Financial Stability Report 2004:1

Contents

Foreword

One of the Riksbank's primary functions is the promotion of safe and efficient payments. To this end, twice a year the Riksbank presents an analysis of the financial system's stability. This analysis comprises financial companies as well as the financial infrastructure, that is, the systems that are required for making payments and for trading and delivering financial products. The analysis of financial companies concentrates on the four major Swedish banking groups because it is these that are of crucial importance for the payment system's stability. In the Report, these banking groups are referred to as the banks. The assessment begins with the macroeconomic factors – developments in the real economy as well as events in financial markets – that can affect the risks in financial markets and the banks' capacity to withstand shocks. The first chapter of this report accordingly discusses how the environment for banking has developed since the publication of the Riksbank's previous Financial Stability Report.

Chapter two presents a survey of how the banks' borrowers have been affected and whether they may act in such a way that the banks become more vulnerable.

As payment system stability can also be affected by the banks' own actions, the third chapter analyses developments in the four banks more closely. Profitability trends can indicate the extent to which banks are exposed to strategic risks. The quality of bank assets is evaluated as an indicator of how credit risks might develop, while the banks' funding capacity provides a picture of potential liquidity risks.

Two articles conclude the report. The indebtedness of households and their ability to service debt are analysed in the first, while the second discusses the banks' internal rating systems and some effects of the new capital adequacy rules.

The Executive Board of the Riksbank discussed this report at its meetings on 6 and 19 May, 2004.

Stockholm, June 2004

Lars Heikensten

GOVERNOR OF SVERIGES RIKSBANK

Summary assessment of stability

Clearer signs of an international economic recovery have led to rising interest rates and to date the markets have adapted to the new situation without any problems. Risk appetite, which had been high for a time, have started to fall back. The major Swedish banks have continued to improve their profitability and thereby their capacity to cope with unexpected losses. The current growth of credit in the Swedish economy consists almost entirely of household mortgage loans. An assessment of the indebtedness and ability to pay of households, both as a group and individually, shows that for the banks, household debt is not a serious risk. The current cyclical position of the Swedish economy is one where the risks of the banks incurring grave loan losses appear to be small.

Since the time of the previous Report, international economic activity has continued to strengthen, as noted in the Inflation Report the Riksbank published at the end of May. The recovery has been particularly strong in the United States and Asia, while growth in the euro area is weaker. All in all, however, the developments in the USA and Asia lead the Riksbank to believe that the global economic upswing will be somewhat more vigorous than was foreseen at the time of the previous Report. As for the Swedish economy, the picture of stronger growth in the coming years has been reinforced to some extent by a stronger international tendency and an expansionary fiscal policy.

The financial markets displayed greater stability last autumn and early this spring. Risk premiums decreased, with lower implied stock-market volatilities and narrowing interest rate spreads between high- and low-rated bonds. But there was some concern that an upturn in market interest rates would break this development and lead to market turbulence. In recent months, market interest rates have risen appreciably in a number of countries on account of the strong and broad upswing in the US economy, which is expected to result in a tighter monetary policy. This has led to some renewed increase in risk premiums and falling equity prices. But the fears that this would generate turbulence have not been confirmed in that the adjustment has occurred in a comparatively orderly manner.

The financial markets also reflect expectations of a recovery. Long-term interest rates have started to climb and international stock markets have gone on rising. The risk premiums in the financial markets seem to have diminished over the past year, as is evident for example from decreased implied equity price volatilities and narrowing interest rate spreads between high- and low-rated bonds.

For some time now, it is mainly household borrowing that has risen, while total borrowing by the *non-financial companies* has decreased. It is corporate borrowing via securities markets and mortgage institutions that has fallen most, accompanied by a slower decline in borrowing via banks. Almost half of total corporate borrowing comes from the four major banks. The main reason why corporate demand for credit has fallen lies in low investment. The

increased demand for goods and services that the Riksbank foresees in the Inflation Report's main scenario should lead to an upswing for investment in the coming year. It is then probable that corporate borrowing will grow.

The corporate ability to pay has improved, albeit at a modest rate. Profits are tending to grow after a number of weak years and the proportion of firms defaulting is now rising more slowly. However, the improved performance is mainly a result of cost-cutting rather than increased earnings. The return on equity remains low or is even negative for many firms. However, a future improvement in the ability to service debt is evident in forward-looking, expectations-based indicators. Equity prices are rising and expected default frequencies in the coming year are decreasing.

The commercial property market has tended to stabilise since the time of the previous Report. In the market for office premises, prices and rents are still falling and the number of vacancies is rising, though more slowly than before. Given the economic upswing foreseen by the Riksbank, there are grounds for believing that in time, prices will rise. A factor of importance for the price trend is the behaviour of the foreign investors, who now own around one-fifth of the institutionally-owned stock of properties and lie behind a growing share of procurements in the Swedish real-estate market. The Swedish property market is perceived as transparent and liquid. To date, external purchases have probably helped to dampen a downward price trend at a time when business activity has been weak and many office-intensive sectors have cut staffing.

The effect on property companies of the fall in prices and rents has been comparatively small to date. One reason, pointed out by the Riksbank in earlier Reports, is that the long duration of contracts in the property market results in a time lag before rents change. Another reason is that the low interest rates have improved the net financial position of firms and thereby offset the effects of lower income from rents. By the same token, higher interest rates in connection with an economic recovery tend to weaken the financial position but this is accompanied by rising income from rents. These two contrary effects ought to impart some stability to company profits.

Households in Sweden, as in many other countries, are still rapidly increasing their debts. Some of the main factors are improved disposable income, low interest rates and a high turnover in the housing market. The ratio of debts to disposable income has risen from around 90 per cent in the mid 1990s up towards 120 per cent at present. Still, on account of the low interest rates, post-tax interest payments on these loans are relatively small in relation to household income. Since 1999 the ratio of interest payments to disposable income has been around 5 per cent, which can be compared with levels up towards 11 per cent in the early 1990s.

The debt and the debt servicing ratios are both expected to rise in the years ahead. However, the ability of Swedish households to

service debt is comparatively good. In addition to disposable income, households have assets that can serve as a buffer against increased borrowing costs. Total assets are larger than total liabilities. So the indebtedness of households as a group does not seem to constitute a major risk for the banks. The Riksbank has also studied the indebtedness and ability to service debt of different income groups. The results, presented in a separate article in this Report, show that to a large extent the debts are being carried by the households that own the assets, which implies that the banks have collateral for the loans. The most vulnerable households (those with no margin to cope with unforeseen expenditures) tend not to have any loans. The households with debts have comfortable margins and not even markedly higher interest rates or unemployment would affect them to such an extent that the risks in the banking system would become seriously greater. So the risks associated with household borrowing remain small even at the level of individual households. Neither was it households that occasioned problems for the banks during the financial crisis in the early 1990s, even though the interest expenditure ratio moved up to 11 per cent and unemployment reached an annual peak of 8.5 per cent in 1993.

Half of the loans to the general public from the major Swedish banks are provided to borrowers abroad, mainly in other Nordic countries, Germany and the Baltic states. Households in the Nordic countries and Germany are also continuing to borrow at a high rate, while firms are more cautious. Norwegian and German companies continue to stand out, with a higher risk of default compared with the other countries. Credit growth in the Baltic states has been strong in recent years. Here, too, the major share is going to households but corporate borrowing is also either rising or stable. However, the rapid increase in credit is occurring from levels that were comparatively low.

The loan losses of the *major Swedish* banks decreased during the latest reporting period and are accordingly still low in both a historical and a European perspective. Given the economic upswing forecast by the Riksbank, the losses are expected to remain moderate. But as loan losses are normally somewhat lagged in relation to the business cycle, they may become somewhat larger when activity has turned upwards.

Bank profitability has risen with the cyclical economic improvement. The increased income has come mainly from stock market developments, while interest income from lending is diminishing in importance. Rising equity prices have increased the income from the banks' insurance operations, besides relieving the banks of the need to set aside pension capital to the same extent as earlier. However, the improvement in bank profitability has not come solely from increased income; to some extent it is also a result of cost reductions.

The Tier 1 capital of the major banks has continued to grow. At end March 2004 it amounted to just over 7 per cent, a level that is satisfactory in relation to the economic situation and the levels of the

banks' earnings and loan losses.

Thus, the capacity of the banks to cope with unexpected losses has continued to improve in the six months since the publication of the previous Stability Report. The current cyclical position of the Swedish economy is one where the risks of the banks incurring major loan losses appear to be small. Excessive optimism and imbalances in asset prices may arise later in the business cycle but there are still no signs of that. In the international markets, there is still a risk that the adjustment to higher interest rates will have disorderly elements that might slow the economic recovery. But that would hardly be likely to threaten the stability of the Swedish payment system.

PART 1. SITUATION REPORT

Macroeconomic developments

International economic activity has continued to strengthen. Expectations of monetary tightening, above all in the United States, have led to a period of rising interest rates. Risk premiums, after falling steadily, have also increased again, partly because investors have searched for higher returns. But even with this adjustment, risk premiums in the financial markets are still comparatively low.

The basis for the Riksbank's assessment of financial stability consists of the macroeconomic factors – tendencies in the real economy as well as in the financial markets – that can affect the Swedish banks or their borrowers. The economic assessment presented in this chapter starts from the appraisal in the Riksbank's Inflation Report from the end of May.

In Europe, as well as in Sweden and the United States, economic growth has been relatively weak for a number of years. In the past year, however, international economic activity has strengthened, though there are geographical differences (see Figure 1:1). The recovery has been strong in the United States and Asia but has not yet taken off properly in the euro area. Growth is subdued in the German economy in particular, while an upswing already seems to have begun in the other euro countries.

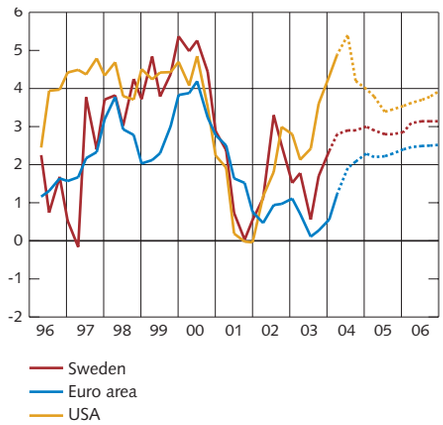
The picture of favourable economic growth in Sweden in the coming years has become even clearer since the time of the previous Report. The more expansionary economic policy is expected to result in higher growth in that companies invest and households consume to a greater extent.

In the other Nordic countries, economic prospects also look brighter than they did last autumn. Here, too, the reasons lie in low interest rates and, in some cases, tax cuts that are expected to boost private consumption.

Estonia, Latvia and Lithuania have been among the fastest expanding economies in Europe in recent years, with annual growth rates between 5 and 9 per cent, mainly due to strong domestic demand. Growth in these countries is expected to remain high, albeit with some fall-off. The risk for economic growth therefore seems to be that growth in these countries' exports markets, mainly the euro area, fails to pick up. In recent years the strong domestic demand has generated an expansion of credit at annual rates between 20 and 40 per cent. Although this expansion started from low levels and can be seen as a natural and important component of the transition to market economies with functional financial systems, there is some concern that it can contribute to overheating. With fixed exchange rates, monetary policy cannot be used to dampen any tendencies to overheating. Estonia and Lithuania have tied their currencies to the euro via currency boards, while Latvia has done so via a currency basket that is to be converted into a fixed rate in 2005.

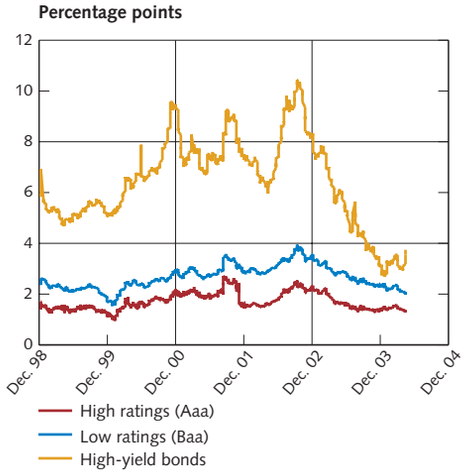
The financial markets displayed greater stability last autumn and early this spring. The terrorist attacks in Istanbul and Madrid had no

Figure 1:1. GDP growth and forecasts.
Percentage 12-month change



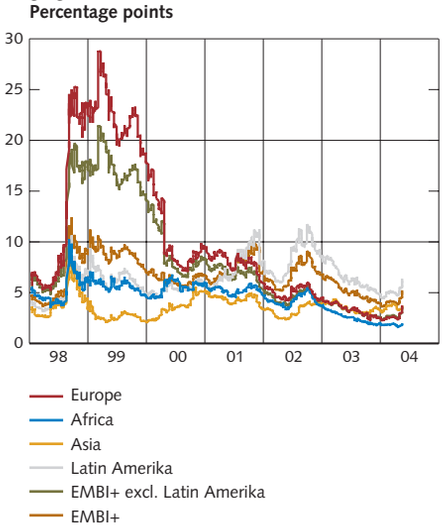
Sources: US Department of Commerce, Eurostat and the Riksbank.

Figure 1:2. Credit spreads for US companies with high and low ratings and for high-yield bonds.
Percentage points



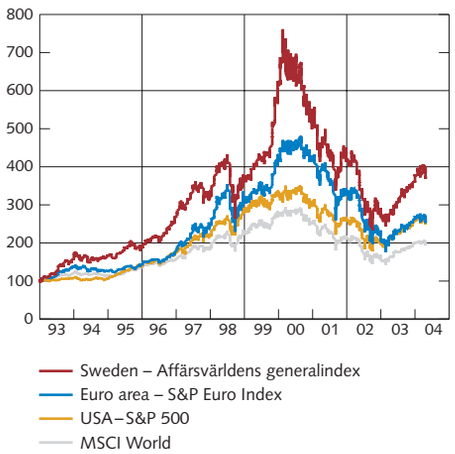
Source: EcoWin.

Figure 1:3. Credit spreads for bonds issues by emerging market economies.
Percentage points



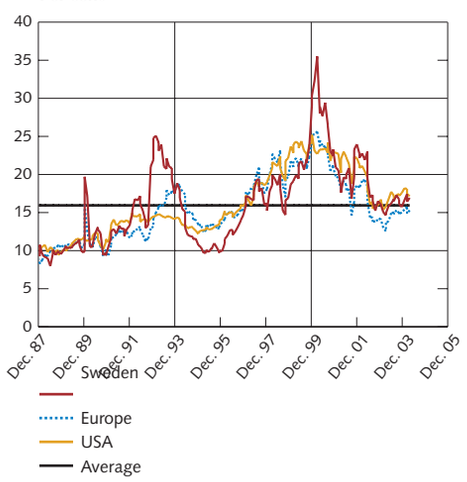
Source: Datastream.

Figure 1:4. Equity prices.
Index 1993 =100



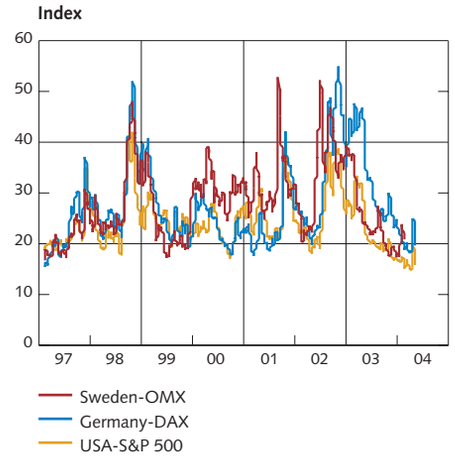
Source: EcoWin.

Figure 1:5. P/E ratios.
Per cent



Sources: Datastream and the Riksbank.

Figure 1:6. Implicit volatility based on OMX , DAX and S&P 500.
Index



Sources: Datastream, Bloomberg and the Riksbank.

sizeable impact on financial market prices. The implied volatilities in stock markets did rise to some extent in connection with these attacks but soon fell back again.

There was also a clear narrowing of the spread between government and corporate bond rates (see Figure 1:2). One explanation probably lies in the consolidation of corporate balance sheets but spreads may also have decreased because investors searched for higher yields and accordingly turned to more risky investments. The latter also affected spreads to bonds issued by emerging-market countries (see Figure 1:3). These spreads shrank to the same low levels as before the financial crisis in Asia in 1998, which led these countries to issue bonds on a larger scale.

But there was some concern in financial markets that developments would become more turbulent if the economic recovery were to be more distinct, so that market interest rates moved up in connection with expectations of monetary tightening. In recent weeks there has been an appreciable increase in market interest rates, accompanied by somewhat higher risk premiums in the form of spreads between high- and low-rated bonds. However, this has occurred without much turbulence. Even with this adjustment, risk premiums in the form of interest rate spreads are still comparatively low.

Stock markets also rose last autumn and early this year in connection with growing optimism about an economic recovery (see Figure 1:4). The upward tendency in Sweden has been stronger than in the United States and the euro area. In the twelve months to mid May 2004, the level of equity prices in Sweden moved up over 30 per cent as against around 20 per cent in other countries. As equity prices have risen more than corporate profits, P/E ratios[1] have moved up relatively markedly since the beginning of 2003; but they are still below the levels in 2000 and are now broadly in line with the average level since 1988 (see Figure 1:5).

Stock markets have fallen in recent weeks; in mid May the rise earlier this year had been eliminated. Stock market uncertainty, measured as implied volatility, has tended to rise again after a period when the level was historically low (see Figure 1:6).

1 The price of equity in relation to the company's expected profit.

Household indebtedness in an international perspective

Household debt has been up for discussion recently in Sweden as well as elsewhere. Developments in a selection of countries are compared here without going into conceivable implications.

A comparison of debt trends in Sweden and other western countries reveals many similarities but also some differences.[2] Indebtedness varies to some extent from country to country. In 2003 the ratio of debt to income was as much as 200 per cent in the Netherlands, while in the United States it was just over 110 per cent.

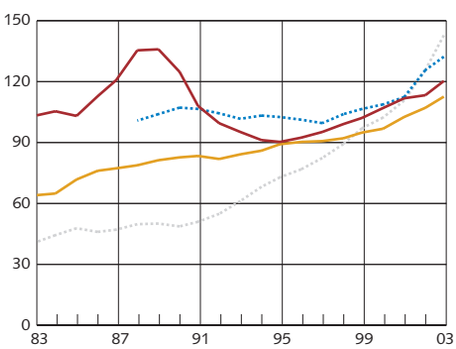
Housing finance is perhaps the principal reason why households incur debt. Country differences in household indebtedness therefore probably reflect the extent to which households own their dwelling. Households in countries with a well-developed rent market are likely to be considerably less indebted than in countries where many people own their home. Other factors behind indebtedness are the construction of tax systems and access to housing finance. In Denmark and the United States, for instance, house mortgage rates can be fixed for 25 to 30 years; this probably makes households willing to carry more debt because they know for sure what the cost will be for a long time to come. Neither do Danish and American households have to pay for the early redemption of a house mortgage loan, so they can cut their borrowing costs whenever interest rates are lowered.

A contributory factor behind the increased indebtedness in Australia may be the growing number of households there that are investing in properties for the rent; studies show that in the 1990s the proportion of households that own rented housing rose from eight to twelve per cent. Loans for investment add up to one-third of total bank lending to households. In the United Kingdom it is also common for households to invest in rented real estate.

Besides these differences, the statistical definition of debt varies between countries and so, therefore, do the items that are included. Consequently it is not particularly meaningful to compare the country levels of debt ratios. Comparing trends is more to the point. Since the mid 1990s the ratio of household debt to income has risen markedly in all the selected countries. In this group the increase has been most rapid in Australia and the Netherlands; from 1995 to 2003 the debt ratios there moved up more than 95 per cent and almost 70 per cent, respectively. In the same period the increases in the United Kingdom, the United States and Sweden were around 30 per cent. Household debt in Denmark grew more than 40 per cent, while the increase in Norway was more moderate.

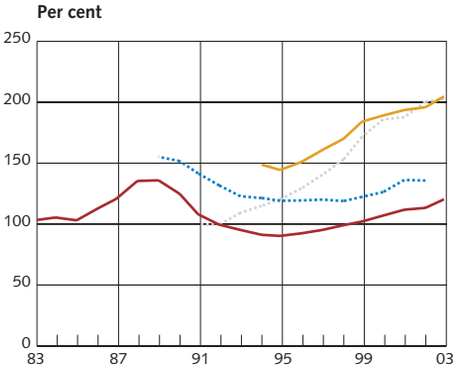
A reasonable explanation for the increased debt is that real interest rates declined in the second half of the 1990s. A number of these

Figure B1. Ratio of household debt to disposable income.
Per cent



Sources: EcoWin, national central banks and the Riksbank.

Figure B2. Ratio of household debt to disposable income.
Per cent



Sources: EcoWin, national central banks and the Riksbank.

2 The countries in the comparison have been chosen partly on grounds of data availability. Nordic countries are naturally relevant for a number of reasons; Swedish banks are active in their markets and there are structural affinities. Besides data availability, Australia, the Netherlands and the United Kingdom are of interest for structural aspects that differ from Sweden. The United States is a natural candidate as a major driving force behind economic activity in the rest of the world but also because the credit market there, having been deregulated for a comparatively long period, is probably more developed than anywhere else. A similar comparison has been presented by the IMF in World Economic Outlook, April 2004.

countries changed their monetary policy regime and established confidence in a low-inflation economy. Nominal interest rates declined as expected inflation moved down and the central banks lowered their instrumental rates. Moreover, the growth of borrowing occurred after a period in which many households had reduced, or at least not increased, their debts. This was particularly evident in the Nordic countries, which it will be recalled had been hit by a currency crisis as well as a financial crisis. In Sweden, the reduction of debt also had to do with a tax reform that abruptly raised interest costs by limiting the scope for tax relief.

Against this background it is hardly surprising that in the second half of the 1990s, households increased their debts more rapidly than before. What is remarkable is that households went on borrowing and that property prices continued to rise during the mild economic slowdown in the early 2000s.

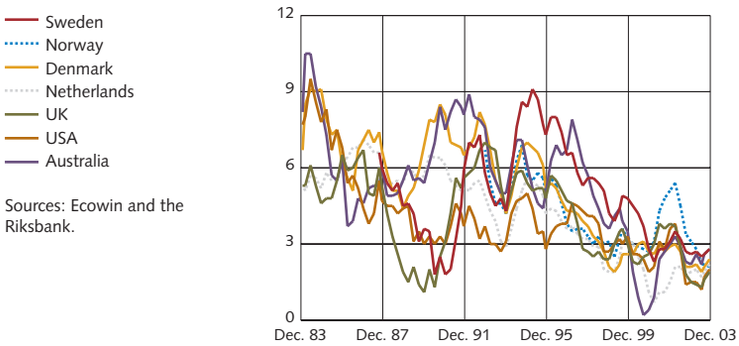
The persistently low interest rates are one explanation. Real interest rates have been historically low in recent years in many of the countries studied here. The countries with the fastest growth of debt – Australia and the Netherlands – have also had the lowest real interest rates. Today, after a period of rather large differences, real interest rates in all these countries have converged onto an interval of two to three per cent.

Besides the drop in inflation and thereby in nominal interest rates, in this period the credit market has been deregulated and developed in a number of these countries. Deregulation is likely to lead to higher indebtedness because earlier liquidity restrictions no long apply and credit markets become more efficient. Falling interest rates have a corresponding effect in that interest expenditure decreases relative to disposable income. This deregulation process started early on in the United States, which may be one reason why the debt ratio there has not recently moved up as sharply as in other countries.

Notwithstanding the rising debt ratios, the interest ratio (households' interest expenditure after tax in relation to disposable income) has fallen in general in the period studied here (see Figures B4 and B5). This is naturally a result of the falling interest rates.

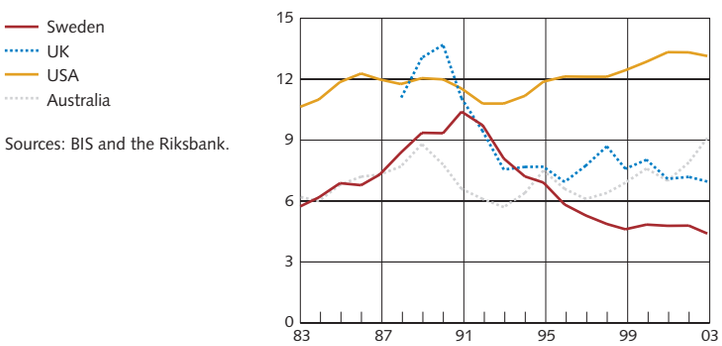
At just over four per cent, the interest ratio

Figure B3. Ten-year real interest rates.
Per cent



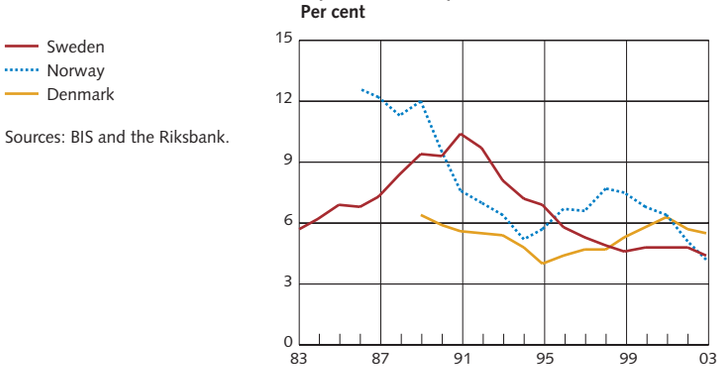
Sources: Ecowin and the Riksbank.

Figure B4. Ratio of households' post-tax interest expenditure to disposable income.
Per cent



Sources: BIS and the Riksbank.

Figure B5. Ratio of households' post-tax interest expenditure to disposable income.
Per cent



Sources: BIS and the Riksbank.

in Sweden is the lowest in the comparison. The reason why the United States, which has the lowest household debt ratio, does not also have the lowest interest ratio is that the statistics on loan costs there include amortization, so the levels are not comparable.

In Australia and the United Kingdom, strong economic trends have recently led to increased instrumental rates. This has not yet shown up in the interest expenditure of British households, for whom the interest ratio has fallen.

In Australia the ratio has moved up, which reflects rising indebtedness as well as the higher interest rates. The development of household interest expenditure over time also depends on the structure of mortgage contracts. Variable interest rates are more common in, for example, the Netherlands and the United Kingdom than they are in Denmark and the United States. In Sweden, a larger proportion of new loans is being arranged in this form.

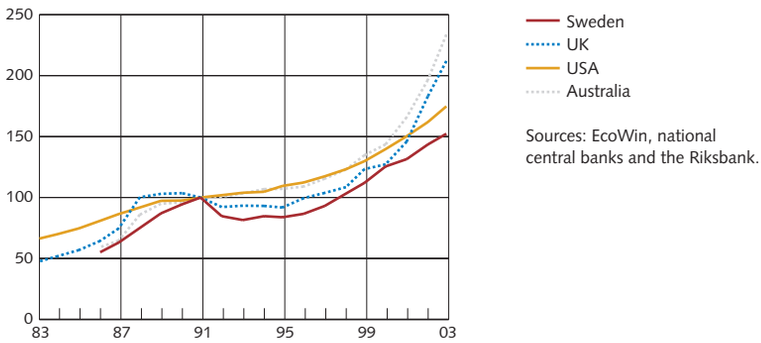
As a large proportion of household borrowing has been used to finance house purchases, the growth of debt has coincided with rising nominal as well as real house prices in all the countries in the comparison (see Figures B6 and B7). Country differences also occur in the definition of house prices: some countries include prices for apartments, others focus entirely on prices for one- and two-family houses.[3]

Except for the United Kingdom, it is the countries where indebtedness has increased most that have had the strongest increase in house prices. Since 1995, house prices in Australia and the Netherlands have risen almost 120 per cent, while the increase in the United Kingdom amounts to as much as 130 per cent, most of it in recent years. House price increases in Nordic countries have been less dramatic, around 70 to 80 per cent.

The higher prices and low interest rates enable households that already own a home to add to their mortgages with a view to increased consumption or the repayment of more costly loans. This opportunity has been used by Dutch and American households. However, house mortgages have slowed in the Netherlands, which has decreased consumption and contributed to a weakening of economic activity.

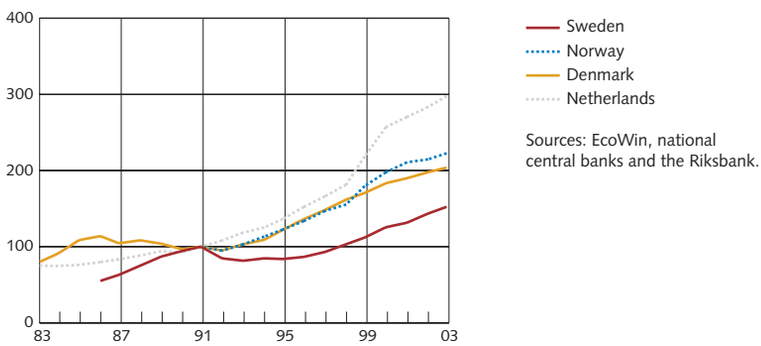
To sum up, the increased indebtedness of Swedish households is not a unique phenomenon. Debts are growing rapidly, accompanied by rising house prices, in a majority of western countries. Moreover, falling interest rates in this period has caused household interest expenditure to decline in relation to disposable income. Compared with the countries studied here, neither the growth of debt among Swedish households nor the increase in Swedish house prices is particularly remarkable.

Figure B6. Nominal house prices. Index 1991=100



Sources: EcoWin, national central banks and the Riksbank.

Figure B7. Nominal house prices. Index 1991=100



Sources: EcoWin, national central banks and the Riksbank.

3 The series for Norway shows prices for apartments. The index for the United States includes prices for apartments as well as one- and two-family houses. For Australia the series covers house prices in metropolitan regions. For the other countries the series refer to house prices. The statistics for Sweden, Australia, the United States and the United Kingdom are based on index calculations, for the other countries on average prices.

The Swedish banks' borrowers

Total corporate borrowing is still falling and the corporate ability to pay has improved. Market indicators point to a decreased risk of default since the time of the previous Financial Stability Report and an unchanged frequency of defaults is foreseen in the coming twelve months. In the market for office premises, the fall in prices and rents has slowed. In spite of the lower rent levels, the financial position of property companies remains good. However, for some companies a low degree of diversification makes them vulnerable to developments in particular regions and sub-markets. Household indebtedness has gone on rising rapidly since the time of the previous Report. This has been accompanied by a further improvement in the financial position of households in connection with the gradual stock-market recovery and rising real estate prices. All in all, households' ability to pay is judged to be good.

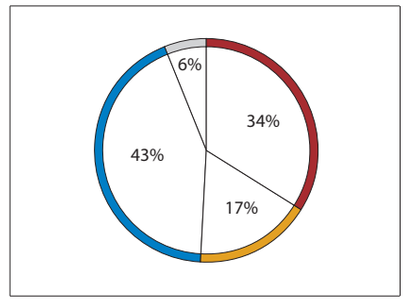
The risk of loan losses in the banking system is contingent on the indebtedness of the borrowers and their ability to repay loans. Loans to the corporate sector make up about 50 per cent of the Swedish banking system's total stock of loans to the Swedish general public, while loans to households make up 40 per cent (see Figure 2:1). The property sector is worth studying separately: property companies are major borrowers and real estate is used as collateral for a large proportion of bank loans. The indebtedness of property companies and their ability to pay are therefore considered in the section on commercial property, as is the development of the value of pledged collateral. As half of the loans from Swedish banks arranged with borrowers abroad, mainly in the other Nordic countries, Germany and the Baltic states, the indebtedness and ability to pay of borrowers in those countries are also considered briefly.

The corporate sector in Sweden

Since 2001 total corporate borrowing has gradually declined. As before, it is mainly borrowing in the securities markets and from mortgage institutions which is falling, accompanied by a smaller decrease in borrowing from the banking system. This means that corporate borrowing is being concentrated even more to the four major banks, which now provide almost half of all corporate loans (see Figure 2:2).

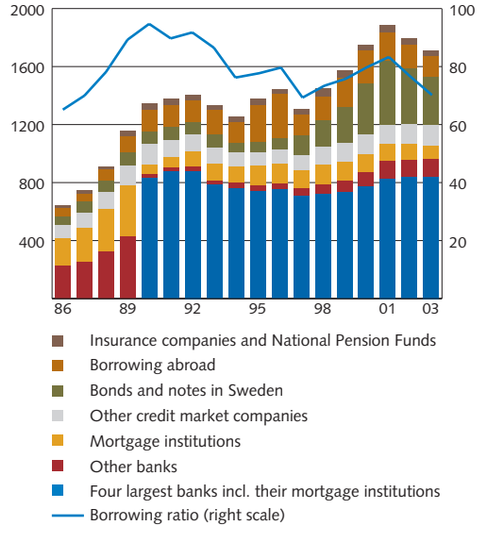
As in the previous Financial Stability Report, the Riksbank considers that corporate borrowing will grow during 2004. Corporate sector profits are gradually improving. An industry breakdown of listed companies' annual reports up to and including 2003 shows a weak development of profits since 1999 for all industries except property management (see Figure 2:3). Some improvement during 2003 is, however, discernible: of the 314 listed companies, about 60 per cent reported an improved result. But only around 33 per cent increased their turnover as well as profits. Thus, the improved

Figure 2:1. Breakdown of the major banks' lending to general public, sectoral breakdown December 2003



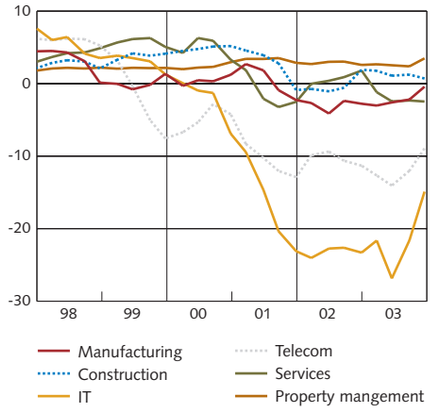
Source: Banks reports.

Figure 2:2. Corporate borrowing and borrowing ratio. SEK billion and per cent



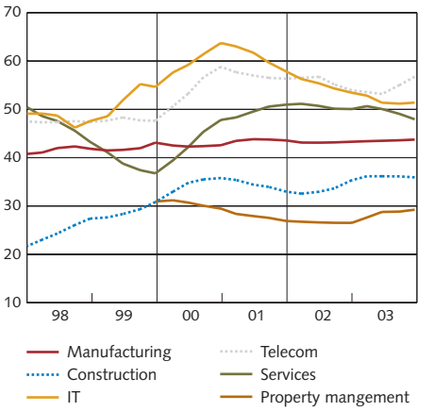
Source: The Riksbank.

Figure 2:3. Return on equity for Swedish listed companies, industry breakdown. Per cent



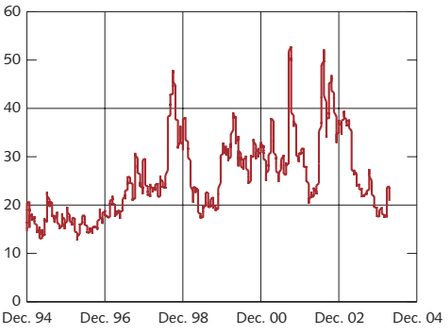
Source: Ecowin.

Figure 2:4. Solvency for Swedish listed companies, industry breakdown.
Ratio



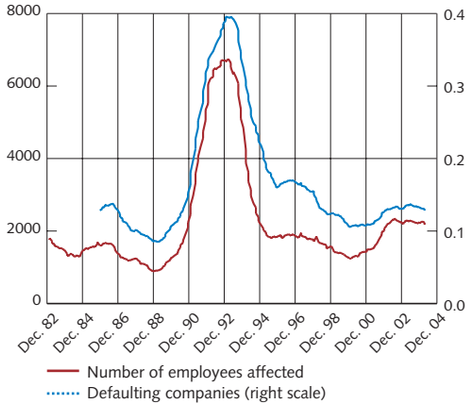
Source: Ecowin.

Figure 2:5. Implicit volatility based on OMX.
Index



Sources: Bloomberg and the Riksbank.

Figure 2:6. Bankruptcies in the corporate sector. 12-months moving average, number and per cent



Source: Statistics Sweden.

performance has been achieved largely by cutting costs rather than as a result of increased earnings.

Along with the reduction of total corporate borrowing and the gradual improvement in profits, companies have been building up bank deposits. Moreover, the level of corporate investment is low at present. This indicates that companies are generating a surplus to a growing extent and that their low demand for credit is due to a lack of profitable investments rather than rationed supply from credit institutions. However, gross fixed capital formation is expected to rise in 2004 and 2005.[4] Given the weak profit trend in recent years, corporate investment will need to be financed in part with borrowed funds.

It is the ability of companies to repay debt that is crucial for whether or not risks are building up in corporate lending by the banks. From 2003 Q2 onwards, solvency has been stable or improving for all industries except services companies (see Figure 2:4).[5] Together with the gradual improvement in corporate profits, this suggests that the ability of companies to repay debt strengthened during 2003. The recovery in equity prices and lower implied volatilities in the stock market in that period show that the market is more positive and less uncertain in its assessments of corporate profits (see Figure 2:5).

The development of company defaults supplements the picture of credit risks in lending to the corporate sector. The statistics show that in the course of 2003 the increase in the number of company defaults slowed. The proportion of companies defaulting averaged about 1.6 per cent in 2003 compared with about 5 per cent the year before.[6] Up to the end of March this year the proportion of companies defaulting decreased about 1.5 per cent in annual terms (see Figure 2:6).

The proportion of companies defaulting is now just below the average level for the entire period from January 1996 to March 2004. The number of employees affected by defaults indicates the extent to which defaults are occurring in large companies. While the number of employees affected by corporate failures is above the average for the period from January 1996 to March 2004, a breakdown by size shows that most of the defaults are occurring among relatively small companies (see Figure 2:7). Just over 90 per cent of all corporate failures involve companies with fewer than twenty employees.

An industry breakdown shows an improvement in the proportion of defaults in all industries except construction. While the increase in the number of defaults has slowed in most branches, it has accelerated in construction (see Figure 2:8). The deviant picture in construction is partly due to lags in the property market whereby

4 See the Riksbank's Inflation Report 2/2004.
5 Solvency is defined here as the ratio of equity to total assets. This measures is not suitable for comparisons between industries so much as for describing tendencies in a particular industry.
6 Single-proprietor companies are classified as households and are therefore not included in the bankruptcy statistics. Thus, the proportion of companies in default is defined as the number of defaulting companies with at least one employee divided by the total number of companies with at least one employee.

construction investment tends to be undertaken late in the business cycle. The development of defaults in construction is therefore not expected to improve until business activity has definitely turned upwards.

A leading indicator of corporate sector bankruptcies is the expected default frequency (EDF) for listed non-financial companies, calculated on the basis of stock-market information and data from financial statements.[7] Less uncertainty about future profits and decreased corporate sector indebtedness have contributed to a decrease in the expected default frequency for the total corporate sector since January 2003. During 2004 Q1, however, the risk of default in the coming twelve months has tended to grow in most industries except IT (see Figure 2:9). In all industries the expected default frequency in the coming twelve months is now lower than at the time of the previous Report. Moreover, in the industries to which the banks are most exposed – property management and manufacturing –the default risk is lower than in any other industry. All in all, this indicates that the credit risk associated with lending to the corporate sector has decreased since the time of the previous Report and is expected to be unchanged in the coming year.

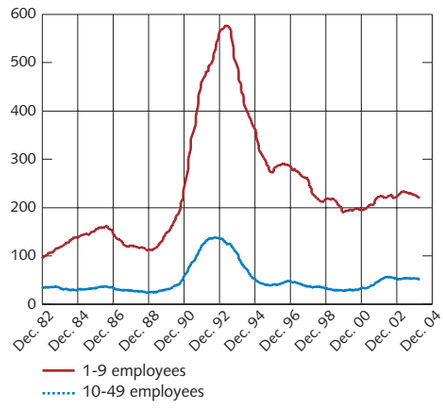
The corporate sector in other Nordic countries, Germany and the Baltic states

Developments in the corporate sector in other Nordic countries largely resemble those in Sweden. Corporate borrowing is moderate. The development of corporate profits has been weak in recent years but there are indications of a future increase in profits and fewer bankruptcies. In Norway, however, the level of defaults continues to be higher than in other Nordic countries, so the risks in lending to companies in Norway are still considered to be greater than in the rest of this area. Credit risks are higher in Germany, too, as the weak development for companies there is expected to continue, with the prospect of increased bankruptcies (see Figure 2:10).

The growth of credit in Estonia, Latvia and Lithuania is of particular interest in that Swedish banks own – directly or indirectly – a large share of the banking systems in these three countries. Increased household borrowing is likewise the main factor behind the rapid expansion of credit in the Baltic states but corporate borrowing is also continuing to rise. As profits are high and prospects look good, companies do not seem to have any difficulty in managing their relatively high indebtedness.

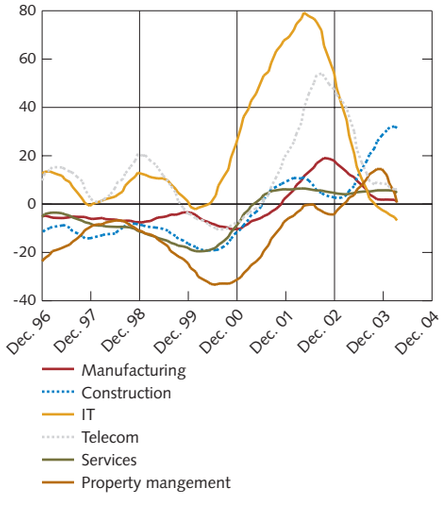
An increasingly common form of lending in the Baltic region is leasing, which can be seen as a substitute for conventional bank

Figure 2:7. Number of defaulting companies broken down by size.



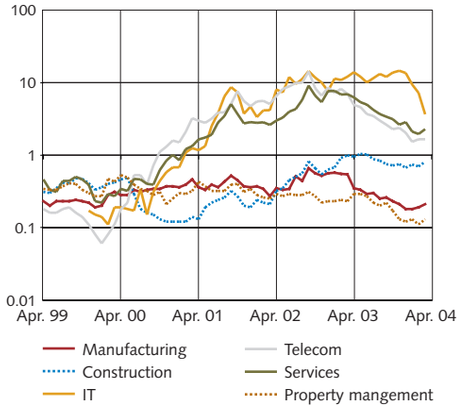
Source: Statistics Sweden.

Figure 2:8. Bankruptcies broken down by industry. 12-months moving average, per cent



Source: Statistics Sweden.

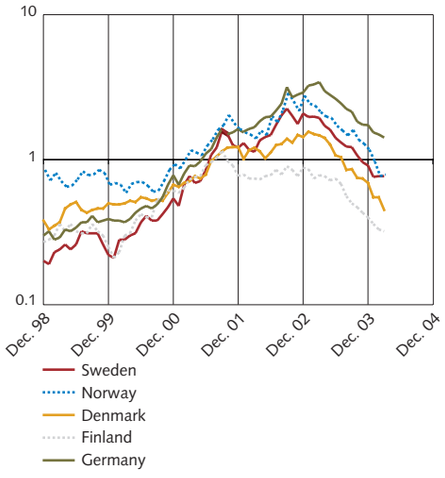
Figure 2:9. Expected default frequency (EDF) by industry for listed non-financial companies. Per cent (logarithmic scale)



Source: Moody´s KMV.

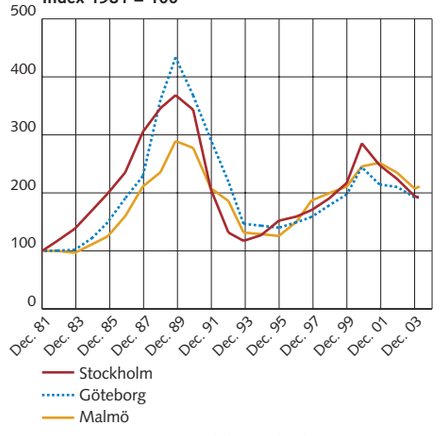
7 Moody's KMV calculates the probability of bankruptcies in limited companies within a given time horizon – the expected default frequency (EDF) – on the basis of share prices and financial statements. By calculating the probability of the market value of a company's assets falling below the size of its debts at the time when the debts mature, the EDF shows the risk of a listed company being unable to meet its commitments. The market value of the company's assets and the volatility of the assets are derived in turn from the company's stock-market value, using option pricing methods.

Figure 2:10. Expected default frequency (EDF) for non-financial companies in the Nordic countries and Germany.
Per cent (logarithmic scale)



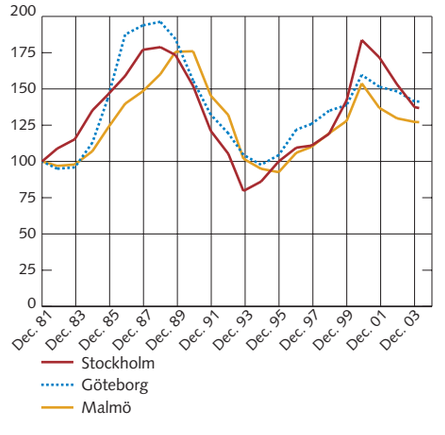
Source: Moody´s KMV.

Figure 2:11. Real prices for office premises in central locations.
Index 1981 = 100



Sources: NewSec AB and the Riksbank.

Figure 2:12. Real rents for office premises in central locations.
Index 1981 = 100



Sources: NewSec AB and the Riksbank.

loans because ownership is transferred to the borrower at the end of the leasing period. In Estonia, leasing makes up around one-third of total loans to the general public. The importance of leasing as a form of financing has also grown in Latvia and Lithuania, albeit from low levels. One reason why this particular form of financing has caught on in the Baltic states is that transactions costs for borrowing against collateral are still high. Leasing is therefore a means for creditors as well as borrowers to evade inefficiency in the market for loans. As the banks own a large proportion of the leasing companies, this form of financing is subject to supervision.

The commercial property sector in Sweden

In the market for commercially rented property, the focus is on office premises and apartment buildings, as these dominate the holdings of the listed property companies. The market for commercial stores and industrial premises makes up little more than one-tenth of the holdings and is therefore considered only briefly. The development of property companies is also discussed with reference to whether it is liable to generate loan losses for the banks. The discussion focuses on both the listed and some of the major unlisted property companies; between them, the latter own around one-fifth of Sweden's stock of commercial real estate.

THE COMMERCIAL PROPERTY MARKET

The weak economic development in the past three years has contributed to decreased demand for office premises, leading to a fall in office rents in new contracts. As a result, prices for office premises have dropped and vacancies have risen. Since 2000, real prices have fallen 35 per cent in Stockholm, 21 per cent in Göteborg and 11 per cent in Malmö (see Figure 2:11).

The price trend is mainly a consequence of lower rents. Since 2000, rents in new contracts have fallen 26 per cent in Stockholm, 11.5 per cent in Göteborg and 17 per cent in Malmö (see Figure 2:12). However, the statistics on prices and rents up to the end of 2004 Q1 do indicate some stabilisation. Since the beginning of this year rents have been declining more slowly in all three metropolitan areas. That has helped to check the price fall for real estate in Stockholm and Göteborg, while prices in Malmö actually rose in this period.

Demand for office premises is mirrored in the number of office employees, which rose in all three metropolitan regions from 1993 to 2002.[8] Since then, however, the number of office employees has decreased in Stockholm at an annual rate of 3 per cent; in the other

8 Office employees are defined as employees in banks, other credit institutions, insurance companies, service companies for financial operations, property companies and property management companies, computer consultants and computer service agents, R&D institutions, other business services companies, civil authorities and professional and industrial organisations.

two metropolitan regions the decline in office employment has been less marked and occurred later. The levels of office employment also indicate that the markets for office premises in Göteborg and Malmö are around one-third as large as in Stockholm (see Figure 2:13).

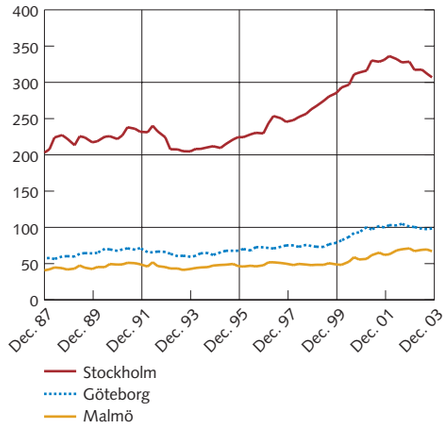
With the decreased demand for office premises and some, albeit small, increment of new offices, the number of vacancies in Stockholm rose from December 2000 to September 2003. This trend has been broken in the two most recent quarters and the vacancy rate has tended to fall. In the other two metropolitan regions, however, the number of vacancies is still rising (see Figure 2:14).[9]

The future paths of property prices, rents and vacancies are dependent on economic developments in general as well as on conditions in the corporate sector, in particular for office-intensive companies. Given the Riksbank's assessment that the Swedish economy will recover during 2004, together with the moderately positive picture of the Swedish corporate sector that was outlined in the previous chapter, with signs of improved profits and a lower or unchanged risk of default in the coming twelve months for all industries, conditions are in place for an end to the office market's downward phase. Price and rent levels could then stabilise during the year. A small supply of new offices and the prospect of increased employment in the metropolitan regions during 2004 should contribute to a fall in the number of vacant offices after a peak this year.[10]

A factor that can be important for future developments is the interest that foreign investors are displaying in the Swedish property market. The increased interest of foreign investors in Swedish real estate has to do with a number of factors. One is that rents in the Swedish property market are judged to be at a cyclical low and the economic trend in Sweden is expected to be somewhat stronger than in the euro area. Another is that foreign investors find property transactions in Sweden easy in that the real estate market is liquid with low transaction costs, a large presence of foreign agents, high transparency and uncomplicated laws. Foreign investors now own one-fifth of the Swedish institutional property market, a share that is valued at over SEK 100 billion.[11] In 2003 foreign investors purchased real estate for around 77 per cent of the total annual turnover of about SEK 85 billion, an increase from around 45 per cent in 2002 and 21 per cent in 2001. That presumably helped to slow the price fall for commercial property in a period when uncertainty about the economic recovery was accompanied by staff cuts to reduce costs in such office-intensive industries as IT, telecom and the financial sector.

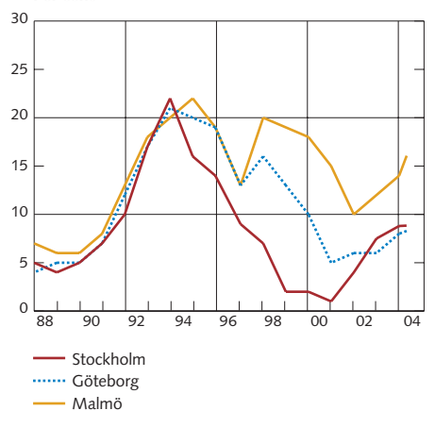
In contrast to the office market, the market for apartment buildings has been characterised by rising prices since 1994 (see Figure 2:15). The impact of market forces is modified by regulations, such as those concerning utility value, and the central rent negotiating

Figure 2:13. Number of office employees in local labour markets.
Thousands



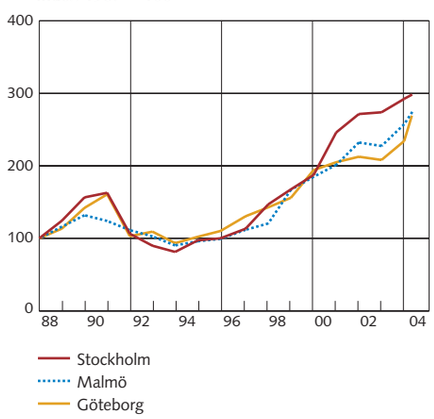
Source: Statistics Sweden.

Figure 2.14. Vacancy rates for office premises in central locations.
Per cent



Source: NewSec AB.

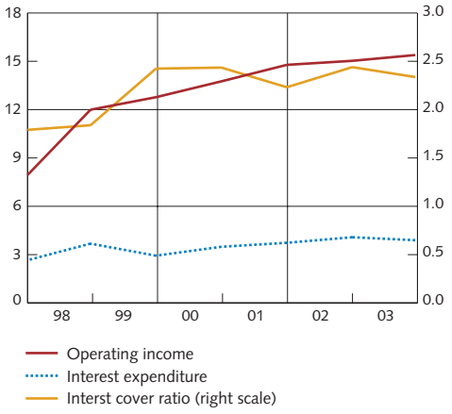
Figure 2.15. Real prices of apartment blocks in central locations.
Index 1987 = 100



Sources: NewSec AB and the Riksbank.

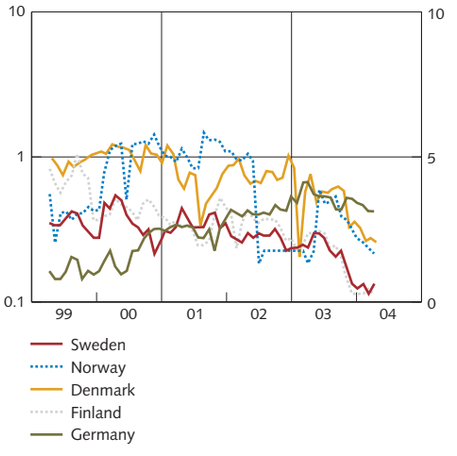
9 The vacancy rate is defined as the unutilised area in relation to the total available are.
10 See Nordic City Report, Spring 2004, from real-estate consultants Jones Lang LaSalle.
11 See Nordic Report Spring 2004 from real-estate consultants NewSec AB.

Figure 2:16. Interest cover ratio, operating income and interest expenditure, averaged for listed property companies.
Ratio and SEK billion



Source: SIX Trust.

Figure 2.17. Expected default frequency (EDF) for listed property companies.
Per cent (logarithmic scale)



Source: Moody's KMV.

system with a view to generating a stable and uniform development of rents. That should have led to a price trend for apartment buildings that is also stable and uniform. However, conversions of rental properties into tenant-owned apartments have generated comparatively strong price increases for apartment buildings.

Price and rent trends for apartment buildings are, of course, susceptible to altered conditions in the form of greatly increased new construction or rapidly falling demand, for example. However, low residential construction and strong housing demand, above all in the metropolitan regions, make it unlikely that rents in apartment buildings will change on account of increased vacancies.

The market for shop premises and industrial property has also been affected by the weak economic situation in recent years, though not to the same extent as the market for office premises. According to the SFI/IPD index[12], since 2001 annual changes in value have averaged 0.9 per cent for shops and –2.3 per cent for industrial properties, as against figures of –5.6 per cent for office premises and 2.7 per cent for housing.

PROPERTY COMPANIES

The picture of falling rents and an increased number of vacancies, above all in the office market, suggests a growing need to renegotiate rent contracts at lower rents. However, a compilation of the listed property companies' income from rent shows that the earnings of property management companies have not deteriorated drastically, though total rent income has decreased since 2003 Q1. A contributory factor here is that rent contracts usually have a duration of three to five years and that contracts are currently being settled at rent levels which are on a par with those that prevailed four to five years ago.

Financial statements from listed property management companies show that the financial position of these companies is still stable. The level of the interest cover ratio[13], which indicates the company's capacity to service debt, has been largely constant over the past five years (see Figure 2:16). Increased operating income has been accompanied by little change in the level of interest expenditure. Moreover, as mentioned in the section on the corporate sector, property management companies have had a stronger return on equity than any other industry. The default statistics, with a fall in the number of bankruptcies since May 2003, also suggest that the risk associated with lending to property management companies has become somewhat smaller.

A lower expected default frequency (EDF) among property companies since 2003 Q1 points to a decreased probability of failures

12 For this index, change in value is defined as the change in market value between two consecutive valuations, net of investment and partial sales, divided by capital employed during the year.
13 Defined here as the sum of earnings after write-offs and interest income divided by interest expenditure.

in the coming twelve months. Moreover, the expected default frequency for property companies is lower than for any other Swedish industry. Like their counterparts in Finland, property companies in Sweden have a lower probability of default than property companies in the other Nordic countries and Germany (see Figure 2:17).

The extent to which property companies are liable to be affected by developments in the real estate market depends on the degree of diversification geographically and by types of real estate. A compilation of the real estate holdings of property companies shows a relatively high exposure to office premises in Stockholm.[14] Expressed in relation to the total holdings of property companies, real estate in Stockholm makes up almost 50 per cent and office premises 55 per cent. The average for all property companies conceals individual discrepancies. But even when real estate holdings are presented for each company, the exposures to the Stockholm region and to office premises are relatively high (see Figures 2:18 and 2:19). Office premises make up more than half of the holdings of eight out of thirteen listed property companies. Of these eight companies, four also have more than half of their total holdings in the Stockholm region; for three of them the concentration to the Stockholm region is as high as between 78 and 98 per cent. The other property companies are more diversified geographically as well as over types of real estate. All in all, this shows that parts of the property management sector are highly exposed to the most risky sub-markets as well as to the region where the level of rents fluctuates most.

All in all, the weak situation in the real estate market has not affected the profitability and financial position of property companies, though the low degree of diversification in certain companies makes these vulnerable to developments in certain regions and sub-markets, above all in the Stockholm region and the market for office premises.

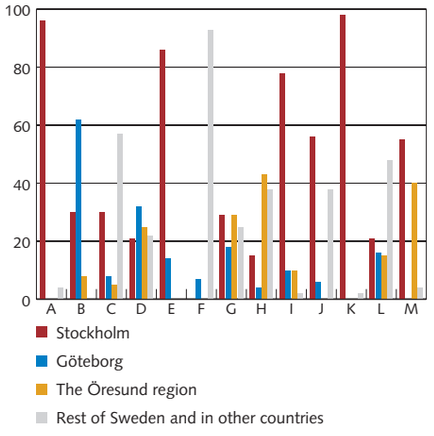
The property sector in other Nordic countries, Germany and the Baltic states

In Norway, credit risk associated with lending to property management companies is growing, particularly in the case of companies that rent out office premises. The vacancy rate for office premises is now at the highest level since these statistics were first published in 1991. To some extent, the bleak picture of the property market is modified by a low supply of new office premises. The expected default frequency in the coming twelve months (EDF) is higher in Denmark, Norway and Germany than in Finland and Sweden but it has fallen since last autumn.

In Lithuania the situation in the commercial property market varies. There is a surplus supply of office premises but high demand for storage premises. In Estonia, rents and prices have been stable.

14 Data from real-estate consultants Leimdörfer. See www.leimdorfer.se.

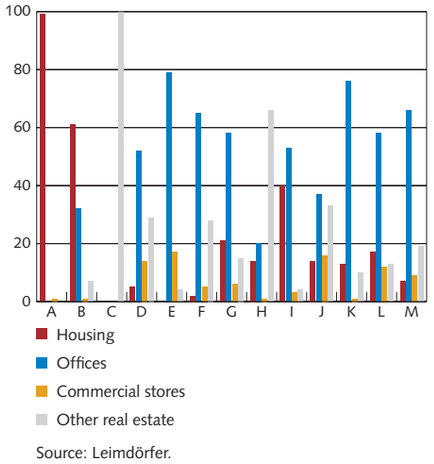
Figure 2:18. Geographic distribution of the value of real estate owned by property companies. Per cent



Source: Leimdörfer.

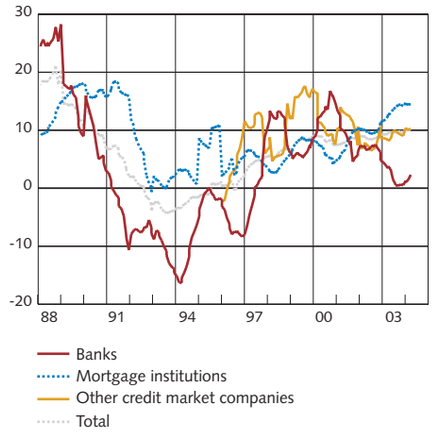
Note. Companies A–M in this figure are the same as those in Figure 2:19.

Figure 2:19. The value of real estate owned by property companies broken down by property types. Per cent



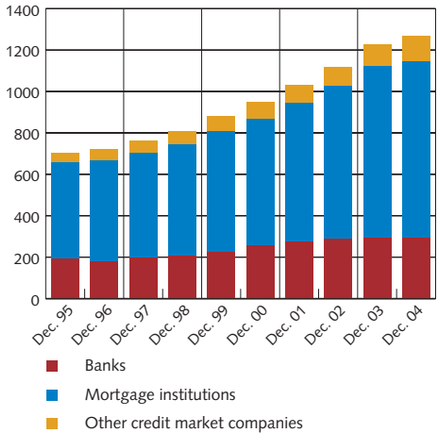
Source: Leimdörfer.

Diagram 2:20. Household borrowing from different institutions. Annual percentage change



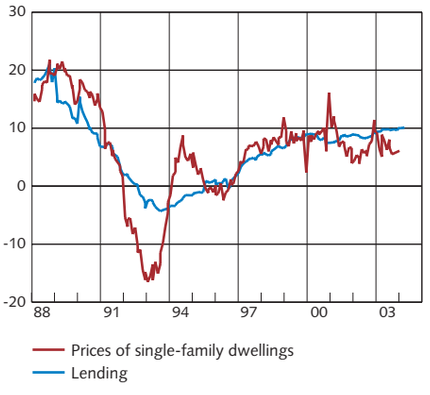
Source: The Riksbank.

Diagram 2:21. Household borrowing broken down by institutions.
SEK billion



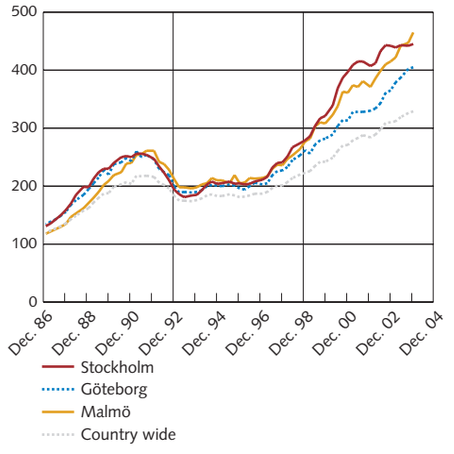
Source: The Riksbank.

Diagram 2:22. Lending to households by credit institutions and prices of single-family dwellings. Annual percentage change.



Sources: Statistics Sweden and the Riksbank.

Figure 2:23. Prices on single-family dwellings. Index 1981=100



Source: Statistics Sweden.

The household sector in Sweden

In the light of low interest rates, the growth of borrowing by households in Sweden has continued at a high rate. In 2004 Q1, total borrowing rose about 10 per cent in annual terms or somewhat more than the average rate of about 9 per cent during 2003 (see Figure 2:20).

In the same period, household borrowing from mortgage institutions rose more than 14 per cent, which mirrors the persistently high activity in the housing market. The growth of borrowing from banks has also picked up in recent months after a period of almost no change. Borrowing from other credit market companies is a relatively minor component but has likewise risen strongly or by more than 10 per cent. Of the total volume of borrowing, more than 65 per cent comes from house mortgage institutions, not quite 25 per cent from banks and 10 per cent from other credit market companies (see Figure 2:21).

Expectations of increased incomes and persistently low interest rates suggest that household indebtedness will go on rising comparatively rapidly for a time. At the same time, house prices are still high. In that a household's primary asset as loan collateral is the value of the house, the rising property prices have made it possible to take on more debt. The continued increase in house prices has also obliged households to borrow more when buying a home; at the same time, the supply of relatively cheap credit has enabled households to pay more for a dwelling. As such, it is difficult to tell which of these factors is driving the other. The strong co-variation between house prices and the rate of change in total household borrowing is evident from Figure 2:22.[15] According to Statistics Sweden, the increase in house prices in 2004 Q1 was about 8 per cent.[16]

The assessment in the previous Report that house values in Sweden are comparatively reasonable still holds. Fundamental factors, such as rising household disposable income and falling interest expenditure, can largely explain the observed price trend. Demand for housing is expected to grow faster than the supply. There are, however, considerable regional differences in the development of house prices in Sweden (see Figure 2:23). Prices in the metropolitan regions have risen appreciably faster than the national average, though in the Stockholm region they have hardly changed in the past two years. Prices have also increased more markedly for tenant-owned dwellings than for owner-occupied housing.

There do not seem to be any tendencies to local imbalances at present that could lead to a sharp price fall. A marked drop in property

15 The combination of rising household indebtedness and a strong house price trend is in many ways an international phenomenon (see the box on page 15). In the light of such a comparison, the situation in Sweden does not seem remarkable.

16 The figure shows the annual change in Statistics Sweden's house price index and stops at 2003 Q4, when the annual rate was 6 per cent.

prices might occur in connection with some form of unforeseen event such as rule changes or a macroeconomic shock. The fact that the level of interest rates will move up in the future ought to be included in households' expectations and can hardly be regarded as an unforeseen event in any economic scenario. Moreover, households are judged to be financially equipped for a future increase in interest rates.[17]

The ratio of household debt to disposable income in 2003 Q4 was 120 per cent. As the growth of borrowing is judged to exceed the projected increase in household disposable income, there is the prospect of a rising debt ratio in the coming two years. In 2004 the debt ratio is expected to average 125 per cent and then increase to 130 per cent in 2006. This means that the debt ratio is expected to flatten off in line with the level at the time of the real estate crisis in 1992 (see Figure 2:24).[18]

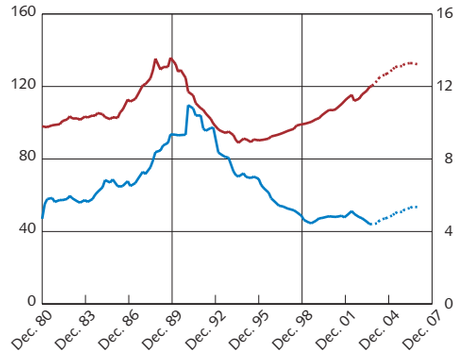
Households' immediate ability to pay is mirrored by the interest ratio (household interest expenditure after tax relief as a percentage of disposable income). Notwithstanding the recent increase in debt, falling interest rates have tended, if anything, to lower the interest ratio, which at just over 4 per cent is at the lowest historical level. Expectations of increased borrowing and gradually rising interest rates in connection with the economic recovery point to an increase in the interest ratio in the years ahead. Calculated after tax, the ratio is expected to move up to an average of just over 5 per cent in 2005 and 2006.[19]

The debt burden must be seen in relation to the value of both financial and real assets. In the years since the crisis in the early 1990s, the level of households' assets in relation to disposable income has developed more strongly than their liabilities (see Figure 2:25). Housing market trends largely explain why wealth was maintained despite the stock-market fall between 2002 and 2003.

The assets of households exceed their total liabilities (see Figure 2:25).[20] Here, however, it is relevant to consider to what extent households would be able to realise these assets in order to service loans if problems were to arise. The broad definition of assets includes items that can hardly be said to be readily convertible to liquid funds, for example private and group insurance saving. The same applies to some extent to holdings in tenant-owned housing. Excluding these items, wealth in the form of liquid assets has changed in line with debt. In that net wealth rose in 2003 Q4, the household sector's ability to service debt is judged to have improved.

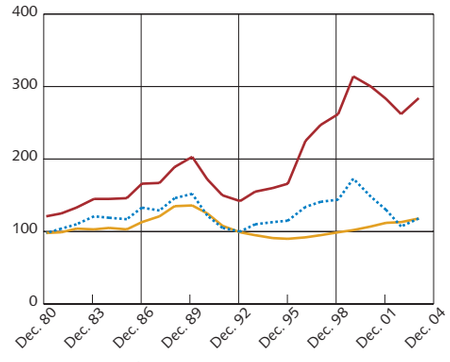
A direct indicator of households' sensitivity to interest rate movements is the duration of interest terms. Just over one-third of all

Figure 2:24. Households' debts in relation to disposable income and households' interest ratio. Per cent



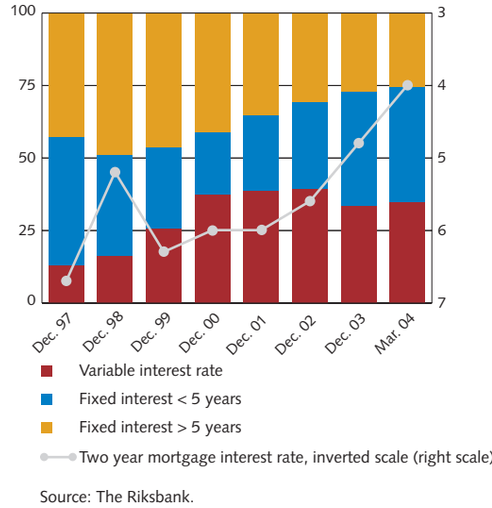
Sources: Statistics Sweden and the Riksbank.

Figure 2:25. Households' holdings of financial assets and debts in relation to disposable income. Per cent



Sources: Statistics Sweden and the Riksbank.

Figure 2:26. Households' mortgage borrowing by interest term and two year mortgage interest rate. Per cent and percentage points



Source: The Riksbank.

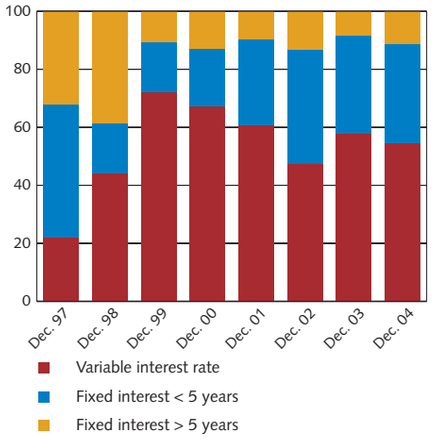
17 See "Swedish households' indebtedness and ability to service debt – an analysis of household data" in this report.

18 As in the case of house prices, the faster growth of debt compared to income is an international phenomenon. The combination of deregulated credit markets and gradually lower interest rates in connection with lower inflation motivates a larger stock of debt in relation to earnings (see the box on page 15). In can be noted, for example, that compared with households in other countries, the growth of household debt in relation to income has been somewhat slower in Sweden.

19 An international comparison indicates that the ability to pay and the financial margins of Swedish households are also satisfactory in terms of the interest ratio (see the box on page 15).

20 Based on assets and liabilities in data from Statistics Sweden, the net wealth of households currently totals about SEK 2200 billion, which approximately equals the size of Sweden's GDP in 2003.

Figure 2:27. Households' new mortgage borrowing by interest term. Per cent



Source: The Riksbank.

house mortgage loans are arranged at variable rates and this figure has tended to rise in recent months because variable rates are being chosen for an increasing proportion of new loans. But the largest category continues to be loans with interest fixed for up to five years (see Figure 2:26).

However, for the major part of the fixed-rate loans the duration of interest terms is probably between one and two years, which from the viewpoint of sensitivity is comparatively short. The combined stock of loans at rates that are either variable or of short duration has grown in line with the fall in nominal interest rates; the total for these two categories in new borrowing by households is over 90 per cent (see Figure 2:27). At present, almost 60 per cent of all new borrowing is arranged at flexible rates. Note, however, that in the light of the levels that were prevalent from 1999 to 2001, the proportion of variable rates in new borrowing is not remarkably high.

An increased proportion of variable-rate loans also means that interest rate movements have a greater impact on the ability to pay. Still, as a study by the Riksbank shows, in terms of the average interest ratio the impact of interest rate hikes on the financial position of households is judged to be relatively limited in both the short and the long term.[21] Moreover, households can change from a flexible to a fixed rate at no cost. The group of households that can be said to be most sensitive to rising costs accounts for just a small share of total borrowing and this share seems to be rising very moderately. Unemployment has gone on rising despite the clear indications of an economic recovery. Unemployment is clearly a risk to be considered in the present analysis and as a rule is a heavy blow to the households it affects. But the risk of rising unemployment seriously affecting the ability to pay in the household sector as a whole is considered to be slight. The composition of the stock of loans to households and the prevailing distribution of wealth over income groups show that unemployment would leave the ability to pay virtually unchanged. The overall assessment is that household indebtedness does not constitute a risk for financial stability. Support for this is to be found in information at the household level as well as in an analysis of the development of various macroeconomic indicators.

The household sector in other Nordic countries, Germany and the Baltic states

In Denmark, Finland and Norway, as well as in Germany and the Baltic states, household indebtedness is continuing to rise in connection with low interest rates but in certain respects the picture varies. The increase in indebtedness is comparatively rapid in a number of countries but in the Baltic region and, to some extent, in Finland the initial level is relatively low. In Lithuania, the ratio of

21 See "Swedesh households' indebtedness and ability to service debt – an analysis of household data" in this report.

debt to disposable income is only around 7 per cent, in Latvia it is just over 20 per cent and in Estonia almost 60 per cent. In December 2003, however, the Estonian central bank warned that households' expectations could be unduly optimistic.

Summary comments

- Total corporate borrowing is declining but some increase is foreseen when investment picks up.
- The development of corporate sector profits is still weak but some improvement is expected in this respect as well as in companies' ability to pay.
- The increase in the proportion of defaults has slowed in the corporate sector as a whole and bankruptcy risks are expected to be unchanged in the coming twelve months.
- The risk of default in Norway and Germany continues to be higher than in the other countries where the major banks are sizeable creditors.
- The fall in office prices and rents has slowed since the time of the previous Report. The increase in the vacancy rate in the office market also seems to have slackened and vacancies have even turned downwards to date this year in the Stockholm region.
- The lower levels of rents in new contracts for office premises have not led to any sizeable decline in the rent income of the property companies and their financial position remains good. But the stock of real estate held by some property companies does show a low degree of diversification, which makes these companies vulnerable to developments in particular regions and sub-markets.
- The Riksbank's main scenario, with an economic recovery in Sweden driven above all by increased investment in this and the coming year, should lead in time to an increase in prices as well as rents for office premises.
- Household borrowing is expected to go on rising in connection with persistently high activity in the house market and rising disposable income. This development points to increases in both the debt and the interest ratio.
- The ability to pay in the household sector is judged to be broadly the same as at the time of the previous Report. In general, the ability to pay is good, as is also indicated by a comparison with other countries.
- The financial position of households has become stronger, making them better equipped than last autumn to cope with a temporary loss of income.

Developments in the banks

The four major banks increased their earnings in the latest reporting period. This was accompanied by decreased loan losses, which had risen for a time. The improved profitability is mainly due to cost reductions, accompanied by better results for net commission income and insurance operations as well as positive pension allocations. The better performance is a consequence of rising stock markets.

The Riksbank's analysis of developments in the banking system concentrates on the four major Swedish banks – Föreningssparbanken, Handelsbanken, Nordea and SEB – because it is primarily these banks that are crucial for payment system stability.[22] The analysis focuses on the strategic risk in profitability, on asset quality, on the structure of financing and on capital.

Stock market uncertainty about the future profitability of the banks has clearly decreased since the beginning of 2003 in connection with growing expectations of an economic recovery. This is reflected in the declining volatilities of bank equity (see Figure 3:1).

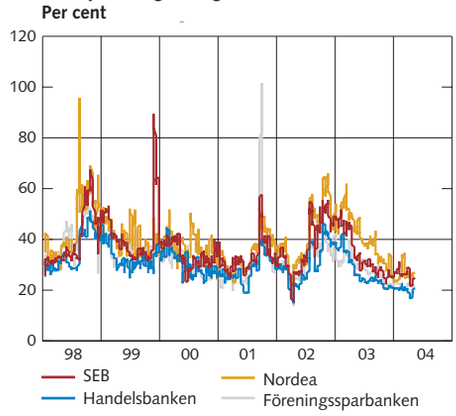
Profitability – strategic risk

The underlying earnings of the major Swedish banks, measured as profit before loan losses in constant prices, rose about 20 per cent in the latest reporting period to over SEK 52 billion (see Figure 3:2).[23] Earnings, which fell in annual terms in 2001 and 2002, are rising once more. Profits for the major banks are now somewhat higher than in 2000, before the stock market fell. At the same time, the banks' loan losses have almost doubled, though the levels are still low. In the latest reporting period, loan losses in constant prices decreased almost 7 per cent to just under SEK 5.1 billion.

Profitability, measured as the return on equity after tax, began to recover in 2000 after falling for a couple of years (see Figure 3:3). In the most recent reporting period, profitability was over 13 per cent, an improvement of about 3 percentage points from the previous period. One-third of the increase in profitability is attributable to a better profit on core operations (see Figure 3:4)[24] that was mainly due to increased net commission income and cost reductions during the reporting period. But it was an increase for net financial transactions that contributed most of the overall improvement.

Profitability also rose because of a swing to a positive outcome for the banks' pension allocations and insurance operations (in Figure 3:4 the latter item is included in other operations). This is a consequence of the rising stock market as that affects the value of the base for income from asset management.

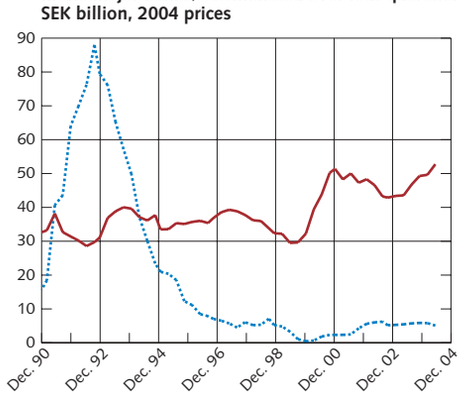
Figure 3:1. Implicit volatility of bank equity, 10-day moving average.
Per cent



Note. The implicit volatility has been calculated from bank options with a maturity of three months.

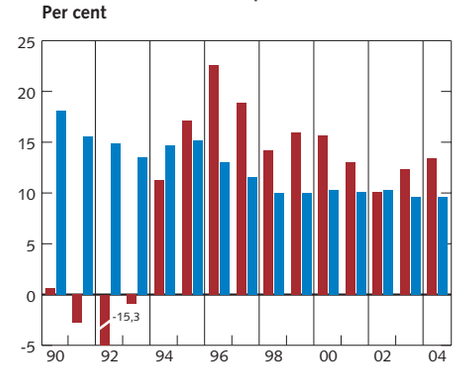
Sources: Bloomberg and the Riksbank.

Figure 3:2. Profit before loan losses and net loan losses in the major banks, accumulated over four quarters.
SEK billion, 2004 prices



Sources: Bank reports and the Riksbank.

Figure 3:3. Return on equity after tax in the major banks and the market's required rate of return.
Per cent



Note. The market's required rate of return is defined as the sum of risk-free interest and a risk premium; risk-free interest is represented by the ten-year government bond rate and the risk premium is assumed to be 5 per cent over the entire period. The data for 2004 refer to the latest reporting period (the four most recent quarters)

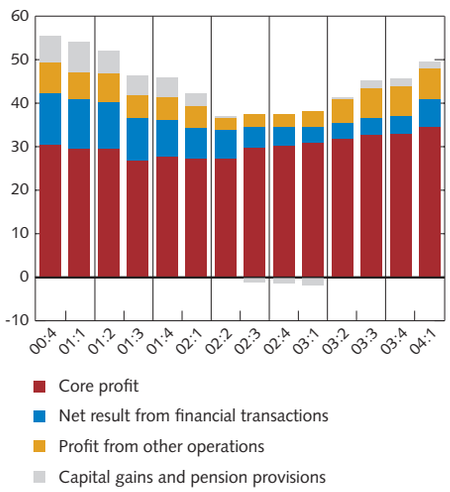
Sources: Bank reports and the Riksbank.

22 The term major bank denotes the bank group as a whole, that is, including both Swedish and foreign subsidiaries. The reason for this perspective is that risks can be taken in various legal entities and it is the consolidated risk exposure that is most relevant for financial stability.

23 The most recent reporting period is the four quarters through 2004 Q1. All results have been adjusted for sizeable one-off effects and unless stated otherwise, all comparisons are with the preceding four-quarter period.

24 The profit on core operations is defined as net interest and commission income less total costs and loan losses.

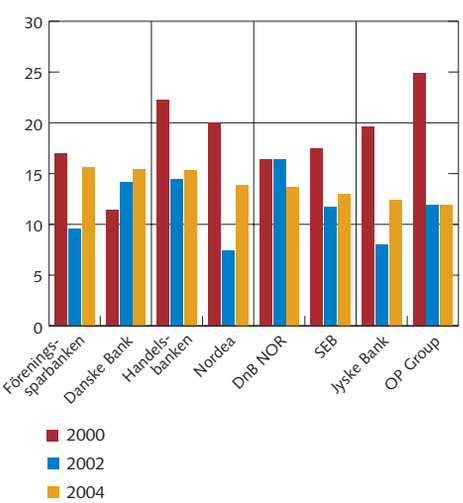
Figure 3:4. Core profit, profit from other operations, financial transactions and capital gains in the major banks, accumulated over four quarters.
SEK billion



Note. Figures are pro forma adjusted for acquisitions. Core profit consists of net interest income and net commission income less expenditure and loan losses. Other operations comprise other income as well as profits from associated companies and net insurance operations.

Sources: Bank reports and the Riksbank.

Figure 3:5. Return on equity after tax.
Per cent



Note. The figures may differ from the banks' annual reports because Bloomberg defines certain items differently. DnB NOR is pro forma. The data for 2004 refer to the latest reporting period.

Sources: Bloomberg and the Riksbank.

In other words, in keeping with recent years, profitability in the latest reporting period has been affected above all by the stock market's development and to only some extent by the banks' cost-cutting.

A comparison with other Nordic banks shows that in every case the return on equity during the latest reporting period was inside a fairly narrow interval (see Figure 3:5). The level ranged from 12 to 15.5 per cent. With the exception of Danske Bank, the return on equity is still below the level in 2000. However, it is higher than in 2002 for all these banks except Dnb NOR and OP Group.

INCOME

The income of the major banks rose 6 per cent in the latest reporting period.

From mid 2000 up to end 2001 the major banks increased their net interest income at an annual rate of over 10 per cent. This was almost entirely a consequence of increased lending. The growth of lending then tended to slacken and so, therefore, did interest income, which was broadly unchanged in the latest reporting period.[25]

The lower growth of interest income, besides reflecting the diminishing increase in lending, is due to some deterioration of margins. Deposit margins have been depressed by falling interest rates in Sweden and the other countries in which these banks operate. At the same time, banks can increase their lending margins when interest rates fall. However, the latter effect has only partly offset the deterioration of deposit margins.

Price competition in the house mortgage market seems to have become fiercer recently. In that mortgage loans provide the banks with collateral in the form of real estate, the margins on this type of operation are lower than for bank loans. Still, the margins for these two forms of lending have co-varied. However, the fiercer competition resulted in mortgage lending margins ceasing to improve at the same rate as bank lending margins during 2003 (see Figure 3:6). This could also be seen in the corporate sector, where the development for mortgage lending margins were less positive than for bank lending margins during the second half of 2003 (see Figure 3:7). In other words, it looks as though the banks lowered their mortgage lending margins in order to gain larger market shares.

For the household sector, lower house mortgage margins as a way of increasing the banks' market share could have to do with the capital requirement for this form of lending being smaller under the new capital adequacy rules, Basel II, which will be implemented at the end of 2006. Under Basel II, the capital requirement for housing loans will be smaller than for other loans and lower margins may then be offset by lower costs in the form of decreased capital requirements.

25 For Handelsbanken this refers to operative interest income as this excludes short-term exchange rate movements.

A similar argument may apply to mortgage loans to the corporate sector because Basel II will give banks greater opportunities of utilising collateral such as real estate at potentially lower capital requirements.

The fall in net commission income since mid 2001 ceased during the latest reporting period and turned into an increase for the four major banks of over 5 per cent (see Figure 3:8). A rising stock market affects net commission income directly because the banks' management fees are dependent on the value of the assets. Moreover, rising stock markets tend to be accompanied by increased securities trading and more activity in corporate finance, which leads to higher commission income. At the end of the reporting period, securities-related commissions were contributing about 45 per cent of total commission income (see Figure 3:9). Payment commissions, for instance for the use of credit cards, went on rising; growth in the reporting period amounted to about 8 per cent. Income from other commissions was unchanged.

The net result of financial transactions, which shows the change in value of bank assets at market prices, rose for the first time since mid 2001. Equity income more than quintupled from the previous reporting period, likewise thanks to the rising stock market.

Falling long-term interest rates in the middle of 2002 and early in 2003 raised the value of the major banks' bond portfolios, so that their interest income grew relatively strongly in that period. In the latter part of 2003, however, long-term interest rates began to move up, which lowered interest income instead. Although long-term interest rates fell again in 2004 Q1, the result for the latest reporting period was negative. Given the increased long-term interest rates in the Riksbank's main scenario, the value of bond portfolios may continue to fall.

COSTS

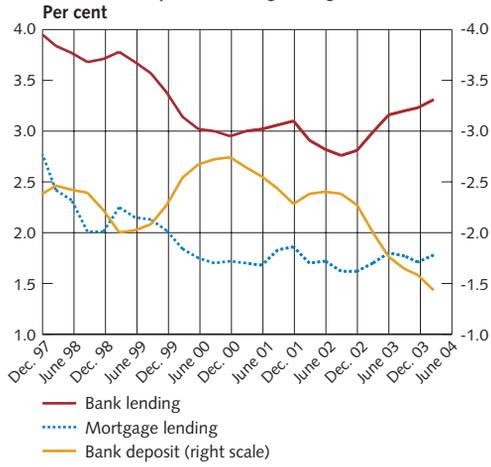
The costs of the major banks were reduced almost 3 per cent in the latest reporting period. Adjusted for outsourcing and disinvestment, in this period the number of employees fell by an average of almost 5 per cent. Although staff reductions have been in progress since 2001, they have not yet had any sizeable effects on costs. In the latest reporting period there was actually a marginal increase in staff costs. The overall reduction of costs has accordingly come from other items, which fell almost 7 per cent.

The decreased costs led to some improvement in cost efficiency (the C/I ratio[26]) in the latest reporting period (see Figure 3:10). In recent years the increased cost efficiency has been achieved primarily by reducing costs. In the latest reporting period, however, it also came from increased earnings.

The ratio of costs to total assets has decreased since 1996, which also represents better cost efficiency in the major banks. However, the

26 The C/I ratio refers to income from banking operations; thus, it does not include income from insurance operations or profits from associated companies, for instance.

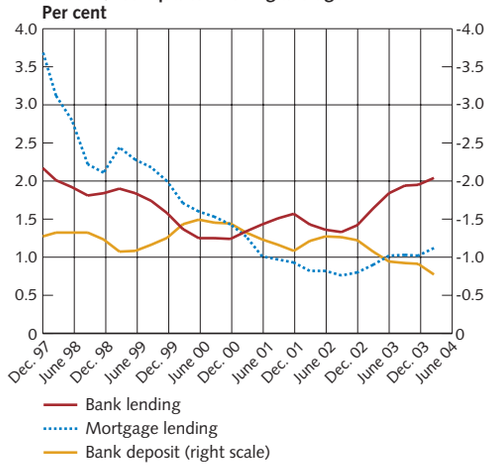
Figure 3:6. Spreads for the major banks on households' bank deposits, bank lending and mortgage lending in Sweden, four quarter moving average.
Per cent



Note. The spread is calculated as the difference between the average interest and the six-month treasury bill rate.

Source: The Riksbank.

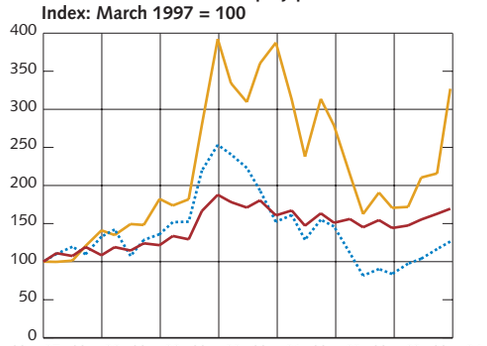
Figure 3:7. Spreads for the major banks on corporate bank deposits, bank lending and mortgage lending in Sweden, four quarter moving average.
Per cent



Note. The spread is calculated as the difference between the average interest and the six-month treasury bill rate.

Source: The Riksbank.

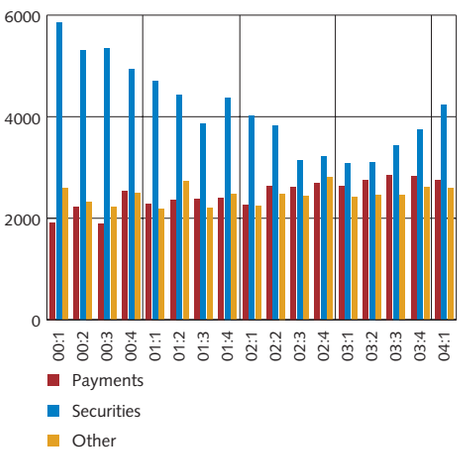
Figure 3:8. Net commission income in the major banks and Stockholmsbörsen's equity prices and turnover.
Index: March 1997 = 100



Note. The figures are pro forma adjusted for acquisitions.

Sources: Bank reports, Stockholmsbörsen, and the Riksbank.

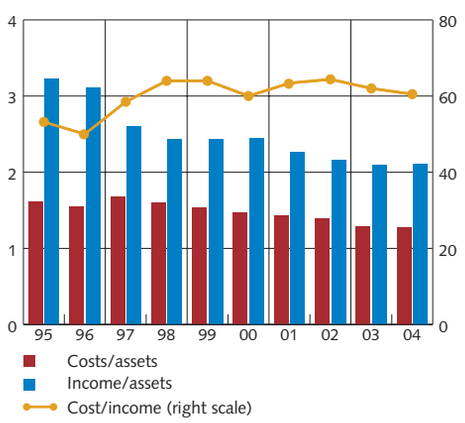
Figure 3:9. Net commission income in the major banks, by category.
SEK million



Note. The figures are pro forma adjusted for acquisitions.

Sources: Bank reports and the Riksbank.

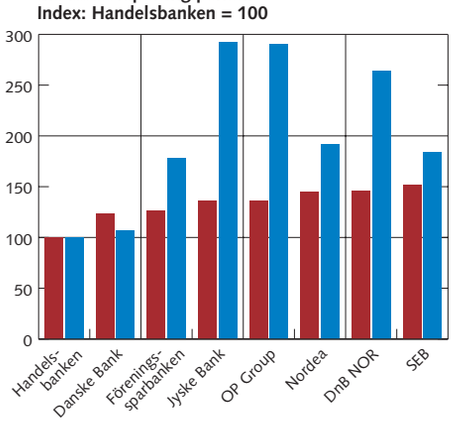
Figure 3:10. Ratios of costs and income to assets and of costs to income.
Per cent



Note. The data for 2004 refer to the latest reporting period.

Sources: Bank reports and the Riksbank.

Figure 3:11. Ratios of costs to income and assets in the latest reporting period.
Index: Handelsbanken = 100



Note. The figures may differ from the banks' annual reports because Bloomberg defines certain items differently. DnB NOR is pro forma. The data refers to the latest reporting period.

Sources: Bloomberg and the Riksbank.

ratio of income to assets has also fallen and this implies a lower return on total assets. One explanation may be the pressure on deposit and lending margins that has prevailed since the mid 1990s. The challenge faced by the major banks therefore seems to be to generate higher income at the current level of costs.

Although the Swedish banks do seem to have become more cost-effective in recent years, it is difficult to discern a uniform pattern in the level of costs. In the comparison of Nordic banks, the Swedish banks are among the most as well as the least cost-effective (see Figure 3:11). In terms of the costs/assets ratio, on the other hand, the four major Swedish banks are among the top five. This supports the impression that the Swedish banks are fairly cost-effective but operate in a market with a limited earnings potential.

What affects return on equity?

The return on equity (ROE), calculated as the annual profit in relation to equity, is commonly used to measure bank profitability. An increased ROE is generally positive but needs to be interpreted with some caution because it may reflect changes in factors other than profitability, such as increased risk. So a rise in ROE does not necessarily represent increased financial strength.

One way of decomposing the definition of pre-tax ROE is to break the concept down into four factors: profit margin, risk-adjusted income (efficiency), risk taking and leverage (see Table B1).[27] This results in the following arrangement: An increased ROE due to a higher profit margin (pre-tax profit/operating income) can be assumed to reduce the financial uncertainty in a bank because it indicates a greater difference between income and costs. An increase in risk-adjusted income (operating income/risk-weighted assets) can also be seen as positive for stability in that it represents more income relative to risk-weighted assets. An increase due to greater leverage (total assets/equity), on the other hand, may indicate a loss of financial strength because it implies increased indebtedness and that can be assumed to increase a bank's risks. An increased risk exposure (risk-weighted assets/total assets) can likewise be assumed to lessen financial strength in that, for example, it may mean that the bank has built up assets by lending capital for projects that are more risky.

Consequently, whether a higher ROE implies that a bank is resistant towards negative chocks is dependent on the underlying factors of the profitability; good margins and high efficiency or big risk taking and high leverage.

In the case of the four major Swedish banks, the changes in ROE in recent years have come mainly from fluctuations in profit margins (see Figure B8). In 2001, ROE dropped about 5.5 percentage points. Besides decreased profit margins, this had to do with a loss of efficiency, measured as risk-adjusted income. The downward shift in ROE was countered by increased leverage but that could indicate that the banks became more vulnerable.

In 2002 the fall was due to a combination of decreased profit margins and lower risk-weighted assets relative to total assets. In other words, the decreased ROE reflected not just a loss of financial strength but also a lower exposure to risks. The increased ROE in 2003

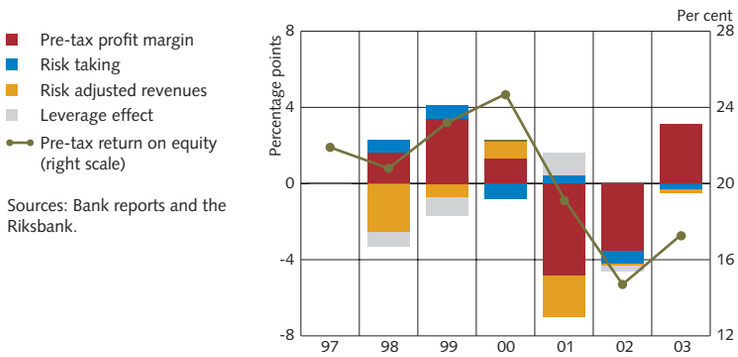
$$\text{Pre-tax ROE} = \frac{\text{Pre-tax profit}}{\text{Operating income}} \times \frac{\text{Operating income}}{\text{Risk-weighted assets}} \times \frac{\text{Risk-weighted assets}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Equity}}$$

Table B1. Decomposition of ROE.

Factor	Description and financial stability implications
Pre-tax profit margin	Measures margin between income and costs. *Effect of rise: positive.*
Risk-adjusted income	Measures efficiency on a risk-adjusted basis. *Effect of rise bank: positive.*
Risk taking	Measures risk propensity. *Effect of rise: negative.*
Financial leverage	Measures gearing. *Effect of rise: negative.*

27 This approach has been used earlier by the Bank of England in *Financial Stability Review*, December 2003.

Figure B8. Pre-tax return on equity.



Sources: Bank reports and the Riksbank.

was not due to either increased leverage or increased risk exposure (the latter actually decreased); it came instead entirely from better profit margins, which can be seen as an indication of increased financial strength.

Assets – credit risk

The assets of the major banks rose more than 4 per cent in the latest reporting period. The increase consisted mainly of interbank claims and interest-bearing assets. Insurance assets also grew.

LENDING

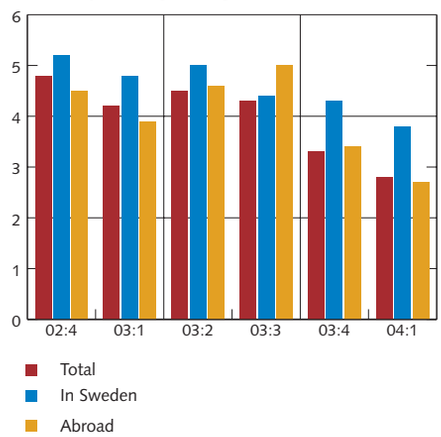
In the latest reporting period the growth of lending by the major banks amounted to just under 3 per cent, which was somewhat less than in the preceding period (see Figure 3:12). Growth varied between the markets to which these banks are most exposed. In 2003, the Nordic region was characterised by an increase in lending of between 5 and 10 per cent, almost all of which went to households. The growth of lending in Germany was weak. In the Baltic states, lending rose in this period by between 25 and 30 per cent; here, too, lending to households rose more rapidly than to the corporate sector, though the latter was also positive. Taken together, two of the Swedish banks have the major share of the bank markets in the Baltic states but as their lending there makes up less than 5 per cent of their total volume, the rapid expansion has little impact on the overall picture. All in all, the growth of lending in the major banks' operations abroad was somewhat lower than in the Swedish market.

In the Swedish market, corporate lending by the major banks fell slightly in the reporting period (see Figure 3:13). The fall for Nordea was somewhat more marked than for the other banks, partly due to the sale of operations with the associated credits.[28] Lending to households rose from all the major banks, entirely due to increased mortgage lending. The increase for Handelsbanken represented some fall-off (see Figure 3:14), while Nordea and SEB achieved rates of 10 and 15 per cent, respectively. This may be partly explained by Nordea and SEB having smaller shares of the household market than the other two major banks but it may also reflect different strategies for taking shares of the house mortgage market.

CREDIT QUALITY

The composition of a bank's loan portfolio can serve as an approximate indicator of the degree of diversification. The sector breakdown has changed only marginally in recent years. At end 2003, over 40 per cent of the loan portfolios of the major banks[29] consisted of loans to households (see Figure 3:15). Around three-quarters of these loans have real estate as collateral. Loans to property management companies make up about 17 per cent of the total

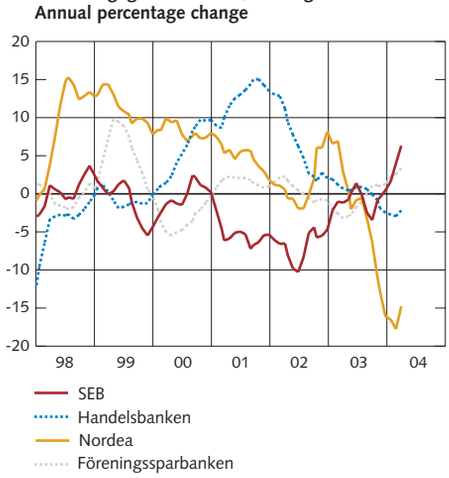
Figure 3:12. Lending by the four major banks to the general public in Sweden and abroad, accumulated over four quarters. Annual percentage change



Note. Lending abroad by Handelsbanken has been adjusted for a total of SEK 19 billion in North America that was previously included in this item but was reassigned at the beginning of 2003 to lending to credit institutions.

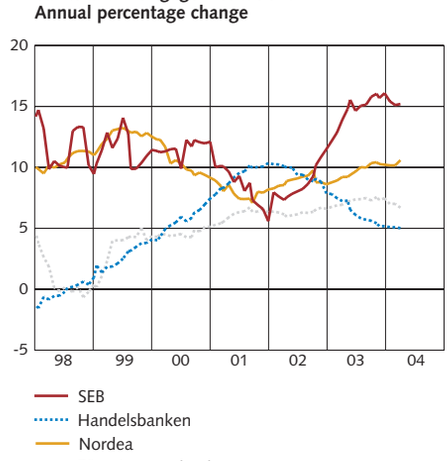
Sources: Bank reports and the Riksbank.

Figure 3:13. Lending to companies in Sweden by banks and mortgage institutions, moving three-month average. Annual percentage change



Source: The Riksbank.

Figure 3:14. Lending to households in Sweden by banks and mortgage institutions. Annual percentage change

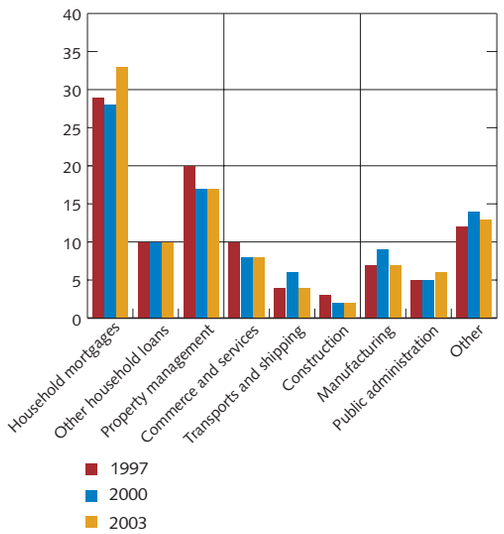


Source: The Riksbank.

28 The data that were reported to the Riksbank prior to Financial Stability Report 2003:2 showed an increase in Nordea's lending to companies in Sweden. Revised figures from Nordea now give a different picture. The drop in lending is partly explained by Nordea having sold a property company in which the bank had held the loans, which were then transferred to the buyer.

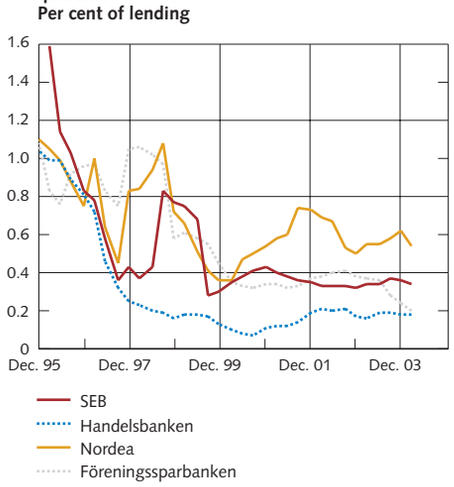
29 Handelsbanken is not included in the breakdown because this bank does not report exposures outside Sweden. It can be noted, however, that the breakdown of its exposures in Sweden resembles that of the other three major banks.

Figure 3:15. Industry breakdown of the major banks' lending to the general public.
Per cent



Sources: Bank reports and the Riksbank.

Figure 3:16. Provisions for incurred and probable loan losses, accumulated over four quarters.
Per cent of lending



Sources: Bank reports and the Riksbank.

stock, which means that this is still the single industry to which the banks are most exposed.

The proportion of impaired loans in the major banks' lending to the general public was unchanged in the latest reporting period. At the same time, loan losses fell 7 per cent, whereas in the previous reporting period they had risen. The main factor behind the downward tendency was that provisions by Föreningssparbanken were almost halved (see Figure 3:16). Provisions by Nordea and SEB also fell but considerably less markedly. Only Handelsbanken reported some increase in provisions; even so, of the four major banks, Handelsbanken still has the lowest level of provisions.

In the Nordic comparison the major Swedish banks lie around the average (see Figure 3:17). For a majority of the banks, loan losses are now above the level in 2000. Since 2001, economic development in Sweden, as in other Nordic countries, has been characterised by a mild slowdown. At the same time, the level of the major banks' loan losses has risen more than 60 per cent, which illustrates the banks' cyclical sensitivity to risk exposures. Even so, the loan losses of the major Swedish banks in recent years must be said to be very low.

It is hard to see how the Riksbank's main scenario, with a cautious economic recovery during 2004, could lead to markedly higher future loan losses, even though such losses do tend to be lagged in relation to the business cycle.

One uncertain factor in this assessment concerns the development of Sweden's corporate sector. According to the main scenario, however, there is a decreased risk of defaults in the coming twelve months and that can be said to reduce the uncertainty. However, the construction industry does have a somewhat increased expected default frequency (see Figure 2:9) but the exposure of the major banks to this industry is small.

There is also some uncertainty about the corporate sectors in Norway and Germany, as is evident from the relatively high expected default frequencies for companies there.

COUNTERPARTY EXPOSURES

The central role of the major banks in the Swedish markets for currency, deposits, securities and derivatives results in considerable exposures to counterparties and settlements.[30] As these exposures are primarily to other financial institutions and large non-financial companies, the risk of default is small as a rule. But if a default were to occur, the exposures are so large that the consequences for systemic stability could be serious. In the context of stability, these risks are particularly relevant when the counterparty is a bank or some other financial institution, since that entails the risk of a problem in one of these institutions spreading to the others.

30 For a fuller account of the Riksbank's analysis of counterparty and settlement exposures, see Financial Stability Report 2002:2 and Blåvarg, M. & Nimander, P., (2002) "Inter-bank Exposures and Systemic Risk", *Sveriges Riksbank Economic Review*, no. 2.

During the second half of 2003 the four major banks reduced their counterparty and currency settlement exposures by almost 23 per cent (see Figure 3:18). The fall from the corresponding period a year earlier amounted to just over 8 per cent. It was above all exposures to currency settlements that decreased sharply, in keeping with what had been expected from the introduction of CLS Bank.[31] The Riksbank's data indicate that the credit ratings of the counterparties are satisfactory and have not changed.

If one of the major banks were to lose the whole of its exposure to its largest counterparty, problems with solvency would probably arise. The magnitude of the solvency problem from a counterparty failure would depend in practice not just on the size of the exposure but also on how much of the original claim the bank ultimately manages to recover.[32] Assuming that the bank recovers 25 per cent of the exposure, in 3 cases out of 8 a counterparty failure in the second half of 2003 would have led to the tier 1 capital ratio falling below the statutory requirement of 4 per cent (see Figure 3:19).

The risk of contagion between the major banks must be said to be moderate. None of the reported exposures for the second half of 2003 were such that a suspension of payments by one of the major banks would have created solvency problems for the other banks. This improvement is due to the combination of the major banks' increased capital and decreased currency settlement exposures (see Figure 3:20).

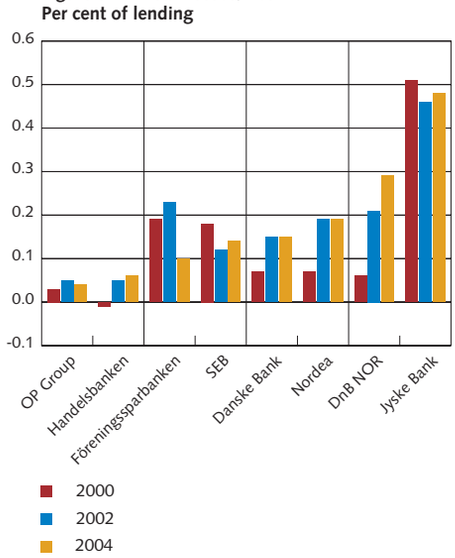
All in all, the relatively good quality of counterparty credit indicates that the probability of a sudden failure is low. An important caveat when interpreting the calculations above is that, as exposures tend to be reduced for quarter-end accounts, the banks' counterparty risks are likely to be larger in the intervening periods.

Funding – liquidity risk and capital

The banks' combination of predominantly illiquid assets (loans) and short-term liabilities (deposits and borrowing) makes them vulnerable to problems with funding. The structure of their funding is therefore a central issue for stability.

In Figures 3:19 and 3:20, the Tier 1 capital of each of the major banks has been reduced in each period by 75 per cent of the amount of the bank's largest corporate and interbank exposure, respectively. The reduction is limited to 75 per cent to allow for the existence of collateral for a part of the exposure. The effect accordingly represents a situation where the bank's largest counterparty (a large company or another major bank) suspends payments with immediate effect with no advance warning and the possibility of recovery is judged to be comparatively small. The resultant levels of Tier 1 capital in the figures should therefore be seen as outcomes of an extreme stress test.

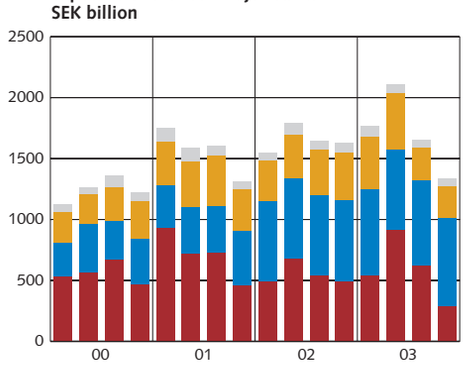
Figure 3:17. Loan losses, net.
Per cent of lending



Note. The figures may differ from the banks' annual reports because Bloomberg defines certain items differently. DnB NOR is pro forma. The data for 2004 refer to the latest reporting period.

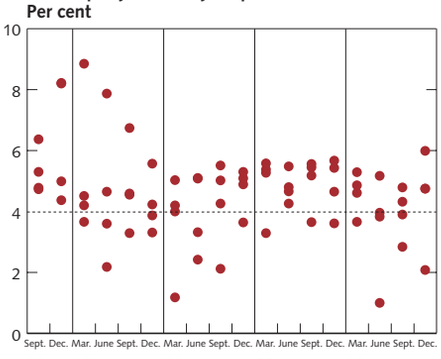
Sources: Bloomberg, bank reports, and the Riksbank.

Figure 3:18 . Counterparty and current settlement exposure of the four major banks.
SEK billion



Source: The Riksbank.

Figure 3:19. Tier 1 capital ratio in the four major Swedish banks after a default of their largest counterparty. Recovery 25 per cent.
Per cent

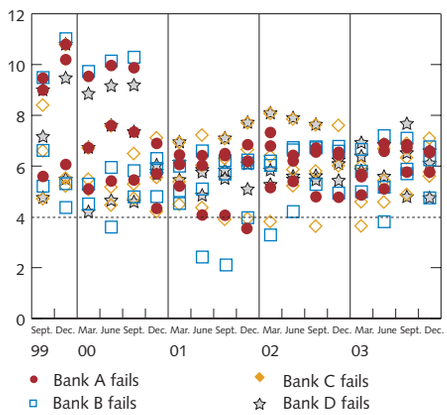


Source: The Riksbank.

31 CLS Bank offers a system for currency settlements that markedly reduces the risks normally associated with currency trading. For a more detailed description, see the article on pages 79–92 in Financial Stability Report 2001:2.

32 The recovery rate is primarily dependent on the bank's collateral; it also varies between industries.

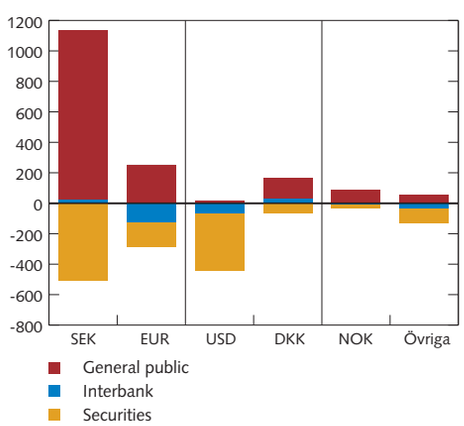
Figure 3:20. Tier 1 capital ratio in the four major Swedish banks after the default of a major Swedish bank. Recovery 25 per cent.
Per cent



Note. Given that Bank A fails, the tier 1 capital ratio is calculated for banks B, C and D at the end of each quarter. This enables tier 1 capital ratios in each period for the three surviving banks to be observed after a specific bank has defaulted.

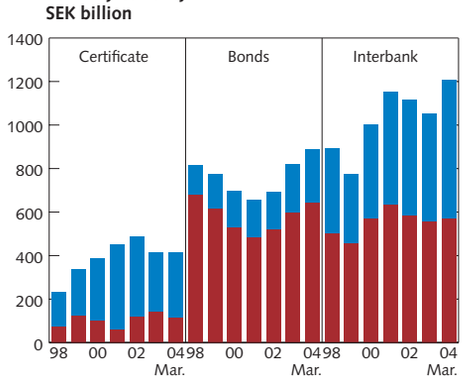
Source: The Riksbank.

Figure 3:21. Interest-bearing assets and liabilities of the major banks broken down by counterparty categories and currencies. Net position in December 2003.
SEK billion



Sources: Bank reports and the Riksbank.

Figure 3:22. Interbank, certificate and bond borrowing from the Swedish parent banks and mortgage institutions of the four major banks, broken down by currency.
SEK billion



Source: The Riksbank.

Almost 80 per cent of the funds of the major banks consists of interest-bearing liabilities. Deposits from the general public and issued securities each make up around 40 per cent of this component and about 20 per cent comes from interbank funding.

For a long time now the domestic market deposits in the major Swedish banks have not sufficed to fund the banks' loans to the general public. The deficit is mainly covered by the banks issuing securities in the Swedish, American and European securities markets but also by borrowing in interbank markets.

During 2003 the four major banks increased their issues of Swedish securities as well as their net borrowing in the European interbank market. This was accompanied by decreased operations in the American interbank market and the securities markets. However, the American securities markets are still an important source of funding for the Swedish banks (see Figure 3:21).

The most volatile source of funding for the major banks is presumably the international interbank and bond markets, where investors are sensitive to ratings and confidence. If a bank's ability to pay is questioned, it is these sources of funding that are most likely to disappear first. In recent years the banks have increased their market borrowing in foreign currency (see Figure 3:22). Certificate issues, in recent years, have to a high degree been in foreign currency, while bond issues are still mainly in Swedish krona. It is above all in the interbank market that foreign currency borrowing has clearly increased and this, as mentioned above, occurs primarily in euro and US dollars.

CAPITAL

In recent years the major Swedish banks have not made any major acquisitions. This is reflected in their Tier 1 capital ratios, which have risen successively (see Figure 3:23). At the end of the latest reporting period the capital adequacy and Tier 1 capital ratios of the major banks averaged 10.0 and 7.2 per cent, respectively. The increase in Tier 1 capital is entirely due to additional equity, not to a reduction of risk-adjusted assets.[33]

In the Nordic comparison, all the major banks except OP Group have a Tier 1 capital ratio inside the relatively narrow interval of 6.7–9.1 per cent (see Figure 3:24). In recent years the levels among the other Nordic banks, like those of the Swedish banks, have risen only marginally.

33 Since the beginning of 2004, a change in accountancy rules for pension costs have had some effect on Tier 1 capital. It has entailed a small overall increase for the four major banks, though some of them experienced a minor fall.

Summary assessment

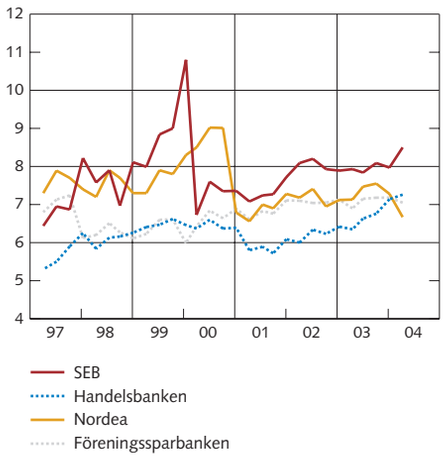
The profitability of the four major banks rose during the latest reporting period. This improvement was mainly a consequence of the rising stock market, which strengthened the net commission and insurance income. Decreased costs also contributed to the better profitability.

Loan losses fell to some extent during the period; in contrast to the development outlined in the previous Report. Given the Riksbank's main scenario, a marked increase in loan losses seems unlikely even though there is a risk of them occurring after some lag in relation to the business cycle.

There are no strong grounds for supposing that the deposit and lending margins of the banks will improve at all substantially. The future growth of the banks' largest source of income – net interest income – will therefore depend on a continued increase in volume.

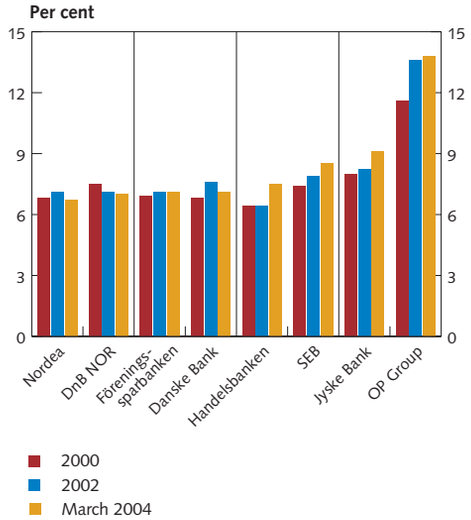
The improved profitability in the latest reporting period means that in the past six months the major banks' capacity for managing unexpected strains has been strengthened.

Figure 3:23. Tier 1 capital ratio.
Per cent



Sources: Bank reports and the Riksbank.

Figure 3:24. Tier 1 capital ratio for the major Nordic banks.
Per cent



Note. The figures may differ from the banks' annual reports because Bloomberg defines certain items differently. DnB NOR is pro forma.

Sources: Bloomberg and the Riksbank.

Profitability of major Swedish banks in a European comparison

The profitability of the four major Swedish banks is compared here with that of 23 major European banks.[34]

Bank profitability is commonly analysed in terms of the return on equity (ROE), which indicates the yield on shareholders' capital during the period in question. It may also be of interest to see why a bank is profitable; whether, for instance, this is due to its efficiency or to it operating in a market with imperfect competition. The efficiency of a bank can be measured in terms of costs relative to income; this C/I ratio reflects efficiency in the sense of the costs the bank incurs in order to generate its income.

ROE and C/I ratios for the banks in the comparison are shown in Figure B9. Not surprisingly, the relationship in the chart is negative – higher costs go hand in hand with lower profitability. The profitability of all the major Swedish banks is above the average level, as indicated by the relatively better ROE. When it comes to explaining the relatively high profitability, however, the C/I ratios do not give a straightforward answer. The C/I ratios for Handelsbanken and Föreningssparbanken are relatively low, while the ratios for Nordea and SEB are somewhat higher. To some extent, the differences in the level of costs can be due to the composition of the banks' operations; the level of costs in banks with a large component of investment banking tends to be relatively higher than in other banks at the same time as their profitability is normally good.

A drawback with the C/I ratio is that a bank that, for example, operates in a market with little competition can perform well in terms of this ratio without being particularly efficient. Large margins, for instance, can generate high income relative to costs without necessarily saying anything about whether or not costs are low. An alternative indicator of a bank's efficiency is the relationship between costs and assets. This ratio is more uniform for the four major Swedish banks, all of which are below the average for the comparison (see Figure B10). Taken together with the relatively low C/I ratios, this may indicate that the profitability of the major Swedish banks is due to their being comparatively efficient.

Given that the efficiency of the Swedish banks is relatively satisfactory, it may be asked why, with the exception of Handelsbanken, their ROE is only just above the average. One possibility is that weak income generation is more of a problem than high costs. That in turn could indicate that the Swedish bank market is characterised by a low growth of earnings and relatively strong competition, which reduces the banks' income margins.

As mentioned above, to some extent the profitability of a bank and the level of its costs can be explained by the composition of its operations. A breakdown of the selected banks' income is presented in Figure B11. The position of a bank is indicative of strategic choices, with the typical retail bank on the far left and banks with sizeable operations in investment banking and asset management on the right. The white circles represent the net interest income margin (net interest income divided by interest-bearing assets). The linear trend for the net interest income margin indicates that banks with relatively little income from net interest generally have a lower margin on these operations. A conceivable explanation is that banks operating in a market with a low interest margin aim for increased income from other operations. This is evident among the Swiss banks, for example, where low net interest income margins are combined with some of the largest proportions for commission income.

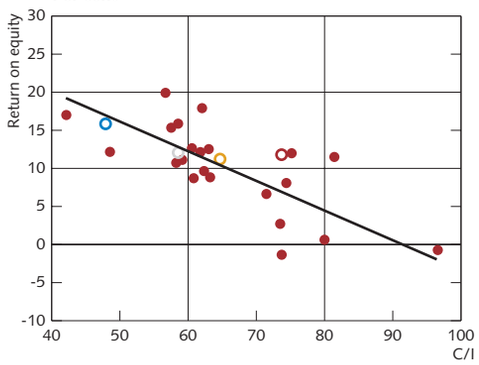
However, the relationship between the net interest income margin and net interest income

34 The comparison is based on data from Bloomberg on bank profits and financial statements. Comparisons such as this raise certain measurement problems in that banks in different countries do not use exactly the same accounting methods. Moreover, the figures may differ from the banks' annual statements because Bloombergs defines certain items differently from the individual bank. The figures represent averages for the period 2001–03; this reduces any one-off effects but also limits the possibility of drawing conclusions about trends over time. See also the separate article on pages 79–84 in Financial Stability Report 2002:1.

is not clear-cut. For example, net interest income makes up a large share for three of the Swedish banks, headed by Handelsbanken, while their net interest income margins are relatively low. The low interest income margin strengthens the hypothesis that the Swedish bank market is characterised by low income growth. An alternative explanation might be that the low interest income margins are a result of lower credit risks. It seems more probable, however, that the country differences in margins are due to differences in competitive pressure rather than to risk exposures in lending. If lending were directed by risk, banks with many corporate customers would have higher margins than those with many household customers because losses occur on the whole in the corporate sector; but that is not the case.[35] Moreover, the margins on lending do not seem to be automatically linked to the general level of interest rates, which favours the competition hypothesis. For example, net interest income margins are high for the Spanish and Italian banks but low for the French, yet the level of interest rates in all these countries is steered by the ECB's instrumental rate.

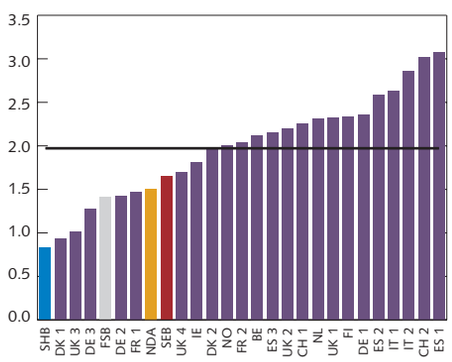
The hypothesis that profitability is generally good in a bank with extensive operations in investment banking is not supported; among the banks studied here, the relationship between the share for interest income and ROE is slightly positive, though this may be because European stock markets fell during the period. It is conceivable, however, that the positive relationship is in line with the hypothesis in the sense that when securities markets are falling, banks with sizeable investment banking operations are usually hit more heavily than other banks on account of their high exposure to these markets.

Figure B9. Return on equity and ratios of costs to income. Average 2001 - 2003.
Per cent



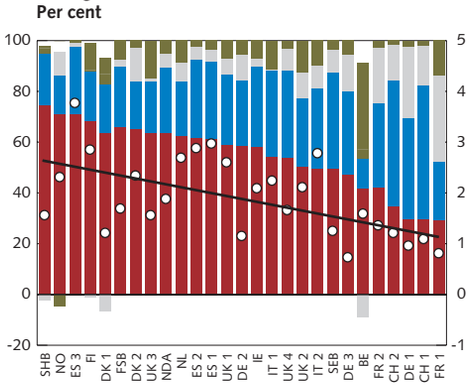
Sources: Bloomberg and the Riksbank.

Figure B10. Ratio of costs to assets. Average 2001 - 2003.
Per cent



Sources: Bloomberg and the Riksbank.

Figure B11. Income and net interest income margin. Average 2001 – 2003.
Per cent



Sources: Bloomberg and the Riksbank.

35 Of course there are also other factors that determine the lower margins on corporate loans. For example, besides providing loans, a bank may have other commitments with a company that also generate income that to some extent may subsidise the lower margins.

The financial infrastructure

The oversight of the stability of the infrastructure involves identifying structural weaknesses that could lead to contagion risks via the payment system. Analysis of the infrastructure differs from analysis of the banks in so far as its vulnerability does not change continuously as a result of, for instance, macroeconomic fluctuations or corporate financing conditions. In the section on the infrastructure, the Riksbank comments on events and trends that affect the central parts of the infrastructure. This time there is a description and analysis of Stockholmsbörsen in its function as central counterparty in the derivatives market. An assessment shows that Stockholmsbörsen's derivatives clearing in all essentials fulfils the international requirements for central counterparties.

As part of its work on promoting a safe and efficient payment system, the Riksbank makes regular analyses and assessments of the financial infrastructure.[36]

For reasons of efficiency, individuals and firms in a modern economy tend to use financial institutions for most of their payments, including the most important ones. Various forms of interdependence are created between these financial institutions. As a consequence, problems in one institution can rapidly spread, through the payment system, to other institutions. There is thus a link between efficiency and safety. On the one hand, efficient payment systems require some concentration of payment mediation to a few institutions. On the other hand this concentration can create dependence and risks. These dependencies are most clear within RIX, which is the hub of the central payment system. As the payments in RIX are settled in real time, a participant can manage its outgoing payments in the system as long as the incoming payments are received as planned. A disruption to the system or suffered by a participant in the system could rapidly lead to substantial liquidity problems among the other participants. If these problems are not solved quickly, they can result in substantial costs to the economy as a whole.

This report contains an analysis of Stockholmsbörsen's central counterparty services in the derivatives market. In addition, there is a brief summary of the Riksbank's assessment of these services and the effects of the cooperation between OM HEX and VPC. The chapter also contains an analysis of the availability of the RIX system, in order to illustrate the systemic risks in the system. There is also a discussion of the need to change the present RIX system. The chapter concludes with a description of CASH, the e-money system which the banks have decided to wind up.

36 For a more detailed description of the Swedish financial infrastructure, see "The Swedish Financial Market".

Stockholmsbörsen as a central counterparty

Stockholmsbörsen is a secondary market where, for instance, equity, debt securities and derivatives are traded. While equity and debt securities are cleared and settled in VPC, Stockholmsbörsen itself clears and settles derivative transactions. Stockholmsbörsen functions as a central counterparty, CCP, in these transactions.[37] This means that it acts as seller to all buyers and as buyer to all sellers. Both the buying and the selling investor will then have Stockholmsbörsen as their legal counterparty. If the buyer is unable to pay, Stockholmsbörsen must pay and if the seller cannot supply the securities, Stockholmsbörsen must do so. One advantage of a central counterparty system is thus that an investor has no settlement risk with regard to other investors. The counterparty risk is instead concentrated to Stockholmsbörsen. As the risks among different counterparties often offset one another, netting leads to a significantly lower total risk. Another advantage is that the brokers do not need to assess all of the other brokers' ability to deliver securities or to pay. It is enough to assess Stockholmsbörsen's capacity to deliver securities and ability to pay. However, the remaining risks are concentrated on one counterparty, Stockholmsbörsen. A further advantage is that a central counterparty facilitates more anonymous trading. There is reason to believe that this promotes liquidity in the market. A CCP can thus contribute to more efficient markets.

The need for a CCP is particularly great on the derivatives market, as a derivative entails an open position for a long period of time. A derivative contract is not finally settled until it reaches maturity, which can be months away. Securities, such as equities and bonds, are usually settled after three days. A derivative instrument thus entails a counterparty risk for a significant period of time. A CCP can therefore make the derivatives market more attractive to investors. However, it also becomes particularly important to assess the creditworthiness and risk management of the institution acting as CCP, in this case Stockholmsbörsen. All participants become dependent on the CCP and usually have substantial exposures towards it. In addition, it is important that investors should be well-informed about the risks to which they are exposed by engaging the CCP.

STOCKHOLMSBÖRSEN'S SYSTEM FOR CENTRAL COUNTERPARTY CLEARING

A CCP can be organised in different ways. Stockholmsbörsen takes on the role of central counterparty for all derivatives traded in Stockholmsbörsen's trading system or reported to Stockholmsbörsen. As soon as a contract has been entered into the trading system, the transaction is transferred to the clearing system for derivatives. When the transaction has been registered

37 For a more detailed discussion of the advantages and disadvantages of a CCP, see the Financial Stability Report 2002:2, pp. 47-58.

in the clearing system, Stockholmsbörsen automatically becomes counterparty to the transaction. In practice, the participant therefore has Stockholmsbörsen as its counterparty in all transactions. As well as acting as central counterparty in market-traded derivatives, Stockholmsbörsen offers central counterparty services for certain instruments traded OTC, i.e. outside of an organised marketplace, but listed for clearing at Stockholmsbörsen. It can also, following approval, act as central counterparty in other derivative transactions. As protection against the risks arising from the clearing process, Stockholmsbörsen requires collateral from clearing members and end-customers. In 2003 Stockholmsbörsen cleared an average of around 230,000 derivative contracts a day. The collateral pledged by members for these transactions amounted on average to SEK 5.2 billion.

Trade in derivatives in Sweden and the other Nordic countries is designed differently from in other countries. The CCPs in most other countries only have a direct relationship to clearing members. The Nordic financial markets instead have end-customer clearing, which means that the customers who trade, both financial institutions and individuals, have their own accounts and a direct contractual relationship to the CCP.[38] This means that even if an end-customer has engaged a clearing member to manage and administer the clearing of derivative transactions, it is the end-customer that has a direct contractual relationship to the CCP. As a result, the end-customer also has a risk exposure to Stockholmsbörsen, rather than towards the clearing member. This also means that clearing on the Nordic markets takes place at end-customer level, while most international central counterparties have no relationship to the end-customers, and instead clear at the level of clearing members' accounts.

Although Stockholmsbörsen clears at end-customer level, it does not usually have any information about the end-customers' identities, as they are only identified by a number in the system. To uphold the end-customer's anonymity, it is instead the end-customers' brokers who are responsible for ensuring that the end-customers have signed the necessary contracts and supplied sufficient collateral. Stockholmsbörsen and the Swedish Securities Dealers' Association jointly own a company called Clearing Control AB, which has the task of checking that collateral pledged by customers is acceptable and correctly-valued. The company also has the right, if and when Stockholmsbörsen so wishes, to carry out inspections at various participants to check the collateral volume.

End-customer clearing has several consequences. One is that Stockholmsbörsen can calculate the necessary collateral separately for each end-customer. This means that each end-customer collateralises his own total position, even if he trades via several brokers. There is

38 The end-customers also have their own accounts in VPC and its equivalents in the Nordic markets. This is also different from most other countries, where only the broker has an account with the central securities depository.

thus an advantage for the end-customer, who can utilise collateral more efficiently. Another consequence is that some of the customers with which Stockholmsbörsen has a contractual relationship are unknown to Stockholmsbörsen. Here it is the broker, who signs the agreement with the end-customer, on behalf of Stockholmsbörsen. This is despite the fact that the broker is not counterparty to the financial transactions. The advantage of this arrangement is that the broker usually manages all of the practical administration in connection with the end-customer's derivative trading and thereby has a more intimate business relationship with the end-customer than Stockholmsbörsen has. [39]

A third result is that the value of the collateral the clearing member has to pledge cannot be calculated from the net exposures to the various end-customers. Netting is at end-customer level in this system, not at member level. In many other countries, the end-customer is responsible for its collateral in relation to the clearing member. The clearing member can then add these together and take responsibility for pledging the net collateral to the CCP. Stockholmsbörsen's system of end-customer clearing leads to a higher total level for the collateral pledged to the CCP. This form of clearing means that end-customers have a lower risk exposure to the clearing member who in formal terms only acts as agent. Instead, they have a risk toward Stockholmsbörsen. For clearing agents, this form of clearing means that their settlement risk toward Stockholmsbörsen is minimised. Formally, the clearing agent is only an agent and thereby not a counterparty in legal terms. It is only if the clearing member acts on its own behalf that it formally becomes a counterparty. However, end-customer clearing means that costs increase as clearing members must pledge more collateral.

If Stockholmsbörsen were to fail, it is uncertain whether the clearing agents could in practice withstand the claims that would be made against them by end-customers. In many cases the clearing agents probably have a broader relationship to the end-customers than merely as agent in derivatives clearing. The problem is reinforced by the fact that end-customer clearing extends beyond the circle of professional participants. Thus, consumer protection considerations may also need to be included in the assessment. From a stability point of view, end-customer clearing thus entails a higher level of total collateral and lower risks. However, the costs to clearing members may increase, which entails a potential efficiency loss.

STOCKHOLMSBÖRSEN'S RISK MANAGEMENT

As a central counterparty Stockholmsbörsen takes risks. The company has a special risk management department with three main tasks. The first is to examine whether new counterparties in derivatives clearing

39 However, Stockholmsbörsen has the right to find out an end-customer's identity in order to safeguard its rights, for instance, if there is a risk that the end-customer will not meet its commitments.

can meet the requirements made by Stockholmsbörsen. In those cases where counterparties remain anonymous to Stockholmsbörsen, the assessment is delegated to an intermediary. After a participant has been accepted, there is regular monitoring to ensure the participant continues to meet the requirements.

The second main task of the risk management department is to set risk limits for each individual counterparty. The exposure caused by each participant is calculated and compared with the risk limit at least once an hour during the day. If any counterparty's exposures were to exceed its risk limit, the risk management department would intervene. The first remedy is for the counterparty to reduce its exposure. If that does not work, the department can demand more collateral.

The third main task of the risk management department is to calculate each individual participant's collateral requirement. This collateral is calculated as follows. The calculation is based on the participant's current portfolio, with a calculation of how the value of this portfolio would have looked each day over the past two years on the basis of historical market prices prevailing at the time. The focus is on the days the portfolio would have shown a loss. Losses are calculated with a two-day horizon. This is the time Stockholmsbörsen would require to settle the counterparty's position. The participant must provide collateral, the value of which after a reduction for Stockholmsbörsen's haircut will cover the fourth largest loss that was calculated.

If the counterparty's collateral should be insufficient in the event of a default, any loss must ultimately be covered by Stockholmsbörsen's own financial resources. Stockholmsbörsen has financial assets earmarked to cover possible losses caused by counterparty exposures corresponding to SEK 1,650 million. Of this, SEK 500 million comprises share capital and reserves[40] while the remaining SEK 1,150 million is provided by insurance policies. The capital is calculated to cover a default by Stockholmsbörsen's five largest counterparties with price fluctuations 1 ½ times the size (for index-linked derivatives, twice the size) of those used to calculate collateral.

THE RIKSBANK'S ASSESSMENT OF STOCKHOLMSBÖRSEN AS A CENTRAL COUNTERPARTY

In spring 2004 the Riksbank made an assessment of Stockholmsbörsen in its function as central counterparty for derivatives clearing.[41] This assessment, which was carried out in accordance with international principles for efficiency and security, was limited to Stockholmsbörsen's clearing of derivative transactions in Sweden. Stockholmsbörsen's other services, including the provision of a market

40 The shareholders' equity can also cover losses arising from operational risks.

41 The Riksbank has earlier made assessments, based on international standards, of the RIX system, BGC and VPC. The complete assessment of Stockholmsbörsen can be viewed on the Riksbank's website www.riksbank.se.

for derivative and spot transactions, have not been assessed.

The assessment is based on the draft for standards for central counterparty clearing produced by CPSS-IOSCO[42] and on the Riksbank's own requirements.

Stockholmsbörsen AB is a subsidiary of OM HEX AB. The OM HEX group offers technological systems for the management of financial transactions through its OM Technology division and financial services in Sweden, Finland and the Baltic countries through its HEX Integrated Markets division. Stockholmsbörsen is part of HEX Integrated Markets. The assessment covered Stockholmsbörsen AB and not the group to which the company belongs, as Stockholmsbörsen AB is the legal counterparty in derivative transactions.

The Riksbank has found that Stockholmsbörsen's derivative clearing essentially fulfils the requirements for central counterparty operations. According to the Riksbank's assessment, Stockholmsbörsen's derivative clearing has a sound and transparent legal basis. The requirements for access to the system are fair and open and make it clear that all who meet the requirements for financial strength, technical systems and administrative conditions can participate.

The management of counterparty risks fulfils the requirements made. Stockholmsbörsen's counterparties are protected against settlement risks in that Stockholmsbörsen uses the Riksbank's RIX system to settle payments[43] and the VPC system for delivering securities, and these systems live up to international standards.

Stockholmsbörsen's technical systems have a high level of security. Measured over the year 2003 as a whole, availability was 99.97 per cent during the opening hours of 8 a.m. to 6 p.m. Stockholmsbörsen has a business continuity plan for managing disruptions to these technical systems and a reserve site that can take over from the main system if necessary. However, the Riksbank considers that Stockholmsbörsen should test its business continuity plan in a scenario where both sites fail to function.

It is important for a CCP to be transparent, as the counterparties can have substantial exposures towards the CCP. It is important that the relevant information for assessing various financial risks is easily available to both existing and potential customers. The Riksbank's assessment is that the need for transparency is particularly acute for a central counterparty like Stockholmsbörsen, which has a direct relationship to end-customers, some of whom are not professional agents.

Stockholmsbörsen achieves a high degree of transparency by clearly describing its risk management on its website, where it also publishes its regulations, an outline of its services as central counterparty and provides information on its organisation, results, and so on. However, the Riksbank considers that an even higher degree

42 The Committee on Payment and Settlement Systems and Technical Committee of the International Organisation of Securities Commissions, Recommendations for Central Counterparties Consultative Report, March 2004. The Riksbank intends to update the assessment after these international standards have been officially adopted.

43 Approximately 10 per cent of the total value of Stockholmsbörsen's payments is made in Denmark and Norway. Stockholmsbörsen uses a bank to manage these payments in the Danish and Norwegian RTGS systems.

of transparency is desirable. This would entail providing a more detailed description of Stockholmsbörsen's organisation and its legal relationship to its owners and other companies in the same group, as well as more quantitative data on the company's commitments and on its derivative clearing operations.

The pricing of Stockholmsbörsen's services for derivative clearing indicates that there is some competition. In February 2001, Stockholmsbörsen reduced the prices of all of its derivative products by 40 per cent as a result of competition from OTC trading and derivatives trading in Eurex. Despite this competition, the participants have no other option than Stockholmsbörsen for clearing of Swedish derivative instruments. Although there is a high level of customer satisfaction, the Riksbank's assessment is that there is scope to improve the routines for participants to submit suggestions and complaints and that the following-up of these suggestions and complaints could be more open.

All in all, the Riksbank's assessment is that Stockholmsbörsen's derivative clearing essentially meets the requirements made by CPSS-IOSCO and the Riksbank for organisations acting as central counterparties. The points where the Riksbank sees possibilities for improvement can be relatively easily dealt with.

The cooperation between OM HEX and VPC

At the end of April, VPC AB and OM HEX AB announced that they had reached agreement on creating a joint Finnish-Swedish organisation, NCSD (Nordic Central Securities Depository), for clearing and settling securities. This is achieved through a merger of the Swedish VPC and its Finnish equivalent, APK, which after a merger between OM and HEX became a subsidiary of OM HEX. [44]

An economic assessment of the consequences of various forms of cooperation and merger must weigh up on the one side the potential gains that can be achieved relatively quickly by utilising economies of scale and better risk management against on the other side, the risk of a lack of competition and its possible consequences in terms of reduced efficiency and poorer risk management in the slightly longer term.

The Riksbank considers this structural deal to be positive for three reasons. Firstly, the agreement creates conditions for making better use of the economies of scale available in both the registering of securities ownership and the clearing and settlement activities. It should thereby be possible to reduce the costs arising after a security transaction has been matched in the market. The cooperation entails a form of horizontal integration. However, the large efficiency gains from this integration only arise when a joint system technology platform can be used. It is therefore positive that the parties have agreed in their letter of intent to introduce this type of uniform platform, in close collaboration with market participants.

44 In formal terms, VPC buys Finnish APK. VPC is paying the purchase price by offering cash and new shares of its own so that OM HEX will own just under 20 per cent of VPC.

Secondly, the structural deal should also increase the opportunities for making the clearing and settlement process more efficient in general. As Stockholmsbörsen, through OM HEX, will obtain closer cooperation with the parts of the infrastructure responsible for clearing and settlement of securities in Sweden, this will increase the probability of future integration of the various securities trading systems. This type of integration would mean that a transaction could be processed directly from the trading platform via clearing to settlement, what is known as straight through processing, STP. It could reduce the time from trade to settlement and thereby both reduce risks in securities settlement and increase market efficiency. Once again, it is important that the systems are integrated to take advantage of all of the potential efficiency gains. Cooperation and co-ownership are only the first stage in achieving the potential risk reductions and efficiency gains.

Thirdly, the cooperation will probably bring up the issue of the introduction of a CCP for spot trading in the Swedish securities markets, as a complement to the CCP services offered by Stockholmsbörsen in Swedish derivatives trading. The Nordic countries are almost the only western European countries that have not yet introduced central counterparty clearing for trading in equity and debt securities. A CCP in the Swedish securities market would have the same positive (and negative) effects as the already established counterparty in the derivatives market. The replacement cost risks and liquidity risks the brokers currently have against one another would disappear. Although these are shorter in securities trading than in the derivatives market, they last for three days, that is to say, the time from the completion of a trade in the marketplace until settlement is complete. The brokers instead have only settlement risks toward the CCP. However, the total risks in the system are reduced, as a large part of the risks can be eliminated through netting.

A CCP probably also leads to a more efficient market, as the costs of assessing different counterparties are reduced and as a CCP facilitates anonymous trading. In addition, the CCP system has become a standard in well-developed securities markets. The cooperation between VPC and OM HEX also makes it possible to create a joint CCP for securities and derivatives trading. This improves the scope for efficient risk management between the two markets. Many of the positions investors take in the derivatives market are hedged on the securities markets. A CCP function that includes both of these markets would probably reduce the collateral requirements. A lower collateral requirement would lead to lower costs and thereby increased efficiency.

While the cooperation between VPC and OM HEX enables solutions with lower settlement risks, increased efficiency in the markets and new development potential, there are also disadvantages. As with all forms of cooperation between commercial parties, there is a risk that competition will decline. Given the dominant position held by VPC and OM HEX in the Swedish capital market, it is important, from

an economic perspective, to ensure that they do not use this position improperly, for instance, through distorted pricing or by limiting competition from new operators. Both a potential future vertical integration and the possible introduction of a CCP also lead to risks of market concentration.

All in all, the new cooperation provides scope to develop the Swedish and Nordic infrastructure in a positive direction. It remains to be seen whether this scope will be realised.

The RIX system

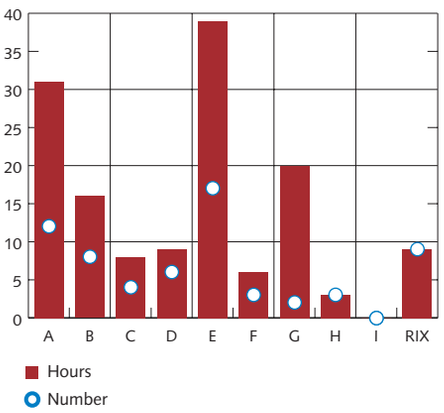
AVAILABILITY

The RIX system, which is owned and operated by the Riksbank, is the hub of the central payment system. Many payments made through RIX are time critical, i.e. it is important that the recipient receives them immediately. RIX is therefore a real-time system. This means that debiting of the sender's account and crediting of the recipient's account occur immediately. In turn, this means that an institution's potential inability to pay could spread rapidly to other banks in the form of liquidity problems. Large amounts pass through RIX every day, on their way to and from banks and clearing organisations. During 2003, the turnover in RIX corresponded to 46 times the entire Swedish gross domestic product, GDP. The size of the payments means that any liquidity problems could have serious consequences for the economy as a whole. It may suffice for one participant to suffer a technical disruption that prevents it from sending off payments in order for other participants to suffer liquidity strain.[45] The Riksbank therefore regularly monitors the availability of the RIX system and its participants. This section analyses some of the availability figures the Riksbank has collected.

In addition to the Riksbank, there are nine participants in RIX whose functioning is particularly important. These are the four large commercial banks, the four clearing organisations – CLS, VPC, Stockholmsbörsen and BGC – and the Swedish National Debt Office. An analysis of the payment flows within RIX during December 2003 shows that the four major banks play important roles in almost all payment categories. CLS accounts for a significant percentage of the foreign exchange transactions. Three of the four major banks are direct participants in CLS and have an additional responsibility, if payment problems should arise, to provide this system with liquidity in kronor. A further dimension of CLS is that a potential disruption could spread both from Sweden out into the world and from foreign payment

45 One example of this type of serious technical disruption that occurred in 2003 was when one participant, participant A, suffered a shutdown and could not send any payments. When the other participants continued to send their payments, the liquidity gathered in participant A's Riksbank account. This liquidity would otherwise have been returned to the system through outgoing payments by participant A. Now the others were forced to provide more liquidity than usual to the system. A participant can counteract this problem by introduction a "stop receiving" instruction in consultation with the Riksbank. However, in this case the participant did not send such an instruction and the disruption was therefore more serious than it should have been.

Figure 4:1. Number of disruptions and hours' stoppage for the nine most important participants in RIX during the period April 2003 to March 2004.



Source: The Riksbank.

systems into the Swedish system. VPC and Stockholmsbörsen manage clearing from trade in financial instruments. The payments arising as a result of this trading go from VPC and Stockholmsbörsen for settlement in RIX. The major banks also account for a significant percentage of the trade in securities and derivatives. In addition, most brokers must ultimately use a settlement bank to receive or send the payments arising in securities trading. The four major commercial banks' share of these payments is between 83 and 97 per cent, depending on the type of transaction. The Swedish National Debt Office is important because of its role as issuer and redeemer of government securities.

Figure 4:1 gives an account of the number of disruptions and the total number of hours these disruptions amounted to for the nine participants during the past four quarters. It is important to emphasise that both the Riksbank and the individual participants have emergency routines for circumventing various types of problem. In extreme cases the Riksbank can operate RIX from a reserve site.

During the period observed, from April 2003 to March 2004, RIX suffered stoppages on nine occasions and during a period of time totalling nine hours.[46] This corresponds to an availability figure of 99.7 per cent, which can be compared with the Riksbank's deliberately high target of 99.9 per cent.[47] Two of the most important participants stand out in hours of stoppage. One of them had an unusually high amount of technical disruptions, 17 in total, which also leads to a large number of hours of down time. The availability for this participant was therefore lower than 99 per cent during the period. While the other participant had twelve disruptions, the stoppage time was 30 hours, which is an unusually high figure.

The disruptions can have differing natures. During the period concerned, two types of disruption were dominant. One was problems with communications between participants and the system. The other was computer problems, mainly software problems. The problem with communications in the system was usually due to faults at the participant's end. In some cases the problem originated with SWIFT, which supplies the communication of payment orders. RIX, like its participants, has efficient emergency routines for communication. There was therefore no disturbance caused by these problems. However, the disruptions originating with SWIFT are more serious, as they affect all of the participants. In addition, they create uncertainty over the reliability of the system. SWIFT also has emergency routines for maintaining communication, but problems can nevertheless arise. For instance, on 26 November 2003 there was a global disruption in the SWIFT traffic.

Disruptions related to computer problems often arise with changes to, or updates in, system software. For instance, it was an update to the RIX software that caused the three disruptions in RIX during the second half of December 2003. Improved tests and

46 Three of these stoppages were caused by SWIFT.
47 Although the targets are not directly comparable, it is worth mentioning that the corresponding target figure for TARGET is 99.4 per cent.

routines for implementing changes could reduce the number of software problems. Problems with software have affected most of the participants in RIX as well as the actual RIX system and attached payment systems. An important vulnerability aspect is that many participants use software from the same suppliers. A fault in one such software program risks creating simultaneous disruptions among a large number of participants. It is therefore important that these problems are discussed openly with the aim of limiting both the number of disruptions and their duration.

At present, there is no common view and aim with regard to all participants' availability in the system. Given the mutual dependence in the RIX central payment system, there is motivation to make a joint effort. There should be quantified targets not only for the actual RIX system, but also for the other participants' availability. These requirements should reflect the participants' significance in the payment system. A reasonable starting point would be that the availability requirement for the nine most significant participants should not deviate significantly from the requirements made of the RIX system. Other participants could have slightly lower requirements.

THE FUTURE RIX SYSTEM

During 2001 and 2002 the Riksbank, together with the Swedish Bankers' Association, the clearing organisations and the major banks, made an analysis of how the future payment system should be organised.[48] This analysis work was put on hold in autumn 2002 prior to the decision on potential participation in the monetary union, which was to be made through a referendum in autumn 2003. Swedish participation in the monetary union, together with the discussions at the time on the future of TARGET, had considerable influence on the choice of future solution for the Swedish central payment system. The result of the referendum, that Sweden would not fully participate in Stage Three of EMU, meant that there would still be a need for a central payment system for Swedish kronor.

The present RIX system was originally developed in the late 1980s. The system is based on a now relatively expensive technical structure, where the fixed costs are high. Settlement in euro, which is also possible in RIX, will in the long-term be concentrated to the new TARGET system. At the same time, the Riksbank is choosing other technical structures for its other IT operations. This development means that a much greater percentage of the Riksbank's costs in this field will be carried by the payment system for kronor. Forecasts indicate that the costs could triple within a few years. As full cost coverage is an ambition in international standards, the increased costs could lead to higher charges in future. From an efficiency perspective, it is also important to find solutions for the settlement of payments that do not entail unnecessarily high costs for the participants. The Riksbank and

48 See Financial Stability Report 2002:1.

the participants in the RIX system agree that measures need to be taken to counteract higher charges, as there is otherwise a risk that large sections of the payment flows will be settled in a cheaper way that would entail greater risks.

The Riksbank's assessment came to the conclusion that the most beneficial solution would be to replace the current RIX system. The most important starting point for the Riksbank is that there is a central payment system and that this system is used in a way that avoids the systemic risks that could otherwise occur. Moreover, the Riksbank is the only institution that can supply accounts and liquidity for settlement without any credit or liquidity risks. It is therefore natural that settlement of these critical payments should be made through accounts with the Riksbank. On the other hand, it is not necessary that the Riksbank should itself develop and operate the actual system.

Given these starting points, the Riksbank made a decision at the end of April that a public procurement procedure should be carried out for a new system. This would cover both the individual system and the system and its technical operation. The new system could be operated by a party other than the Riksbank, unless costs and security reasons require in-house operation. The target is to be able to launch a new system in 2006. The continued project will be run in close cooperation with the participants in RIX.

CASH card to be phased out

In 1998 the CASH system was launched, as the first Swedish e-money system. It entailed a prepaid value being stored on a microprocessor embedded in the CASH card. Both the terminal costs and transaction costs are lower than for other forms of card, as the payments do not require real-time communication between the point of sale terminal and the card-issuing bank. The money is contained in the card. The intention was thus that the CASH card would replace banknotes and coins for transactions entailing small amounts made at small points of sale.

However, this new instrument of payment enjoyed little success among Swedish consumers. The number of transactions has actually declined in recent years, from 2.9 million in 2000, to 0.9 million in 2002. In January 2004, the Swedish Cash Association, which consists of Nordea, SEB and Föreningssparbanken, therefore announced that the CASH system would be wound up during the year.

Why has the CASH card had so little success in the Swedish payment market? E-money has also received a cool reception in the other Nordic countries, as well as some other countries in Europe. However, e-money has achieved greater acceptance in Belgium, the Netherlands and Luxembourg. In these countries, the number of transactions is between 15 and 30 a day per thousand inhabitants, which can be compared with the corresponding figure of between 0.3 and 3.9 in the Nordic countries. Moreover, the use of e-money has grown rapidly over the past 3-4 years in these countries, by 330 per cent in Belgium, 412 per cent in the Netherlands and 985 per cent in Luxembourg. Outside of Europe, one country that uses e-money to a large degree is Singapore.

It appears that the use of e-money never achieved sufficient critical mass in Sweden. Like other instruments of payment, e-money is characterised by network effects. This means that the number of CASH card terminals affects the usefulness for the user. The more terminals that are installed, the more useful the card becomes and the more interesting it becomes to further increase the spread of the system. Network effects lead to new instruments of payment often requiring a long period of time to become established in the market. When a sufficiently large market has been established, and critical mass achieved, the use of the new instrument often increases rapidly. If critical mass is not achieved after a period of time, there is considerable risk that no market will be established. It is easier to achieve critical mass if the number of cards and the number of terminals grow at the same pace, which is why the various card issuers should cooperate to establish common standards.

Table B2 compares the use of e-money in some other European countries with the use of closely-related payment substitutes, such as cash and card payments.

Table B2. Use of e-money systems in various countries in 2002. Comparison with card and cash use.

Year 2002	Number of transactions per day and per thousand inhabitants	Number of terminals per thousand inhabitants	M0/GDP	Number of card transactions per year and per person
Sweden	0.3	4.6	4.1 %	66
Denmark	3.9	0.3	2.9 %	94
Finland	0.5	1.1	1.8 %	94
Switzerland	7.5	4.6	8.7 %	42
Belgium	29.1	10.9	2.8 %	58
Luxembourg	17.3	16.1	1.8 %	74
France	1.6	1.6	2.0 %	67
Germany	1.3	1.6	3.3 %	24
Netherlands	14.8	10.2	2.1 %	69
Singapore	28.23	10.0	8.2 %	21

Sources: BIS Survey on e-money developments 2004, Blue Book 2004. Red Book 2003. For the euro countries the data on M0/GDP is from the year 2001. The data on card payments per person for Singapore applies to the year 2000 and is obtained from Payment systems in Singapore, Nov. 2001. Singapore's data on M0 and GDP was obtained from the IMF International Financial Statistics Year Book, 2003.

The table shows a positive correlation between the number of terminals accepting electronic money and the number of transactions per day. This is natural, but cannot be regarded as the entire explanation for the differences in the success of e-money. In Sweden there is a relatively large number of terminals, but the number of transactions has still been small.

The issuing Swedish banks have cooperated

with regard to infrastructure and standards. The CASH system technology is common to all of the three issuing banks. Loading and point-of-sale terminals accept all CASH cards, regardless of which bank has issued them. Shortly after the launch, some retail trade organisations complained about the pricing, particularly the distribution of costs and charges between banks and shops. Some of the banks therefore changed their price structure and introduced a period with no charges for the shops. The aim was to increase acceptance among the shops and thus increase the utility for cardholders. The establishment of terminals proceeded relatively quickly after this. In 2001, only three years after the launch, the number of terminals was 47,000, which is more than half of the number of terminals accepting ordinary card payments. That same year, there were half a million CASH cards in circulation. Despite this, the card was not used.

Several countries with a high level of use of e-money have a relatively low level of use of cash, when measured as M0 in relation to GDP. This is not surprising as e-money replaces cash. However, there are countries where e-money has not gained acceptance, but where cash use is at a low level. Finland and Denmark are both examples of this phenomenon.

Could the differences in usage be explained by use of credit and debit cards being so widespread that CASH no longer has any business potential? This does not appear to be the case. In the Benelux countries, usage of other charge cards is lower than in Denmark and Finland, although it is higher than in Sweden.

Another possible explanation could be prices of cash withdrawals in relation to the CASH card charge. In Sweden, cash withdrawals are free of charge for the general public, while the CASH card entails an annual charge. In many European countries there are charges for cash withdrawals. However, this explanation also has certain shortcomings. In Belgium and the Netherlands, where e-money is used to a relatively high degree, cash withdrawals are free of charge.

The success of e-money in Singapore is perhaps due to the possibility of using the card for payments over the Internet, where there is no suitable substitution. The card can also be reloaded over the Internet. Singapore is the only country where that is possible.

There is therefore no clear-cut explanation as to why e-money appears to have been accepted in some countries but not in others.

However, the examples above indicate two important factors. Firstly, network effects appear to be important. The infrastructure should be extended at the same rate as the instrument of payment. Secondly, the availability of substitutes is possibly an important factor. If e-money can be used where other instruments of payment cannot be used, its power of penetration will probably increase.

PART 2. ARTICLES

Swedish households' indebtedness and ability to service debt – an analysis of household data

Despite the sharp expansion in credit to households over a number of years there is not judged to be any considerable risks to banks at the aggregate level. This article analyses the indebtedness and ability to service debt of individual indebted households to ascertain whether this leads to a different conclusion regarding the household sector as a whole. The conclusion is the same. The indebted households appear to have financial buffers that protect them against fairly sharp changes in interest costs and employment income. Consequently, households are not in a position to cause the banks such losses that would threaten stability in the payment system.

As in many other countries the debt burden of Swedish households has risen since the mid-1990s.[49] Household debt in relation to disposable income has therefore returned to the levels seen before the banking crisis at the beginning of the 1990s. The Riksbank's stability assessment concludes that this indebtedness in the household sector as a whole does not constitute a risk for the banks, as the interest costs on the loans comprise a relatively small fraction of the households' disposable income. Although the interest burden is low at aggregate level, there may be groups of households with a high interest burden and small financial margins which could probably be hit harder by increased interest costs or lower income. Consequently, this article also studies the indebtedness and ability to service debt of individual indebted households in order to see whether this changes the overall picture. Do the risks of loan losses from household lending appear higher when taking account of what margins the indebted households have for meeting cost increases and an unexpected loss of income, or do the conclusions in question hold for the household sector as a whole?

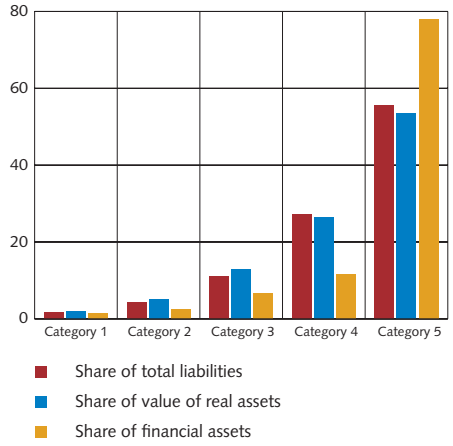
The analysis has been performed on the basis of wealth and income data from Statistics Sweden for Swedish households for the years 2000 and 2001.[50] More recent data is unfortunately not available. The article begins with a description of the current debt distribution and ability to service debt among Swedish households. This is followed by a discussion of the possible effects on the ability to service debt of, firstly, a rise in interest rates and, secondly, a loss of income due to increased unemployment. To get an idea of households' vulnerability at present, their indebtedness and ability to service debt is calculated with the aid of changes in interest rates, disposable income and indebtedness at aggregate level. Finally, the article discusses some conclusions for financial stability.

The situation in recent years has not only raised the question of what the sharp expansion in credit could entail for financial stability,

49 See the box on page 15 in this Report for a comparison of indebtedness in a number of selected countries, as well as the chapter on Swedish households on page 25 for a discussion of indebtedness and the ability to service debt at macro level in the household sector.

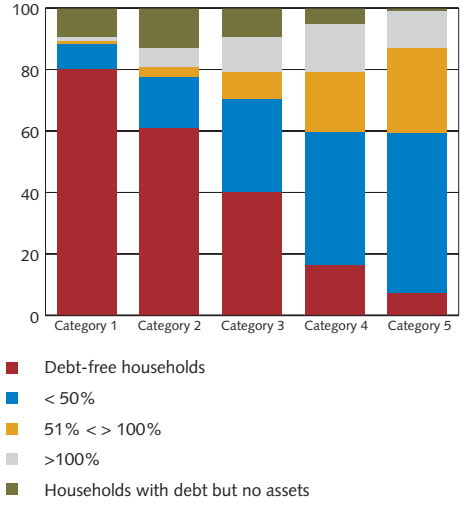
50 Statistics Sweden's HINK/HEK survey, which covers 17,000 households in the respective years.

Figure 1. Assets and liabilities of different income categories in 2001.
Per cent



Sources: Statistics Sweden and the Riksbank.

Figure 2. Indebtedness in each income category in 2001.
Percentage shares



Note. The Figure shows the proportion of debt-free households and the proportion of households with different indebtedness (debt as a percentage of total assets) in the respective income categories.

Sources: Statistics Sweden and the Riksbank.

but also how economic growth could be affected if this development was to be broken. However, the article focuses on the direct stability aspects of the debt situation and leaves any demand effects open.

Indebtedness and the ability to service debt

To analyse households' indebtedness and ability to service debt, the households in question have been divided into five equally large categories according to the level of their disposable income.

DISTRIBUTION OF ASSETS AND LIABILITIES

In total, liabilities constitute just less than 50 per cent of the value of total assets. The most heavily indebted households are also those that hold the majority of the assets. According to the statistics, the lowest income category (category 1) accounts for less than 2 per cent of both the total value of real and financial assets and of the total outstanding debt stock (see Figure 1).[51] The households in the highest income category (category 5) account for more than 55 per cent of the total debt stock. A large proportion of the loans are used to finance housing purchases, as indicated by the fact that this income category owns more than half of the total value of owner-occupied and tenant-owned dwellings. The value of these is twice that of the liabilities. The households in the highest income categories also own close to 80 per cent of the financial assets. The value of these amounts to just over one-third of the liabilities.

The differences in indebtedness and asset holdings are large not only across the different income categories, but also within them. The most heterogeneous group is category 1, where there are sizable deviations between individuals both as regards assets and liabilities. This group is difficult to distinguish since it consists of individuals with very different finances and life situations. The statistics show that a major part of these households or individuals have neither employment income nor assets or liabilities. Less than 20 per cent of the households in this category have debts. In the highest income category more than 90 per cent of the households are indebted and practically all the households also have financial and real assets.

That the debts are largely accounted for by holders of real assets is positive from a lender perspective, since lenders thus have collateral to cover the larger part of the loans. In the majority of the indebted households the real and financial assets exceed the liabilities. This net wealth is also largest in the highest income categories (see Figure 2).

HOUSEHOLDS' ABILITY TO SERVICE DEBT

Should interest costs rise unexpectedly or income decrease,

51 Total assets include households' financial assets including insurance saving, and the market value of owner-occupied and tenant-owned dwellings and secondary dwellings. Other items are rental property, agricultural property and other property including building sites.

households have the possibility to realise any assets they may have. Financial assets are relatively easy to realise and can therefore serve as a financial buffer in the shorter term. Real assets can be seen as a buffer for the longer term as households, for example, can choose less expensive housing. A study of households' ability to service debt requires not only an idea of their asset holdings but also of the size of their income and how large a proportion of this income that goes toward interest expenditure. Table 1 shows the indebted households' financial situation in 2000 and 2001.

Table 1. Indebted households' financial situation in 2000 and 2001. Median values (average in parentheses), SEK thousand and per cent

2000	Category 1	Cat. 2	Cat. 3	Cat. 4	Cat. 5
Disposable income (SEK thousand)	66 (60)	119 (118)	178 (177)	271 (268)	378 (431)
Debt (SEK thousand)	21 (126)	44 (132)	91 (192)	268 (376)	519 (672)
Financial assets (SEK thousand)	0 (92)	0.9 (81)	26 (163)	68 (255)	170 (605)
Real assets (SEK thousand)	0 (358)	0 (280)	210 (437)	583 (770)	1 035 (1 417)
Interest ratio (%)	0.3 (14.8)	1.5 (3.8)	2.5 (4.4)	4.2 (5.4)	5.6 (6.3)
Debt ratio (%)	36 (767)	36 (114)	52 (108)	100 (140)	131 (156)
Indebtedness (%)	394	117	52	49	43
Share of total liabilities (%)	2.0	4.7	10.7	27.5	55.0
Share of total assets (%)	2.4	4.6	11.6	24.3	57.1
2001	**Category 1**	**Cat. 2**	**Cat. 3**	**Cat. 4**	**Cat. 5**
Disposable income (SEK thousand)	70 (64)	126 (125)	188 (188)	286 (283)	402 (445)
Debt (SEK thousand)	12 (116)	50 (141)	113 (224)	277 (403)	566 (750)
Financial assets (SEK thousand)	0 (102)	1.3 (74)	30 (163)	68 (220)	171 (586)
Real assets (SEK thousand)	0 (280)	0 (309)	287 (500)	614 (842)	1 125 (1 517)
Interest ratio (%)	0.2 (7.0)	1.8 (3.9)	2.7 (4.6)	4.1 (5.2)	5.6 (6.3)
Debt ratio (%)	19 (330)	40 (112)	60 (118)	99 (142)	133 (166)
Indebtedness (%)	87	94	50	49	45
Share of total liabilities (%)	1.6	4.4	11.0	27.1	55.8
Share of total assets (%)	1.7	3.9	10.1	20.7	63.5
Interest cost after tax (SEK thousand)	0.2 (2.5)	2.2 (4.9)	5.1 (8.8)	11.5 (14.7)	23.5 (27.6)

Note. Indebtedness here shows the share of total assets comprised by debt.

In order to get an idea of households' vulnerability to changes in income or expenditure, their financial margins have been calculated, in other words the households' post-tax income after interest expenditure and other regular living costs have been paid (see Table 2). The living costs have been based on calculations by the Swedish Consumer Agency.[52]

52 Households' budget has been estimated by matching family composition with the Swedish Consumer Agency's calculations for living costs as presented in its publication *Koll på pengarna 2004*. When lending to households, banks generally prepare financial estimates for which they usually use the Agency's guidelines, or variations of them, so as to establish the borrowing costs that households can bear.

Table 2. Proportion of households with no financial margins. Per cent in 2001

2001	Category 1	Cat. 2	Cat. 3	Cat. 4	Cat. 5
Households without margins, (%)	20	4.7	1.1	0.0	0.0
Indebted households without margins (%)	100	19	3.3	0.3	0.0
Total proportion of indebted households (%)	20	40	60	83	92
Proportion of total debt (%)	1.6	4.4	11	27	56

The analysis of the ability to service debt becomes somewhat simplified since it can be more difficult in reality for a household to realise its assets or to adapt to lower financial margins. A high-income household is likely to have higher day-to-day expenses than those costs specified here, which means that the margin is overestimated. Correspondingly, the regular living costs have probably been overestimated for many of the households with very low incomes.

The households with the largest debt (category 5) had a median income of SEK 402,000 in 2001, in other words a monthly income after tax of just over SEK 33,000. Their post-tax interest costs totalled just less than SEK 2,000 a month. Thus, the households in this category had wide margins once interest and other regular living costs had been paid. None of the households in this category lacked financial margins according to the definition used here. They also owned a substantial share of the financial and real assets. In 2001 the value of their real assets was twice as high as the households' debt in this category.

Also in the next highest income category, which accounts for just over 25 per cent of the loans, the risk of default is judged to be low. In category 4 the median post-tax income was SEK 286,000, or just less than SEK 24,000 a month. As interest costs amounted to around SEK 1,000 a month the margins were good in this household group as well. A very small proportion of the indebted households in category 4 had no financial margins in 2001. This category also had a buffer in the form of real and financial assets.

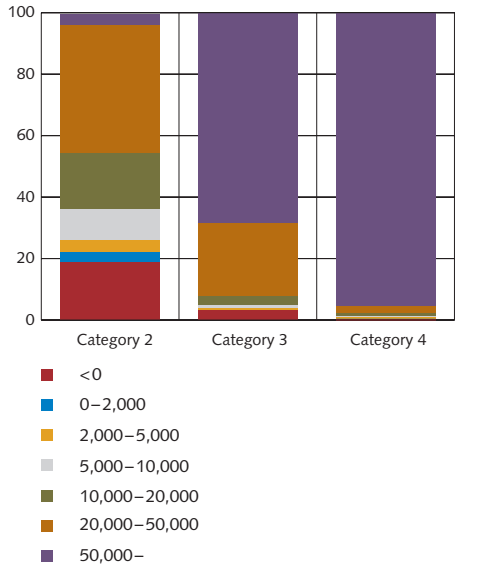
The middle income category is the group that appears to have increased its debt most over the two years. One conceivable explanation is that it is these households that have previously been constrained in their ability to borrow. Due to lower interest rates banks have been able to grant additional loans to these households, given that the financial margin requirement has been the same. Higher-income households have most likely not been as restricted, but have been able to borrow the desired amounts previously as well. Just over 10 per cent of the loans are accounted for by category 3. The median income in this group was SEK 188,000 in 2001, or just less than SEK 16,000 a month after tax. At the same time post-tax interest costs amounted to just over SEK 400 a month. The percentage of indebted households with no financial margins was comparatively low. The households in this income category also had a certain buffer in the form of financial and real assets.

It is mainly the households in category 2 that can be viewed as potentially vulnerable. The median household had an annual income of SEK 126,000 in 2001, or just over SEK 10,000 a month after tax. Their monthly interest costs totalled a little less than SEK 200. Calculations of their margins show that almost 20 per cent of the households in this category did not have any income left on which to live once interest and other regular living costs had been paid.

Figure 3 shows how the percentage of indebted households without financial margins changes according as their expenses increase. This gives an idea of their vulnerability.

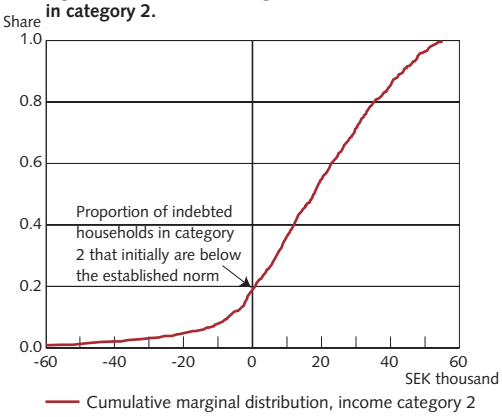
A markedly large proportion of the households, notably in category 2, had small financial margins in 2001 and were thereby sensitive to increased costs. Were the households' expenses to rise by SEK 1,000 a month, as many as one-third of the households in category 2 would fall below the estimated margin. Figure 4 shows how the households in this income category would be affected by a deterioration in their budget, per decrease by SEK 1,000. Zero on the horizontal scale indicates the point at which the indebted households are exactly at their estimated margin. The percentage of households without margins grows relatively quickly according as their costs increase or their income decreases.

Figure 3. Percentage of indebted households in various income categories with different financial margins. Per cent



Source: The Riksbank.

Figure 4. Tolerance to rising costs or loss of income in category 2.



Source: The Riksbank.

How is the ability to service debt affected by macroeconomic changes?

In the event of a marked deterioration in the ability to pay of weak households with small margins, due for example to higher interest rates or increased unemployment, the households could encounter difficulties in servicing their debt, and banks' credit risks would rise. This section shows how the ability to service debt and the risk of loan losses are affected by a rise in the interest rate and unemployment, respectively, with the aid of partial calculations. The ability to service debt is tested with the assumption that the interest rate is raised by 1 and 4 percentage points, respectively, and that unemployment increases by 1 to 3 percentage points.

The effects that are studied are the impact on the households' interest ratio, the change in the proportion of vulnerable households – that is those households without financial margins - and the impact on banks' exposure to this group. The households' sensitivity is shown by how the proportion of vulnerable households changes after a deterioration in the households' finances. The fraction of the households' total loans that can be attributed to these vulnerable households can be seen as a measure of increased credit risk in lending. Initially the interest ratio is just over 5 per cent. A little less than 10 per cent of all indebted households can be described as vulnerable, that is they have no financial margins for increased costs in the initial position (see Table 3).

It should be pointed out that this kind of partial calculation does not take account of dynamic effects. Normally interest rates rise in

conjunction with more robust economic activity. Such conditions are also accompanied by stronger household income, but this has not been included in these calculations as income is held constant. Consequently, the effect on the households' ability to service debt is overestimated under the assumption of higher interest rates. Conversely, a rise in unemployment is usually associated with an economic slowdown, which results in a deterioration in income and asset values that is partly compensated for by the fact that interest rates are most likely to fall.

EFFECTS OF RISING INTEREST RATES

How sensitive the households are to changes in the interest rate depends on the fixed-rate terms of their loans. Households with variable-rate loans are affected immediately by a change in rates, while for fixed-rate loans the effect is only felt when the loans are renegotiated. In the following calculations the short-term effects are studied first, in other words given the fixed-rate terms that the Swedish households have on their loans today. This is followed by an analysis of the long-term effects that arise if the change in the interest rate affects the entire stock of debt. All the loans are assumed at that stage to have been renegotiated at the new higher rate.

Table 3. Effects of rising interest rates.

	2001	1 percentage point		4 percentage points	
		Immediate	Full impact	Immediate	Full impact
Int. ratio, average (indebted)	5.2	5.6	5.9	6.9	7.7
Int. ratio, median (indebted)	3.7	4.0	4.2	4.9	5.5
Int. ratio, average (all)	3.3	3.5	3.7	4.3	4.8
(a) Proportion with int. ratio > 10%	14.7	17.3	18.7	25.2	29.6
Percentage of total debt (a)	37.4	41.4	43.6	54.0	60.3
(b) Proportion with int. ratio > 20%	1.8	2.3	2.5	4.3	6.4
Percentage of total debt (b)	6.7	8.4	9.0	15.2	20.2
(c) Percentage with no margin	9.7	9.8	9.9	10.1	10.4
Percentage of total debt (c)	4.7	4.9	5.1	5.7	6.1

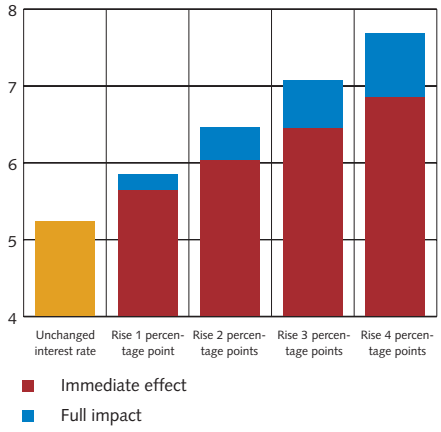
A rise of 1 percentage point in the general level of interest rates would result in an increase in the households' average interest ratio from 5.2 to 5.6 per cent in the short term (see Table 3). The proportion of households below the margin is largely unchanged (9.7 and 9.8 per cent) and thereby also lenders' exposures to this group (4.7 and 4.9 per cent). The credit risk in household lending is thus essentially unchanged.

If the general level of interest rates instead rises by 4 percentage points, the average interest ratio increases by almost 2 percentage points to just below 7 per cent in the short run. But nor does the sharper rise in interest rates affect the proportion of households below the margin to any great extent (9.7 and 10.1 per cent). The banks' exposures increase somewhat more (4.7 and 5.7 per cent), but the percentages are still rather low. One explanation is that the households with tight margins have small loans and low interest costs.

What then is the effect in the longer term, when all loans have been renegotiated at the new, higher interest rate? Here, a rise of 1 percentage point in the general level of interest rates causes the average interest ratio to increase to 5.9 per cent. The proportion of households with no margin still rises marginally (9.7 and 9.9 per cent), as does the banks' exposures to these households (4.7 and 5.1 per cent). In the case of a rise in interest rates of 4 percentage points, the full impact on the interest ratio is an increase of 2.5 percentage points (from 5.2 to 7.7 per cent, see Figure 5). Again the effects are small on the proportion of vulnerable households and the banks' exposures to them (9.7 to 10.4 per cent and 4.7 to 6.1 per cent, respectively).

The conclusion of this exercise is that the households' ability to service debt would not be affected to any great extent by even relatively steep rises in interest rates.

Figure 5. Effects of rising interest rates on the average interest ratio of indebted households in 2001. Per cent



Source: The Riksbank.

EFFECTS OF INCREASED UNEMPLOYMENT

In the event of unemployment a household suffers a loss of income equivalent to the difference between its previous salary and the unemployment benefit it receives from *arbetslöshetskassan*.[53] Could an increase in unemployment affect the risks in household lending in a way that gives cause for concern? In these calculations all gainfully employed persons have been assigned an equally large probability of becoming unemployed, which is likely to mean that the effect is overestimated.[54]

If unemployment rises by 1 percentage point, the interest ratio remains unchanged (see Table 4). The effects on the proportion of vulnerable households and the banks' exposures to them are less than in the case of rising interest rates. Neither do increases in unemployment of 2 and 3 percentage points, respectively, affect the size of the interest ratio. The proportion of vulnerable households rises at most from 9.7 to 9.9 per cent, while the banks' exposures to them increase at the same time from 4.7 to 5.4 per cent.

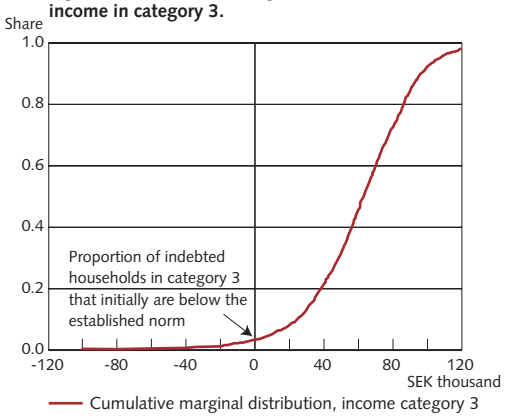
Table 4. Effects of increased unemployment.

	2001	1 percentage point	2 percentage points	3 percentage points
Int. ratio, average (indebted)	5.2	5.2	5.2	5.2
Int. ratio, median (indebted)	3.7	3.8	3.8	3.8
Int. ratio, average (all)	3.3	3.3	3.3	3.3
(a) Proportion with int. ratio > 10%	14.7	14.8	14.9	15.0
Percentage of total debt (a)	37.4	37.5	37.7	37.9
(b) Proportion with int. ratio > 20%	1.8	1.9	1.9	1.9
Percentage of total debt (b)	6.7	6.8	7.0	7.1
(c) Percentage below margin	9.7	9.7	9.8	9.9
Percentage of total debt (c)	4.7	5.3	5.3	5.4

53 Unemployment insurance is constructed in such a way that unemployment benefit is paid at 80 per cent of a worker's pay on income up to approximately SEK 15,000 a month. The loss of income is therefore higher in percentage terms for households with high employment income. For example, individuals with an income above SEK 30,000 a month lose more than half of their post-tax income if they become unemployed while those with an income below the cut-off point lose less than one-fifth of their income after tax (provided that they do not collect supplementary income insurance)

54 The method applied is a Monte Carlo simulation that has been repeated 1,000 times. The average effects have thereafter been calculated.

Figure 6. Tolerance to rising costs or loss of income in category 3.



Source: The Riksbank.

In other words the indebted households' ability to service debt is not particularly sensitive to a change in unemployment. One explanation for this is the composition of the households' debt and income. As stated already the households that have no financial margins or very small margins belong to the lowest income categories. The level of indebtedness was also very limited in these categories.

Figure 6 shows, for example, the distribution of households in category 3, of which only 3 per cent have no margin initially, with regard to income and expenditure. Income can fall by around SEK 25,000 per year before the proportion of households with no margin reaches 10 per cent. Thus, the households in categories 2 and 3 have different conditions on the margin, and the differences are even bigger if these groups are compared with the higher-income categories. Even initially the latter have considerable margins to cope with increases in regular living costs. It is less important, therefore, that their loss of income is relatively larger than in the other groups. The households in the lower-income categories lose a smaller share of their income after becoming unemployed.

Another explanation is that there is a higher number with employment income in the high-income households than in the lower-income categories. 90 per cent of the households in category 5 have two persons with employment income, while the corresponding share in category 2 is only 3 per cent. These factors contribute to the proportion of vulnerable households having risen to such a limited extent in the calculations. That the interest ratio is not affected is partly because the interest rate is held constant in the calculations and partly because the decline in disposable income caused by the rise in unemployment is too small to make any impact on the ratio.

Households' current ability to service debt

So what is the current situation for individual households' ability to service debt? Since 2001 households have continued to borrow at a high rate. The value of real assets has risen, while the value of financial assets has started again to increase after the substantial falls in stock prices. All in all, this situation should if anything have resulted in an improvement in the financial position of the households in the higher-income categories compared with the other categories. In addition the proportion of debt fell in category 1 between 2000 and 2001. If this trend has continued it means that the percentage of vulnerable households has continued to decline. Using the changes that have occurred for the household sector as a whole, the sensitivity of households today to changes in interest rates can be estimated (see Table 5).[55]

55 All households are assumed to have the same development in income and debt, regardless of income category. The households' debt burden and disposable income have been assumed to grow by around 20 and 10 per cent, respectively, during the period from 2001. The proportion of loans that, due to fixed-rate terms, is unaffected by the fall in interest rates during the period is assumed to be 7/10, while the remaining 3/10 are assumed to have adjusted fully. Households' interest costs have been estimated to decrease by about 1 per cent since 2001, taking into account the above assumptions.

Table 5. Effects of rising interest rates on households' interest ratios and on the proportion of vulnerable households and the banks' exposures to them.

	2003/2004	1 percentage point		4 percentage points	
		Immediate	Full impact	Immediate	Full impact
Int. ratio, average (indebted)	4.9	5.1	5.6	6.0	7.7
Int. ratio, median (indebted)	3.5	3.7	4.0	4.3	5.5
Int. ratio, average (all)	3.0	3.2	3.5	3.7	4.8
(a) Proportion with int. ratio > 10%	12.3	14.2	16.7	19.7	29.6
Percentage of total debt (a)	32.1	36.3	40.5	45.4	60.2
(b) Proportion with int. ratio > 20%	1.4	1.7	2.2	2.8	6.3
Percentage of total debt (b)	5.6	6.3	7.9	10.4	20.1
(c) Percentage with no margin	7.1	7.2	7.4	7.5	8.1
Percentage of total debt (c)	3.6	3.7	3.9	4.1	4.7

These calculations show that the initial position is more favourable than in 2001. The interest ratio is somewhat lower, as is the proportion of vulnerable households and the banks' exposures to them. Given the assumption that the composition of the households' income and debt has remained largely unchanged since 2001, the households' ability to service debt has thus improved, in spite of a rise in the debt stock of almost 20 per cent during the same period. A corresponding example with rising unemployment shows also that households appear to be somewhat better equipped to deal with a loss of income today than in 2001. Households' sensitivity to rising interest costs and increasing unemployment should therefore not have increased.

Conclusion

The analysis of individual, indebted households shows that the conclusions drawn regarding the total household sector are the same: the high indebtedness does not pose any appreciable risk to the banks and thereby neither to financial stability.

The majority of the loans are attributable to the highest income categories of those households that also own the real and financial assets. These households have margins left once interest expenses and regular living costs have been paid. The risk that cost increases in the form of higher interest rates would lead to difficulties for many households to service their debt is therefore small. A loss of income following unemployment would indeed greatly reduce the income in this group, but not enough to cause payment difficulties. Since these households also have financial assets and large values in property, the risk of losses in this borrower group is judged to be small.

The most vulnerable households - those that have no margins for unexpected expenses each month - are largely debt-free. All in all, the calculations yield the same results that the recurring assessments at macro level have indicated – that households are not in a position to cause the banks such losses that would threaten financial stability. The high indebtedness, however, could give rise to problems for individual households and even have an impact on consuption and saving, and thereby also on macroeconomic developments. The large margins that households nevertheless appear to have should limit any effects in this regard though. These questions are beyond the scope of this article, however.

Internal rating systems and risk-sensitive capital requirements

In recent years banks have been working to develop their internal rating systems. This work has taken on added significance due to the new capital adequacy regulations (Basel II) , which will partly allow banks to use their internal rating systems to calculate their regulatory capital requirements. By making the capital requirements more risk-sensitive in this way, Basel II aims to improve banks' risk management practices. At the same time the new regulations may entail greater cyclical sensitivity in the capital requirements and pose a challenge to regulators and central banks.

At the centre of the discussion of the possible effects on the banking system of Basel II is banks' internal rating systems, which according to the new regulations shall constitute the basis of the banks' regulatory capital requirements. A new set of regulations is essentially a desirable and positive step, but some problems could arise in conjunction with their implementation. This article aims to discuss these problems and the options available for dealing with them.

The article begins with a description of the development and design of banks' internal rating systems and their role in banks' risk models. This is followed by a description of the potential importance of these systems for banks and credit markets, and the role they are expected to play in the new capital adequacy regulations. The article concludes with a discussion of the possible effects of Basel II on the functioning of the banking system and the challenges faced by supervisors and central banks under the new regime.

Development of internal rating systems

One feature of the credit market is that the available information there is both imperfect and asymmetric. In other words the information on which lenders base their risk assessments is both incomplete and uncertain, as well as unevenly distributed between lenders and borrowers – borrowers usually know more about their own risk than lenders. There is also a conflict of interest between lender and borrower once a loan has been granted. Since the borrower, having been granted the loan, stands to receive all possible additional gains from choosing a riskier strategy, but at most can only lose the capital invested, the borrower has an incentive to increase the risk of the project. This phenomenon is an example of so-called moral hazard.

Imperfect and asymmetric information as well as moral hazard create a need for credit assessment and monitoring of borrowers. Fulfilling this need is one of the banking system's main tasks. By gathering private information and experience from several different credit relationships, banks become experts at assessing and pricing risk.

Particularly during the last two decades advances in IT have enabled banks' credit assessments to be systematised. There are

several driving forces at work here: (i) in order to be fully able to take advantage of the progress within financial theory and new insights into managing portfolio risk, banks have had to systematise and standardise their internal ratings; (ii) external interests, such as supervisory authorities and analysts, have demanded greater transparency and precision in banks' reporting of risks; (iii) the deregulation of the financial markets, and the increase in competition and wave of consolidation that followed, has resulted in larger banks with better opportunities to build, greater needs to use and bigger advantages to be derived from more sophisticated internal reporting systems.

The design of internal rating systems[56]

The primitive predecessor to an internal rating system is a common accounting system that classifies credits as normal or doubtful. The rating in such a system is rather static and reactive. A credit is classed as normal until some event occurs that makes it doubtful. Internal rating systems, however, are considerably more ambitious in terms of precision and time horizon. An internal rating system generally covers all of a bank's credit exposures to companies and institutions.[57] Each borrower or exposure is assigned to a risk class depending on the assessed risk. Usually the system has around ten risk classes although anything from five to almost twenty classes is common. All ratings are followed up regularly and the system keeps a record of all changes over time.

The design of an internal rating system comprises a large number of both operating and analytical aspects. The operating design relates to the organisational *process* for and the *control* of how the risk of credits is classified. Important operating aspects, for example, are where in the organisation the rating is done and established, and how responsibility for monitoring, validation and control is divided in the organisation. The analytical design relates to how risk is *measured* and *assessed*. This includes how loss concepts are defined and measured as well as what methods and models are used to classify and estimate risk. The remainder of this article focuses on the analytical aspects.

The analytical design of rating systems often differs markedly between different banks. Common to the systems, however, is that each credit exposure within a certain risk class is associated with a number of measurable loss concepts. The two concepts that together reflect an exposure's credit risk are the probability that the borrower

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56 This section is based largely on Carey and Tracey, "Credit Risk Rating at Large U.S. Banks", *Federal Reserve Bulletin* November 1998, pp. 897-921, The Basel Committee on Banking Supervision, "Range of Practice in Banks' Internal Ratings Systems", Discussion Paper 2000 and Jacobsson et al. (2003) "Internal Rating Systems, Implied Credit Risk and the Consistency of Banks' Risk Classification Policies", *Sveriges Riksbank Working Paper Series* No 155.

57 Some banks do indeed assign credit ratings to households, but in such cases this is done in separate systems and is based almost entirely on observable criteria. Another question is whether the rating reflects loss characteristics associated with the borrower or with the specific transaction. Both kinds exist. Many banks use a two-dimensional approach whereby the borrower is first assigned a grade given the probability of default and the transaction is thereafter given a rating depending on its specific structure with regard to rights and collateral.

will default or suspend payments (PD) and what fraction of the loan that will be lost in the event of default (LGD).[58] Based on these two parameters, PD and LGD, and the size of the outstanding *exposure at default* (EAD), the statistically *expected loss* (EL) for a certain loan can be calculated.[59] Given the EL and an assumption about the probability distribution, the *unexpected loss* (UL) can also be estimated.

The methods chosen to classify risk and to calculate, in the risk-modelling, the above-mentioned loss parameters – PD, LGD and EAD - have great significance for the measurement result. Of particular importance in this regard is the rating system's sensitivity to (or ability to measure) changes in risk over time. This gives rise to a number of difficult trade-offs, particularly as regards the method and time horizon of the rating, the stability of the risk classes' PDs and the number of risk classes.

METHOD AND TIME HORIZON OF THE RATING

Banks' internal ratings are based both on qualitative and quantitative factors. Important factors include credit history, key financial ratios (for example profitability, debt/equity ratio and interest coverage ratio), industry conditions, the competence of senior management, credit ratings from credit rating agencies and market information (for example equity prices and bond yield spreads). In some banks the rating of risk is based to a high degree on an expert assessment, while in other banks it is based on statistical models.[60] The distinction between the different approaches is not clear-cut, however. Expert-based systems often use quantitative models as a means to support or cross-check the internal expert assessment. Correspondingly, model-based systems often include scope for some elements of expert assessments.

In an expert-based system, internal definitions of risk classes are often formulated in qualitative terms and without strict quantitative guidelines. In a more model-based system, each risk class is instead associated with necessary quantitative conditions for different variables. The choice between an expert- or model-based method is determined partly by corporate culture, but also by the composition of the bank's customers. The expert-based method is often considered to require more resources and is therefore used mainly in the rating of large companies, while the rating of smaller companies tends to be considerably more standardised and model-controlled. This can be compensated for to a certain extent by the fact that the availability

58 A credit or borrower is usually defined as having gone into default when the delay in paying interest or amortization of principal exceeds 45 or 60 days. The fraction of the loss given default depends on factors such as the bank's rights in the event of default, the existence of collateral and guarantees, the bank's internal policies for working with recovery but also current economic conditions.

59 The expected loss is calculated according to the formula: EL = PD x LGD x EAD

60 Examples of models that are based on key financial ratios and credit history are so-called scoring models, e.g. Altman's Z-score model or that used by Swedish credit information agency Upplysningscentralen. An example of a model that uses market information is KMV Moody's Credit Monitor, which is based on the theory of options pricing.

of market information and external credit ratings is often highest for large companies, which can facilitate a model-based rating of risk for these companies as well.

An important question in both a model- and expert-based system is the time horizon of the rating. It is perhaps most straightforward to allow the rating to mirror the borrower's ability to service debt given its current condition. This approach, known as *point-in-time*, assesses the risk that the borrower will default in the near future, usually within one year. A more ambitious but also more demanding approach is to allow the rating to reflect the ability to repay over an entire economic cycle. Such an approach, known as *through-the-cycle*, entails an assessment of the borrower's ability to service debt at the worst point in the economic cycle. Depending on which of these two time horizons is used, the rating system will produce different measurements. With point-in-time rating, the risk measured in a given portfolio will be considerably more sensitive to cyclical changes in risk, rising during downturns and falling during booms. With through-the-cycle rating, however, the risk measured in a portfolio should in principle only change if the long-term conditions for one or more of the companies in question have changed and there is reason to adjust the original ratings.

The choice of time horizon is highly dependent on the purpose of the rating system.[61] Through-the-cycle is an appropriate approach if the rating is intended to support credit and investment decisions. For example, the ratings of the major credit rating agencies aim to mirror credit risk through-the-cycle. Among banks, however, point-in-time rating is more common since this can be a more relevant time horizon if the purpose is to monitor borrowers' credit worthiness so as to be able to take actions, estimate provisions and allocate economic capital. It also happens that the horizon is adapted to the term of a loan, which consequently becomes something of a cross between point-in-time and through-the-cycle. Many banks that strive to rate through-the-cycle also concede that these ratings are not entirely independent of economic fluctuations. In practice, also a long-term rating is often affected by current economic conditions. This is because accounting data and market information by definition are point-in-time and that it is often very difficult in practice, to distinguish cyclical factors from longer-term circumstances. Several empirical studies of cyclical sensitivity in the ratings of credit rating agencies also find a clear relationship between the probability of rating adjustments and economic activity.[62]

STABLE OR VARIABLE PROBABILITIES OF DEFAULT

In the same way that ratings can be affected by the economic cycle, the PD associated with a risk class can be either stable or variable over

61 See Crouhy et al., "Prototype Risk Rating System", *Journal of Banking & Finance* 25, 2001, pp. 47-95.

62 See, for instance, Nickel, Perraudin & Varotto, "Stability of rating transitions", *Bank of England Working Papes Series* 2001 and Caterineu-Rabell et al. "Procyclicality and the new Basel Accord – banks' choice of loan rating system," *Bank of England Working Paper* no 181.

time. With stable PDs, a given risk class is always associated with a certain risk regardless of the economic cycle. When PDs are variable the same risk class will reflect different levels of risk depending on current economic conditions. Most banks strive to keep the PDs of the risk classes stable over time. In practice, however, the stability of the PDs is affected by the availability of data. In order to obtain stable probabilities, historical data are needed, over several business cycles, regarding defaults for each rating. The shorter the historical time frame employed, the more unstable the PDs will be since they are updated as more data become available. And the more unstable the PDs, the more correlated with current economic fluctuations they will be as a result.[63] Longer time series, and therefore stabler PDs, are not always preferable, however. The accuracy of a forward-looking assessment does not necessarily improve the longer the time series used.

One method used by many banks to solve the problem of insufficient historical data is to map their internal rating scales to those of external credit rating agencies and thus make use of the latter's longer historical information. However, there are a number of difficulties with this mapping process. Perhaps the biggest problem is that, particularly outside the US, there are very few small and medium-sized enterprises that have an external credit rating, which means that rating agencies' data will not be representative of many banks' loan portfolios. In practice, therefore, there is a risk that PDs estimated in this way will not give an especially true picture and thereby be unstable.

NUMBER OF RISK CLASSES

The accuracy of risk classification, but also the stability of the borrowers' rating over the business cycle is also affected by the number of risk classes a bank chooses to work with; the fewer risk classes there are, the greater the span of PDs covered by each class, and the more seldom a given change in a borrower's PD will lead to an adjustment of the rating. A change in the number of risk classes also leads to a change in the measured total risk, since the PDs associated with each risk class are influenced by how loans with different degrees of risk are distributed.[64]

SUMMARY

All in all, it is clear that the information given by a rating system is highly dependent on the system's design. Moreover, as a result of practical limitations, banks' rating systems are in fact somewhere in-between the different theoretically refined approaches. Even when the ambition is to rate through-the-cycle and to have stable PDs, both

63 In the final version of Basel II, banks' historical data are required to span at least five years.

64 See, for instance, Carling, Jacobson, Lindé & Roszbach (2002), "Capital Charges under Basel II: Corporate Credit Risk Modelling and the Macro Economy", *Sveriges Riksbank Working Paper Series* No 142.

these 'measures' tend to be somewhat short-sighted and thereby to vary over time. One conclusion is that banks' internal rating systems are cyclically sensitive, albeit to varying degrees. Another conclusion is that it is difficult to interpret changes in a bank's distribution of risk classes, and even more so to compare distributions and changes of risk classes across different banks, without a detailed knowledge of the methods and approaches used.

The value of internal rating systems

An internal rating system is a tool for improving the accuracy of a bank's credit ratings and for making them consistent. By keeping a record of a company's default and rating history, the bank can follow up its ratings and thus create a clearer institutional memory in the organisation. The historical data helps the bank to discover and address systematic rating errors. Having assigned each company an explicit PD the bank can cross-check its rating with external sources. The bank can also continually fine-tune its rating models by finding new relationships between different indicators and the PD.

Besides contributing to enhanced accuracy in credit assessments, internal rating systems should be able to be used in the bank's business activities. As a rating system standardises and gathers information that otherwise is scattered throughout the bank, it can be used to report developments in the risk of its loan portfolio to the management and board of directors. With the aid of this information the bank can then assess return, risk, pricing and strategies in different business areas and customer segments.

An internal rating system also enables a bank to estimate the total expected loss of its loan portfolio, as well as its risk. To this end, however, it is necessary not only to have the information that can be obtained from an internal rating system (PDs and LGDs) but also knowledge of the loans' maturities, the correlation between the risk of different loans and the estimated exposure of the loans at default.

With knowledge of how individual exposures and the covariation of risk between them determine the total portfolio risk, the bank can estimate its economic capital. A bank's economic capital - which until recently was mainly a theoretical concept - can be described as the buffer required against risk, often defined as unexpected losses, given the bank's risk tolerance. The size of the economic capital is thus determined both by the risk in the bank's activities and by what probability the bank will accept of an unexpected loss resulting in insolvency.

All in all the development of internal rating systems, and increasingly precise methods and models for risk measurement, enable banks to produce better credit ratings and allow a more efficient use of capital. This is positive for the economy as a whole since it both can free up capital for other investment and contribute to better investment decisions. Moreover, increased precision in banks' credit

ratings should be able to result in better and more differentiated pricing of credits. [65]

Internal ratings and capital requirements

Due to the pivotal role played by banks in the financial system, bank failures, through their adverse effects on payment systems and lending, are often very costly for the economy as a whole. Since it is not in the interest of private agents to take account of the total economic costs, banks' risk-taking can be excessive from society's perspective. Put differently the capital level that is optimal for a specific bank, its economic capital, may be lower than that which is optimal for the economy as a whole. In other words the bank's tolerance of its own risk of failure is greater than that of society's.

Supervisors have attempted to address this problem by requiring banks to hold a certain minimum level of capital against their risks. Capital requirements have two aims. On the one hand a bank must hold a level of capital that takes account of the total cost of insolvency and that therefore exceeds the bank's optimal economic capital. On the other hand the capital requirement limits shareholders' moral hazard by ensuring that their loss is sufficiently high in the event of failure.

The current capital adequacy regulations, Basel I, were introduced in 1988 with a view to ensuring a sufficiently high minimum level of capital in large, internationally active banks. [66] According to Basel I, banks' capital base may not be less than 8 per cent of their risk-weighted assets. The risk-weighted assets are calculated by dividing all assets into four different classes, with different weights depending on the risk of the asset class. The advantage of Basel I is its simplicity and objectivity. The disadvantage is the very rough division of risk, which reduces the incentive for good risk management, distorts the pricing of risk and enables regulatory arbitrage. As banks have developed their methods for measuring and managing risk, these disadvantages have become increasingly evident. This development has left the regulations behind and made them less effective, mainly in large international banks.

Against this background the Basel Committee has been working for several years to develop a new regulatory framework, Basel II, which is currently planned to come into force at the end of 2006. The point of departure in the design of the new regulations has been to try to capitalise on the progress of the last decade within risk measurement. The amendments to the regulations aim, according to the Basel Committee, to strengthen both banks' and authorities' focus on risk management and to encourage continuous improvements in

65 For a description of how banks' use of imprecise rules of thumb can lead to credit rationing, see Stiglitz & Weiss "Credit Rationing in Markets with Imperfect Information", *American Economic Review*, Vol.71, No 3, pp. 393-410.

66 The international regulations for capital adequacy are developed by the Basel Committee on Banking Supervision. This committee comprises representatives of supervisory authorities and central banks from the G10 countries.

banks' ability to assess risk.[67] This is achieved by partly making the minimum capital requirements much more risk-sensitive, and partly allowing the regulations to encompass not only minimum capital requirements but also principles for how supervisors should regularly appraise banks' capital adequacy and market discipline.

Basel II comprises three pillars: (1) minimum capital requirements; (2) appraisal of banks' own assessment of their total capital requirements; (3) greater market discipline through increased reporting and transparency. Pillar 1 allows banks to choose between two different approaches for calculating minimum capital requirements: the Standardised Approach or the Internal Ratings Based Approach (IRB). The Standardised Approach does not entail any essential departure from Basel I, although the precision in risk weightings has been improved considerably. The IRB Approach, however, involves a fundamental change by allowing minimum capital requirements to be based on banks' internal ratings. In order to obtain supervisors' approval to use the IRB Approach, banks must be able to demonstrate that their internal rating systems are sufficiently effective. Under Pillar 2, banks are required to assess their total capital needs, taking into account factors that are not encompassed by Pillar 1, for example interest rate and concentration risk. This assessment is evaluated by the supervisors, which can, where necessary, adjust the bank's assessed capital requirements. All in all, the IRB Approach entails a closer alignment of the definitions of the regulatory capital requirement and economic capital.

Possible effects of Basel II on the banking system

In May 2004 the central banks and supervisory authorities of the G10 countries agreed upon the final design of Basel II. This is a big step forward that creates conditions for better risk management and capital utilisation in banks. But there are also problems as regards the implementation. Ever since the first draft was published in 1999, Basel II has been a hot topic of discussion among academics, banks and authorities. The main criticism of Basel II falls under two general themes, of which one concerns the risk of increased procyclicality in the banking system and the other has to do with how supervisors, in the practical implementation of Pillars 1 and 2, should exercise their new responsibility for validating internal rating systems and assessing banks' total capital requirements. Both these themes derive from banks' new opportunity under Pillar 1 to use internal rating systems for computing minimum capital requirements.

Should these two challenges – increased procyclicality and more complex capital supervision - not be addressed in the right way by authorities, the positive effects of Basel II may be reduced or not materialise at all.

67 Overview of the New Basel Capital Accord (April 2003). Basel Committee on Banking Supervision.

INCREASED PROCYCLICALITY

Banks' profitability is by nature strongly dependent on economic activity. Income from lending and capital market activities is at its highest during booms while the costs of risk-taking do not often appear until the economy has entered a slump. At the same time banks themselves contribute to economic fluctuations by expanding lending during upswings and shrinking it during slowdowns. There are a number of conceivable reasons for the procyclicality of bank lending: [68]

(1) The financial accelerator that arises as a result of banks lending against assets, where the assets' valuation tends to follow economic activity;

(2) Due to the difficulty economic agents have in predicting changes in systematic risk over time, risk is often overestimated in slowdowns and underestimated in upswings. For each individual bank the rational decision is then to tighten lending during a slowdown and to increase it during an upswing;

(3) Herd mentality in the sense that economic agents copy each other's behaviour. In an uncertain world with imperfect information it can often be a fully rational strategy for individual players to imitate other agents that appear to know what they are doing. Another cause might be that bank managers are assessed relative to one another, which means that it can seem less bad to be one of many that are wrong than to be the only one.

The question now is whether Basel II, through a tighter linking of banks' capital requirements to 'risk-sensitive' internal rating systems, will reinforce procyclicality in the banking system and thereby contribute to sharper economic fluctuations. The source of increased procyclicality would be the difficulty involved in rating, like in risk assessment in general, to predict changes in risk over time. As indicated above, ratings tend to vary with the cycle even when the ambition is to rate through-the-cycle. [69] This could thus lead to sharp fluctuations in banks' risk-weighted assets over a business cycle, which in turn would result in more cyclically sensitive capital requirements. As the capital requirements affect banks' lending capacity, this would increase the cyclical component in the credit supply, with the result that the fluctuations in economic activity would be amplified further.

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68 See, for instance, Borio, Furfine & Lowe, "Procyclicality of the Financial System and Financial Stability: Issues and Policy Options", *BIS Papers* No 1 2001.

69 However, the very fact that capital requirements will depend on internal ratings may lead to a situation where banks' ratings will be much less sensitive to economic fluctuations than those of credit rating agencies. The pressure to change ratings for "problem companies" can be much greater at credit rating agencies than at banks.

There is no doubt that risk-sensitive capital requirements will vary considerably more with the economic cycle than today's almost static capital requirements. The only way that economic activity affects the capital requirement in Basel I is if the bank incurs losses, thus causing the capital (the numerator in the ratio) to decrease. However, the risk-weighted assets (the denominator) are not affected at all in Basel I by any changes in risk. It is true that economic sensitivity has been limited in the final version of Basel II by flattening the function that produces the risk-weighted assets on the basis of the different loss parameters.[70] The fact remains however: risk-sensitive capital requirements will, all other things being equal, lead to bigger variation in the capital requirement. This is after all one of the aims of Basel II.

However, bigger variation in the minimum capital requirements does not necessarily imply greater variation in the total capital requirements. According to Pillar 2, a bank should assess its total capital requirement not only with regard to its estimated minimum capital requirement but also with regard to its activities in general, its business focus and strategy. It is also necessary that the bank as part of this assessment conducts stress tests with the aim of showing how the capital requirement may rise in the event of a deterioration in economic conditions. The results of these stress tests are intended to be used to judge whether there is a need to accumulate a capital buffer for leaner times.[71] The supervisory authority then evaluates the bank's assessment of its total capital requirement and judges whether the capital is sufficient given the bank's risks and risk management. Should the capital be judged insufficient the supervisory authority will adjust the capital requirement to the level that is considered appropriate. The sensitivity in the total capital requirements will thereby also be dependent in practice on supervisors' application of Pillar 2.

It is still too early to say with certainty what increases/adjustments will be made under Pillar 2. The attitude to Pillar 2 differs also to some extent between different countries' supervisors. Some supervisors advocate a more active application, where the supervisor makes discretionary adjustments of the capital requirements based on the current phase of the business cycle. In other words, under such an application Pillar 2 would have an explicitly contracyclical role. Other supervisors recommend instead that the procyclicality should be dealt with as far as possible under Pillar 1. Besides underlining the importance of actually rating through-the-cycle, these supervisors seek to ensure that the PDs of the risk classes remain very stable over time. The latter can be achieved by using sufficiently long time series in the calculations. This would dampen an excessively steep rise in the PDs of the risk classes during a recession. An additional method is to ensure that banks make dynamic or statistical provisions

70 This applies only to corporate loans. A given change in the loss parameters, e.g. PDs, results therefore in a smaller change in the risk-weighted assets than before.

71 See "Riskmätning och kapitalkrav II – en lägesrapport om arbetet med nya kapitaltäckningsregler" (Risk measurement and capital requirements II – a progress report on the work with new capital adequacy rules). The Swedish Financial Supervisory Authority's reports 2002:8

in their income statements. This means that banks would build up large capital buffers when times are good with a view to reducing the effects of increased capital requirements during less favourable periods. [72]

The Swedish Financial Supervisory Authority has clarified that its ambition is to make a bank's own capital assessment the basis for the total capital requirement. Only in cases where a bank's own assessment results in a capital level that is considered insufficient will the supervisor take measures. At the same time, however, supervisors always have the final say as regards what constitutes sufficient capital, which means that there is a very fine line between direct adjustments and indirect pressures. A supervisor may face a difficult balancing act between two, in the short term partly opposite, goals: risk-sensitive capital requirements and a stable banking system. On the one hand, if Basel II is really to lead to better management and measurement of risk, supervisors cannot make far-reaching adjustments to banks' own assessments of their capital requirements. In such a case a bank has limited incentives to carry out satisfactory risk management. On the other hand, if a supervisor allows the banks' own assessments of their capital needs to govern the capital requirements, it could lead to greater variations in the capital requirements and thereby also to more procyclical banks.

In the long run there is also a good chance that Basel II, despite more risk-sensitive capital requirements, can actually contribute to reducing procyclicality. Most studies of the possible effects of Basel II on capital requirements and bank lending assume that banks will not change their behaviour. This assumption can certainly be questioned. Changed conditions almost always lead to a change in the behaviour of those concerned. As the capital requirements will become more risk-sensitive, banks' cyclical sensitivity will be highlighted, which in itself creates incentives to deal with this, for example through different kinds of securitisation strategies, diversification and improved capital planning. Pillar 2 speeds up this process by requiring banks to develop methods for making forward-looking assessments of their capital needs. An increased ability to manage cyclical sensitivity should result in banks becoming less procyclical.

MORE COMPLEX CAPITAL SUPERVISION

Basel II entails much more complex capital supervision than before. High demands are imposed on supervisors' resources and competence in order to be able to carry out the validation and assessment required by Pillars 1 and 2.

A basic difficulty that the supervisor must deal with in its assessment is that internal ratings are based on private, often inexact information that is unique to each bank. After all, the basis of banks' business concept is to have specific competence for gathering and

72 This is enabled partly in Basel II by allowing provisions for expected losses to be included in the capital.

assessing private information, which may lead to big differences between the risk assessments of different banks. This raises several difficult questions as regards what stance a supervisor should adopt to a bank's own assessment of its total capital requirements. The bank's estimated requirements should correspond closely to its economic capital. However, a bank's economic capital has certain features that pose a challenge to a supervisor wishing to use it as a basis for regulation.[73]

i) the calculation of economic capital is unique to each bank and therefore difficult to replicate and validate. The discussion of the design of internal rating systems showed how different these systems are in practice. The fact that the systems have different rating horizons, different numbers of risk classes and different ways of calculating these classes' expected PDs may result in fairly large variations in the measured risk for a given portfolio.

ii) economic capital is internal to the bank and is based on private information and proprietary methods. Ratings are based partly on private information, which is likely to result in large differences between the different banks' assessments. Banks' methods are based also on other factors, such as what collateral is available, how large the bank's exposure is, if there are other lenders exposed to the customer, or if the bank is the largest lender. Moreover, banks themselves can to a certain extent influence the risk of default by taking various measures.

iii) the calculated economic capital is difficult to compare across banks as it is based on individually designed, internal models. For the same reason it also varies over time in relation to underlying nominal positions (balance sheet measures).

iv) economic capital represents an optimal capital level for a bank in view of the calculated risk and is thereby necessarily binding. It can thus be problematic to base a minimum level on economic capital.

That there are big dissimilarities between banks' credit ratings and that the results produced by internal systems thereby can be very different is also confirmed by empirical research in the field. A number of studies, by identifying 'overlapping' portfolios, have compared various banks' credit ratings of the same companies. One study by Carey (2002) surveyed a database of some twenty large US banks' internal ratings over the period 1994-1998.[74] After mapping the banks' internal rating scales to a common ten-grade scale, the study

73 See Estrella, "Regulatory Capital and the Supervision of Financial Institutions: Some Basic Distinctions and Policy Choices", Sveriges Riksbank Workshop on Challenges for Central Banking 2000.

74 Carey (2002) "Some Evidence on the Consistency of Banks' Internal Credit Ratings," in Michael Ong, ed., *Credit Ratings: Methodologies, Rationale and Default Risk*. London: Risk Books, 2002.

showed that the banks in just over half of the cases had assigned different ratings to the same company, even if the ratings were within three grades in 98 per cent of the cases.

Mingo (2000) studied in a similar way eight large US banks' assignment of default risk to major companies at the same time.[75] On average, four of the eight banks had a significantly divergent view compared with the other banks regarding the default risk associated with the companies.

Similar findings are obtained in a study of two major Swedish banks (Jacobson et al. 2003), which compares ratings quarter by quarter in an overlapping portfolio of almost 3,000 companies. On the whole the banks had a similar view of the companies' relative ranking, even though there were substantial differences in the ratings for individual companies. The differences between the two banks were bigger, however, as regards the assessment of the absolute risk, measured as the expected probability of default, for each company. In one example these differences were estimated to result in the portfolio's statistically expected loss being twice as high in one of the banks as in the other.

However, the banks' total capital requirements in Basel II are not the same as their economic capital. Instead, a number of parameters under Pillar I and to a certain extent methodology under Pillar II will be provided by supervisors, which should simplify evaluation and validation. Nevertheless, large differences may arise between banks' own assessments of their capital needs. It is also inevitable that supervisors will have less information and knowledge than banks about the banks' own systems and methods. This does not have to be a problem if there are sufficient time series regarding actual losses to enable validation. However, data series for ratings and outcomes almost always either cover too short a period or are insufficient. In practice it can be a difficult task for a supervisor with limited resources to determine whether observed differences in measured risk are due to differences in actual risk, in the design of rating systems, in portfolio composition or in absolute risk assessments. On the other hand another, more subtle problem will arise if a supervisor needs to work much closer with a bank and become a great deal more involved than before in its internal development of methods and models. This could result in the supervisor implicitly sharing responsibility for the bank's development, thus giving the supervisor a vested interest in the performance of the bank.[76] This could, for instance, lead to a situation where the supervisor does not take necessary corrective action in time when the bank is headed for difficulties.

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75 Mingo (2000), "EDF Estimation: A 'Test-Deck' Exercise", *The RMA Journal*, November 2000

76 This phenomenon is known as regulatory capture. For an elaboration of this problem, see, for instance, The European Shadow Financial Regulatory Committee, "Bank Supervisors' Business: Risk Management or Systemic Stability?", Statement no. 16 2003.

Conclusions

The increased risk-sensitivity in the capital requirements in Basel II is positive for banks, as it encourages the development of internal rating systems and models to measure and manage risk. This should result in better credit ratings as well as in improved precision and internal control. In the long run this could enhance the allocation of capital in the total economy.

The implementation of Basel II, however, entails several challenges for authorities. One of these is that the increased risk-sensitivity will contribute to a more procyclical banking system as the fluctuations in the capital requirements become sharper. The shift in bank behaviour that Basel II in itself should bring about should limit this effect, however. The second challenge derives from banks' ratings being based on internal information and from the fact that the design of methods and models may differ considerably across banks. Moreover, data regarding previous defaults and ratings are often insufficient, which imposes high demands on supervisors when they validate and evaluate banks' internal systems. At the same time as authorities have to be able to understand and interpret the effects and results of different systems, approaches and models, supervisors must strive to keep banks' internal work at arm's length. Otherwise, authorities could indirectly become partly responsible for banks' risk management, which could make it more difficult for an authority to take necessary actions against a problem bank. One way for authorities to deal with this is to develop clear rules of action that are explicitly connected to different capital levels or situations. How authorities decide to meet these challenges is of great significance for what effects Basel II will have in practice on the banking system.

Finally, there is a danger that both the industry's and authorities' desire to achieve a level playing field and uniform capital requirements could precipitate a development towards increased regulation of detail in the design of systems and models. This would be unfortunate as it would worsen the dynamics in, and incentives for, further development and enhancement of management and measurement of risk.