exempt holdings of these bonds by insurance companies and managed funds from normal diversification requirements. Member states may also apply a lower risk weighting to these bonds when calculating capital adequacy – 10 per cent rather than the normal 20 per cent for bonds issued by credit institutions.¹⁵ More precisely, these exemptions apply to bond loans issued by credit institutions if:¹⁶

1. Bondholders have preferential rights in the event of the issuer's failure.
2. Funds raised through the issue of the bonds are invested in assets that are able to cover the claims associated with the bonds throughout the life of the bonds (in other words invested in line with specific rules known in advance).
3. The issuer is subject to *special* public supervision designed to protect bondholders.

Bonds meeting these three criteria have come to be known as “gilt-edged” mortgage bonds in Sweden. Besides Denmark and Germany, where these bonds are long established, Austria, Finland, France, Luxembourg and Spain have introduced legislation that allows some institutions to exploit this special form of funding.


The introduction of gilt-edged mortgage bonds has been discussed in Sweden too and the government has commissioned a report on how equivalent legislation might be formulated.¹⁷ The resulting draft bill, which was published in August 1997 but has not yet resulted in any new legislation, requires that this type

¹⁴ Any surplus on the earmarked assets will fall to the other creditors. Similarly, the holders of these special bonds will have a claim against the bank's other assets if the cash flows from the earmarked assets prove insufficient.

¹⁵ However, the basis for exemption is contradictory: Article 11(2) of Directive 89/647/EEC on a solvency ratio for credit institutions first sets a five-year time limit for the reduced risk weighting and then allows member states to maintain this weighting “for credit institutions when and if they consider it necessary, to avoid grave disturbances in the operation of their markets. Such exceptions shall be reported to the Commission.”

¹⁶ The exemption criteria are set out in Article 22(4) of Directive 85/611/EEC on the coordination of laws, regulations and administrative provisions relating to undertakings for collective investment in transferable securities (UCITS), as amended by Directive 88/220/EEC.

¹⁷ See “Särskilda regler för vissa kreditmarknadsbolag” [Special Rules for Certain Credit Market Companies], Committee Terms of Reference, dir 1996:42.



of bond should carry preferential rights, that clear limits should be set for the loan-to-value ratio (no more than 75 per cent for residential properties) and that the properties held as collateral should be specified in a special register monitored by the Financial Supervisory Authority.¹⁸

BENEFITS FOR ISSUERS AND INVESTORS


When the debate about gilt-edged mortgage bonds got under way in Sweden in the early 1990s, it was against a background of fears about the new investment rules planned for the insurance companies. These rules required greater diversification than before and so limited the amount that the insurance companies could invest in mortgage bonds. Where then would the mortgage institutions sell their bonds? If the bonds were gilt-edged after the Dano-German model, they would to some extent be exempt from the new diversification requirements and allow the mortgage institutions to continue selling their bonds to Sweden’s insurance companies.

However, these fears proved unfounded and the introduction of the new investment rules for the insurance companies passed without drama, partly because the mortgage institutions had already begun to borrow increasingly abroad. This argument in favour of the introduction of gilt-edged mortgage bonds could therefore be dismissed.

<hr/> <p>The mortgage institutions’ interest in gilt-edged mortgage bonds has a natural basis in the fact that their competitors in Europe are able to issue these bonds, which are well established in some markets.</p> <hr/>	<p>The mortgage institutions’ interest in gilt-edged mortgage bonds has a natural basis in the fact that their competitors in Europe are able to issue these bonds, which are well established in some markets. Gilt-edged mortgage bonds should therefore be easier to sell to investors, command greater liquidity and require lower coupons than traditional Swedish mortgage bonds. This in turn would ease the funding situation for the mortgage institutions and, with luck, result in lower interest rates for consumers.</p>
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<hr/> <p>Gilt-edged mortgage bonds undeniably have some benefits for investors.</p> <hr/>	<p>Gilt-edged mortgage bonds undeniably have some benefits for investors. If the mortgage institution that issued a bond becomes insolvent, investors know exactly which collateral they have preferential rights to, and the supervisory authority has ensured that</p>
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¹⁸ For a more detailed presentation of the draft bill, see “Säkrare obligationer?” [Safer Bonds?], Swedish Government Official Reports, SOU 1997:110.



this collateral is intact. Investors would therefore be in a better position than if forced to fight other creditors for a slice of the company's assets, whose value is uncertain.

Would investors be willing to pay for this added security by buying gilt-edged mortgage bonds with a lower coupon than traditional mortgage bonds? And would investors accept a lower buffer of equity capital at the issuer? It does not seem unreasonable to assume that this would be the case.¹⁹ Firstly, the credibility lent by special legislation and supervision would reduce uncertainty about the level of risk inherent in the bonds, a feature much prized by investors and credit rating bodies. Unlike traditional mortgage bonds, the risk to the investor would be tied directly to the credit risk associated with specific high-quality underlying assets, and the supervisory authority would ensure that the quality of the collateral does not deteriorate over the life of the bond.²⁰ Secondly, it is possible that the involvement of the government might be taken as an implicit government guarantee. In this case the risk associated with the bonds would be perceived as lower than would otherwise have been the case and so a lower risk premium will apply than to traditional mortgage bonds.


The investor base would probably also expand, partly because the bonds would have the potential to attract investors who may/dare not invest in standard mortgage bonds, and partly because insurance companies and managed funds in some European countries are allowed to invest more in gilt-edged mortgage bonds than in their traditional counterparts.

MARKET DEVELOPMENT

The players in the Swedish market have concluded that gilt-edged mortgage bonds could be sold with coupons around 10 basis points below those of traditional mortgage bonds. This, however, does not necessarily mean that overall funding costs will be reduced to the same extent, since there are also factors pulling in the opposite direction. If the mortgage institutions' current loan-to-value ratios are more generous than the maximum set for eligibility as collateral for gilt-edged mortgage bonds, some loans (such as second mortgages) could reasonably be expected to prove more expensive to fund since gilt-edged bonds may only be backed by a certain percentage of collateral value. The division of bor-

¹⁹ Nevertheless, in practice there is less scope for the issuer to reduce its equity capital than with securitisation since the issuer is still covered by the statutory capital adequacy requirements in respect of the assets underlying the bonds.

²⁰ With securitisation, the same thing is achieved by setting up the SPV and effectively limiting its activities to passively managing the assets transferred.



rowing into several different types of bond could also undermine liquidity, which might have a negative impact on the cost of the loans. Gilt-edged mortgage bonds also require special supervision, the cost of which would probably have to be borne by the issuers.

It is still too early to draw any conclusions about how the market for gilt-edged mortgage bonds will turn out.

It could also be claimed that it is still too early to draw any conclusions about how the market for gilt-edged mortgage bonds will turn out. In this respect these bonds are similar to those issued by the SPVs resulting from

securitisation. Here too Europe lacks an established market other than the UK, which is admittedly an important one.

Although the German mortgage banks have enjoyed great success, most of the bonds they have sold in the international market have been *Öffentliche Pfandbriefe*, which are secured against loans to the public sector. These bonds are considered to offer good liquidity, because they are issued in the form of *Jumbo Pfandbriefe*, which are standardised bonds issued in blocks of at least EUR 500 million. The bonds that are relevant for comparison in this context, *Hypotheken Pfandbriefe*, feature limited liquidity and are largely traded in the domestic market. Although recent issues of *Obligations Foncières* and *Cédulas Hipotecarias* by the French and Spanish mortgage banks have been well received in the European market, these came during the first year of EMU when many investors were busy reallocating their portfolios. The real issue is what will happen in the longer term, especially when considering that these are not homogeneous instruments. The EU directives allow vastly different regulatory systems to be developed, which is exactly what has happened in practice. Legislation in other relevant areas, such as business failures, also varies from country to country. As a result, investors will not be able to avoid making separate assessments of each national market. Furthermore, it is not easy to create large homogeneous pools of loans secured against real property and so it will probably be difficult to achieve the same level of liquidity as enjoyed by Germany's *Öffentliche Pfandbriefe*. Even if gilt-edged mortgage bonds come to be prized as low-risk instruments, this does not necessarily make for a uniform, large and liquid market.

OBJECTIONS TO THIS FORM OF FUNDING

Moreover, a number of objections can be raised to gilt-edged mortgage bonds as a form of funding, some of them quite serious. The Riksbank has highlighted the dubious role assumed by the government supervisory authority in accepting responsibility for ensuring that the collateral underlying the loans is intact. What



happens if the mortgage institution becomes insolvent and this collateral proves inadequate? Is it the supervisory authority that gets the blame? Does the legislation effectively constitute some kind of implicit government guarantee? Investors might claim that it was specifically the element of government

The Riksbank has highlighted the dubious role assumed by the government supervisory authority in accepting responsibility for ensuring that the collateral underlying the loans is intact.

supervision that encouraged them to invest in the failed institution's bonds, and experience from other areas shows that investors do tend to view government involvement in exactly this way.²¹ Furthermore, special legislation on gilt-edged mortgage bonds would mean a partial re-regulation of the market, once again giving the mortgage institutions special status in the capital markets. Is it fair to introduce special legislation to reduce the funding costs of a particular category of company? After all, in principle the mortgage institutions could themselves create bonds with properties equivalent to gilt-edged mortgage bonds using special clauses in their loan contracts and their memoranda and articles of association or through securitisation.

One key feature of gilt-edged mortgage bonds is that they carry preferential rights in the event of the issuer's failure, since this helps to reduce uncertainty about the degree of risk associated with the bonds. In practice these preferential rights cannot be brought about in any other way than through legislation. When it comes to supervision, which is the most problematic issue when it comes to the implicit government guarantee, the situation may be rather different. Here the mortgage institutions themselves could in principle bring in internationally respected external auditors or the equivalent to assure bondholders that the collateral is intact and of the stipulated quality. Investors might well accept a solution of this kind, with the independent supervisory function undertaken by a non-governmental organisation: this is already the case with securitisation where investors are protected without the SPV being subject to any special regulation. Unfortunately the EU directives explicitly require public supervision for the bonds to be considered gilt-edged.

²¹ One way of dealing with this implicit guarantee might be to make it explicit and charge for it, for example by making a special fee payable by the issuer to the supervisory authority.



Summary and conclusions

There is every indication that competition will continue to grow in the Swedish mortgage market.

in EMU are the driving forces that will together lower the entry barriers and so increase competition. Since mortgages are standardised products, price is the primary competitive parameter and so funding issues will be the focus of attention.

The traditional Swedish form of mortgage funding where all of the institution's assets serve as collateral has many advantages, but investors' need for security in the form of equity capital may gradually make this form of funding too expensive. Greater use of securitisation may be one way of tackling this problem. It allows an institution to reduce its capital/assets ratio and so its overall funding costs, since equity capital is a more expensive source of funding than debt financing. Another advantage of securitisation is the efficiency gains to be had from specialisation in the different parts of the lending process. From an economic perspective, increased use of securitisation could have positive effects on the stability of the financial system because credit risks can be transferred from institutions subject to regulation to players that are less sensitive to heavy credit losses.²²

Cutting funding costs through a reduction in equity capital currently requires an SPV to be set up abroad. Securitisation within Sweden will require the assistance of the legislature in the form of continued deregulation in line with the international model.

In a market where equity capital is becoming an increasingly scarce resource, securitisation is likely to grow in importance because it makes more efficient use of the company's equity capital than both traditional and gilt-edged mortgage bonds.

There is every indication that competition will continue to grow in the Swedish mortgage market. New forms of funding, new technology and possible future participation

Gilt-edged mortgage bonds may also be a way of reducing overall funding costs. In this case the main mechanism is not a reduction in the institution's capital/assets ratio but the way that the special legislation and supervision involved enables the institution to reach more investors and lowers the required risk premium on the bonds. Gilt-edged mortgage

bonds would also require the blessing of the legislature in the form of special legislation in line with the European model. From an economic perspective, the disadvantage is that the special legislation and supervision could be viewed as an implicit government guarantee.

²² See Blåvarg, M. & P. Lilja, "Securitisation – A Future Form of Financing?", Sveriges Riksbank Quarterly Review, 3/1998.



One general reflection is that financial innovations in a new market develop best when governed by the wishes of investors and issuers. It is impossible to predict exactly what their future wishes will be. However, in a market where equity capital is becoming an increasingly scarce resource, securitisation is likely to grow in importance because it makes more efficient use of the company's equity capital than both traditional and gilt-edged mortgage bonds.



Conducting Monetary Policy with a Collegial Board: The New Swedish Legislation One Year On

BY CLAES BERG AND HANS LINDBERG

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In this paper we discuss the recent experience of conducting monetary policy with a collegial board according to the Riksbank Act. Interest rate decisions are normally taken with the aim to bring inflation in line with the 2 per cent inflation target one to two years ahead. When there are dissenting views in the Executive Board, the majority rule serves as a formal aggregation rule. Disagreements on the inflation outlook have occurred due to different opinions on the relation between growth and inflation, the current state of the economy and the future outlook for exogenous determinants of inflation. By publishing inflation reports and minutes from meetings with the Executive Board, good incentives are provided to both the staff and the Executive Board to do their best and it also ensures accountability on the part of the Executive Board for achievement of the price stability objective.

1. Introduction

In the literature on optimal delegation of monetary policy the central bank is normally portrayed as a single individual, who rationally processes the information available. In real-world central banks, however, the executive body is usually a

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board, where the Governor is *primus inter pares* (with the casting vote in case of a tie). There is also a staff, which is responsible for presenting forecasts of inflation and the economic development in general, conditional e.g. on different paths of the interest rate, which is to be set by the board.

In the literature on optimal delegation of monetary policy the central bank is normally portrayed as a single individual, who rationally processes the information available.

The internal decision structure of the central bank has not been subject to much economic analysis. The few studies that exist deal primarily with the US Federal Reserve Bank.¹ In these studies, the first reason to prefer a collegial board to a single individual is to balance the influence of different groups in society on monetary policymaking, hence making monetary policy less influenced by partisan interests. The second reason is to assure that adequate competence is present in the decision-making body.

The aim of this paper is to discuss some issues concerning the institutional set up for monetary policy and price stability in Sweden. In particular, we will analyse the internal decision-making structure at the Riksbank, when aggregating information in order to forecast inflation and take decisions on interest rate policy.

The aim of this paper is to discuss some issues concerning the institutional set up for monetary policy and price stability in Sweden.

In 1993 Sveriges Riksbank announced an inflation-targeting strategy, stating that CPI inflation, from 1995 and onwards, should be limited to 2 per cent a year with a tolerance interval of ± 1 percentage point.² The inflation rate has since then been fairly well in line with the target, and the credibility of monetary policy has been enhanced. The amendments to the Swedish central-bank legislation in 1999 can be viewed as being consistent with a strategy for maintaining the improved monetary policy performance by explicitly assigning price stability as the goal of an independent and accountable central bank.

Delegating monetary policy to an independent central bank with strong preferences for low inflation is hence a means of strengthening the credibility of the inflation target, see Rogoff (1985). The modern view on optimal delegation of monetary policy can be summarised in three points:

¹ See for example Faust (1996) and Waller (1989, 1992). von Hagen and Stüppel (1994) provide an analysis of the effects on inflation performance of shifting power between the centre and the periphery within a monetary union, and apply the results to the European Central Bank.

² Monetary policy is currently based on an assessment of underlying rate of inflation, e.g. CPI excluding indirect taxes and subsidies and house mortgage expenditures, see Heikensten (1999) and Berg (1999).

- a) The political authorities define a clear goal for monetary policy, price stability being the most appropriate goal. This goal should preferably be explicitly legislated.
- b) The central bank is given operational or instrumental independence in order to be able to fulfil the target.
- c) The central bank is held accountable to the political bodies for the monetary policy conducted.

The amendments to the Riksbank Act which came into force 1 January 1999 were designed to give the Swedish central bank greater independence from political influence, establish price stability as the objective for monetary policy with a statutory backing and ensure accountability on the part of the Riksbank for achievement of its policy objective.

The amendments to the Riksbank Act which came into force 1 January 1999 were designed to give the Swedish central bank greater independence from political influence, establish price stability as the objective for monetary policy with a statutory backing and ensure accountability on the part of the Riksbank for achievement of its policy objective.^{3,4} The Riksbank shall also promote a safe and efficient payment system.

Besides the national need of credibility for a low-inflation policy, an important factor

behind the new legislation was the Swedish EU membership and the Treaty provisions regarding central bank independence.

The management structure of the Riksbank was changed. Under the previous system, the Governing Board, which is appointed by the Riksdag, had responsibility for operational matters in monetary and exchange rate policies. The responsibility for monetary and exchange rate policies was instead transferred to a new body, the Executive Board. The Executive Board has six full-time members of whom one is chairman and Governor of the Riksbank.⁵ Their term of office is six years and they will be up for election on a rolling basis. The General Council

³ With regard to exchange rate policy, the Government will have the authority to decide, after consultation with the Riksbank, on the choice of exchange rate regime. The Riksbank will have responsibility for the implementation of the exchange rate regime adopted by the Government. This means, for example, that the Riksbank will decide on the central rate and the band width in a fixed exchange rate system and on the practical application of policies in a floating rate system.

⁴ The first step towards making the Riksbank more independent was taken already in 1988. For a discussion of the Swedish debate, see Apel and Viotti (1998) and Heikensten and Vredin (1998).

⁵ Also having constitutional status is a provision to the effect that no public authority will be allowed to issue instructions to the Riksbank in matters relating to monetary policy. A corresponding provision is included in the Riksbank Act. No member of the Executive Board is allowed to seek or accept instructions in monetary policy matters, except in the form of law adopted by the Parliament.



(former Governing Board) retains general, supervisory functions and appoints the members of the Executive Board.⁶

The Executive Board and the General Council have also other responsibilities. The Executive Board shall draft a budget for the Riksbank's administrative activities during the following accounting year. The Executive Board shall submit the budget to the Parliamentary Standing Committee on Finance and the Office of the Parliamentary Auditors and the General Council for their attention. An Annual Report of the Riksbank's operations during the preceding accounting year shall be submitted by the Executive Board to the Riksdag and the Office of the Parliamentary Auditors and the General Council. The General Council shall make proposals to the Riksdag and the Office of the Parliamentary Auditors on the allocation of the profit of the Riksbank.

For the credibility of monetary policy and its support in society it is important that the policy can be widely understood, openly discussed and evaluated. Accountability and transparency are ensured in several ways. Speeches by the members of the Executive

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Board reveal overall policy intentions and views on structural issues in the economy. The quarterly inflation reports present the inflation forecasts, facilitate policy assessment and encourage discussion of monetary policy issues. The semi-annual presentation of a report to the Standing Finance Committee of the Parliament is part of the assessment procedure. Financial stability reports are published twice a year.

According to chapter 3 Art. 3 in the Sveriges Riksbank Act (1988:1385)⁷ minutes shall be taken at meetings of the Executive Board. At its first meeting on 4 January 1999 the Executive Board decided that it would devote eight to ten meetings a year to more comprehensive monetary policy analysis and assessment. The Board also decided to publish the minutes from those meetings. The minutes announce the view of the entire Board as well as separate members on the current economic situation. The minutes were first published with a time lag of six to eight weeks. Since October 1999, the publication lag has been reduced to between two and four weeks.

In the next section we discuss the reasons to prefer a collegial board to a single decision-maker when taking interest rate decisions. We discuss the role of a

⁶ It is not possible to separate a member of the Executive Board from his position unless he no longer fulfils the conditions required for the performance of his duties or if he has been guilty of serious misconduct.

⁷ As amended to apply from 1 January 1999 (unauthorised translation).



loss function for the central bank and relate it to the horizon for meeting the inflation target, i.e. the target horizon. We then describe how the staff and the Executive Board interact in producing the inflation forecast and discuss the aggregation and voting process. In the third section we describe some incidents during 1999 when the new decision-making framework was put to the test. We also discuss market reactions on the minutes from monetary policy meetings, the inflation reports and changes in the repo rate – the policy instrument of the Riksbank. The fourth section concludes.

2. Optimal delegation in theory and in practice

2.1 BALANCE OF POWER

We will first discuss the balance of power in terms of the allocation of votes. To achieve a good equilibrium, preferences and judgements must be co-ordinated. One way of doing this, suggested by Faust (1996) to be the *raison d'être* for the construction of the Federal Reserve, is to create an independent, balanced board. This may allow for discretionary policy-making in the best interest of society. At the core of the analysis is the important point that the median voter's preferences may not reflect what is best for society. The source of the inflationary bias is the heterogeneous preferences of the public, which arises endogenously from the redistributive effects of inflation. The policy conclusion is that diverse inflation preferences of the public may require that monetary institutions, in order to be successful, need to be more zealous than the public at large in its anti-inflation quest. This is the Rogoff (1985) conservative central banker result extended to a collegial Executive Board setting.⁸

Waller (1989) makes a case for the view that staggered appointments to the board of an independent central bank will make it easier to predict future policy actions, which in turn implies smaller forecast errors and, thus, smaller fluctuations in output and inflation. The main result in Waller (1992) is that appointments to the central bank in the early part of an administration's term will be extremely partisan in their views on monetary policy, while later appointments are more moderate in their views. Therefore overlapping terms for the members of the Executive Board will mean that more moderate members will be appointed. Hence, to the extent that these less extreme preferences are reflected in monetary

⁸ However, an alternative to appointing a conservative (strongly inflation-averse) Executive Board can be the contracting or legislative approaches for containing the inflation bias, see Walsh (1995) and Persson and Tabellini (1993).



policy decisions, the politically induced volatility in output and inflation will be less than otherwise. According to the Riksbank Act, the appointment of the six members are staggered in time, so in this respect the Act fulfils one important condition for central bank independence within this framework.

The Governor undoubtedly has greater influence on the monetary policy decisions than the other members of the Executive Board. From a formal point of view, this is related to the fact that the Governor has the

The Governor undoubtedly has greater influence on the monetary policy decisions than the other members of the Executive Board.

casting vote in case there is no majority, in particular since there are six members on the Board.⁹ It might therefore seem especially motivated to avoid strong political influence over the election of the Governor. This corresponds to the conclusion in Waller (1992) that the term for the Governor preferably should be leading the general elections by one period. Members of the Executive Board are from now on appointed for a term of six years, while elections to the Riksdag (the Parliament) – and the General Council – are held every fourth year. With such term periods, the appointment of the Governor will occur with varying lead/lags relative to the election to the Riksdag.¹⁰

Another implication of the analysis in Waller (1992) is that the term of the Executive Board members should be relatively long compared to the interval between the general elections (and the elections of the members of the General Council, which has a term that is concurrent with the Riksdag). Such an arrangement would reduce the incentives for the majority to elect a partisan candidate. Since the appointments to the Board are staggered, changing the composition of the Board is a lengthy process; hence monetary policy ought to be sheltered from day-to-day political pressures.

It might also be argued that the partisan framework is less relevant for the Riksbank, which in the new Riksbank legislation is given a legislated primary goal of price stability. Hence, according to this view, the members of the Executive Board can be seen as having common preferences – for stable prices – and any partisan motives when appointing the Executive Board are abstracted from. However, as we turn to the issue of common versus individual preferences below it is clear that in-

⁹ This differs for instance from the case in UK, where there is an odd number (nine) of members in the Monetary Policy Committee.

¹⁰ This is assuming that all Governors serve the full term. Waller (1992) assumes, in accordance with the appointment rules applied to the Board of Governors in the Federal Reserve, that in case a board member does not serve the full term, the successor is appointed to the remainder of the term. According to the Riksbank Act, a successor that is appointed in “mid-term” will be appointed for an entire six years term. Hence, the initial pattern of staggering might change over time.

flation targeting involves concerns about real variability and the relative weight put on inflation and output may therefore easily differ among board members.

2.2 PREFERENCES AND AGGREGATION OF INFORMATION

The second reason to prefer a collegial board to a single individual might be to assure that adequate competence is present in the decision-making body, and not just within the analytic departments of the central bank. However, even when the board members have common preferences over macro variables, it is necessary to think about how information is processed by the staff and how it is aggregated over the members of the executive body into decisions on monetary policy.

In this section we will discuss what factors determine the monetary policy response, i.e. how the Riksbank adjusts its instrument (the repo rate) in order to fulfil the monetary policy objective. The interesting issues with an Executive Board setting the interest rate are whether or not the various decision-makers have different views on the loss function (see below), the horizon for implementing the inflation target, the inflation forecast and the impact a change in the repo rate will have on the inflation outlook. Our starting point is that there is agreement on the formulation of the monetary policy target. At a meeting on 4 February 1999 the Executive Board unanimously decided that monetary policy is normally conducted so as to meet the 2 per cent inflation target, ± 1 percentage point, defined in terms of the CPI change, one to two years ahead. Departures from this general rule may be warranted, however, and when this occurs the magnitude of the deviation from the inflation target, defined in terms of the CPI, that may be motivated 1 to 2 years ahead will be clarified by the Riksbank in advance.


As is evident from this clarification of the inflation target and statements in inflation reports published since June 1999, while monetary policy is currently based on an assessment of underlying inflation as measured by UNDEX, headline CPI is still the target variable in the long run, see footnote 2.

2.2.1 LOSS FUNCTION AND TARGET HORIZON

In the academic literature, inflation targeting involves both attempts to minimize deviations of inflation from the explicit inflation target and concerns about real variability.

In the academic literature, inflation targeting involves both attempts to minimize deviations of inflation from the explicit inflation target and concerns about real variability.¹¹ The loss function of a central bank thus includes both inflation and output gap variabil-

¹¹ In formal analysis preferences for output stabilization is measured by the parameter λ in a loss function of the type $L_t = (\pi_t - \pi^*)^2 + \lambda y_t^2$ for where $(\pi_t - \pi^*)$ and y_t the inflation and output gap respectively.



ity.¹² In practice, monetary policy affects the economy with some lags and current interest rate decisions therefore primarily affect future inflation and future levels of the output gap. In order to agree on a certain interest rate, the members of a decision-making body have to make an assessment of the appropriate target horizon for meeting the target and of the inflation forecast on that horizon.

According to the clarification of the inflation target the Executive Board normally takes interest rate decisions with the aim to bring the inflation rate in line with the target one to two years ahead. Hence, the so-called target horizon is usually one to two years under normal circumstances. We interpret this as a clarification by the Executive Board that inflation targeting in practice implies concerns about real variability. In the clarification, it was also pointed out that in the event of a sizeable deviation from target, there may be grounds for weighing the ambition to achieve a rapid return to target against its consequences for the real economy.¹³ There should therefore be scope for adjusting the target horizon in the event of a sizeable shock. If the normal target horizon is considered to be insufficient for returning inflation to the target, this should be made clear. Individual members of the Executive Board may have different opinions on the appropriate target horizon, in the event of such a shock. To date, however, there has not been disagreement on the appropriate target horizon within the board. On the other hand, there has been disagreement on the inflation forecast, which we will discuss below.

2.2.2 THE INFLATION FORECAST


In this section the role of the staff and the role of the Executive Board in producing the inflation forecast will be discussed. A full forecasting exercise, in order to prepare for the publication of the inflation report, is undertaken by the staff four times a year. Approximately half way through the process, the staff presents its recommendation to the members of the Executive Board (in a so-called Policy Report), who then discuss the outlook and make their evaluation of it. With this as a basis, the Executive Board then commissions the staff to finalise the Inflation Report.¹⁴

The operative work in preparing a forecast is undertaken at the Economics Department. In general, the forecasting horizon comprises up to two years but it may vary somewhat depending on what particular variable that is considered. For

¹² See the clarification on the formulation of monetary policy in Heikensten (1999).

¹³ See Heikensten and Vredin (1998) for a discussion on flexible inflation targeting.

¹⁴ At monetary policy meetings with the Executive Board when no inflation report is discussed, an inflation update is presented, referring to the inflation outlook in relation to the previous report.



The operative work in preparing a forecast is undertaken at the Economics Department.

At present, the Riksbank's forecast is based on the assumption that the repo rate is kept unchanged during the whole forecasting period.

the purpose of making the forecast operationally useful, it is of course crucial to be precise about the conditioning set on which the forecast relies, in particular about the assumptions concerning the bank's own instrumental rate (the so-called repo rate). At present, the Riksbank's forecast is based on the assumption that the repo rate is kept unchanged during the whole forecasting period.

While this assumption obviously is not without problems, it has so far turned out to be a useful device for communicating the forecast and its policy implications, both internally and externally. By contrast, the inflation forecasts of many external observers assume some change in the repo rate over the forecast horizon. An illustrative calculation, based on repo rate changes in line with the expectations of money market investors as reported in a survey, has therefore been presented in the inflation reports since October 1999.

In the bank's Inflation Report the point estimate of the forecast is the development of the economy that is perceived to have the largest probability of occurring. This means that it is the modes of the underlying forecast distributions of the variables that are being considered. The Inflation Report labels this development the main scenario. As concerns the use of the forecast in the conduct of monetary policy, it is important to note that not only the point estimate of the forecast is used but that policy also considers the uncertainty that surrounds the point forecast. In practice this means that the whole distribution of the forecast, in particular the mean forecast and the variance, is considered when discussing policy.¹⁵

The uncertainty analysis discussed is based on two types of assessments for each factor that is deemed to affect inflation. First, an assessment is made whether or not the uncertainty in the forecast is larger or smaller than the uncertainty that historically has been associated with the factor. Second, an assessment is made if the probability of outcomes above the main scenario is deemed to be larger than the probability of outcomes below (i.e. the possibility of asymmetric risk). This would then constitute an "upward" risk in the forecast. Correspondingly, there would be a downward risk if the probability of outcomes below the main scenario is judged to be larger than the probability of outcomes above the main scenario. In other words, it is possible for the risks to be asymmetrically distributed around the main scenario. The resulting distributions are then weighed

¹⁵ For further details see Berg (1999). See also the discussion in Svensson (1999) and Blix and Sellin (1999).



together to an inflation-forecast distribution with weights that reflect each factor's relative importance for future inflation.

The Executive Board takes the main scenario and the picture of risk from the Economics Department's analysis as the starting point for its assessment. The initial assessment from the Economics Department thereby provides a concrete basis for the Executive Board's discussion. Various alternative scenarios, reflecting different assumptions regarding the paths for important exogenous variables, e.g. oil prices, or inherently uncertain starting values for endogenous variables, e.g. the current output gap, are presented. The Executive Board's conclusions may imply that the main scenario and the distribution for the inflation forecast are revised. The role of the Economics Department is then to make sure that a new consistent projection is produced and presented to the Executive Board for its final assessment. When there are dissenting views within the Executive Board regarding the inflation outlook, it is the majority view which is reflected in the Riksbank's Inflation Report. The focus of interest therefore then becomes how the information about the present state of the economy should be aggregated into a forecast for future inflation and a decision on monetary policy.


2.2.3 AGGREGATION AND VOTING

In this section we will discuss the aggregation process for the Executive Board's inflation forecast and the voting on the repo rate. Since the Executive Board obtained the responsibility for conducting monetary policy, four consecutive inflation reports have been published during 1999. All members of the Executive Board supported the inflation forecasts presented in the first two reports. However, one member of the executive board did not support the forecast presented in the third report, published in October 1999. In the minutes published around two weeks after the publication of the inflation report this member announced her own inflation forecast. Thus, in case there are disagreements on the inflation outlook, the inflation report represents the majority view on future inflation, while the minority view is presented several weeks later, when the minutes from the monetary policy meeting are published.

At four occasions in 1999 individual Executive Board members have expressed reservations to the majority decisions taken regarding the repo rate. So far, disagreements have occurred for the following reasons.

First, there may be disagreement on key economic relations, for example the link between growth and inflation. Accord-

At four occasions in 1999 individual Executive Board members have expressed reservations to the majority decisions taken regarding the repo rate.



ing to the minutes from the meeting of the Executive Board on 5 October, Eva Srejber entered a reservation against the decision to adopt the Inflation Report. She did not support the majority view that improved confidence in monetary and fiscal policy – deregulations and increased competition pointed to a somewhat weaker link between growth and inflation than had been assumed in June 1999. Eva Srejber presented an alternative, higher, forecast, partly based on another assessment of the link between growth and inflation.

Second, there may be disagreement on how to interpret the current state of the economy. During the summer in 1999 two Executive Board members, Eva Srejber and Kerstin Hessius, identified an upward risk for the inflation rate. Both Board members opposed leaving the repo rate unchanged. According to the minutes from the Executive Board meeting on 12 August Ms. Hessius stated that the repo rate should be raised by 0.25 percentage points. Ms. Srejber stated that the repo rate should be raised by 0.10 percentage points. Ms. Hessius shared the other Board members' view on the economic situation but considered that in a situation with high growth figures in Sweden and appreciably improved international economic prospects, the present level of the repo rate, at 2.90 per cent, was too low. Eva Srejber judged that the growth rates in Sweden and abroad, with rising resource utilisation in Sweden, were leading to increased inflationary pressure. She suggested that with an unchanged, monetary stance, in one to two years' time inflation would be above 2 per cent. Eva Srejber restated her dissenting view on the current state of economic situation in October.

Third, there may be disagreement on the future path for one or several exogenous determinants of future inflation, for example oil prices. In October, the majority assumed that the barrel price of crude oil would fall back from the current level to just over USD 17 at the end of the forecast period. Eva Srejber, on the other hand, suggested that the oil price would fluctuate around USD 20. In November, Villy Bergström entered a reservation against the decision to raise the repo rate on the grounds that the wage forecast was somewhat too high.

Fourth, there has been disagreement on the timing of interest rate decisions and how changes in the repo rate should relate to the inflation forecast. According to the separate minutes of the Executive Board meeting on 22 April, Lars Heikensten entered a reservation against the decision to leave the interest rate unchanged and stated that the repo rate should be reduced by 0.25 percentage points. The decisive argument for this was that, excluding transitory effects and with the repo rate unchanged, inflation one to two years ahead would be somewhat below the target. According to Mr Heikensten, a decision to refrain from lowering the interest rate in that situation could mean the establishment of a



higher than necessary interest rate for a longer period of time. However, the majority of the Board underscored that it was too early to decide whether there was room for another interest rate reduction and emphasised the importance of waiting for new information to get a clearer picture of the inflation outlook.

We would like to end this section by emphasising that when there are dissenting views the majority rule serves as a formal aggregation rule. In the aggregation process,

In the aggregation process, the chairman, Urban Bäckström, has a strong role for two reasons.

the Chairman, Urban Bäckström, has a strong role for two reasons. First, he has the casting vote, in case there is no majority in the board. In practice, this means that he only needs the support from two other members in order to form a majority. Second, the Chairman puts forward the proposition. In order to be informed about individual preferences and possible outcomes of the voting procedure, negotiations may be undertaken before the proposition is made. This was for example evident at the meeting on 24 March 1999 when the inflation outlook pointed to a repo rate cut. Two alternatives were discussed: a reduction by either 0.15 or 0.25 percentage points. Several members then pointed out that there was an advantage in conducting monetary policy with clear, distinct steps in the repo rate. Altogether, five members considered that a reduction of the repo rate by 0.25 percentage points was appropriate. The sixth member declared a rather indifferent attitude to the choice between the two alternatives and was therefore willing to support the majority view. The Chairman thereafter proposed the Executive Board to unanimously decide to reduce the repo rate by 0.25 percentage points, which it did.


3. Accountability

3.1 THE RIKSBANK PUT TO THE TEST

During the introductory year of institutional independence a few situations have arisen where the Riksbank has been put to the test. Two of them will be accounted for in this section. According to chapter 6 Art. 4 of the Sveriges Riksbank Act (1988:1385)¹⁶ the Riksbank shall hand over a written report on monetary policy to the Parliamentary Standing Finance Committee at

During the introductory year of institutional independence a few situations have arisen where the Riksbank has been put to the test.

¹⁶ As amended to apply from 1 January 1999 (unauthorised translation).



least twice a year. The Riksbank has chosen the Inflation Report for this purpose. When the first Inflation Report was presented by the Governor in a Finance Committee meeting on 25 March, the Riksbank had been asked by the Finance Committee to present the report in advance on the previous night. The request was however denied, due to the rule stating that the general public should have simultaneous access to new monetary policy information from the Riksbank. The Riksbank did however suggest a postponement of the Finance Committee meeting in order to provide the members with additional time for preparation. However, the standing committee decided to hold the meeting as scheduled.

The second test of the procedure for holding the Riksbank accountable concerned the evaluation of monetary policy 1996–98 by the Riksdag, which focused on the fact that the annual rate of price increases averaged 0.7 per cent during 1996–98, and thus underscored the inflation target set by the Riksbank.¹⁷

In the hearing by the Parliamentary Standing Finance Committee on 18 May 1999 the Governor argued in an introductory remark that in each of these years CPI inflation was markedly affected by shocks that *ex post* were fairly easy to identify and only had transitory direct effects on the inflation rate.¹⁸ Had the Riksbank attempted to counter such price movements, the result might have been unnecessarily costly for the economy, in terms of exaggerated fluctuations in economic activity as well as in the financial markets.

Shortly thereafter, in mid-May, the Riksbank received fierce criticism in an assessment by a majority¹⁹ of the Parliamentary Standing Finance Committee for its monetary policy conducted during the last three years, 1996–98. According to the majority, interest rates had been lowered too little and too late, despite a stronger krona and less expansive fiscal policy.

The criticism was met in an article by Governor Bäckström, Deputy Governor Heikensten, the previous Governing Board Chairman Feldt and the present Governing Council vice-Chairman Gernandt, emphasising the importance of price stability and the monetary policy conduct in terms of its effects on inflation expectations during these years.

¹⁷ Inflation as measured by UND1X, which excludes interest expenditure, taxes and subsidies, averaged 1.5 percent.

¹⁸ This was mainly due to three factors. Firstly, the repo rate cut, from 8.90 to 3.40 per cent, resulted in an initial further decrease in inflation through effects from the mortgage interest rate component in the CPI. This downward and direct impact on CPI inflation is appreciably larger in the short run than the upward tendency associated with stronger economic activity. Secondly, cuts in indirect taxes, such as the tobacco tax or the property tax on private houses, have generally constituted a one-off shift in the price level, which has not altered the inflation trend. All else equal, twelve months later the rate of inflation shifts back up to the earlier level. Thirdly, some transitory shocks have also affected the underlying inflation. For instance, the oil price fall caused both UND1X and CPI to decrease.

¹⁹ The SDP, the Left Party and the Greens.



At the subsequent meeting with the standing committee, in October 1999, this issue was not discussed further.

3.2 SOME MARKET REACTIONS

With the new central bank legislation in place, communication with the general public and market participants has intensified. By publishing the inflation forecast, the minutes from the Executive Board's monetary

With the new central bank legislation in place, communication with the general public and market participants has intensified.

policy meetings and speeches by all members of the board, intentions and changes in the monetary policy stance are communicated in a way attempting to be transparent.

Four inflation reports and eight sets of minutes from monetary policy meetings have been published so far. The policy instrument – the repo rate – was changed three times by the Executive Board during 1999. The repo rate was lowered on 12 February and 25 March, by 0.25 percentage points each time, but on 12 November it was raised by 0.35 percentage points, to 3.25 percent.

Given the possibility for dissenting views on the inflation outlook and interest rate decisions within the Executive Board it is interesting to study how the market interpreted the publications of the reports and the minutes, and what reaction, if any, they had on market interest rates. Figure 1 below shows the development during 1999 for some market interest rates. The four dotted vertical

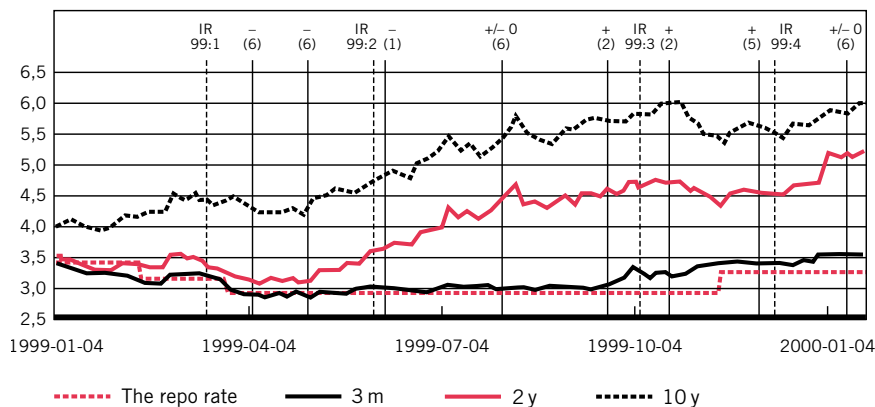
Given the possibility for dissenting views on the inflation outlook and interest rate decisions within the Executive Board it is interesting to study how the market interpreted the publications of the reports and the minutes, and what reaction, if any, they had on market interest rates.

lines mark when the four inflation reports were published and the eight solid lines mark the publication of the minutes. The numbers above the lines indicate the voting results, i.e. how many of the board members that voted for a lower (–) or higher (+) repo rate. Zero indicates that nobody wanted to change the repo rate. The overall impression is that the effects on market interest rates from repo rate decisions, inflation reports and minutes have been relatively small. This suggests that the Riksbank has been quite clear and transparent in the communication with the market participants. The short-term interest rate was evidently affected directly by the announcement of the repo rate adjustments in February, March and November. However, the publication of the minutes also had some effects on market interest rates. For instance, when the minutes published after the meeting in August revealed that two members of the Executive Board wanted to raise the

repo rate, the short-term interest rate began to increase. In particular, the one-month forward rate rose after the publication on 21 September of the minutes of the Executive Board meeting in August.

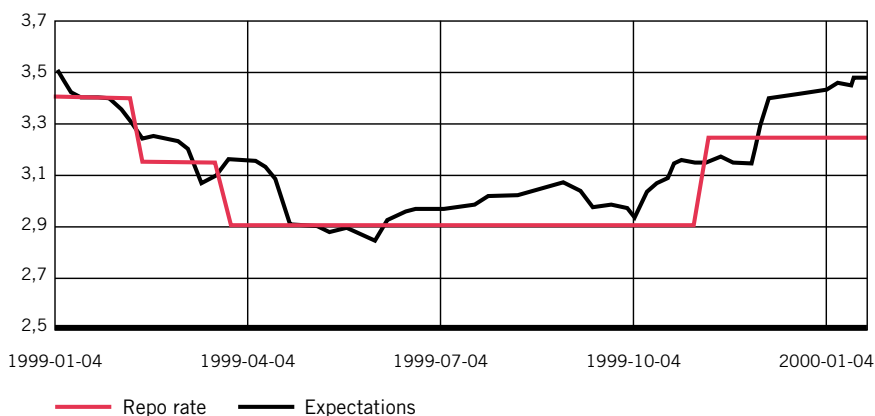
Figure 1. Some market interest rates, the publication of the inflation reports and the minutes. Daily observations, January 1999–January 2000

Per cent



In Figure 2 it is shown that market participants anticipated the repo rate hike in November already in late September, although most of them had expected an increase by 0,25 percentage points instead of the realised 0,35 percentage point increase. The upward trend in short term interest rates slowed between the publication of the inflation report on 6 October and the publication of the minutes on 20 October. The October report judged that the link between growth and inflation was to be somewhat weaker than envisaged in the June report and that inflation would be marginally above the inflation target in two years' time. The minutes published on 20 October (from the meeting on 5 October) revealed that two members of the Executive Board still wanted to raise the repo rate. Four members of the Board considered that the repo rate should continue to be kept unchanged for a time but that it was important to send clear signals of the need to raise the repo rate in the near future. When the repo rate was finally raised on 12 November it was therefore very much in line with market participants expectations. This experience shows that the minutes from the meetings of the Executive Board may be equally (or more) important as a signalling device than the inflation reports, as the minutes may reveal detailed information on both actual and future intentions regarding interest rate policy.

Figure 2. The repo rate and expectations one month earlier according to forward rates, January 1999–January 2000




4. Conclusions

In this paper we have discussed the recent experience of conducting monetary policy with a collegial board according to the amendments to the Riksbank Act which came into force in 1999. According to the Riksbank Act, the appointments of the six members in the Executive Board are staggered in time. The term of the board members is relatively long compared to the interval between the general elections. Changing the composition of the board is therefore a lengthy process. This may reduce output volatility and the inflation bias according to the academic literature.

Interest rate decisions are normally taken with the aim to bring inflation in line with the 2 per cent inflation target one to two years ahead. There is scope for adjusting the target horizon in the event of a sizeable deviation from the target. The Executive Board takes the inflation forecast from the Economics Department's analysis as a starting point of its own assessment.

Interest rate decisions are normally taken with the aim to bring inflation in line with the 2 per cent inflation target one to two years ahead.

Individual Board members have expressed reservations several times to the majority decisions taken regarding the repo rate. Disagreements on the inflation outlook have occurred due to different opinions on the relation between growth and inflation, the current state of the economy and the future outlook for one or several exogenous determinants of inflation. When there are dissenting views in the Executive Board, the majority rule serves as a formal aggregation rule. The Chairman, the Governor of the Riksbank, has the casting vote, but so far he has



not used it. The Chairman also puts forward the proposition, sometimes after negotiations have been undertaken. By publishing inflation reports and minutes from meetings with the Executive Board, the inflation forecasts of the Riksbank are openly discussed and motivated. This transparency provides good incentives to both the staff and the Executive Board to do their best. It also ensures accountability on the part of the Executive Board and its individual members for achievement of the price stability objective.



References

- Berg, Claes (1999), "Inflation Forecast Targeting: the Swedish Experience", *Quarterly Review*, 1999:3, 40–66, *Sveriges Riksbank*.
- Blix, Mårten and Peter Sellin (1999), "A bivariate distribution for inflation and output forecasts," *mimeo*, *Sveriges Riksbank*.
- Faust, Jon (1996), "Whom can we trust to run the Fed? Theoretical support for the founders' views", *Journal of Monetary Economics* 37, 267–283.
- Heikensten, Lars (1999), "The Riksbank's Inflation Target – Clarification and Evaluation" *Quarterly Review*, 1999:1, 5–17, *Sveriges Riksbank*.
- Heikensten, Lars and Anders Vredin (1998), "Inflation Targeting and Swedish Monetary Policy – Experience and Problems", *Quarterly Review*, 1998:4, 5–33 *Sveriges Riksbank*.
- Persson, Torsten and Guido Tabellini (1993), "Designing institutions for monetary stability", *Carnegie-Rochester Conference Series on Public Policy* 39.
- Rogoff, Kenneth (1985), "The optimal degree of commitment to an intermediate monetary target", *Quarterly Journal of Economics* 100, 1169–1190.
- Svensson, Lars E.O. (June 1999), "Price stability as a target for monetary policy: defining and maintaining price stability", *mimeo*, Institute for International Economic Studies, Stockholm University, seminar paper No. 673, presented at the Deutsche Bundesbank conference on *The Monetary Transmission Process: Recent Developments and Lessons for Europe*, MacMillan, London, forthcoming.
- von Hagen, Jürgen and Süppel (1994), "Central bank constitutions for federal monetary unions", *European Economic Review* 38, 774–782.
- Waller, Christopher (1989), "Monetary Policy Games and Central Bank Politics", *Journal of Money, Credit and Banking* 21, 422–431.
- Waller, Christopher (1992), "A bargaining model of partisan appointments to the central bank", *Journal of Monetary Economics* 21, 411–428.
- Walsh, Carl (1995), "Optimal contracts for central bankers", *American Economic Review* 85, 150–167.



Notices

Rapid rise in lending to households

“Lending to households has risen by between 5 and 10 per cent per annum in recent years and lending as a whole is growing far more quickly than the economy, a situation which is not sustainable in the long run,” commented Deputy Governor of the Riksbank Lars Nyberg in a speech at Handelsbanken in Linköping recently, urging both banks and borrowers to be aware of the inherent risks.

“Although it is good to see households feeling optimistic about the future, this situation is worrying to the extent that borrowed money is being used to invest in the stock and property markets, where prices have climbed very rapidly over the last six months. Experience shows that high gearing leads to problems for both households and banks when asset prices fall.”

Signs of the new economy

“There is good reason to wonder whether we are not actually seeing signs of the ‘new economy’ emerging in Sweden – there are at the very least indications of its arrival in the form of the acceleration in productivity and investment during the latter part of last year,” claimed Deputy Governor of the Riksbank Kerstin Hesselius in a debate on growth at Controller Congress 2000 recently.

“The latest economic data for Sweden confirm the impression that the rate of growth is faster than foreseen in the December Inflation Report.”



Repo rate left unchanged at 3.75 per cent

The global economic outlook has continued to improve since the December Inflation Report. The latest Inflation Report, published on 23 March, predicts higher oil prices and a somewhat slower appreciation of the krona than its predecessor. The Swedish economy is also expected to grow more quickly than previously thought, thanks primarily to higher private consumption. The Riksbank's current assessment is that inflation will hold below 2 per cent over the next one to two years and so the repo rate has been left unchanged.

The euro in the Swedish financial sector

The Riksbank would need about a year to complete the necessary preparations for a full changeover to the euro, provided that some preparations can be made during an “advance warning” period. Such is the conclusion of a study of lead times in the financial sector presented in the Riksbank's recently published report *The Euro in the Swedish Financial Sector – Situation Report 5*.

The report also suggests that the Swedish bank system, securities dealers, insurance companies and the Financial Supervisory Authority would need around 18 months to prepare. The bulk of the changeover work would concern the modification of computer systems, but a need for legislative changes has also been identified. Some financial players, including the Stockholm Stock Exchange, the Central Securities Depository (VPC) and various market players, are already largely euro-ready.



Monetary policy calendar

1997-01-02 The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.5 per cent as of 3 January 1997.

1997-04-01 The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.5 per cent (unchanged).

1997-07-01 The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.5 per cent (unchanged).

1997-10-01 The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.5 per cent (unchanged).

1997-12-11 The *fixed repo rate* is increased by the Riksbank Governor from 4.10 to 4.35 per cent as of 17 December 1997. Due to the Christmas and New Year holidays, the repo rate set on 16 December will apply for four weeks until 14 January 1998.

1998-01-02 The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.5 per cent (unchanged).

1998-04-01 The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.5 per cent (unchanged).

1998-06-04 The *fixed repo rate* is lowered by the Riksbank Governor from 4.35 per cent to 4.10 per cent as of 9 June 1998.

1998-07-01 The *reference* (official discount) *rate* is confirmed by the Riksbank Governor at 2.0 per cent as of 2 July 1998.



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

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

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

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

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

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

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


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

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

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

1999-10-01 The *reference* (official discount) *rate* is confirmed by the Riksbank at 1.5 per cent as of 4 October 1999.

1999-11-11 The *repo rate* is increased by the Riksbank from 2.90 per cent to 3.25 as of 17 November 1999.



2000-01-03 The *reference* (official discount) *rate* is confirmed by the Riksbank at 2.0 per cent as of 4 January 2000.

2000-02-03 The *repo rate* is increased by the Riksbank from 3.25 per cent to 3.75 as of 9 February 2000.

2000-04-03 The *reference* (official discount) *rate* is confirmed by the Riksbank at 2.5 per cent as of 4 April 2000.

Statistical appendix

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

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

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1

Riksbank's assets and liabilities

Assets. Period-end stock figures. SEK million

		Foreign exchange	Government securities	Lending to banks	Fixed assets	Other	Total
1999	Jan	113 875	36 086	1	1 162	44 617	195 757
	Feb	142 998	32 862	730	1 094	38 977	216 678
	March	130 172	33 376	1 997	1 104	52 872	219 538
	April	133 770	34 152	229	1 089	47 483	216 732
	May	140 671	33 279	98	1 090	42 424	217 568
	June	137 691	33 163	2 412	1 140	39 344	213 756
	July	141 359	32 712	65	1 140	36 802	212 085
	Aug	152 249	32 660	117	1 138	32 869	219 042

		Gold	Government securities	Lending to monetary policy counterparts	Receivables in foreign currency	Other	Total
	Sept	13 834	31 932	31 122	136 565	3 053	216 506
	Oct	13 834	31 728	31 929	135 222	2 220	214 933
	Nov	13 834	31 579	27 577	143 963	1 647	218 600
	Dec	13 834	31 332	45 633	139 153	1 775	231 727
2000	Jan	14 774	29 584	30 039	132 133	3 164	217 694
	Feb	14 774	28 833	39 558	126 231	2 984	212 380
	March	14 774	31 728	31 929	135 222	2 220	214 933

Liabilities

		Notes and coins in circulation	Riksbank liquidity bills	Bank deposits in the Riksbank	Capital liabilities	Other	Total
1999	Jan	81 539	–	653	37 162	76 403	195 747
	Feb	80 470	–	95	49 848	86 265	216 678
	March	81 609	–	1 188	49 848	86 893	219 538
	April	81 738	–	1 007	49 848	84 139	216 732
	May	82 652	–	808	49 848	84 260	217 568
	June	83 024	–	2 301	60 487	67 944	213 756
	July	83 950	–	145	60 487	67 503	212 085
	Aug	84 525	–	3 792	60 487	70 238	219 042

		Notes and coins in circulation	Capital liabilities	Debts to monetary policy counterparts	Debts in foreign currency	Other	Total
	Sept	85 070	60 487	97	14 395	56 457	216 506
	Oct	86 161	60 487	61	11 421	56 803	214 933
	Nov	88 375	60 487	86	12 113	57 539	218 600
	Dec	98 421	60 487	4 457	9 829	58 533	231 727
2000	Jan	90 463	60 487	469	9 616	52 734	217 694
	Feb	88 254	60 487	392	6 507	52 812	212 380
	March	86 161	60 487	61	11 421	56 803	214 933

2 Money supply

End-of-month stock

	SEK million		Twelve months change in per cent		
	M0	M3		M0	M3
1997					
Jan	67 503	791 513	Jan	5.3	7.4
Feb	67 490	783 635	Feb	5.8	7.4
March	68 683	807 482	March	7.4	6.5
April	67 473	788 247	April	5.4	4.3
May	67 527	794 077	May	5.1	4.1
June	68 101	807 112	June	4.7	5.3
July	66 763	791 753	July	5.0	3.2
Aug	68 623	804 033	Aug	4.0	4.6
Sept	68 118	799 854	Sept	3.7	2.1
Oct	68 556	799 604	Oct	5.7	3.4
Nov	69 762	807 415	Nov	4.6	1.3
Dec	74 380	826 242	Dec	3.0	1.3
1998					
Jan	70 751	821 712	Jan	4.8	3.8
Feb	70 434	806 800	Feb	4.4	3.0
March	69 560	802 877	March	1.3	-0.6
April	70 181	807 368	April	4.0	2.4
May	70 783	814 796	May	4.8	2.6
June	71 118	829 968	June	4.4	2.8
July	71 369	835 079	July	6.9	5.5
Aug	73 042	835 199	Aug	6.4	3.9
Sept	71 954	838 568	Sept	5.6	4.8
Oct	73 041	846 579	Oct	6.5	5.9
Nov	73 929	852 805	Nov	6.0	5.6
Dec	78 139	843 416	Dec	5.1	2.1
1999					
Jan	74 940	855 180	Jan	5.9	4.1
Feb	74 621	853 298	Feb	5.9	5.8
March	75 302	853 557	March	8.3	6.3
April	75 533	861 790	April	7.6	6.7
May	76 532	868 965	May	8.1	6.6
June	76 413	879 325	June	7.4	5.9
July	77 050	872 482	July	8.0	4.5
Aug	78 067	889 400	Aug	6.9	6.5
Sept	78 475	899 641	Sept	9.1	7.3
Oct	79 413	930 834	Oct	8.7	10.0
Nov	80 681	915 960	Nov	9.1	7.4
Dec	87 481	926 954	Dec	12.0	9.9
2000					
Jan	82 625	921 000	Jan	10.3	8.6
Feb	81 421	930 806	Feb	9.1	9.1

3

Interest rates set by the Riksbank

Per cent

	Date	Repo rate	Deposit rate	Lending rate		Date	Discount rate
1996	08-14	5.40			1993	01-05	9.00
	08-21		4.75	6.25		04-02	7.00
	08-28	5.25				07-02	6.00
	09-11	5.15				10-08	5.00
	09-25	5.05			1994	01-04	4.50
	10-09	4.95				07-04	5.50
	10-23	4.80				10-04	7.00
	10-30	4.60	4.25	5.75	1995	07-04	7.50
	11-27	4.30				10-06	7.00
	12-11		3.75	5.25	1996	01-03	6.00
	12-18	4.10				04-02	5.50
1997	12-17	4.35				07-02	4.50
1998	06-10	4.10				10-02	3.50
	11-04	3.85			1997	01-03	2.50
	11-18		3.25	4.75	1998	07-02	2.00
	11-25	3.60			1999	01-05	1.50
	12-16	3.40				04-06	1.00
1999	02-17	3.15	2.75	4.25		10-04	1.50
	03-31	2.90			2000	01-04	2.00
	11-17	3.25				04-04	2.50
2000	02-09	3.75	2.75	4.25			

4

Capital market interest rates

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

		Bonds issued by:					
		Central government				Housing	(Caisse)
		3 years	5 years	7 years	9–10 years	2 years	5 years
1998	Jan	5.15	5.33	5.49	5.65	5.56	5.81
	Feb	5.02	5.19	5.36	5.53	5.37	5.63
	March	4.95	5.06	5.18	5.35	5.27	5.44
	April	4.88	4.99	5.05	5.21	5.16	5.31
	May	4.83	4.98	5.04	5.20	5.08	5.25
	June	4.46	4.70	4.79	4.97	4.70	4.96
	July	4.36	4.61	4.71	4.88	4.58	4.88
	Aug	4.39	4.60	4.66	4.80	4.68	4.99
	Sept	4.37	4.56	4.63	4.79	4.72	5.15
	Oct	4.35	4.53	4.68	4.75	4.71	5.30
	Nov	3.94	4.19	4.47	4.59	4.18	4.79
	Dec	3.64	3.86	4.12	4.25	3.89	4.46
1999	Jan	3.38	3.59	3.87	4.02	3.59	4.14
	Feb	3.36	3.67	4.01	4.18	3.52	4.13
	March	3.39	3.80	4.25	4.44	3.55	4.29
	April	3.12	3.53	3.99	4.24	3.26	3.99
	May	3.30	3.80	4.26	4.50	3.47	4.54
	June	3.72	4.28	4.67	4.87	3.82	5.09
	July	4.17	4.81	5.12	5.26	4.64	5.75
	Aug	4.43	5.09	5.39	5.49	5.02	6.15
	Sept	4.51	5.29	5.60	5.69	5.08	6.22
	Oct	4.70	5.53	5.83	5.92	5.22	6.33
	Nov	4.52	5.17	5.46	5.56	4.99	5.89
	Dec	4.61	5.26	5.49	5.59	5.05	5.93
2000	Jan	5.20	5.68	5.87	5.95	5.61	6.22
	Feb	5.36	5.76	5.86	5.90	5.81	6.35
	March	5.17	5.44	5.49	5.51	5.66	6.11

5

Overnight and money market interest rates

Monthly average, per cent

		Repo- rate	Inter- bank- rate	SSVX			Company certificates		
				3 months	6 months	12 months	3 months	6 months	
1997	Jan	4.10	4.20	3.79	3.84			3.95	4.00
	Feb	4.10	4.20	3.96	4.03			4.13	4.20
	March	4.10	4.20	4.16	4.26		4.45	4.34	4.43
	April	4.10	4.20	4.06	4.18			4.24	4.35
	May	4.10	4.20	4.12	4.23			4.30	4.40
	June	4.10	4.20	4.08	4.18		4.47	4.28	4.37
	July	4.10	4.20	4.09	4.24			4.36	4.46
	Aug	4.10	4.20	4.20	4.36			4.45	4.60
	Sep	4.10	4.20	4.13	4.28		4.66	4.37	4.53
	Oct	4.10	4.20	4.26	4.44			4.49	4.68
	Nov	4.10	4.20	4.33	4.54		5.16	4.59	4.79
	Dec	4.19	4.29	4.45	4.73		5.09	4.70	4.99
1998	Jan	4.35	4.45	4.44	4.58			4.44	4.59
	Feb	4.35	4.45	4.36	4.54		4.71	4.56	4.73
	March	4.35	4.45	4.51	4.59		4.72	4.68	4.76
	April	4.35	4.45	4.50	4.61			4.66	4.76
	May	4.35	4.45	4.52	4.54		4.48	4.18	4.23
	June	4.16	4.28	4.23	4.23		4.29	4.39	4.38
	July	4.10	4.20	4.14	4.14			4.29	4.30
	Aug	4.10	4.20	4.23	4.26			4.37	4.39
	Sept	4.10	4.20	4.22	4.21		4.29	4.36	4.36
	Oct	4.10	4.20	4.20	4.18			4.36	4.34
	Nov	3.83	3.93	3.82	3.75			4.00	3.96
	Dec	3.51	3.61	3.45	3.51		3.53	3.65	3.69
1999	Jan	3.40	3.50	3.27	3.25			3.45	3.46
	Feb	3.30	3.40	3.14	3.16			3.31	3.35
	March	3.14	3.24	3.13	3.18		3.17	3.30	3.33
	April	2.90	3.00	2.87	2.90			3.04	3.07
	May	2.90	3.00	2.92	2.96		3.26	3.11	3.15
	June	2.90	3.00	2.97	3.03		3.37	3.18	3.22
	July	2.90	3.00	3.01	3.16			3.30	3.57
	Aug	2.90	3.00	3.00	3.20		3.83	3.32	3.77
	Sept	2.90	3.00	3.05	3.28		3.91	3.27	3.75
	Oct	2.90	3.00	3.23	3.55			3.87	4.00
	Nov	3.06	3.16	3.38	3.63		4.26	3.83	3.91
	Dec	3.25	3.35	3.41	3.73		4.24	3.71	3.95
2000	Jan	3.25	3.35	3.57	3.86			3.77	4.05
	Feb	3.61	3.71	3.90	4.22			4.11	4.43
	March	3.75	3.85	4.06	4.30		4.74	4.27	4.53

6

Treasury bills and selected international rates

Annualized rate. Monthly average, per cent

		3-month deposits					6-month deposits				
		USD	DEM	EUR	GBP	SSVX	USD	DEM	EUR	GBP	SSVX
1997	Jan	5.58	3.13		6.47	3.79	5.67	3.14		6.66	3.84
	Feb	5.50	3.19		6.35	3.96	5.60	3.19		6.49	4.03
	March	5.62	3.29		6.42	4.16	5.79	3.30		6.54	4.26
	April	5.81	3.25		6.48	4.06	5.99	3.29		6.74	4.18
	May	5.80	3.20		6.54	4.12	5.97	3.26		6.72	4.23
	June	5.77	3.16		6.77	4.08	5.89	3.22		6.91	4.18
	July	5.72	3.16		7.05	4.09	5.81	3.23		7.24	4.24
	Aug	5.69	3.28		7.25	4.20	5.82	3.42		7.37	4.36
	Sept	5.67	3.34		7.29	4.13	5.80	3.48		7.43	4.28
	Oct	5.73	3.65		7.36	4.26	5.80	3.78		7.46	4.44
	Nov	5.83	3.78		7.71	4.33	5.87	3.89		7.77	4.54
	Dec	5.89	3.76		7.69	4.45	5.94	3.84		7.77	4.73
1998	Jan	5.52	3.45		7.42	4.44	5.58	3.54		7.41	4.58
	Feb	5.51	3.41		7.38	4.36	5.52	3.48		7.38	4.54
	March	5.56	3.46		7.41	4.51	5.60	3.58		7.42	4.59
	April	5.57	3.58		7.39	4.50	5.62	3.66		7.39	4.61
	May	5.57	3.54		7.34	4.52	5.64	3.65		7.32	4.54
	June	5.59	3.49		7.59	4.23	5.63	3.59		7.65	4.23
	July	5.57	3.47		7.66	4.14	5.64	3.56		7.71	4.14
	Aug	5.56	3.43		7.57	4.23	5.60	3.52		7.56	4.26
	Sept	5.39	3.42		7.32	4.22	5.30	3.48		7.18	4.21
	Oct	5.18	3.48		7.05	4.20	4.97	3.45		6.83	4.18
	Nov	5.24	3.56		6.79	3.82	5.06	3.51		6.55	3.75
	Dec	5.14	3.26		6.27	3.45	5.00	3.22		5.97	3.51
1999	Jan	4.88		3.04	5.74	3.27	4.89		2.99	5.52	3.25
	Feb	4.87		3.02	5.38	3.14	4.93		2.97	5.25	3.16
	March	4.89		2.98	5.26	3.13	4.97		2.93	5.17	3.18
	April	4.87		2.63	5.17	2.87	4.94		2.62	5.12	2.90
	May	4.90		2.51	5.20	2.92	5.01		2.51	5.18	2.96
	June	5.09		2.57	5.08	2.97	5.28		2.63	5.09	3.03
	July	5.22		2.61	5.03	3.01	5.53		2.81	5.21	3.16
	Aug	5.37		2.64	5.13	3.00	5.78		2.97	5.43	3.20
	Sept	5.48		2.66	5.29	3.05	5.87		3.03	5.68	3.28
	Oct	6.11		3.29	5.85	3.23	6.02		3.33	5.95	3.55
	Nov	6.01		3.38	5.72	3.38	5.96		3.40	5.88	3.63
	Dec	6.07		3.38	5.91	3.41	5.09		3.46	6.10	3.73
2000	Jan	5.93		3.28	6.00	3.57	6.14		3.50	6.25	3.86
	Feb	5.99		3.47	6.09	3.90	6.24		3.67	6.27	4.22
	March	6.12		3.70	6.10	4.06	6.34		3.89	6.29	4.30

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

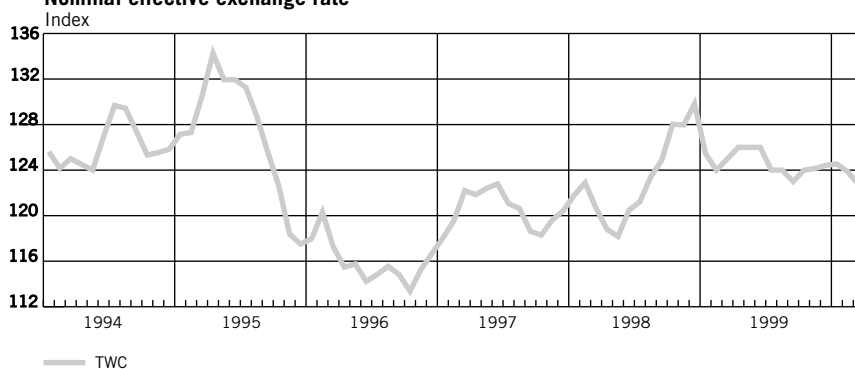
Annual and monthly averages; annual highs and lows

			SEK per				USD per	
TCW-index			USD	100 DEM	EUR	100 JPY	DEM	JPY
1997	Jan	118.02	7.06	440.02		5.99	1.60	117.83
	Feb	119.55	7.40	442.22		6.02	1.67	122.93
	March	122.20	7.65	450.95		6.25	1.70	122.57
	April	121.85	7.68	449.31		6.12	1.71	125.56
	May	122.40	7.67	450.73		6.47	1.70	118.61
	June	122.79	7.74	448.77		6.78	1.73	114.29
	July	121.06	7.81	436.41		6.78	1.79	115.24
	Aug	120.63	8.00	433.89		6.78	1.84	117.91
	Sept	118.62	7.70	430.56		6.38	1.79	120.73
	Oct	118.36	7.57	430.99		6.26	1.76	120.96
	Nov	119.62	7.56	436.58		6.04	1.73	125.18
	Dec	120.44	7.78	438.03		6.01	1.78	129.49
1998	Jan	121.66	8.01	441.19		6.18	1.82	129.50
	Feb	122.89	8.08	445.30		6.43	1.81	125.69
	March	120.65	7.97	436.38		6.18	1.83	129.00
	April	118.81	7.82	431.28		5.93	1.81	132.13
	May	118.17	7.69	433.46		5.70	1.77	134.96
	June	120.47	7.91	441.36		5.62	1.79	140.15
	July	121.22	7.98	444.30		5.68	1.80	140.63
	Aug	123.41	8.13	447.56		5.61	1.79	144.68
	Sept	124.88	7.91	464.26		5.88	1.70	134.57
	Oct	128.03	7.85	479.02		6.49	1.64	120.78
	Nov	127.97	7.99	475.49		6.64	1.68	120.35
	Dec	129.83	8.05	482.79		6.86	1.67	117.24
1999	Jan	125.46	7.82	464.45	9.0838	6.92	1.69	113.16
	Feb	124.00	7.95	455.54	8.9096	6.82	1.75	116.72
	March	125.43	8.22	457.34	8.9497	6.87	1.80	119.64
	April	125.75	8.32	455.88	8.9162	6.97	1.83	119.72
	May	126.87	8.44	458.97	8.9766	6.93	1.84	122.05
	June	125.69	8.51	451.67	8.8338	7.05	1.88	120.76
	July	124.40	8.46	447.31	8.7485	7.07	1.89	119.54
	Aug	124.17	8.26	447.81	8.7584	7.29	1.84	113.25
	Sept	123.42	8.22	441.40	8.6330	7.67	1.86	107.01
	Oct	124.35	8.15	446.30	8.7289	7.69	1.83	106.03
	Nov	124.14	8.34	441.27	8.6305	7.96	1.89	104.70
	Dec	124.42	8.48	439.16	8.5892	8.27	1.93	102.59
2000	Jan	124.54	8.47	439.49	8.5956	8.07	1.93	105.10
	Feb	123.85	8.65	435.17	8.5112	7.91	1.99	109.45
	March	122.71	8.69	429.23	8.3950	8.16	2.03	106.38

Note. The base for TCW index is 18 November 1992.

8

Nominal effective exchange rate



Note. The base for TCW index is 18 November 1992.

9

Forward foreign exchange market

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

		Non-bank public		Bank abroad	Riksbank	Total
		Resident (1)	Non-resident (2)	Net (3)	Net (4)	(1+2+3+4)
1998	Jan	-212 998	-22 001	140 364	- 262	- 94 897
	Feb	-186 583	-18 304	119 476	1 382	- 84 029
	March	-192 115	-19 175	142 227	5	- 69 058
	April	-186 239	-17 669	122 320	397	- 81 191
	May	-174 575	-47 495	133 608	0	- 88 462
	June	-220 387	-23 274	112 675	0	-130 986
	July	-218 997	-22 052	129 587	0	-111 462
	Aug	-284 131	-27 586	201 845	0	-109 872
	Sept	-239 370	-26 312	178 740	0	- 86 942
	Oct	-283 253	-29 446	157 158	0	-155 541
	Nov	-304 235	-26 910	158 008	0	-173 137
	Dec	-274 469	-16 164	129 535	0	-161 098
1999	Jan	-251 675	-11 774	117 395	0	-146 054
	Feb	-252 950	-12 878	93 133	0	-172 695
	March	-272 142	-11 752	131 858	0	-152 036
	April	-274 127	- 9 540	127 642	0	-156 025
	May	-289 324	- 4 744	150 131	0	-143 937
	June	-283 220	- 1 091	129 813	0	-154 498
	July	-279 761	- 2 317	147 386	0	-134 692
	Aug	-271 051	4 393	143 815	0	-122 843
	Sept	-262 300	-11 669	156 294	0	-117 705
	Oct	-258 628	- 6 778	174 294	0	- 91 112
	Nov	-272 818	327	185 332	0	- 87 159
	March	-285 131	5 843	182 019	0	- 97 269

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