Financial Stability Report 2006:1

31 May 2006

Contents

Foreword

An analysis of the stability of the financial system is presented by the Riksbank twice a year. The purpose of the Financial Stability Report is to identify potential risks in the financial system and assess the ability to withstand shocks. Publishing the Report makes its analysis available to players in the financial markets as well as to others who are interested, so that it can contribute to a well-informed debate concerning Sweden's financial system. The Report is also an instrument for demonstrating how the Riksbank works on the objective, assigned to it by the Riksdag, of promoting a safe and efficient payments system.

The analysis of financial stability concerns the ability to withstand unforeseen shocks to financial companies as well as to the financial infrastructure. The analysis of financial companies concentrates on the four major Swedish banking groups because it is these that are of crucial importance for the payments system's stability.

The assessment starts from the external factors that can affect the participants in Sweden's payments system. The first chapter of this report accordingly discusses real economic and financial market developments.

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 the stability of the payments system can also be affected by the banks' own actions, the third chapter analyses developments in the four major banks more closely. Changes in profitability can indicate the extent to which banks are exposed to strategic risks. The quality of bank assets and the development of bank equity are evaluated as indicators of how credit and market risks might develop, while the banks' funding capacity provides a picture of potential liquidity risks.

The Riksbank also oversees the financial infrastructure in order to obtain a picture of any structural weakness that could generate contagious effects via the payments system. This infrastructure is made up of systems that are required for making payments and for trading and delivering financial products. The term financial infrastructure can also be understood in a wider sense that includes the public framework for financial transactions, that is, rules, supervision and crisis management. In this Report, the chapter on the infrastructure is therefore devoted to a description of the financial infrastructure, particularly the components which the Riksbank oversees. The Riksbank's evaluation of these components for the 2005 accounting year is also presented, together with a discussion of the changes in the cash market that are occurring at present.

Two articles conclude this Report. The first describes a method for measuring credit risk in the banking sector, using external information. In the second, the Riksbank maps the development of hedge funds and their significance for the financial system.

The Executive Board of the Riksbank discussed this Report at its meetings on 4 and 18 May. The Report uses data available as at 15 May 2006.

Stockholm, May 2006

Stefan Ingves
GOVERNOR OF SVERIGES RIKSBANK

Summary of the stability assessment

The major Swedish banks are judged by the Riksbank to be in a favourable position at present to cope with unexpected losses. Profitability has been improved, mainly in connection with increased stock-market turnover, growing volumes of credit and low loan losses. For the financial system, conditions are accordingly favourable for coping with shocks in the coming years. There are, however, some issues that, while not a problem at present, do seem unsustainable in the longer run. One is that for real-estate companies, the required yield continued to fall even though the risk-free long-term interest rate had risen. Another issue is the rapid rate at which house prices and household debt are rising.

During 2005 economic activity continued to strengthen in Sweden as well as in the rest of the world. In the February Inflation Report the Riksbank judged that in the coming two years, international economic growth would amount to around 4 per cent. At the monetary policy meeting on 27 April the Riksbank observed that, on the whole, the Inflation Report's picture of growth still applies but the more recent statistics provide reasons for counting on a somewhat stronger development in the rest of the world.

Corporate profits have continued to exceed expectations and this has contributed to rising equity prices in international stock markets. Valuations in terms of the P/E ratio remain close to the average level for the period since the mid 1990s. There has recently been some increase in stock-market volatility but this is still comparatively low.

During the winter and spring a number of central banks, including the Riksbank, have raised their instrumental rates. Long-term interest rates have also increased since the time of the November Report but their level is still low. The factors that were mentioned as likely explanations in the previous Report – increased credibility of low and stable inflation, high saving in Asian and oil-producing countries, and rule changes for institutional investors – still appear to be influencing the development of long-term interest rates.

Credit spreads for higher-risk bonds have narrowed again. The lower compensation for risk that this implies might be motivated to some extent by rising profits and improved macroeconomic conditions in emerging-market economies. Spreads for certain credit derivatives (credit default swaps) have likewise narrowed during the spring.

THE CORPORATE SECTOR

Corporate borrowing in Sweden grew comparatively rapidly during 2005 but the rate tended to slacken in the early months of 2006. Borrowing from banks makes up the major part. The Riksbank judges that corporate borrowing will continue to increase. However, one reason for this is the prospect of an increase in gross fixed capital formation.

Corporate debt has grown in relation to total assets. However, of the listed companies, 40 per cent had a debt ratio of less than 50 per cent in 2005, which is the same proportion as in 2004.

Improved profits and increased turnover in the corporate sector have continued to contribute to a growing ability to service debt. The increases in operating profits and financial receipts have been accompanied by persistently low interest rates. The expected probability of corporate defaults, calculated from financial statements and equity prices, has decreased gradually over the past four years. The latest calculations indicate that defaults are expected to go on falling, so the debt-servicing ability will remain sound.

Real-estate companies, which constitute the banks' largest exposures, have increased their borrowing from banks more rapidly than the corporate sector as a whole. But this corporate category also appears to have a good ability to service debt. A falling debt ratio has been accompanied by a rising interest cover ratio. The Riksbank judges that these companies will continue to be in a favourable position to service debt, partly because the rent market is expected to be strong. The probability of these companies defaulting in the coming twelve months, calculated from financial statements and equity prices, is falling and this is another indication that real-estate companies will maintain their ability to service debt.

At the same time, this bright picture of developments for real-estate companies includes an increased sensitivity to interest rates in that the duration of their interest periods is shortening, accompanied by increased borrowing.

In the commercial property market, prices for office premises have risen in all three metropolitan regions. One reason for this is that the required direct yield has gradually decreased, probably because the long-term risk-free interest rate has fallen. But it also looks as though risk premiums (investors' compensation for risk) have come down, in keeping with developments in other markets. In 2006 Q1 this became more pronounced: the real price level rose up to 25 per cent in annual terms in some places even though there was some increase in the risk-free interest rate. This suggests that risk premiums have continued to decrease.

More than half of corporate lending by the major Swedish banks goes to companies abroad, mainly in the other Nordic countries, the Baltic states and Germany. The picture in the other Nordic countries is much the same as in Sweden: corporate borrowing is rising but the ability to service debt remains sound.

In the Baltic states, persistently rapid economic growth is accompanied by high demand for credit. However, corporate financial positions and thereby the ability to service debt are still sound. At the same time, although the present rate of credit growth in the Baltic states is proceeding from a low level, it cannot continue indefinitely. Moreover, fixed exchange rate regimes prevent the Baltic central banks from using monetary policy instruments to influence the growth of credit. Then there is the exchange risk in the loans. Taken together, this is a reason for being alert to the possibility of growing imbalances that lead to difficulties in servicing debt.

Developments in Germany are weaker but there are certain signs that demand for corporate credit will pick up because firms are displaying a renewed interest in investing.

THE HOUSEHOLD SECTOR

The growth of household debt has continued to rise. In the twelve months to January this year total borrowing rose 13 per cent, which is the highest rate since the early 1990s. The ratio of total debt to disposable income in the household sector was over 130 per cent at the end of 2005.

As previously, the loans are obtained mainly for housing, and house prices have continued to rise. The regional differences are still substantial, with a rate of house price increases in Stockholm that is below the national average. The statistics indicate that, so far, the Riksbank's interest rate increases have not had any sizeable impact on the development of house prices.

The ability of households to service debt remains robust. The ratio of households' interest expenditure to disposable income has continued to fall. Using data on the incomes, debts and interest expenditure of individual households, the Riksbank has updated the study of the debt-servicing ability in different income categories. Households are now divided into ten income categories. It was mainly households in the top two income deciles that increased their debts from 2003 to 2004. These were already the most indebted households, in absolute terms as well as in relation to their incomes. However, these households also held the major part of the household sector's assets. The Riksbank's calculation of households' financial margins – the post-tax income that remains when interest expenditure and other living costs have been paid – show that even with the increased debt, households in the top two income deciles had margins for coping with higher interest rates or a loss of income.

Although Swedish households seem to be in a position to service their debts, a situation where annual increases in debt and house prices average 10 per cent is not sustainable in the longer run. Both house prices and households' debt ratios are therefore judged to rise more slowly in the future. The calculations of future house prices have been updated by the Riksbank, using the equations that were presented in last November's Report. The results suggest that the increase in house prices will be somewhat slower this year and more so in 2007 and 2008.

While the household sector as a whole has a sound debt-servicing ability, the increased debt burden can lead to problems for individual households. Higher mortgaging and lower repayment requirements have enabled individual borrowers to take larger risks than before. There is therefore reason to monitor this development closely, as well as the effects it might have on households' debt-servicing ability and on their consumption.

Approximately half of the banks' loans to households goes to

households outside Sweden. Here, too, developments in the other Nordic countries resemble the picture in Sweden, with growing debt, rising house prices but a persistently sound ability to service debt.

In the Baltic states, household debt grew rapidly in 2005, driven by strong domestic housing demand as well as by households' pent-up borrowing requirement before the credit market was deregulated. Debt has therefore grown from a low level and the household sector's debt ratio is still comparatively modest.

In Germany, households have continued to be cautious about borrowing and the debt ratio has shown a downward trend since 2000, albeit from a comparatively high level. Households' cautious borrowing stance has largely been a consequence of the weak economic development, but demographic factors and a housing surplus have also played a part.

THE BANKS

The profitability of the four major banks rose during the latest four-quarter period (up to the end of 2006 Q1). This was a result of strong increases in lending, to households as well as to the corporate sector, rising stock markets, lower long-term interest rates and diminishing loan losses.

Net interest income continues to be the main source of bank earnings. Pressure on interest margins has been accompanied by an increase in the volume of bank lending. If lending to the corporate and households sectors were to stop growing, the effect on the profitability of the major banks would be considerable. An arithmetical example indicates that profitability would be reduced by between 19 and 28 per cent.

In the latest four-quarter period, however, lending rose at a rapid rate. For all the major banks, lending abroad is expanding faster than in Sweden.

During 2005 there was a renewed increase in the rate of lending to the corporate sector, though with some differences between the banks. The increase came mainly from lending to companies in property management, trade and services. The rate tended to slacken again in the early months of 2006.

Lending to households in the Swedish market has continued to rise rapidly, mainly via the banks' mortgage institutions. However, the major banks' market shares have either fallen or been unchanged. SBAB, Danske Bank and Länsförsäkringar Bank have continued to take market shares.

Loan losses continued to decrease and are now virtually negligible for the four major banks.[1] Unlike the case in the two previous years – when the lower loan losses came from decreased provisions for new losses – the fall has now come from increased recoveries. Given the Riksbank's economic forecast in the February

1 Loan losses consist of the sum of provisions for existing and probable future losses less recoveries and reversals from earlier losses. It follows that if reversals exceed provisions, the item makes a positive contribution to bank profitability.

Inflation Report, loan losses are expected to remain low in the coming years. There is, however, uncertainty about developments in the Baltic states. If there were to be a downturn in the strong economic growth there, it could lead to increased loan losses. The same applies if the debt-servicing ability of property companies were to deteriorate.

At present it does not seem that bank lending and the development of loan losses are creating any problems. Experience has shown, however, that it is in this stage that, by easing credit policies in various ways, banks pave the way to future loan losses. There is therefore reason to pay close attention to the quality of credit in different market segments.

The improvement in bank profitability in recent years has been accompanied by increased capital. The Tier 1 capital ratio at the end of the latest four-quarter period (end March 2006) was just over 7. In the current economic situation and with the development of bank earnings and loan losses, this seems satisfactory.

Since the early 1980s the banks' lending to the public has exceeded deposits. The deposit gap has grown and the four major banks have accordingly become increasingly dependent on funding in the interbank and securities markets. In the latest four-quarter period the banks obtained funds mainly by issuing securities denominated in US dollars, euro and Danish kronor. However, a large proportion of the borrowing has been covered for exchange risk. For stability it is an advantage that the banks borrow in a variety of markets because this renders them less dependent on a single source of funds. At the same time, the banks become more vulnerable to problems in the financial markets.

All in all, the major Swedish banks appear to be in a sound position to cope with unexpected losses in the years ahead. Profitability has improved, mainly in connection with equity price increases, higher stock-market turnover, growing credit volumes and low loan losses. Conditions are accordingly favourable for the financial system to cope with any shocks.

RISKS FROM FINANCIAL MARKETS

Price adjustments in financial markets may well occur in orderly forms. A number of events in recent years – the change to more restrictive monetary stances in the United States and Europe is one example – have had comparatively little impact on financial markets. At the same time, there are a number of possible reasons why a future adjustment could be abrupt and turbulent, with a rapid increase in volatility. Long-term interest rates are low for the current economic situation and credit spreads are depressed. There is also the possibility that investors are turning to bonds with a greater risk in order to obtain a higher yield than treasury bonds offer, without requiring compensation for the risk. If credit quality were to deteriorate unexpectedly, leading to increased defaults, credit spreads may widen rapidly.

In the rapidly expanding market for credit derivatives it can be difficult to appraise how a shock would affect market liquidity. The growth of this market has been accompanied by the emergence of hedge funds as important participants. Hedge funds are also active in other markets, which may mean that disruptions quickly spread from market to market. There are also indications that credit institutions have lowered their counterparty requirements for hedge funds and accepted increasingly high mortgaging levels in order to compete for the income these funds generate.

Taken together, all this could lead to portfolio adjustments at short notice if something were to happen that suddenly changes expectations so that participants invest instead in assets with higher credit quality. Such a course of events could lead to further turbulence and a rapid loss of liquidity in more complex markets, such as those for credit derivatives.

The Swedish banks, however, are sufficiently resilient to make it unlikely that increased financial turbulence would cause them problems with solvency. The market risks of these banks are comparatively small, notwithstanding recent signs of some increase. However, decreased liquidity in some markets could increase the cost of market funding. If interest rates right across the yield curve had risen 1 percentage point from one day to the next, the effects on interest-bearing assets and liabilities would have lowered the banks' profits for 2005 by around 20 per cent, assuming that the banks chose to absorb the whole of the loss in value.

It is difficult to estimate the indirect effects which financial turbulence and decreased market liquidity might have in the longer run. A loss of corporate investment and slacker lending at a time when economic growth is lower and securities trading is falling would affect the banks' main sources of income – net income from interest and commissions.

THE FINANCIAL INFRASTRUCTURE

The Riksbank's annual assessment of the most important payment systems shows that they maintain a good international standard. For a couple of the systems, however, there are some weaknesses as regards transparency and access requirements. It is reasonable that a country like Sweden fully complies with internationally agreed standards. However, none of the weaknesses is considered to pose a threat to financial stability.

Conclusions

- The profitability of the major Swedish banks is sound, as is their ability to manage unexpected losses.

- Household and corporate borrowing is growing but the overall debt-servicing ability of borrower groups is sound. At the same time, certain aspects of the picture of borrowing do not seem to be sustainable in the long run. One is that commercial property prices presuppose that the rent market becomes stronger. Another is the rapid rate of the increases in house prices and household debt.

- If lending to households and firms slackens or stock markets fall markedly, the profitability of the banks would deteriorate considerably. Quick price adjustments in other respects in financial markets, with rapidly rising volatility, could also affect profitability because they would increase the cost of the banks' market funding.

The Riksbank's role in work on financial stability

The financial system has three main functions: providing payment services, converting saving into investment and managing financial risks. The system consists of banks and other agents, market-places where they can meet and the financial infrastructure for registering and settling transactions. The stability of the financial system is a major socioeconomic concern. If the system were to stop functioning, the economic and social consequences could be very great. The government therefore has a particular interest in overseeing its functioning.

Considering the huge volume of payments that flows through the system, the greatest economic damage would probably arise from disruptions to the payment function. All economic transactions involve some form of payment. The payment system's central agents are the Riksbank and the commercial banks. The banks distribute notes and coins, keep transaction accounts connected to the giro system and manage card systems. The Riksbank issues notes and coins and provides accounts in the RIX payment system, which banks can use to execute large mutual payments.

In the light of its central role in the payment system, the Riksbank has the Riksdag's mandate to promote safe and efficient payments. Here there is also a clear link to the Riksbank's other primary objective of maintaining the value of money. A stable financial system is a basic premise for an effective inflation-targeting policy.

The importance of the banks for the payment system means that the public interest in overseeing financial stability focuses on them.[2] A crisis in the banking system could have serious consequences for payments. Overseeing banks is particularly complicated because the element of risk in banking is greater than in most other enterprises. Bank liabilities (deposits, interbank loans) are mostly short-term, whereas assets tend to be long-term.

Moreover, a problem in one bank is liable to spread to other banks and thereby develop into a threat to the system as a whole. One reason for this is that banks have mutual obligations connected with lending and securities trading, or simply because they all participate in the payment system. Another reason is that the similarity of their operations means that problems can hit them all in the same way. Contagious effects can also arise simply because other agents suspect that the institutions are interrelated even if that is not the case. Under certain circumstances, such suspicions are liable to be self-fulfilling.

The fact that suspicions alone may suffice to generate contagious effects is characteristic of the financial system. It illustrates the high degree to which financial system stability is dependent on the participants' and the users' confidence that all the system's functions are in working order. A loss of this confidence can make it difficult for banks to conduct operations, which would threaten the workings of the system. An example is to be found in the banking crisis in Sweden in the early 1990s, when the international credit market had little confidence in Swedish banks in general, regardless of the extent of the problems in each particular case. This resulted in funding problems for all the banks and the State was obliged to guarantee all of the banks' liabilities.

However, it is not just confidence in the individual banks that is essential for the proper functioning of the financial system. Participants must have confidence in all the system's components. In practice, oversight therefore has to go beyond the banks in the payment system. In addition, the Riksbank needs to analyse developments in financial markets and the factors there that could exacerbate the risks in the financial system. To a growing extent, this is also an international issue.

The oversight of systemic stability also extends to the stability of the financial infrastructure, that is, the systems that are required to execute payments and to trade,

2 In this oversight, the Riksbank and Finansinspektionen (the Swedish Financial Supervisory Authority) both have important functions that inevitably overlap in many respects. Together with the Finance Ministry, these two agencies have clarified the division of work and the collaboration on these issues in an agreement; see www.riksbank.com/upload/Dokument_riksbank/Kat_AFS/samradsdok_kris_eng_0602.pdf for an English translation.

register and settle financial instruments. The proper functioning of these systems lessens the risk that problems which arise somewhere in financial markets or in some institution, spread to other participants or markets. It also reduces the risk of disruptions occurring in some part of the infrastructure and spreading from there. By continuously evaluating the components of the system on the basis of international norms and standards, the Riksbank can act to make the infrastructure capable of withstanding shocks of various kinds.

In addition, the infrastructure includes the public framework for all financial transactions, that is, rules, supervision and crisis management. Laws and regulations establish the bounds within which financial companies must operate. The Riksbank contributes to this by submitting opinions and by participating in the international work in this field. The development of the regulatory framework is undertaken to a large extent within the Basel Committee and the EU. Matters connected with other aspects of the public framework are also discussed in these contexts.

The Riksbank's assessment of the risks in the financial system and of the banks' ability to withstand shocks is published twice a year in this Financial Stability Report. As the four major Swedish bank groups have around 80 per cent of the Swedish market, the analysis of bank resilience concentrates on them.

Besides the preventive aspects, the work on stability includes crisis management, that is, a readiness to act if a crisis were actually to occur. Crisis management presupposes that the authorities are in a position to gauge the consequences if an institution were to default. In the event of serious consequences, the authorities must be in a position to take measures to mitigate them. This may involve contributing to an orderly closure of the institution in some cases or providing financial support in others.

In certain cases, it may be up to the Riksbank to provide emergency liquidity assistance. This possibility only arises, however, if one or more institutions have such grave problems that there is a threat to the stability of the system as a whole. Moreover, to qualify for this form of support, the institution in question must be solvent. If the institution is insolvent, any support has to be granted by the Riksdag, because there is then a risk of costs arising for taxpayers.

The preventive oversight and crisis management are closely connected. Oversight is a prerequisite for the ability of the Riksbank to assess whether a crisis threatens stability and whether the particular problem concerns solvency or liquidity. In a critical situation, moreover, the cooperation with Finansinspektionen and the Finance Ministry is especially important.

Financial markets

Favourable macroeconomic conditions and increased corporate profits have led to rising equity prices. Long-term interest rates have risen, while spreads for corporate and emerging-market bonds have remained low. The risks that were highlighted in the November Report still essentially apply – rapid adjustments to long-term interest rates and interest rate spreads, as well as sudden changes in market liquidity – though the probability of them materialising is judged to be slight.

The Riksbank's stability assessment starts from the external factors – real economic conditions and developments in financial markets – that are liable to affect banks and their borrowers. This chapter opens with an account of the Riksbank's real economic assessment in connection with monetary policy decisions. Developments in financial markets are considered next and the chapter concludes with a discussion of potential associated risks.

Economic conditions and financial markets

During 2005 economic activity continued to strengthen in Sweden as well as elsewhere. In the latest Inflation Report the Riksbank judged that global economic growth will continue to be strong and amount to about 4 per cent in each of the coming two years.

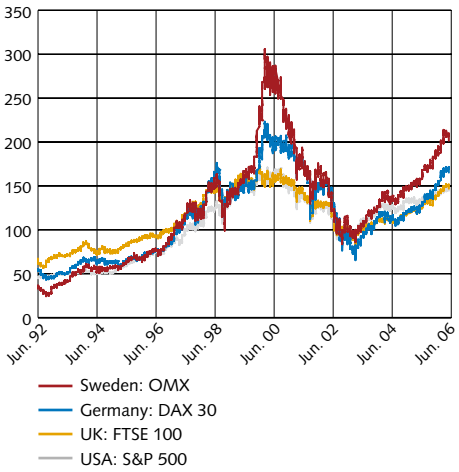
Some slackening of growth was foreseen in the United States, but the rate would remain comparatively high. It mostly looks as though the slowdown at the end of 2005 was temporary. In Asia, a recovery has begun in Japan and growth in China is rapid. That has led to economic expansion in other countries in this region.

In the euro area, signs of higher growth appeared during 2005 and the prospects for a continued recovery were judged to be favourable. Growth has remained strong in Estonia, Latvia and Lithuania, driven as before mainly by strong domestic demand.

In Sweden, growth picked up during 2005 after some slowdown around the turn of 2004. In the latest Inflation Report the Riksbank considered that growth in 2006 would reach about 3.5 per cent, followed by some slackening in connection with a less expansionary fiscal policy and rising interest rates.

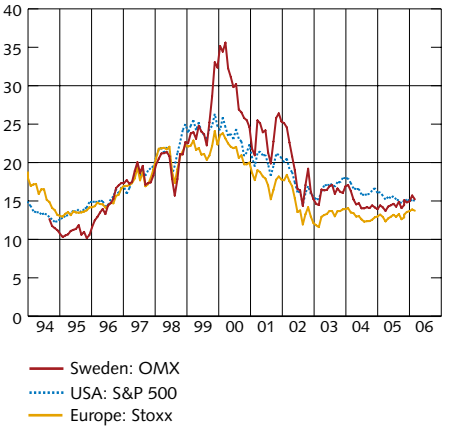
At the monetary policy meeting on 27 April, the Riksbank observed that, on the whole, the earlier picture of growth in Sweden and the rest of the world still applies but more recent statistics point to a somewhat stronger development in the rest of the world.

Figure 1:1. Stock markets in selected countries
Index. September 2002 = 100



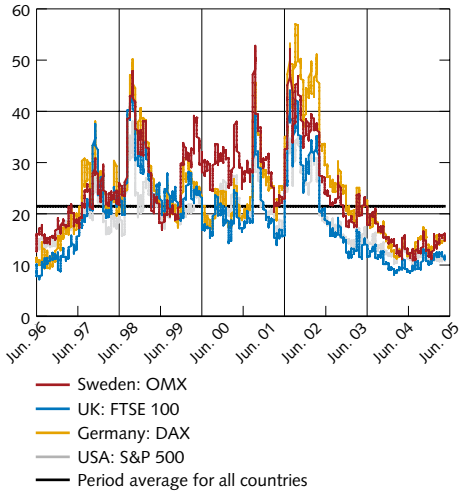
Source: Reuters EcoWin

Figure 1:2. P/E ratios for Sweden, Europe and the United States



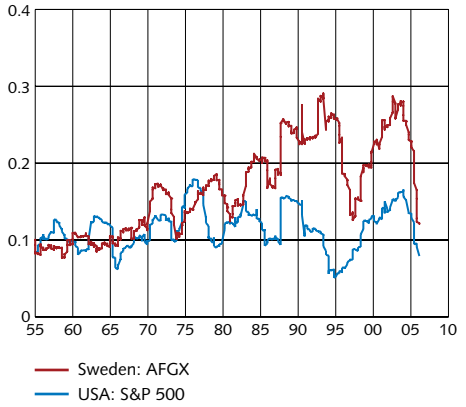
Source: Reuters EcoWin

Figure 1:3. Implied stock-market volatility
Index



Source: Bloomberg

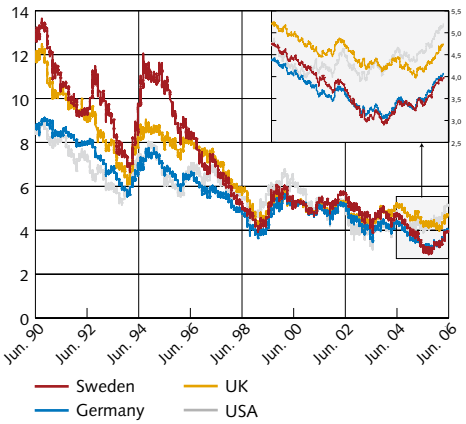
Figure 1:4. Historical stock-market volatility in Sweden and the United States



Note. Historical volatility denotes the extent of equity price movements; it is calculated on overlapping 24-month observations and expressed in annual terms.

Source: Reuters EcoWin

Figure 1:5. Ten-year government bond rates
Per cent



Source: Reuters EcoWin

STOCK MARKETS

The recent favourable economic development is also mirrored in stock markets around the world. These markets were somewhat weaker last autumn, partly due to concern about higher inflation and rising interest rates, but the general trend for the international bourses has been upwards (see Figure 1:1). As previously, the equity price rise stems from unexpectedly high corporate profits. More than 60 per cent of the companies listed on S&P 500 exceeded profit expectations in 2005 Q1 and the corresponding figure for OMX was over 50 per cent. The growth of profits is expected to continue in general in 2006, though not at the same rate as from 2004 to 2005.

Valuations in terms of P/E ratios for Sweden, Europe and the United States are relatively close to the average for the period since the mid 1990s (see Figure 1:2) and broadly the same as in the past four years.

Since the beginning of the 2000s, market uncertainty about future equity prices (measured in terms of implied volatility) has decreased markedly (see Figure 1:3).[3] Implied volatility is below the average for the period from 1996 to March 2006. However, seen in a longer perspective – from 1953 to the present – volatility is not remarkably low (see Figure 1:4).

INTEREST RATES

For some time now, long-term interest rates have been historically low in relation to the economic situation (see Figure 1:5). Since the time of the November Report, however, long-term rates have become somewhat higher. In the meantime, instrumental rates have been increased by a number of central banks, including the Federal Reserve, the ECB and the Riksbank. In some countries, however, long-term interest rates have not increased to the same extent as instrumental rates and shorter market rates, leading to a flatter yield curve or a negative slope.

Long-term interest rates and hence the slope of the yield curve seem to have been affected by factors that are not directly connected with macroeconomic tendencies. One such factor is the increased credibility of low and stable inflation. Other explanations that are often mentioned include high saving in certain regions, high liquidity, which tends to push asset prices up, and both structural and rule changes that have induced institutional investors and pension managers to increase their demand for long-term bonds.[4]

3 Implied volatility, calculated with a formula for option pricing, indicates market participants' expectations of future equity price movements.
4 For the United Kingdom, see Bank of England Quarterly Bulletin, Spring 2006.

Interest rate spreads in the market for corporate bonds widened slightly at the end of 2005 but have now narrowed again (see Figures 1:6 and 1:7). Small spreads imply low compensation for risk, which can be motivated by strong profits as well as by few defaults and only minor payment problems in the corporate sector. During 2005 only one credit-rated company in Europe (the Swedish bus company Concordia) failed to meet its financial commitments.[5]

The same picture is conveyed by the development of spreads for the type of credit derivative called *credit default swaps* (CDS).[6] In principle, this spread represents the cost of hedging credit risk and accordingly serves as an indicator of expectations about future defaults. Figure 1:8 presents indices of the average spreads for high-grade companies in North America and Europe. These spreads have fallen to date in 2006.

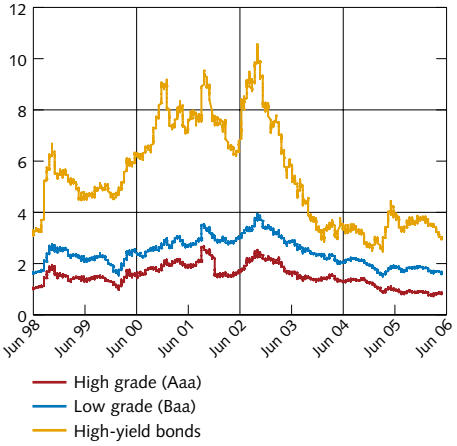
In the emerging-market economies, the asset price trend has been strong for a time, as it has for bonds issued by these economies. The spreads from US Treasury bonds have narrowed to historically low levels (see Figure 1:9). This has been accompanied by improved creditworthiness in a majority of these countries, which could warrant a higher price.

Assessments by credit rating companies supplement the picture of corporate credit risks in the United States, Europe and emerging-market economies. In the credit ratings issued by Standard and Poor's, downgrades have outnumbered upgrades for a long time in the United States as well as Europe. In 2006 Q1, the proportion of downgrades increased for companies in Europe but decreased for American companies.

In the emerging-market economies, upgrades have greatly outnumbered downgrades for a considerable time, in keeping with the strong macroeconomic development. In 2006 Q1, the proportion of downgrades in emerging-market economies was 12 per cent as against 51 per cent in the United States and 72 per cent in Europe.[7]

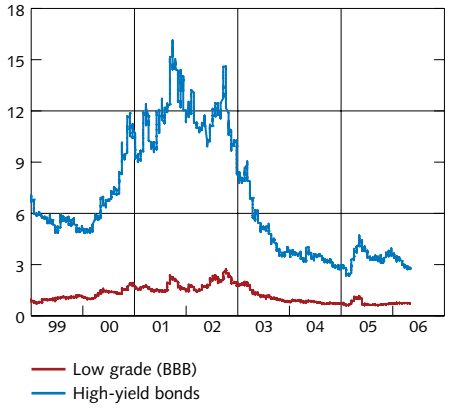
Thus, the picture presented by interest rate spreads and premia is consistent. It may indicate that credit risk is judged to be low. However, in an environment with low long-term interest rates and high liquidity, low spreads and premia can also be a consequence of investors turning to assets with a higher risk in order to obtain a more satisfactory yield.

Figure 1:6. Credit spreads in the United States
Percentage points



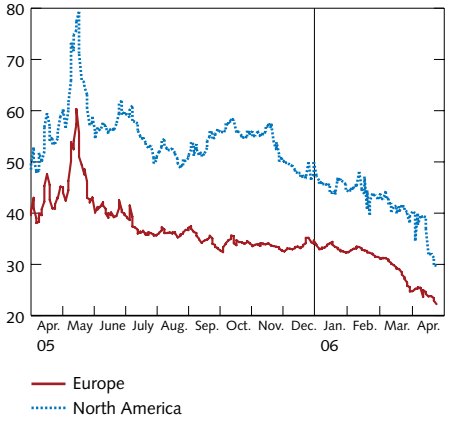
Sources: Reuters EcoWin, Federal Reserve Board and Merrill Lynch

Figure 1:7. Corporate bond spreads in Europe.
Percentage points



Sources: Reuters Ecowin J.P. Morgan and Merrill Lynch

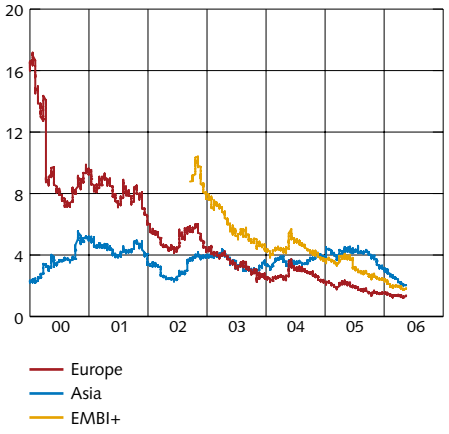
Figure 1:8. Credit default swap spreads



Note. Average of bid and ask spreads.
Source: Bloomberg

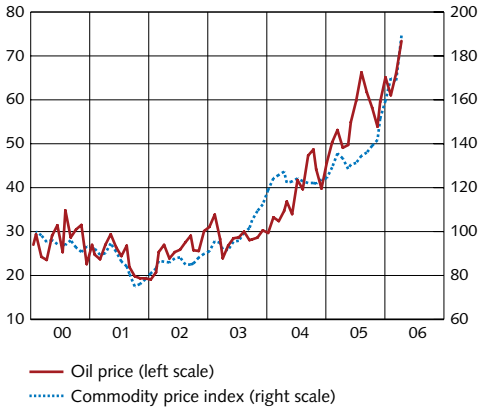
5 Standard and Poor's *Global Credit Market Trends: Quarterly Update and Forecast*, Fourth Quarter 2005.
6 Credit default swaps are a variant of credit derivatives that functions in principle as an insurance against credit risk. The buyer pays a premium in exchange for compensation for certain specified credit events, e.g. a default. These premia should therefore mirror expectations of future credit risk. The indices in the figure represent the average level of the premia.
7 Standard and Poor's *Global Corporate and Sovereign Rating Actions*, First Quarter 2006.

Figure 1:9. Spreads for bonds issued by emerging-market economies
Percentage points



Source: Bloomberg

Figure 1:10. Oil price and commodity price index
USD per barrel and index: February 2002=100



Sources: The Economist and Reuters EcoWin

COMMODITY MARKETS

Prices for petroleum and other commodities have continued to rise since the time of the November Report. As previously, the increase in the price of oil has exceeded what most observers expected and prices for other commodities have risen faster than before (see Figure 1:10).

Risks from financial markets

In view of low long-term interest rates, persistently narrow credit spreads and the ongoing rapid development of markets for complex credit instruments, there is a risk of sudden price adjustments and increased financial market turbulence.

Price adjustments in financial markets may well occur in orderly forms. A number of events in recent years, such as the change to more restrictive monetary stances in the United States and Europe, have had comparatively little impact on financial markets. At the same time, there are a number of possible reasons why an adjustment could be abrupt and turbulent, with a rapid increase in volatility. One is if the low long-term interest rate spreads are partly a consequence of investors turning to bonds with a greater risk in order to obtain a higher yield than treasury bonds offer, without requiring the normal compensation for risk. If credit quality were to deteriorate rapidly, leading to a larger number of defaults in the international bond markets, credit spreads may widen quickly. The number of corporate defaults on outstanding bond issues has been low in the past year at the same time as bonds have been issued by more companies with a relatively low credit rating.

In the rapidly expanding market for credit derivatives it can be difficult to appraise how a shock would affect market liquidity. To date this market has proved to be robust in connection with defaults and increased uncertainty. Concentrations to the more complex credit markets may mean that the risk of contagion has become greater.[8] The growth of this market has been accompanied by the emergence of hedge funds as important participants in credit derivatives; they account for around 15 per cent of credit protection transactions. Hedge funds are also active in other markets, which could mean that disruptions quickly spread from market to market and add to the turbulence. There are also indications that credit institutions have lowered their counterparty requirements for hedge funds and accepted increasingly high mortgaging levels in order to compete for the income these funds generate; this also increases the risk of an adjustment being more abrupt.[9]

8 Concentrations exist at a number of levels. For example, the 15 largest international banks handle more than 75 per cent of trade in complex credit instruments, while house mortgages make up a large part of the collateral behind CDO issues. See Fitch, "Global Credit Derivatives Survey: Risk Dispersion Accelerates", November 2005, and S&P, "CDO Spotlight: Is the Fortune For Structured Finance CDOs Tied to RMBS Performance for Better or Worse?", September, 2005.

9 See Greenwich Associates, "European Fixed Income: Focus on Hedge Funds", December 2005.

Taken together, all this could lead to portfolio adjustments at short notice if something were to happen that suddenly changes expectations so that participants invest instead in assets with higher credit quality. Such a course of events could lead to further turbulence and a rapid loss of liquidity in more complex markets, such as those for credit derivatives. Financial agents would then have larger total risk exposures in terms of VaR models. However, that should not lead to unforeseen losses provided the participants have stress-tested their exposures and counterparties. Still, there is a risk that such a course of events would alter correlations between assets, possibly leading to losses at a time when market liquidity has fallen.

However, a turbulent development in financial markets is not expected to affect the Swedish financial system to such an extent that the banks have problems with solvency. The market risks of Swedish banks are comparatively small. Still, decreased liquidity in some markets could raise the cost of market funding. A rapid increase in interest rates and interest rate spreads would reduce the value of the banks' bond portfolios (see Chapter 3).

The indirect effects that financial turbulence and decreased market liquidity might have in the longer run are more difficult to estimate. A loss of corporate investment and decreased lending at a time when economic growth is lower and securities trading is falling would affect the banks' main sources of income – net income from interest and commissions.

Summary assessment

- Equity and credit markets mirror expectations of a persistently strong global macroeconomic development and buoyant corporate profits.

- However, risk compensation in credit markets appears to be historically low. If credit quality were to deteriorate rapidly in the year ahead, increased compensation for risk would probably be required.

- With low long-term interest rates and narrow credit spreads, there continues to be a risk of abrupt price adjustments in financial markets.

House prices in an international perspective

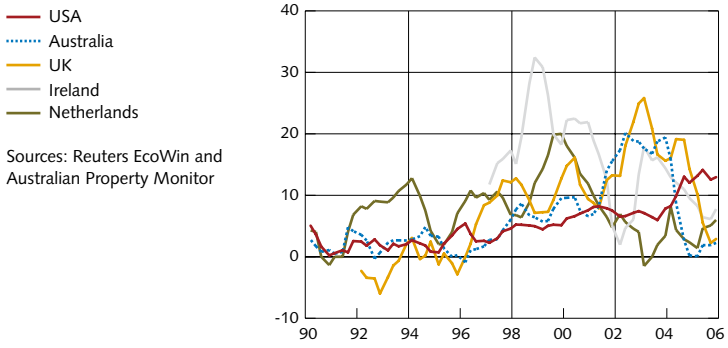
Since the mid 1990s house prices have risen rapidly in many countries, including Sweden. The increase has also been stronger and lasted longer than before.

For about a year now, however, the rate of increase has slackened in some countries (see Figures B1 and B2). The slowdown has been most marked in the United Kingdom and Australia after the interest rate was increased, though in Australia there was some lag before this happened. The Australian central bank began to raise its instrumental rate during 2002 but it was not until the spring of 2004 that house prices began to waver; recently they have actually fallen in certain regions. In the United Kingdom, on the other hand, the rate of increase seems to be picking up again.[10] In Ireland, house price increases seem to have stabilised at a slightly lower level and in the Netherlands the increase has been slower in the past five years.[11]

In Denmark, Norway, Spain, Sweden and the United States, house prices are still rising strongly, by more than 10 per cent in annual terms. The rate in 2005 in the United States was the highest there since the late 1970s. Some more complex forms of mortgage loans, for instance loans with either no or negative repayment, have been introduced there in recent years and there are indications that they have been used in particular in states where house prices have risen most.[12] In contrast to Australia and the United Kingdom, the rate of house price increases has remained high despite the increased instrumental rate.

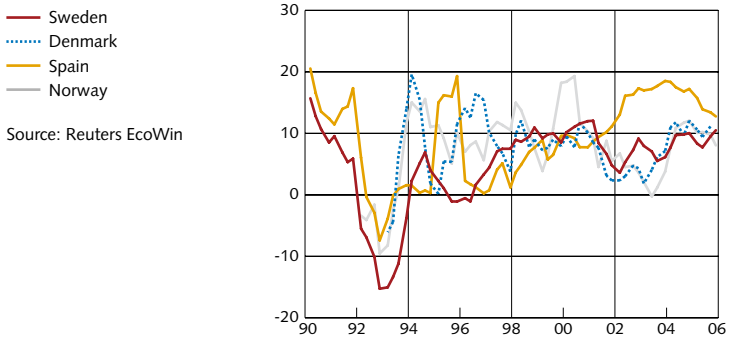
The rapid house price increases in these countries since the 1990s probably have a number of causes – falling interest rates, rising disposable incomes, demographic factors and changes in the workings of the house mortgage market. But these housing markets also differ in important respects, often as a result of fundamental differences in regulations, taxation and institutional structures. Households in the United States and Denmark, but not in other countries, can, for example, repay a fixed interest loan in advance for a low fee. This means that American and Danish households are in a position to renegotiate loans when interest rates fall and thereby secure their interest expenditure; if interest rates rise, they can continue with their lower rates. With no or small transaction fees, households are more flexible. In the United States and Denmark, moreover, loans can be tied for up to 30 years. Another factor behind the development of house prices is probably the possibility in some countries of purchasing residential property in order to let it. This is the case in Australia in particular but also

Figure B1. Nominal house prices
Twelve-month change, per cent



Sources: Reuters EcoWin and Australian Property Monitor

Figure B2. Nominal house prices
Twelve-month change, per cent



Source: Reuters EcoWin

10 See "UK house price gains have further to run", Special report, JPMorganChaseBank, January 2006.
11 In the Netherlands, the mortgaging level for 60 per cent of housing loans is above 100 per cent, which may be one explanation for the slower increase in house prices since 2000. See European Housing Review 2006, RICS, http://www.rics.org.
12 With negative repayment, the loan is written up each month and the borrower chooses to pay less in interest. See A. Frankell, "Prime or not so prime? An exploration of US housing finance in the new century", BIS Quarterly Review, March 2006.

in the United Kingdom, the United States and Ireland.[13]

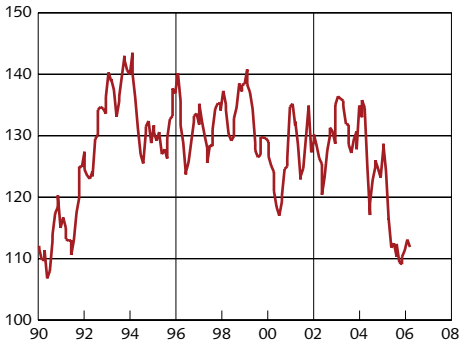
Developments in housing markets have caused observes to question the sustainability of the high rate of increase and to ask what would happen if future house price increases were to be slower or even swing to a fall. The higher house prices have probably had a positive effect on household consumption by making households feel wealthier. Moreover, households have consumed a part of their real wealth by choosing a higher level of mortgaging.

Most things suggest, however, that a slower rate of price increases, even falling house prices, would not be a threat to financial stability. Stress tests, scenario analyses by rating institutions, supervisors and central banks, indicate that the household sector as a whole can afford its housing loans.[14] In the United States the debt-servicing ability of households is still high even though it has followed a downward trend in recent years (see Figure B3).

If the price rise were to cease or even turn into a fall, it could affect the household consumption propensity or potential. Slower house price gains make it less possible to choose a higher mortgaging level to finance consumption. House price increases in the United States are often said to be a reason why consumption there has been high in recent years, even though it has been hard to pin down their role. When house price increases in the Netherlands slackened during 2000, this also affected consumption and thereby economic growth.[15]

If house mortgage rates were to rise, so would households' interest expenditure, making it necessary to cut back saving or consumption. A general tendency in recent years has been for households to borrow to a growing extent at interest rates that are either variable or have just a short duration. In the United States, however, a higher interest rate does not directly affect house mortgage customers – for almost 60 per cent of all house mortgage loans the interest rate there is tied for anything up to 30 years.

Figure B3. US households' ability to service house purchases
Index



Note. The ability to service house purchases denotes the share of the median household income that is spent on interest costs and loan repayment for a median-priced house.

Source: Reuters EcoWin

In the US and other housing markets, however, housing loans to sub-prime households have increased rapidly in recent years. From 1996 to 2004, loans to this group in the United States more than quintupled and amounted in 2004 to about 10 per cent of the total stock of loans to households.[16] A large proportion of these loans are securitised, which means that the financial institutions are not directly affected by any loan losses.

Rising house mortgage rates, accompanied by house price increases that are lower or even negative, would probably also influence the propensity to renovate dwellings and purchase new housing, which would affect investment in residential construction. Construction investment has developed strongly in recent years in many countries, no doubt with a favourable effect on demand and economic growth. In Spain, for example, the construction sector contributes 17 per cent of GDP.

While the development of house prices in

13 See "Housing finance in the Global Financial System", Committee of the Global Financial System, Report no. 26. http://www.bis.org/ and OECD Economic Outlook 68, 2000.
14 See ibid.
15 See P.J.A. van Els, W.A. van den End and M.C.J. van Rooij, "Financial behaviour of Dutch households: analysis of the DNB Household Survey 2003" Research Memorandum WO no 744 / Meb-Series no 2003-09.
16 Loans of this type have also increased rapidly in the United Kingdom and Canada but their share of the total loan stock is smaller. See "Housing finance in the Global Financial System", Committee of the Global Financial System, Report no. 26, http:/www.bis.org.

an international perspective may be associated with risks, most things suggest that the risk does not primarily concern financial stability. On the other hand, a fall-off in house prices could affect private consumption and construction investment in particular. If house prices are influenced by over-optimistic expectations, there is a risk that both they and demand continue to rise rapidly. Further ahead, that could lead to a situation where house prices and expectations undergo a sudden downward adjustment. Past experience in Sweden and other countries indicates that falling house prices can be accompanied by a weaker development of private consumption and economic output.[17] Developments in the United Kingdom and Australia demonstrate that an adjustment to lower house price increases has been achieved in orderly forms to date and the effects on banks and economic development need not be all that marked.

17 See e.g. World Economic Outlook, IMF, April 2006.

The Swedish banks' borrowers

Corporate borrowing in Sweden rose during 2005. The increase is expected to continue in 2006–08 as economic activity strengthens. Profitability is generally sound, with fewer and fewer defaults, and servicing corporate debt is not likely to be a problem. Borrowing by households also continued to rise in 2005, primarily from mortgage institutions, accompanied by a further increase in house prices. Studies of micro data show that households nevertheless have a sound ability to service debt. In the commercial property market, vacancies and rents have stabilised but prices have risen comparatively sharply in all three metropolitan regions, mainly in connection with a fall in the required direct yield, while the risk premium for real-estate investment seems to have risen.

The corporate sector in Sweden

Corporate borrowing has continued to rise at a high rate since the time of the November 2005 Report. In the twelve months to March this year, corporate borrowing from credit market institutions was around 9 per cent higher than in the previous twelve months. Borrowing from banks increased most, by around 15 per cent. Compared with the final months of 2005, however, the growth of total corporate borrowing slackened in the early months of 2006 (see Figure 2:1).[18]

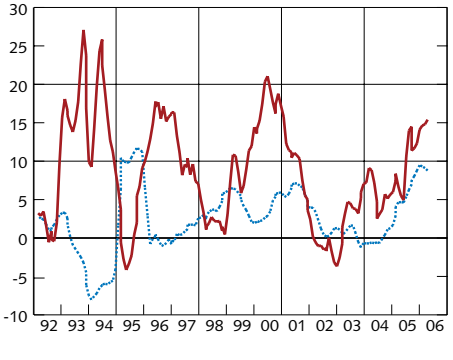
Borrowing is rising mainly in the trade and services sector and in real-estate management. Total borrowing by these two groups rose in 2005 by 32 and 15 per cent, respectively.[19] The banks' exposures are largest to real-estate management, which accounts for around 40 per cent of the major banks' loans to the corporate sector, while the share for the trade and services sector is 16 per cent.

Corporate borrowing in the securities market has also risen. In December 2005 the stock of bonds and certificates issued by non-financial companies totalled SEK 380 million, which is 20 per cent more than a year earlier (see Figure 2:2).

Investment continued to increase in 2005 and together with the corporate sector's relatively high profitability, this probably contributed to the increased demand for corporate credit (see Figure 2:3). Total corporate sector investment rose around 10 per cent in 2005. The increase was strongest, almost 15 per cent, for housing investment.[20] Corporate loans have also been used to finance acquisitions via private equity investment companies. This type of activity was extensive during 2005, though it did slacken in the third quarter.[21]

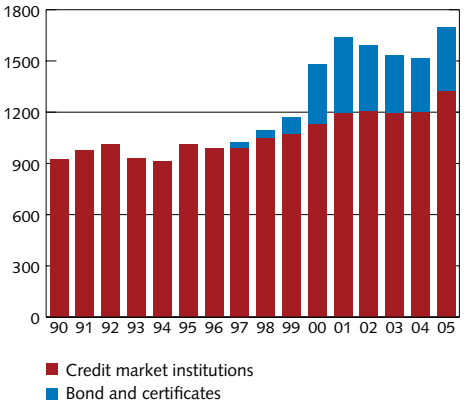
There are many indications that borrowing will continue to rise. The primary reason is that fixed gross investment is expected to grow almost 6 per cent in 2006, followed by rates that are almost

Figure 2:1. Non-financial companies: borrowing and bank deposits
Percentage twelve-month change, three-month moving average



Source: The Riksbank

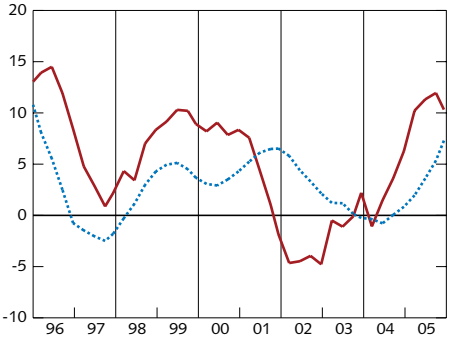
Figure 2:2. Non-financial companies: borrowing from securities markets and credit market institutions
SEK billion



Note. When Nordea AB was converted into a bank in January 2004 and Nordea Sverige AB was incorporated, an internal transaction that was formerly included in Sweden's corporate sector came to an end; in December 2003 this transaction amounted to around SEK 30 billion.

Source: The Riksbank

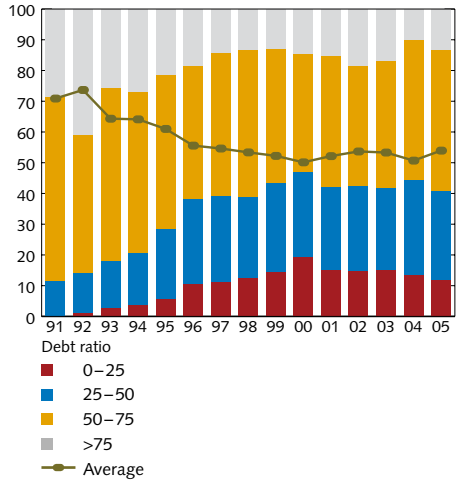
Figure 2:3. Corporate sector gross fixed capital formation and borrowing by non-financial companies from credit market institutions
Percentage twelve-month change, four-month moving average



Sources: Statistics Sweden and the Riksbank

18 The average growth rate since 2000 is just over 3 per cent.
19 This refers to borrowing from the four major banks.
20 Housing investment made up 17 per cent of gross fixed investrment in 2005.
21 See the box on pp. 28–29.

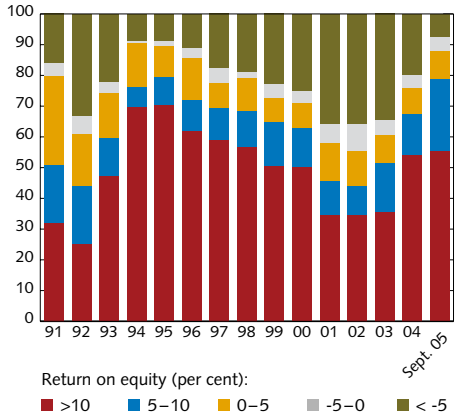
Figure 2:4. Ratio of debt to total assets in listed companies
Per cent of all listed companies



Note. The data from 2005 refer to 45 per cent of the companies listed on the Stockholm Exchange

Sources: Bloomberg and the Riksbank

Figure 2:5. Returns on equity in listed companies
Per cent of all listed companies



Note. The data for September 2005 refer to 56 per cent of the companies listed on the Stockholm Stock Exchange.

Sources: Bloomberg and the Riksbank

as high in the next two years.[22] A survey of 150 managers of bank branches throughout Sweden shows that around 80 per cent of the respondents count on an increase or a substantial increase in borrowing from the previous to the coming year.[23] Credit demand is assumed to be strongest in manufacturing, followed by real-estate management and engineering.

It is now more than a year since the new rules for preferential rights under bankruptcy law came into force in full.[24] In the survey of bank managers, 60 per cent state that the new rules have had no effect on lending, while 39 per cent consider that there has been some fall. If companies have reduced their borrowing on account of the new rules, they may have turned instead to factoring and leasing.[25] In January, factoring and leasing rose 8 per cent in annual terms, which can be compared with an average increase of less than 3 per cent in the past two years.

The average ratio of debt to assets turned upwards in 2005 (see Figure 2:4). However, approximately 40 per cent of the listed companies still have a debt ratio below 50 per cent.

Corporate profits continue to improve. Financial statements for 2005 from 349 listed companies show that an increased profit is reported by 68 per cent and this was accompanied by increased turnover for 54 per cent. The combined profits of the listed companies totalled over SEK 300 billion, an increase of 45 per cent from 2004. With the higher profits, the proportion of companies for which the yield on equity is positive has also risen and is now 87 per cent of the companies listed on the Stockholm Exchange (see Figure 2:5). Market participants foresee that profits will continue to rise in 2006, though at a lower rate.[26]

The growth of corporate borrowing is accompanied by an increasingly rapid increase in the corporate sector's bank deposits. In March, these deposits totalled SEK 550 billion or 17 per cent more than a year earlier. The companies that choose to borrow more are presumably not the same as those that increase their deposits. The growth of bank deposits may be a sign that certain companies have probably not yet identified sufficiently profitable investment projects. This is also indicated by the increase in equity buy-backs. In the twelve months to March 2006, equity buy-backs by companies listed on the Stockholm Stock Exchange were 18 per cent higher than in the previous twelve months.

The higher profits and low interest rates suggest that the corporate debt-servicing ability remains sound. This is also indicated by the development of defaults. The average number of defaults in

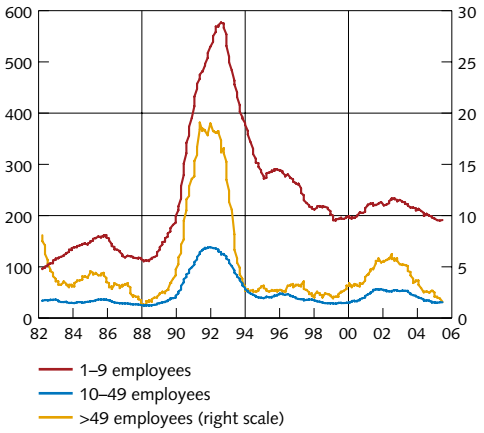
22 Inflation Report 2006:1, Sveriges Riksbank.
23 Almi's lending indicator, April 2006; see www.almi.se.
24 The new rules apply in full as of January 2005; one of their consequences is that banks are in a poorer position to recover claims from estates in bankruptcy. See the Riksbank's Financial Stability Report 2004:2, pp. 27–28.
25 Factoring is a procedure whereby a company mortgages or sells its invoices to a finance company. Leasing involves renting equipment or real capital from a finance/leasing company.
26 The profit predictions of market participants are measured as the expected growth of earnings per share on OMXS30.

March this year was around 5 per cent fewer than a year earlier. The defaulting companies are mostly small, with less than 9 employees, but defaults have fallen in every size group (see Figure 2:6).

In an industry breakdown, however, the number of defaults is still rising among hotel and restaurant companies, transport companies and real-estate management, now with an increase also in the IT-telecom sector. In all these industries it is still a matter of just a few defaults.

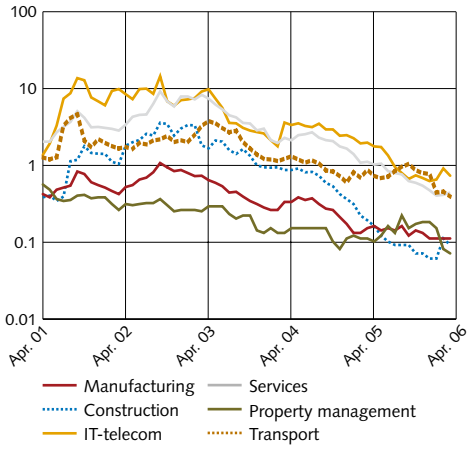
Expected default frequencies, calculated for listed companies on the basis of stock-market information and data from financial statements, are a leading indicator of bankruptcies.[27] For four years now the probability of corporate defaults has gradually fallen. Since the time of the November Report, expected default frequencies have risen for the construction industry and the IT-telecom sector, while for other industries they have fallen or are unchanged (see Figure 2:7). But in the corporate sector as a whole the fall is expected to continue, which supports the impression that the debt-servicing ability remains sound (see Figure 2:8).

Figure 2:6. Number of corporate defaults by company size



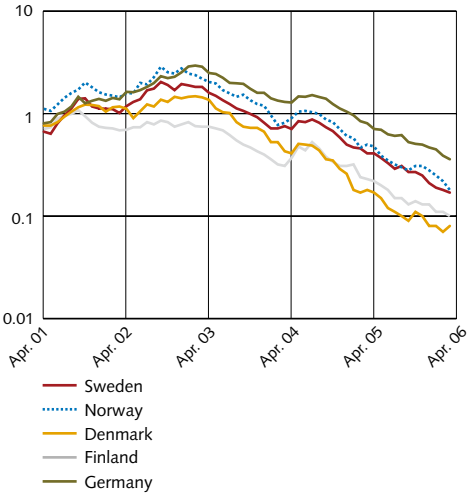
Source: Statistics Sweden

Figure 2:7. Expected default frequency (EDF) by industry for listed non-financial companies Per cent (logarithmic scale)



Source: Moody´s KMV

Figure 2:8. Expected default frequency (EDF) for listed non-financial companies in Nordic countries and Germany Per cent (logarithmic scale)



Source: Moody´s KMV

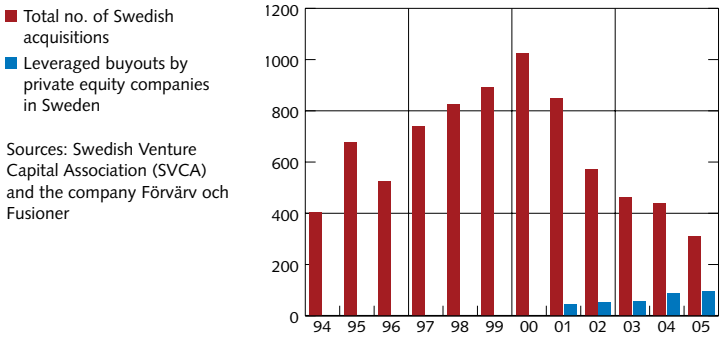
27 Moody´s KMV calculates the probability of bankruptcies among limited companies – the expected default frequency (EDF) – within a given time horizon on the basis of equity prices and financial statements. As a calculation of the probability that a company's assets will be smaller than its debts when the latter mature, the EDF represents the estimated risk of a limited company being unable to meet its commitments. The market value and the volatility of a company's assets are derived in turn from the company's stock-market value, using option pricing methods. Higher indebtedness, a lower market value and higher asset volatility all lead to a higher EDF, that is, a greater probability of default within the given time horizon.

The private equity investment market in 2005

An account of private equity investment companies that operate in Sweden and their links with the Swedish banking system was presented in Financial Stability Report 2005:1. It is updated here to examine what has happened since then in the market for private equity investment.

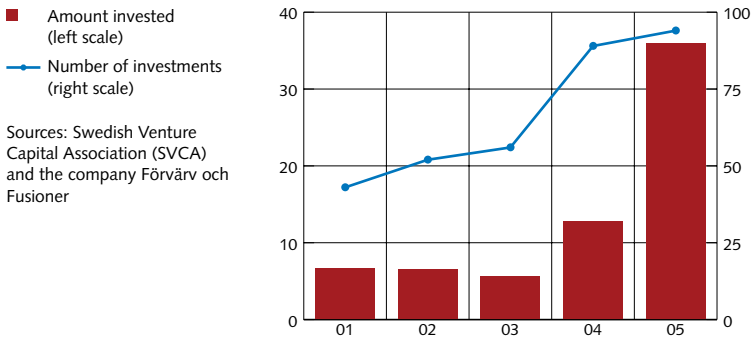
The capital in the private equity investment companies that are active in Sweden currently totals around SEK 134 billion. Around 80 per cent is managed by the companies that finance corporate acquisitions with loans.[28] This is the market segment with the strongest links to the banking system because the acquisitions are funded to a large extent with bank loans.

Figure B4. Company acquisitions



Sources: Swedish Venture Capital Association (SVCA) and the company Förvärv och Fusioner

Figure B5. Leveraged buyout investments
SEK billion and number



Sources: Swedish Venture Capital Association (SVCA) and the company Förvärv och Fusioner

Last year's account included the following assessments:

- Loans from banks are the largest source of funds for leveraged buyouts but their share of the four major Swedish banks' total stock of corporate loans is relatively small.

- Increased competition between private equity investment companies leads to higher buyout prices, while increased competition between the banks leads to higher mortgaging levels and a larger proportion of straight loans.

- Compared with the European average, transaction prices are not high in relation to the operating result for enterprises acquired by Swedish private equity investment companies.

- Larger transactions by private equity investment companies, higher prices for portfolio companies and higher mortgaging levels in holding companies have contributed to a level of risk in the loan-funded segment of the private equity market that is higher than some years ago.

Developments during 2005 provide grounds for some accentuation of these assessments. The Bank of England's Stability Report in December 2005 and the BIS quarterly report in March both noted a global increase during 2005 in the level of risk in leveraged buyouts. A plentiful supply of capital and low interest rates have led to higher mortgaging levels, easier borrowing terms and higher transaction prices for these buyouts. The same applies to some extent to the Swedish market for private equity investment.

The increased number of corporate acquisitions by private equity investment companies is regarded internationally as one aspect of a general increase in corporate

28 See SVCA and NUTEK's report, "Riskkapitalföretagens aktiviteter, fjärde kvartalet 2005" (Private equity companies's activities, 2005 Q4).

acquisitions. The situation in Sweden is different. The total number of acquisitions with Swedish participants rose from 1994 to a high in 2000, since when it has declined, whereas acquisitions in Sweden by private equity investment companies have risen continuously (see Figure B4).

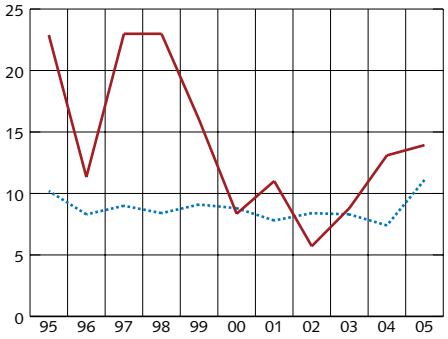
The growth of investment by the private equity companies in the form of leveraged buyouts in 2005 was almost three times higher than the year before. This is the strongest increase for this investment category since SVCA (the Swedish Private Equity & Venture Capital Association) began to study the operations of private equity companies in Sweden (see Figure B5). However, much of the increase came from a few large investments.

The risks associated with investment in the form of leveraged buyouts can be gauged approximately with a multiple that relates the acquired company's transaction price to its earnings before interest payments and tax (EBIT). A high EBIT multiple indicates a high risk, because the transaction price is high in relation to the underlying earning potential. Low interest costs and good access to credit can lead to high mortgaging levels and inflated transaction prices, possibly ending in an increased probability that the bank loans will not be repaid.

Average EBIT multiples for leveraged buyouts in Sweden and Europe have risen in the past three years, which suggests that the level of risk for this type of investment has increased in Sweden as well as in Europe (see Figure B6). A look at leveraged buyouts abroad by Swedish private equity companies shows that they are associated with higher EBIT multiples and thereby greater risks than buyouts in Sweden (see Figure B7). This may be because there is more competition for potential buyouts abroad.

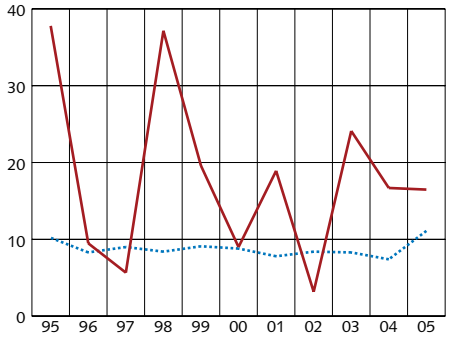
An important issue is the extent to which Swedish banks participate by providing credit for leveraged buyouts. Private equity companies' investments in leveraged buyouts can serve to estimate how much the Swedish banks have lent for transactions of this type. Private equity companies active in Sweden have invested equity totalling around SEK 107 billion in leveraged buyouts. Assuming that half of the investments are made in Sweden and that the private equity companies mortgage the target company up to around 50 per cent, the total lent by Swedish banks works out at around SEK 50 billion. That is about 8 per cent of the banks' total lending to the corporate sector in Sweden. However, as the banks' operations outside Sweden are substantial, particularly in the other Nordic countries, the share is presumably larger than this. Thus, the banks' lending to private equity companies makes up a not inconsiderable proportion of their total loan portfolios.

Figure B6. EBIT multiples for leveraged buyouts
Average in SEK million



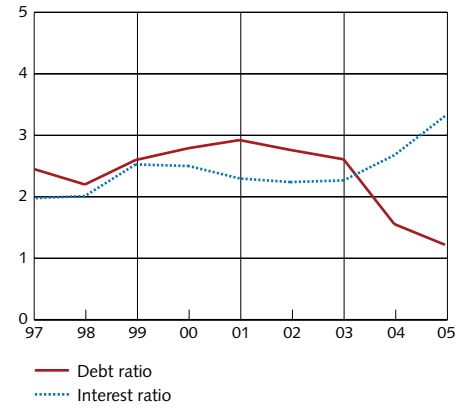
Source: The Centre for Management Buy-out Research

Figure B7. EBIT multiples for Swedish equity companies' acquisitions abroad
Average in SEK million



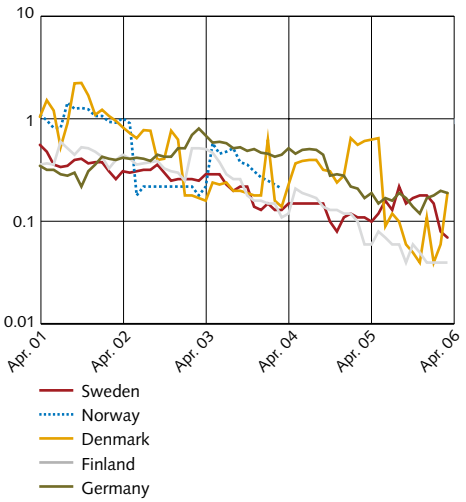
Source: The Centre for Management Buy-out Research

Figure 2:9. Interest-expenditure and debt ratios for listed property companies



Sources: Financial statements and the Riksbank

Figure 2:10. Expected default frequency (EDF) for listed property companies in Nordic countries and Germany
Per cent (logarithmic scale)



Source: Moody´s KMV

Property companies

Approximately 20 per cent of the total stock of bank loans to the public is provided for companies that manage real estate, making this the industry to which the banks are most exposed. Moreover, a large proportion of all bank loans are secured with real estate. These factors warrant a separate analysis of this industry. The debt-servicing ability of property companies is largely determined by conditions in the market for commercial property, which is considered in a box.

During 2005, borrowing by property companies from the banks rose 15 per cent.[29]

The debt ratio has continued to fall for the listed companies, accompanied by improved earnings (see Figure 2:9). Financial statements for 2005 show that the operating result improved for 13 out of 14 listed property companies and the operating surplus improved for 9 out of 14. Companies reporting a decreased operating surplus state that this was due to a loss of rent income when properties were disposed of. The improved results and persistently low interest rates have led to a higher interest expenditure ratio.

While the picture of the listed companies is comparatively favourable, the level of defaults among all property-management companies has risen. Rents have developed weakly for a number of years and this is now showing up in corporate earnings. However, the number of defaulting companies is still small. Leading indicators of the probability of default point to a lower level than at the time of the November Report. Fewer defaults are expected in the coming twelve months (see Figure 2:10).[30]

Thus it looks as though the listed property companies have strengthened their financial position and their ability to service debt. The Riksbank judges that the debt-servicing ability of property companies as a group will be reinforced in connection with an expected improvement in the rent market in the coming twelve months.[31]

While this gives a bright picture of developments for property companies, shorter interest periods and increased borrowing have made them more vulnerable.

29 Refers to borrowing from the four major banks.
30 The total return in 2005 on equity in Swedish real-estate companies was almost 36 per cent.
31 See the box on pp. 31–32.

The commercial property market

Market conditions for commercial real estate affect property companies' debt-servicing ability. Moreover, property is frequently used as collateral for loans. The Riksbank's analysis of stability focuses here on office premises and apartment buildings, because they are the major items in the portfolios of the listed property companies.

The Swedish property market remained lively in 2005. Turnover totalled around SEK 120 billion, or 30 per cent more than the year before. The market continued to attract foreign investors, who contributed 44 per cent of total real-estate investment in 2005. According to the real-estate index (SFI/IPD), the total return in 2005 on investment in Swedish real estate was 12.7 per cent, which is more than twice as much as the year before. The yield increased most for investment in shop premises, followed by investment in housing and in industrial premises. The yield was lowest for the fourth category, office premises.

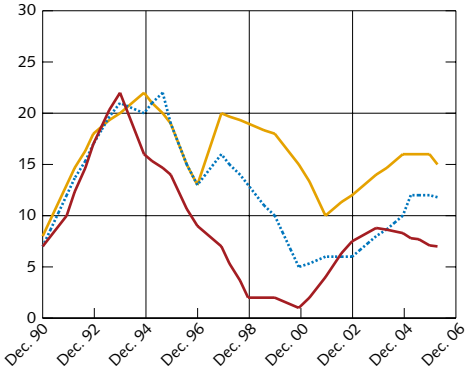
Office premises

The market for office premises has been weak since 2000 and the real level of rents has fallen, though there was some stabilisation during 2005.

In Stockholm, vacancies continued to fall during 2005 and 2006 Q1. Vacancies in Malmö were unchanged in 2005 from the year before, followed by some fall in 2006 Q1. In Göteborg, vacancies rose slightly during 2005 from 2004 and then fell marginally in Q1 this year. However, the total level of vacancies remains higher than in 2004 (see Figure B8).

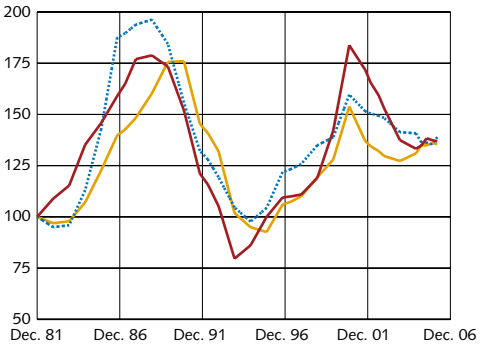
The level of vacancies is expected to fall in all three regions as the labour market improves, accompanied by increased demand for office premises.[32] This assessment is supported by an increase in all three regions in the number of companies advertising for new premises.[33]

Figure B8. Vacancy rates for office premises in central locations
Per cent



Sources: NewSec AB and the Riksbank

Figure B9. Real rents for office premises in central locations
Index 1981 = 100



Sources: NewSec AB and the Riksbank

Another reason for expecting a falling level of vacancies is the small increment to office space in recent years. Office space in Stockholm decreased in 2004 and 2005, after new construction had been relatively high for some years. Production then began to pick up during 2005, which points to an increased supply of office space in the years ahead. However, the risk of the new office premises having a marked effect on the level of vacancies is considered to be relatively slight.[34]

In Göteborg, the construction of new office premises was negligible in 2005, after a relatively strong increase in 2003. The prospect of a persistently small increment in the coming years will give the market a chance to recover. In Malmö, the supply of new office space in recent

32 See the Riksbank's Inflation Report 2006:1.
33 See "Kontorsmarknaden allt hetare" (Office market increasingly hot), Dagens Industri, 19 April 2006.
34 See Nordic Report RealEstate Spring 2006, from real-estate consultants NewSec AB.

years has been relatively low and stable but an increase is expected in 2006.[35] This may lead to a slower decline in the level of vacancies.[36]

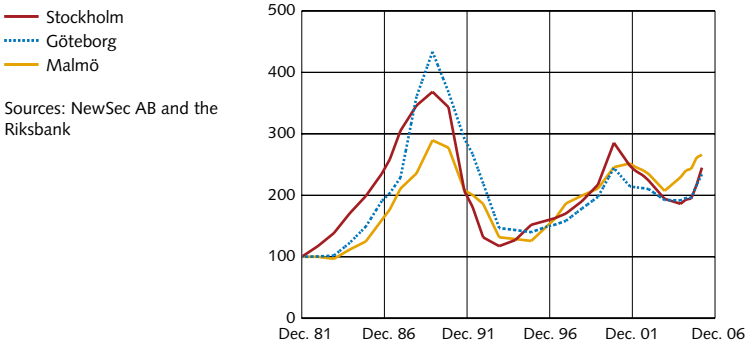
Lower vacancy rates in Stockholm have not had any sizeable effect on rents in this region. Real rents in 2006 Q1 were around 1.5 per cent higher than a year earlier. Rents in Malmö were broadly unchanged in this period, whereas in Göteborg they rose almost 2 per cent even though the market has not yet turned upwards (see Figure B9). Rents are expected to rise as vacancies decline.

Prices for office premises depend in the short run on the direct yield requirement of property companies. This requirement is related in turn to the risk-free long-term interest rate and risk premia. In the longer run, prices depend on rents and vacancies. Although there has been no clear recovery to date, prices are rising in all the metropolitan regions. In 2006 Q1 the real price level rose in annual terms between 10 and 25 per cent (see Figure B10).

One reason why prices rose during 2005 is that the direct yield required by these companies has fallen. That has to do with the low level of long-term interest rates. As in other markets, however, it also looks as though risk premia have fallen in the commercial property market.

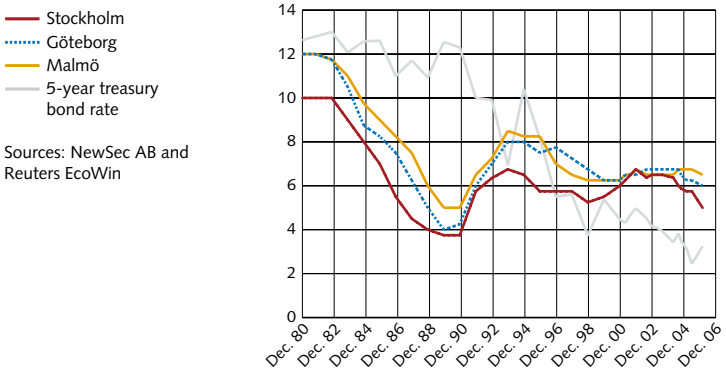
In earlier periods, a rising long-term interest rate has led to a higher required yield. That did not happen in 2006 Q1, which indicates that risk premia have continued to fall (see Figure B11).

Figure B10. Real prices for office premises in central locations
Index 1981 = 100



Sources: NewSec AB and the Riksbank

Figure B11. Average direct return required for office premises in central locations
Per cent



Sources: NewSec AB and Reuters EcoWin

Apartment buildings

The market for apartment buildings presents a different picture, with increases in prices as well as rents. In 2006 Q1 the real price level rose between 10 and 30 per cent in annual terms in the three metropolitan regions. Price formation is influenced by the low interest rate, rising prices for tenant-owned housing, a relatively low supply of new housing and ongoing conversions from rented to tenant-owned dwellings. It is also possible that prices are affected by expectations that rent controls may be altered.

Industrial property and shop premises

In the market for industrial property, the real-estate index (SFI/IPD) shows that prices rose 5.8 per cent in 2005 after falling for four years. For shop premises, prices fell in 2003 and began to recover in 2004, followed by a continued increase of 11 per cent in 2005. There is a large supply of new shop premises and this is expected to be the case for a number of years, while existing premises are being renovated. In time, this may affect the level of vacancies.

35 See ibid.
36 See Nordic City Report, Spring 2006, from real-estate consultants Jones Lang Lasalle.

Corporate sectors in the other Nordic countries, the Baltic states and Germany

The external exposures of Swedish banks are largely located in the other Nordic countries, the Baltic states and Germany, which warrants a separate analysis of the corporate sectors in those countries.

In the other Nordic countries, the picture broadly resembles that in Sweden. Now that investment in Norway has picked up, corporate borrowing from credit market institutions there is growing at an increasing rate. In 2005, borrowing rose almost 16 per cent, which can be compared with 1.5 per cent the previous year. This tendency has continued in the early months of 2006. Notwithstanding the growth of borrowing, the ratio of debt to equity has fallen. This has been accompanied by a robust development of profits in the past two years, which should have strengthened financial positions. This picture is supported by the development of defaults. The number of defaults fell 20 per cent in 2005 and a further decline is expected in the coming year (see Figures 2:8 and 2:10).

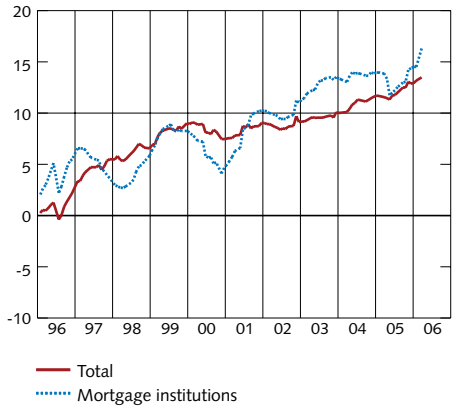
In Finland, corporate borrowing rose almost 8 per cent in 2005. Borrowing abroad has been reduced in favour of borrowing via domestic banks. The level of debt is low and there are no indications of an impaired ability to service corporate debt. Defaults decreased only marginally in 2005 but the level was already very low. Leading indicators of default point to a further decline (see Figures 2:8 and 2:10).

In Denmark, too, the expansion of corporate borrowing has continued at an increasing rate, over 14 per cent in 2005 compared with 7 per cent the year before. A relatively high investment rate in the past two years has probably contributed to this. During 2005 the number of defaults decreased by around 8 per cent. The expected default frequency in Denmark's corporate sector has risen slightly but the current level is much the same as at the time of the November Report. In the case of real-estate companies, however, the expected default frequency has increased markedly (see Figure 2:8 and 2:10).

The Baltic states continue to be characterised by strong economic growth and high demand for credit. After increases of around 30 per cent in each of these countries in 2004, corporate borrowing from credit market institutions rose in 2005 by around 50 per cent in Estonia and Latvia and by just over 40 per cent in Lithuania. The strong domestic and external demand has generated increased corporate profits and a growing number of newly registered companies. In Lithuania, however, the higher profits reflect cost-cutting rather than increased turnover. Still, the debt-servicing ability of Baltic companies appears to be generally sound. This impression is supported by the number of defaults, which fell in 2005 by 20 per cent in Estonia and 40 per cent in Latvia, though in Lithuania the number did rise 8 per cent.[37]

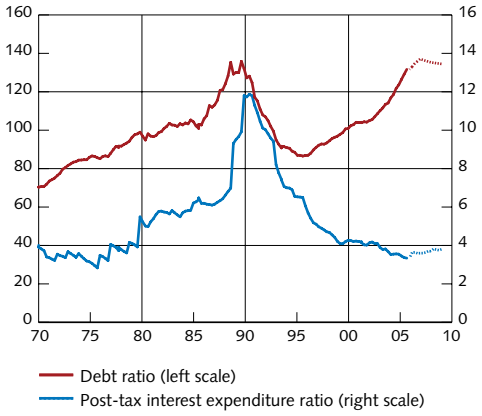
37 See also the section in Chapter 3 on the Swedish banks' lending in the Baltic states.

Figure 2:11 Household borrowing by type of institution
Percentage 12-month change



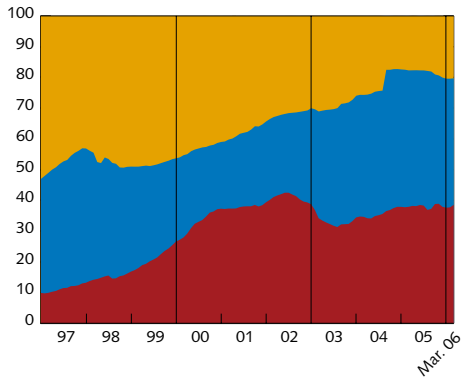
Source: The Riksbank

Figure 2:12. Household debt and post-tax interest expenditure in relation to disposable income
Per cent



Note. The broken lines represent the Riksbank's forecasts.
Source: Statistics Sweden and the Riksbank

Figure 2:13. Duration of fixed interest periods for house mortgage loans
Per cent of total stock



Source: The Riksbank

The rapid expansion of credit in the Baltic states is occurring from low levels. However, the currently strong rate cannot continue indefinitely. This – plus the fact that fixed exchange rate regimes prevent the Baltic central banks from using monetary policy instruments to influence the rapid growth of credit – is a reason for paying attention to the expansion of debt.

In Germany, corporate borrowing from credit market companies was broadly unchanged from 2004 to 2005. Surveys of the banks show, however, that the corporate investment propensity has risen, which points to a future increase in corporate borrowing. It is mainly the small and medium-sized companies that are showing a greater inclination to invest. The level of debt among these companies is on a downward trend. The financial position is also generally firm among the large companies. Defaults decreased for the second year running, in 2005 by 3.5 per cent. Not counting solitary proprietors and small companies, where defaults are most frequent, in 2005 the number of defaults fell 12 per cent. This tendency is expected to continue (see Figure 2:8). In the case of property companies, however, defaults are expected to rise (see Figure 2:10).

The household sector in Sweden

Household borrowing continued to rise in 2005. In January 2006 the total stock of household debt with financial institutions was 13 per cent higher than a year earlier, the strongest rate since the mid 1990s (see Figure 2:11). Borrowing from mortgage institutions rose most rapidly, 14 per cent. Of the stock of household debt at end 2005, loans from mortgage institutions made up 70 per cent. This does not give a complete picture of house mortgage loans in relation to total household debt, partly because top mortgage loans are provided by the banks. At end 2005, over 85 per cent of household debt with financial institutions was collateralised with real estate.[38]

The growth of households' disposable income in recent years and the low interest rates have been major factors behind the rapid expansion of household borrowing. The ratio of total household debt to income is over 130 per cent but the ratio of interest expenditure to disposable income has fallen to 3.2 per cent (see Figure 2:12).[39] For the group of indebted households, the debt and interest ratios are 170 and 5 per cent, respectively.

Notwithstanding the rapid expansion of household borrowing, there is nothing which suggests that the household sector as a whole risks having problems with payments; the households with the largest debts also have the highest incomes (see the box on pp. 38–40).

Since the mid 1990s, a variable interest rate has been chosen

38 Households (in other countries as well as in Sweden) have approximately 40 per cent of the major Swedish banking groups' total loan stock.

39 The debt ratio is calculated as debt in relation to the sum of disposable income in the latest four quarters. For the interest expenditure ratio, Statistics Sweden now calculates houses' interest expenditure excluding the value of the financial services that households implicitly consume when they utilise services provided by credit institutions (FISIM). For comparability with earlier statistics, however, for Figure 2:12 interest expenditure has been calculated including these services.

for a growing share of the stock of household mortgage loans (see Figure 2:13). A plausible explanation is that a low-inflation regime has been established, leading to less volatile nominal and real interest rates. Perhaps this has made households less interested in paying the "insurance premium" that borrowing at a fixed interest rate entails. It is also possible that in the mid 1990s households misjudged the future development of interest rates and have successively adjusted by switching to a variable interest rate.

A large proportion of household borrowing consists of house mortgage loans. There is a close historical relationship between house prices and household debt (see Figure 2:14). During 2005 house prices continued to rise. Statistics Sweden's house price index shows an increase of almost 10 per cent, which is much the same as in 2004. The regional differences are considerable. Since 2002, house prices in Stockholm have been rising more slowly than the national average (see Figure 2:15).

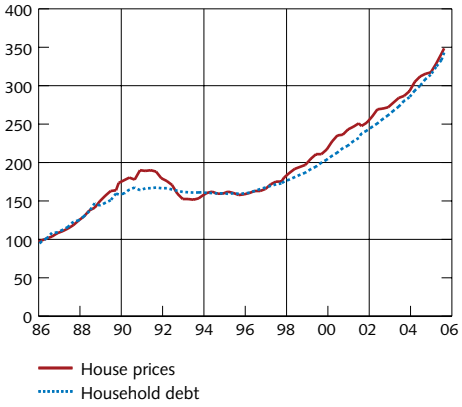
According to Statistics Sweden's house price barometer, which is available after a shorter lag than the house price index but is not as comprehensive, house prices continued to rise in the first three months of 2006.

New housing construction has expanded rapidly in recent years, though the number of units is still considerably lower than in the 1980s (see Figure 2:16). High house prices and low interest rates have made construction profitable, at least in the metropolitan regions. One way of calculating profitability is in terms of Tobin's *q*, which represents the market value of a house divided by the cost of producing it. Tobin's *q* above unity can be interpreted as an indication that building a house is profitable.[40] In 2005 the value of *q* was above unity mainly in municipalities in the counties of Stockholm, Västra Götaland and Skåne. This was the case in a total of only 87 municipalities (30 per cent), where it was accordingly profitable to build in 2005.

In the case of tenant-owned housing, it seems that in the past ten years, price increases have exceeded those for privately-owned houses. Estate-agent statistics show that from 1996 to 2005 the national average price per square metre rose 200 per cent for tenant-owned dwellings, while Statistics Sweden's house price index rose 110 per cent (see Figure 2:17).[41]

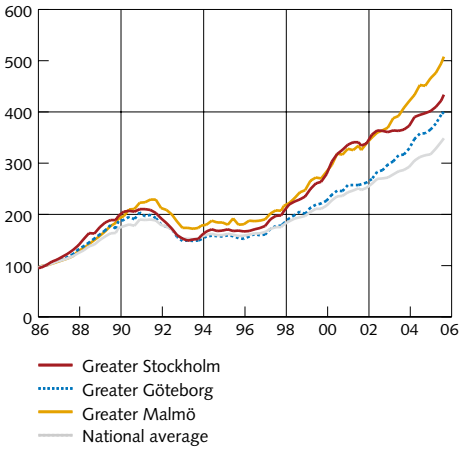
In a long-term perspective with low inflation, annual 10 per cent increases in house prices and household debt are unsustainable. This applies even if interest rates were to remain at the present low

Figure 2:14. Household debt and house prices
Index: 1986=100



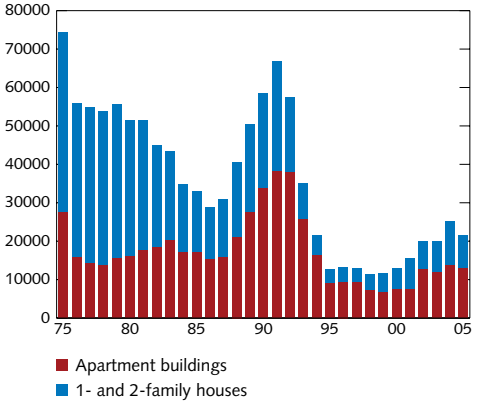
Source: Statistics Sweden

Figure 2:15. House prices
Index: 1986 = 100



Source: Statistics Sweden

Figure 2:16. Completed new residential construction, by type of housing
Number of dwelling units

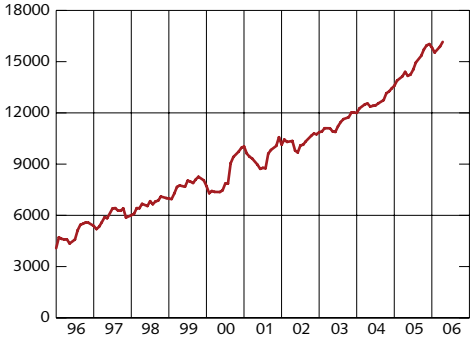


Source: Statistics Sweden

40 Tobin's *q* is calculated annually by IBF (the Swedish Institute for Housing and Urban Research) for 1- and 2-family houses in every municipality in Sweden.

41 Note, however, that Statistics Sweden's house price index is not directly comparable to the statistics from estate agents because the price indices are constructed differently. The share for collectively-owned dwellings in household borrowing from mortgage institutions has grown from 12 per cent in 2002 to almost 18 per cent in 2005. Numerous recent conversions of rented to collectively-owned housing may have contributed to this.

Figure 2:17. National average price of tenant-owned dwellings
SEK per square metre



Source: maklarstatistik.se

level. Calculations by the Riksbank indicate that house price increases will slacken to some extent this year if interest rates follow market expectations but the rate of increase will still be comparatively high. In 2007 and 2008, however, the level of annual price increases is expected to come down to only a couple of per cent in view of the market's predictions of higher interest rates and forecasts of an increased supply of housing. However, falling nominal house prices are not foreseen in this period, given the macroeconomic outlook in the Riksbank's main scenario.[42]

To sum up, household borrowing continues to rise at a high rate but the household sector's debt-servicing ability remains sound. Most of the borrowing is used to finance house purchases and this has led to a continued increase in house prices. In the longer run, house prices and household debt will both rise more slowly.

42 It should be borne in mind that econometric models are simplifications of reality and may yield misleading results if structural changes in the economic environment have altered the equation's parameters. It is possible that households perceive the currently low interest rates as partly temporary, so that higher rates are already allowed for in their housing estimates. Taking such factors into consideration is difficult in econometric estimations, which are therefore liable to overestimate the extent to which an increase in interest rates affects house prices. .

Household sectors in the other Nordic countries, the Baltic states and Germany

The Swedish banks have been increasingly active in lending to households outside Sweden, above all in Norway, Finland and Germany but also in Denmark, Poland and the Baltic states. Households outside Sweden account for about half of all loans to households from these banks.[43]

In Denmark, Norway and Finland, household debt and house prices rose during 2005. Just as in Sweden, the debt-servicing ability of the households is sound and it is hard to conceive of a scenario where households would threaten the banking sector's solvency.

In the Baltic states, household debt accumulated rapidly in 2005, by 60, 85 and 86 per cent in Estonia, Latvia and Lithuania, respectively. The expansion of credit is driven by strong domestic demand for housing as well as by households' pent-up borrowing requirement before the credit market was deregulated. The stock of debt is accordingly growing from a low level and households' debt ratio is still low.

Lending to German households, on the other hand, has been weak and the debt ratio here shows a falling trend since 2000. This is very much a consequence of the weak economic development, though demographic factors and a housing surplus have also contributed.

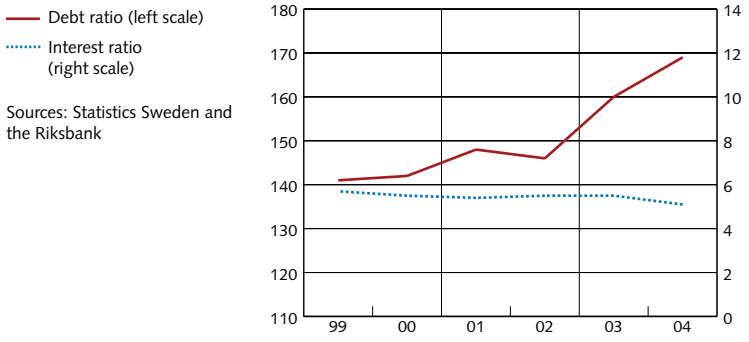
43 See Figure 3:1 for a graphic account of the Swedish banks' exposures abroad.

Households' economy in 2004

The Riksbank monitors economic developments in the household sector with the aid of Statistics Sweden's annual cross-sectional survey of households' economy (the HEK survey).[44] The results for 2004 show that, as a rule, households with large debts also have high incomes and there are no indications that households may threaten bank solvency by suspending payments on their loans.

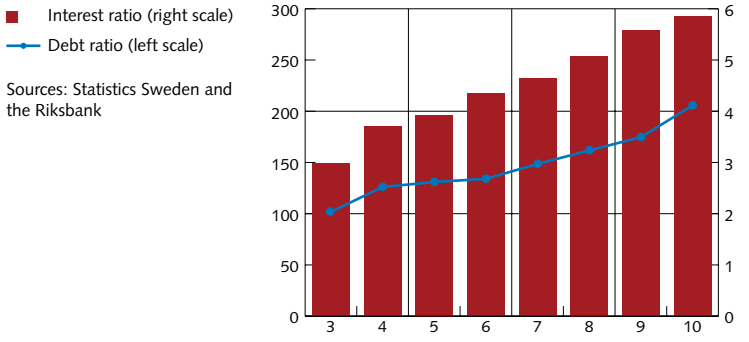
The survey is based on a sample of just over 20,000 households, drawn from a population of almost 4.9 million households. The advantage of exploring the household sector with micro data is that one can examine the distribution of debt and income within the sector and thereby identify any weak aspects that are liable to go undetected in aggregated data from the financial or the national accounts. The resultant picture of households' economy may differ from that conveyed by aggregated debt and interest expenditure ratios because the latter also include incomes of households that do not have debts. For indebted houses only, the interest ratio has been notably stable at just over 5 per cent from 1999 to 2004 (see Figure B12). The drawback with micro data is that, compared with aggregated data, there is a much longer time lag before they are published.

Figure B12. Debt and interest expenditure ratios for indebted households
Per cent



Sources: Statistics Sweden and the Riksbank

Figure B13. Debt and interest expenditure ratios, by income deciles
Per cent



Sources: Statistics Sweden and the Riksbank

Given the rapid increase in households' debt ratio in recent years, it is pertinent to identify the households that carry the major share of total debt and to map their private financial situation. Figure B13 presents debt and interest ratios for different income deciles in the household sector.[45]

As Figure B13 shows, there is a strong relationship between households' debt ratios, interest ratios and income. The households with the largest debts and the highest interest expenditures (in absolute terms as well as in relation to disposable income) belong to the group of households with the highest incomes.

A calculation of households' financial margins can serve to indicate households' ability to manage negative shocks to their private economy. Financial margins are calculated as follows:

A household's margin = the household's disposable income after deductions for interest expenditure, other housing expenditure and expenditure for a reasonable standard of living.

A zero or a negative margin implies that the household has no possibility at all of coping with strains on its private economy without selling assets, if any. Figure B14 shows the percentage of households in each income decile that have no financial margin, together with each income

44 For an account of the Riksbank's analysis of households' economy, see the article on pp. 61–69 in *Financial Stability Report* 2004:1.
45 The income categories are constructed by dividing households into ten equally large groups (deciles) in ascending order of income. The study then focuses on the indebted households in each income decile.

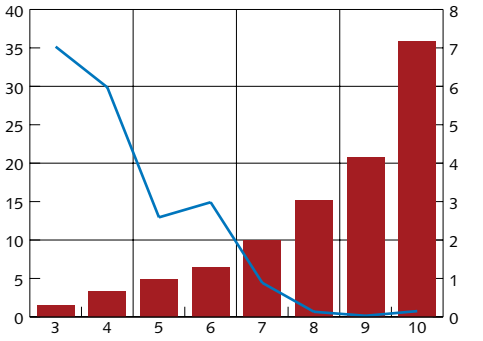
decile's share of total household sector debt. More than half of the debt (57 per cent) is in the top two income deciles, where financial margins are substantial (less than one per cent of the households in these two deciles have no financial margin). The study also shows that the households with the largest debts have the largest assets, too (see Figure B15). Each income decile's share of debt is similar to its share of assets. Households in the top two income deciles own more than 60 per cent of total financial wealth and thus generally have large financial assets that can be disposed of to manage any problems with liquidity in the event of sickness or unemployment.

It seems to have been mainly households in the top two income categories that increased their debts from 2003 to 2004; their combined share of total debt grew 2 percentage points (from 55 to 57 per cent).As financial margins are substantial in these two income categories, the increased debt does not entail an appreciable weakening of the household sector's debt-servicing ability.

Not surprisingly, households' debt burdens vary over regions, see Table B1. In Stockholm, debt amounts to 208 per cent of the disposable income of indebted households, while outside the three metropolitan regions the ratio is 152 per cent. The interest ratio, however, is not much higher in the metropolitan regions compared with the rest of Sweden. In terms of the interest ratio for the group of households that own their dwellings (thereby excluding households with small loans, which have a downward effect on the interest ratios in Table 1), Stockholm still ranks highest with an interest ratio of almost 8 per cent. Table B1 also shows the average price of a 1- or 2-family house. While one might expect both debt and house prices in Stockholm to be higher than in the rest of the country, it is somewhat surprising – considering the sizeable differences in average house prices – that the debt ratios in the other two metropolitan regions do not differ more from the rest of Sweden.

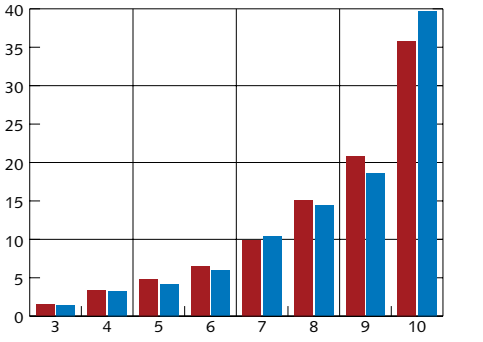
The study concerns 2004 but it seems likely (given the economic outlook in the Riksbank's and other forecasts) that the household sector will have an increasingly strong economy in the period 2006–08. If economic activity were to be weaker that expected, however, a situation could arise in which households consider they have excessive debts and therefore set about repaying loans. That would reduce aggregate demand and could lead to a further economic slowdown.

Figure B14. Share of household sector debt and proportion of households below the margin, by income deciles
Per cent



Sources: Statistics Sweden and the Riksbank.

Figure B15. Shares of household sector debt and assets, by income deciles
Per cent



Sources: Statistics Sweden and the Riksbank.

46 Household sector real wealth includes owner-occupied housing, cooperatively-owned housing, other real estate and building sites; financial wealth includes bank deposits, bonds, equity and insurance.

Table B1 – Regional breakdown of indebted households' incomes and debts

	National average	Stockholm region	Göteborg region	Malmö region	Rest of Sweden
Disposable income (SEK 1000s)	283	302	281	280	277
Debt (SEK 1000s)	478	633	494	493	421
Interest ratio (%)	5.1	6.3	5.4	5.4	4.6
Debt ratio (%)	169	210	176	176	152
Average house price (SEK 1000s)	1345	2591	1985	1992	931

Note 1:The metropolitan regions are defined in accordance with Statistics Sweden's demarcation as of 1 January 2005.

Note 2: The average house price is calculated as the annual average of a moving three-month mean. The price for the rest of Sweden is calculated as the average for all counties except Stockholm, Västra Götaland and Skåne.

Sources: Statistics Sweden and the Riksbank

In conclusion, there is always a risk of individual households obtaining unduly large loans and being obliged to make painful private financial adjustments later on. The household sector as a whole, however, is not judged to pose a threat to the banking sector by defaulting on loan payments.

Summary assessment

- Corporate sector borrowing in Sweden is still rising. The increase is occurring mainly in the trade and services sector and in real-estate management. However, the debt-servicing ability of the corporate sector is sound and in most industries both actual and expected defaults have decreased.

- Household sector borrowing is still rising, mainly from mortgage institutions, accompanied by increased house prices in 2005. A slower rate of increase in house prices as well as in household debt is foreseen from 2007 onwards. Studies on micro data show that the major part of household debt is carried by households with high incomes and wealth. The debt-servicing ability of the household sector is accordingly sound.

- Even if households are able to service debt, a situation where debt and house prices rise at an average annual rate of 10 per cent is not sustainable in the long run. House prices and the household debt ratio are both estimated to rise more slowly in the future.

- Swedish banks are becoming increasingly active in the Baltic states, with corporate as well as household credit. However, credit is growing in these countries at a rate that is not sustainable in the longer run. The economic situation in the Baltic states therefore calls for particular attention.

- In the commercial property market there is still no sign of a clear turnaround, though vacancies and rents have stabilised. Still, prices have risen in all three metropolitan areas, mainly due to a falling direct yield requirement. The spread between this requirement and the risk-free interest rate has narrowed recently, which indicates a decreased risk premium for commercial real estate.

Developments in the banks

Conditions for the major banks have continued to be very favourable, for instance with rising stock markets and low loan losses. Profitability improved in the latest four-quarter period, mainly as a result of increased securities-related income. Movements in the value of financial instruments and decreased loan losses also contributed. The Riksbank estimates that the major banks continue to be in a strong position to cope with unexpected losses.

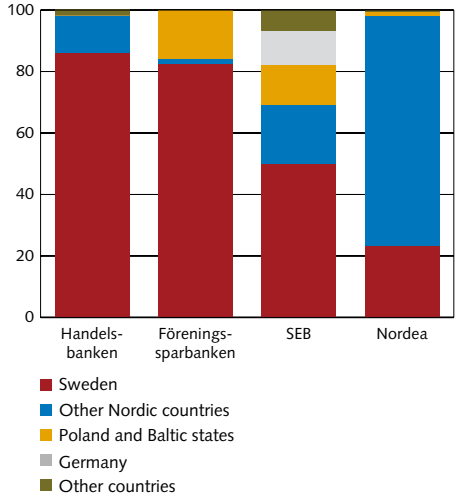
The Riksbank's analysis of banking developments concentrates on the four major Swedish banks – Föreningssparbanken, Handelsbanken, Nordea and SEB – because it is primarily these banks that are of importance for the financial system's stability. All these banks now operate to various extents in markets abroad (see Figure 3:1). The analysis deals with each bank group as a whole because it is the systemically important banks' consolidated risk exposure that is relevant for financial stability.[47]

The aspects considered in the analysis are strategic risk with respect to profitability, asset quality, capital and funding structure.

Stock-market uncertainty about the major banks' future earnings remains low. This is suggested by the development of implied volatilities of bank equity. The level is still low, though for all the major banks there has been some increase since the time of the November 2005 Report (see Figure 3:2). The low level is in line with the stock market as a whole (see Chapter 1).

The major Swedish banks have continued to expand operations, both by making minor acquisitions of other banks and by opening new branches. The banks have expanded abroad in particular, for instance in the other Nordic countries, the Baltic states, Poland and Russia. There has also been some expansion in Sweden, for example in the development of advisory services.

Figure 3:1. Geographical breakdown of operating profits for 2005
Per cent

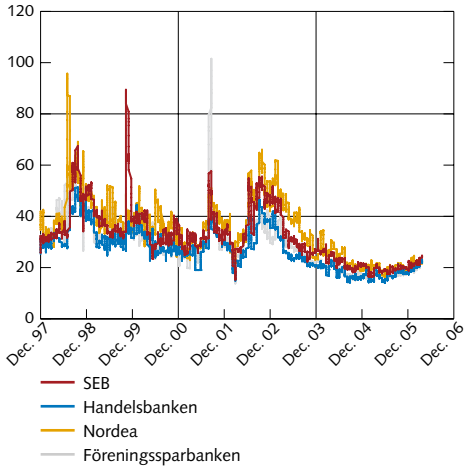


Note. For Nordea, Corporate and institutions (excl. Poland and the Baltic states), as well as Treasury, are broken down as for Retail, while profits for Asset management and life are assumed to be proportional to the volumes.

For Handelsbanken, Capital markets and Capital management are broken down as for Retail, while Pension and insurance and Other operations are assumed to belong to operations in Sweden.

Sources: Bank reports and the Riksbank

Figure 3:2. Implied volatility of bank equity
Per cent, moving 10-day average



Note. Implied volatility is calculated from 3-month bank options.

Sources: Bloomberg and the Riksbank

Profitability and earnings – strategic risk

The profitability of the four major banks rose during the latest four-quarter period; the post-tax return on equity was about 18 per cent, which can be compared with not quite 15 per cent in 2004.[48]

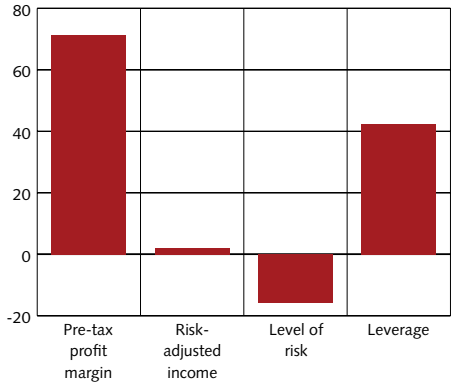
Profitability can be decomposed into profit margin, risk-adjusted income, risk level and leverage in order to see what the improvement means for the banks.[49] An increase in the first two components can be assumed to strengthen a bank's resilience. A higher profit margin implies a greater difference between incomes and expenditures, while increased risk-adjusted income means that income has risen relative to risk-weighted assets. An increased risk level or higher leverage can

47 Unless stated otherwise, the term major banks accordingly refers here to the bank groups.

48 The latest four-quarter period runs to the end of 2006 Q1. Unless stated otherwise, comparisons are with the preceding four-quarter period. All performance data have been adjusted for sizeable one-off effects. As of 2005 the banks present financial statements in accordance with IFRS (see the box on pp. 49–51 of Financial Stability Report 2005:1). The banks have also presented versions of statements for 2004 that follow IFRS and these have been used here in comparisons with the preceding four-quarter period.

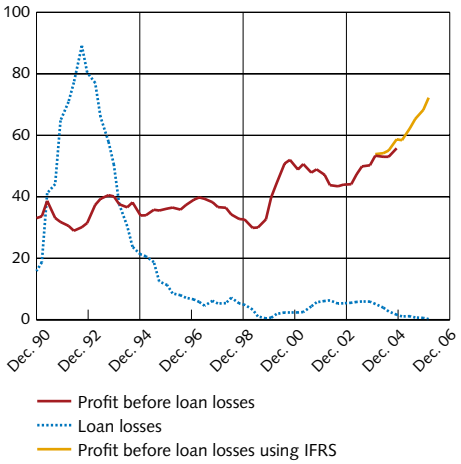
49 The components are explained in more detail in a box on pp. 35–36 in Financial Stability Report 2004:1.

Figure 3:3. Pre-tax return on equity
Per cent



Note. The data refer to the latest four-quarter period.
Sources: Bank reports and the Riksbank

Figure 3:4. Profit before loan losses and net loan losses in the major banks
Four-quarter figures. SEK billion, 2006 prices



Sources: Bank reports and the Riksbank

mean that the bank is taking greater risks, in which case it does not necessarily represent an increase in resilience. A higher risk level may mean, for example, that the bank has enlarged its assets by lending capital to projects that carry more risk, while higher leverage implies increased debt.

$$\text{Pre-tax ROE} = \overbrace{\frac{\textit{pre-tax profit}}{\textit{operating income}}}^{\text{profit margin}} \times \overbrace{\frac{\textit{operating income}}{\textit{risk-weighted assets}}}^{\text{risk-adjusted income}} \times \overbrace{\frac{\textit{risk-weighted assets}}{\textit{total assets}}}^{\text{risk level}} \times \overbrace{\frac{\textit{total assets}}{\textit{equity}}}^{\text{leverage}}$$

In the late 1990s there was a decline in profitability, partly because interest rates fell and the banks' margins decreased. The downward trend was broken briefly in 2000 when stock markets rose sharply and this generated increased equity-related income, leading to improved profit margins. The subsequent stock-market fall in 2001 and 2002 reduced bank earnings and profit margins deteriorated. Another reason for the lower margins was that the banks had not yet adjusted costs to the deteriorating market.

Since 2003, however, the banks' profit margins have improved continuously, partly in connection with increased equity-related income and cost-cutting. These developments continued in the latest four-quarter period (see Figure 3:3).

Leverage also increased, which can indicate that the banks are taking greater risks. To some extent, the increased leverage was compensated by a falling level of risk, that is, balance-sheet assets grew more rapidly than assets adjusted for risk. However, a partial explanation for the changes in leverage and risk level may be that since January 2005 the banks present their accounts in accordance with new rules. As a result of the rule changes, more assets are booked at current market values and additional assets are included in the balance sheet.

Underlying earnings for the four major banks, defined as profit before loan losses at constant prices, rose almost 24 per cent in the latest four-quarter period (see Figure 3:4). This was accompanied by markedly lower loan losses, which are now at the lowest level since the early 1990s. This has lead to a further increase in the difference between loans losses and underlying earnings.

To see what lies behind the increased profit margins, one can look at the development of incomes and expenditures. Over a third of the improvement in profitability in the latest four-quarter period can be attributed to a better core performance – net interest and commission incomes less expenditures and loan losses (see Figure 3:5).

Income from commissions rose in particular, mainly because the continued increase in equity prices and higher turnover improved the banks' earnings from securities trading and asset management (Figure

3:6).[50] Securities-related earnings currently contribute more than half of net commission income, which can be compared with about 40 per cent in 2002.

Payment-related commissions are a more stable source of commission income. The increase in the latest four-quarter period was just over 3 per cent. The growth of income from commissions of this type is partly explained by the increasingly widespread use of payment and credit cards.

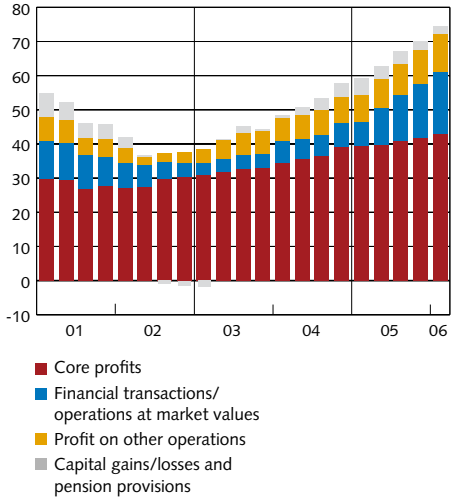
Although interest margins continued to narrow in the latest four-quarter period, net interest income (the largest source of bank income) increased as a result of the continued expansion of lending to the household and corporate sectors.[51] The lower loan losses also contributed to the improvement in core performance. Staff-related costs rose, however, in the latest four-quarter period, with a negative effect on core performance.

More than half of the improvement in profitability in the latest four-quarter period came from changes in market values for bank assets. Under the new accounting rules, more assets are booked at current values and changes in value are presented to a greater extent in the profit and loss account, making this item more volatile than before.[52] During the latest four-quarter period, rising stock markets led to increased equity-related earnings. Some of the banks also include income and value changes for insurance operations; this item also contributed to the improvement. Exchange-rate movements also had a positive effect on some banks' profits and so did the development of interest rates – the long-term rates were lower in the latest four-quarter period, though they did start to rise towards the end. A continued increase in long-term interest rates could mean that the value of the banks' bond portfolios falls.

All in all, the profitability of the banks and their capacity for coping with unexpected events seem to be sound. The future in this respect will depend in part on the development of stock markets and the growth of lending. A hypothetical example illustrates how a lower increase in volume would affect net interest income. With no increase in volume but unchanged pressure on margins, net interest income in the latest four-quarter period would have been around 5–12 per cent lower.[53] As net interest income is the largest source of bank earnings, profitability would have been impaired by 19–28 per cent.

In the Swedish market, increased lending is foreseen to households as well as the corporate sector, albeit in time at a somewhat slacker rate. However, it is difficult to tell whether the growth will be sufficient to compensate for the possibility of continued pressure on lending margins in this market.

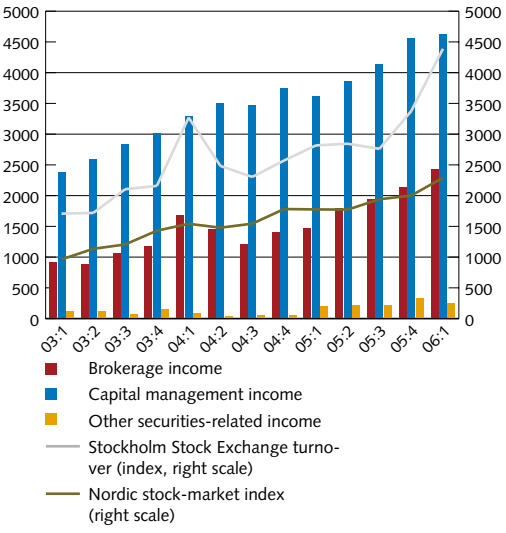
Figure 3:5. The major Swedish banks' profits
Four-quarter figures, SEK billion



Note. Core profits are net interest and commission income less total costs and loan losses. The profit on other operations comes from other earnings, minority interests and insurance operations.

Sources: Bank reports and the Riksbank

Figure 3:6. The major banks' securities-related commission income, Stockholm Stock Exchange turnover and a Nordic stock-market index
SEK million and index: 1997=100



Note. The Nordic stock-market index is from Financial Times.

Sources: Bank reports, Reuters EcoWin and the Riksbank

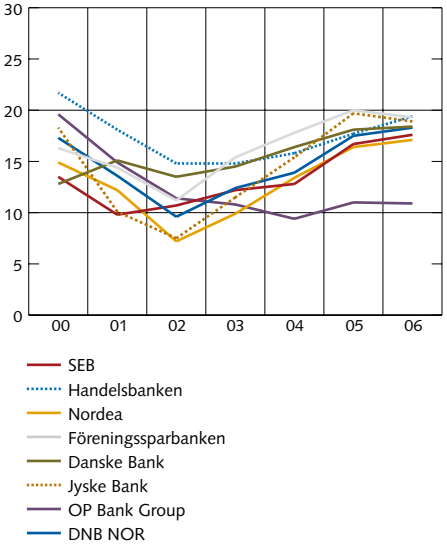
50 Net commission income for the four major banks does not include either Handelsbanken's insurance item or Nordea's life assurance item.

51 For a more detailed account, see the box on pp. 47–49.

52 The greater volatility connected with the new accounting rules does not necessarily imply a change in the banks' operations. However, comparisons are more difficult than before because of certain differences between the banks' reporting. Another problem with comparisons is that for 2004, not all the banks reported financial instruments in accordance with IAS 39 (Financial instruments: Accounting and evaluation).

53 This examples assumes that the volume of lending to the public did not increase from the preceding four-quarter period.

Figure 3:7. Post-tax return on equity
Per cent



Note. DNB NOR 2000–03 is pro forma. 2006 is the latest four-quarter period.

Sources: Bank reports and the Riksbank

As in the major Swedish banks, profitability in the other major Nordic banks has increased since 2002 (see Figure 3:7).[54] Average profitability in the latest four-quarter period was above the latest high in 2000. The improvement was mainly a result of higher profit margins, which chiefly mirrors a combination of increased earnings and low loan losses. Just as in the case of the Swedish banks, a weak increase in net interest income has been accompanied by strong growth for net commission income and other income. Here, too, the new accounting rules have contributed to the improved profitability, with greatly increased income from operations at current market values.

54 The reason for making certain comparisons between the major Swedish banks and four other major Nordic banks, even though these are not regarded as systemically important in Sweden, is that the former's operations abroad are in much the same markets as the latter.

Net interest income and bank costs

As net interest income is the principle source of bank income, it may be of interest to take a close look at its development. The costs of the major Swedish banks are also considered and a comparison is made with the other major Nordic banks.

Net interest income

The share of bank earnings that comes from net interest income shows a downward trend in the longer run. In the late 1990s this was partly due to narrower margins but it also mirrored a growing share for equity-related income. Strongly rising stock markets and increased private saving generated increased bank income from commissions for asset management, life assurance and investment banking. In 2000, little more than half of total bank earnings came from net interest income. In 2001 and 2002, however, net interest income's share of total earnings increased, partly because stock markets fell. At present, though, net interest income is again contributing not much more than half of total bank earnings and the share for equity-related income has grown (see Figure B15).

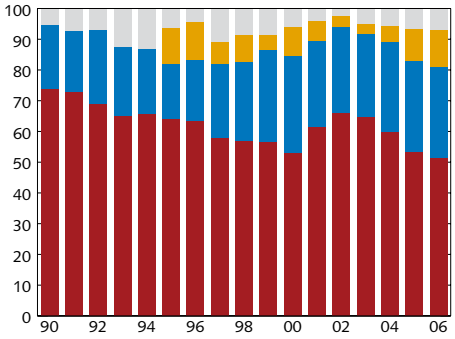
In the Swedish market, the fall in interest rates since 2002 has depressed the banks' lending margins. Simplifying somewhat, the lending margin is the difference between the rate a bank obtains by investing money in the market and the rate it pays to customers for the money. A falling interest rate market means that the banks earn less on their investments there, so they lower their deposit rates. However, as the interest rate on many types of bank account is already very low or even zero, it cannot be cut even more and a decreased market rate therefore reduces the banks' margins.

Even when the lower market rates strengthened lending margins initially, this could not entirely make up for the pressure on deposit margins. The improvement in Swedish lending margins was also broken in 2004 and has decreased since then, partly as a consequence of growing competition from mortgage lending in particular (see Figure B16).

In spite of continued pressure on margins, in the latest four-quarter period the net interest income of the major banks rose by about 3 per cent. The growth came mainly from increased volumes of house mortgage loans as well as corporate loans.[55]

In contrast to the Swedish market, the pressure on bank margins is not as pronounced in other markets, though the pattern in some of the other Nordic countries does seem to resemble that in Sweden. For some of the banks, the combination of lower pressure on margins

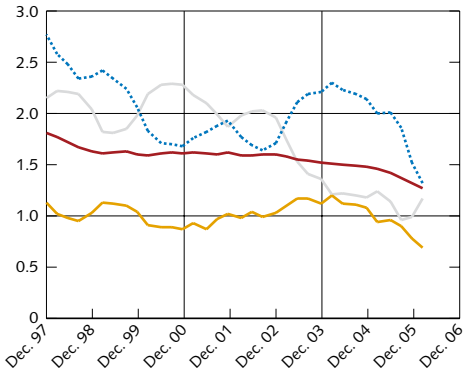
Figure B15. Breakdown of the major banks income
Per cent



Note. 2006 is the four latest quarters.

Sources: Bank reports and the Riksbank

Figure B16. Net interest margin and spreads for the major banks on deposits, bank loans and mortgage loans
Per cent, moving 4-quarter average

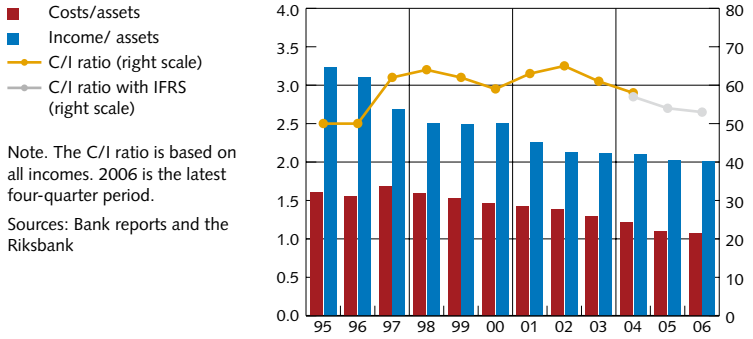


Note. The spreads are the difference between the average bank rate and the six-month treasury bill rate, and between the average mortgage rate and the three-month treasury bill rate. For banks whose operational net interest income differs markedly from the legal figure, the former is used here.

Sources: Bank reports and the Riksbank

55 Part of the increase is a consequence of the new accounting rules.

Figure B17. Cost efficiency of the major banks
Per cent



Note. The C/I ratio is based on all incomes. 2006 is the latest four-quarter period.

Sources: Bank reports and the Riksbank

and strong volume growth in operations abroad is the main explanation for the improvement in net interest income.

The pressure on margins mainly applies to new lending and to loans with a variable interest rate. Margins are higher on a large part of the banks' loan stocks for which interest was fixed when rates were higher. However, these loans will be renegotiated successively when the period at a fixed rate expires and that could result in lower margins as a consequence of competition and the generally low level of interest rates. In the longer run, a growing share of the loan stocks may therefore have lower margins. So given unchanged competition, there is unlikely to be a marked future improvement in lending margins.

Higher market interest rates, on the other hand, should have a favourable effect on deposit margins. The development of net interest income will therefore probably depend on higher interest rates, continued volume growth and the expansion of operations abroad, where the banks' margins are higher.

Costs

The costs of the major banks rose about 6 per cent in the latest four-quarter period, mainly due to increased staff costs. One explanation for the higher staff costs is some minor acquisitions and expansion in a number of fields, whereby the number of employees rose about 4 per cent. Another factor behind the higher staff costs is increased variable staff costs in connection with higher equity-related earnings.

The costs/income (C/I) ratio has improved continuously since 2002, when the banks initiated extensive cuts to bring costs into line with the lower level of income at that time. The cost-cutting could thus be seen as a strategy for managing the loss of income that was partly a consequence of falling stock markets. Although costs increased in the latest four-quarter period, the C/I ratio continued to improve because income rose even more (see Figure B17).

There has also been some improvement in the relationship between costs and assets. However, the relatively marked change from 2004 to 2005 is partly explained by a higher valuation of assets in connection with the new accounting rules.

Even when the major cost-cutting programmes have been implemented and expansion leads to certain increases in costs, the challenge for the future should be to generate increased income at a given level of assets and stable costs. This has proved difficult to date. The income/assets ratio shows a downward trend since 2000, though higher income in 2004 did result in stabilisation. In the latest four-quarter period, the income/assets ratio did not improve even though income rose.[56]

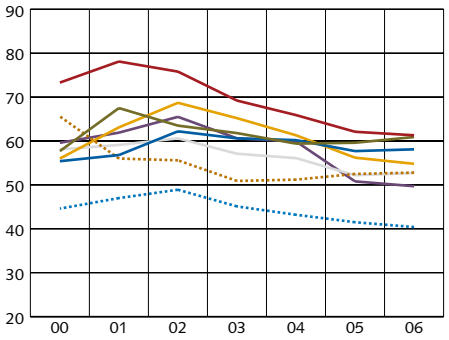
The C/I ratios for the other major Nordic banks have also improved in recent years, as costs have been relatively stable and income has risen. Swedish banks have the lowest as well as the highest C/I ratio of all the major Nordic banks (see Figure B18).

This is partly explained by differences in the composition of operations, because a large element of investment banking usually entails a higher level of costs compared with other banks.

56 Larger assets worsen the income/assets ratio in much the same way as they improve the costs/assets ratio.

The C/I ratios for most of the Nordic banks lie in the interval 50–60 per cent. The biggest change from 2004 to 2005 is for DNB NOR; in addition to increased income, this is explained by synergism, above all from the merger with Gjensidige.

Figure B18. Cost/income ratios
Per cent



Note. The data for 2006 are for the latest four-quarter period.

Sources: Bank reports and the Riksbank

Assets and capital – credit and market risk

The assets of the major banks rose about 20 per cent in the latest four-quarter period, to a total of over SEK 8100 billion. Some minor acquisitions contributed to the increase but this also came from a change as of 2005 to market valuation for additional assets. Interest-bearing securities and the item other assets, which includes equity and derivatives, rose appreciably. However, the growth of assets was also a result of increased lending to both the household and the corporate sector.

As mentioned earlier, in the latest four-quarter period there was some fall in the level of risk, that is, assets weighted for risk decreased relative to total assets (see also Figure 3:3). It was mainly assets weighted for credit risk that decreased relative to total assets, possibly as a result of the rapid expansion of mortgage lending, which has a lower risk weight than corporate lending (see below under Lending).[57]

Assets weighted for market risk rose, on the other hand, in the latest four-quarter period, which points to increased market risks. For some of the banks there was also some increase in 2005 in value at risk (VaR), which measures the need for capital cover. The higher VaR levels did not come from market volatility, which did not rise in this period. This supports the impression that some banks are taking larger risks.

As mentioned in Chapter 1, long-term interest rates are low in relation to the economic situation and the tightening of monetary policy. It may therefore be of interest to estimate how a sudden adjustment of interest rates would affect bank profits. A quick parallel upward shift of 100 basis points in the yield curve would have lowered bank profits in 2005 by up to 21 per cent as a result, all else equal, of effects on the banks' interest-bearing assets and liabilities.[58] This presupposes, however, that the banks absorbed the entire change in value, which is less likely because the banks are not obliged to present all changes in interest-bearing assets and liabilities directly in the profit and loss account. In relation to each bank's capital base, the fall in value would have amounted to between 1.7 and 5 per cent.

LENDING

In the past, credit problems in the banking sector have often been preceded by a rapid expansion of lending, so this can serve as a warning about the level of risks in banking, though high lending growth by no means always leads to greatly increased loan losses.

Lending by the major banks rose almost 15 per cent in annual terms. The rates for the individual banks were in the relatively narrow interval of 14 to 16 per cent.

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57 The fall is also a consequence of an increased level of assets in connection with the new accounting rules.

58 The result of the stress test differs between the banks, partly because some banks do not report off-balance-sheet items. Because of accounting differences between the banks and to increase the "stress" on profits, equity capital is excluded.

The sector breakdown of a bank's portfolio can serve as an approximate measure of the degree of diversification. The changes in this respect in recent years have been marginal. Lending to the corporate sector is the largest component but the share for house mortgage loans is growing. In 2005, when total lending by the major banks rose more than SEK 650 billion, about 30 per cent of the increase consisted of mortgage loans to households (see Figure 3:8). Lending to several parts of the corporate sector rose relatively strongly in 2005. The largest shares were for real-estate management and the trade and services sector.

Lending to the corporate sector in Sweden began to pick up in 2005 after weak growth for a couple of years. As the rate slowed somewhat early in 2006, the increase in annual terms in the latest four-quarter period was almost 6 per cent.[59] There were considerable differences between the banks, with average growth rates of about 8 and 9 per cent for Föreningssparbanken and Nordea, respectively, but only 2 and 4 per cent for SEB and Handelsbanken, though for SEB the rate had been considerably higher earlier in the period (see Figure 3:9).

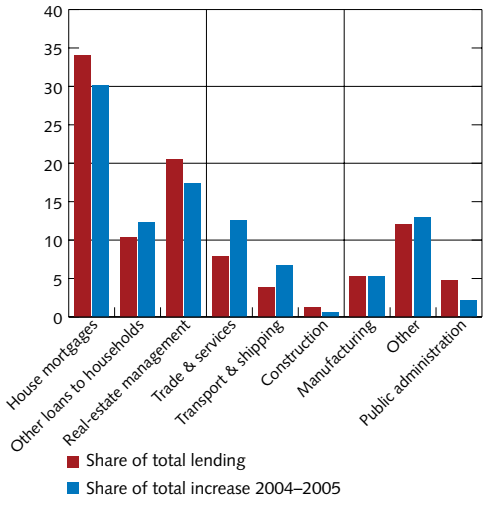
Lending to the household sector continued to rise in the latest four-quarter period at a rapid rate, almost 12 per cent in annual terms for the major banks. The main factor behind this growth is increased lending by mortgage institutions. The rate was highest, around 16 per cent, for SEB, followed by about 13 per cent for Nordea, 11 per cent for Handelsbanken and 10 per cent for Föreningssparbanken (see Figure 3:10).

Although lending to households is rising rapidly, the market shares of the major banks are relatively stable and even tending to fall. Market share is being taken above all by Danske Bank, SBAB and Länsförsäkringar Bank.

In the other Nordic countries, lending to households also rose relatively strong in 2005, by between 13 and 15 per cent (see Chapter 2). In Norway, lending to the corporate sector grew somewhat faster than to households, while in Denmark the rates to these two categories were much the same. In Finland, lending to the corporate sector rose around 8 per cent. In the Baltic states, lending continued to expand strongly, with rates between 60 and 87 per cent to the household sectors and between 42 and 50 per cent to the corporate sectors.

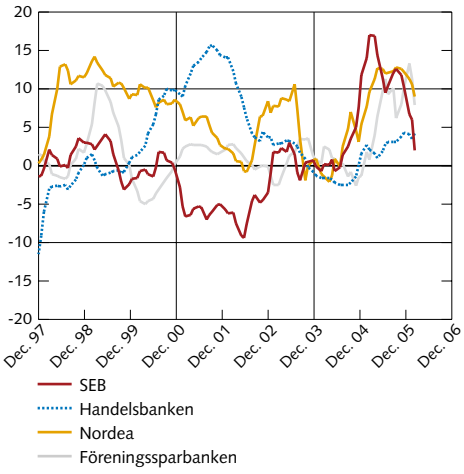
Exposures to markets abroad differ between the major Swedish banks. Nordea and SEB have relatively large proportions of their operations in other countries, while Föreningssparbanken and Handelsbanken operate mainly in Sweden (cf. Figure 3:1). Lending abroad by all these banks grew faster than lending in Sweden (see Figure 3:10). Föreningssparbanken's high rate for lending abroad is due in turn to this bank's exposures in the Baltic states.

Figure 3:8. Stock of loans to the general public: sector breakdown and share of growth
Per cent



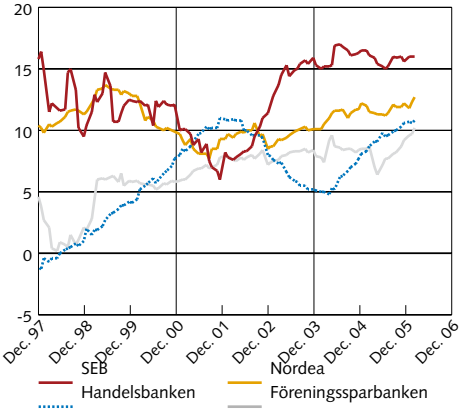
Sources: Bank reports and the Riksbank

Figure 3:9. Lending by credit institutions to companies in Sweden
Percentage 12-month change, three-month moving average



Source: The Riksbank

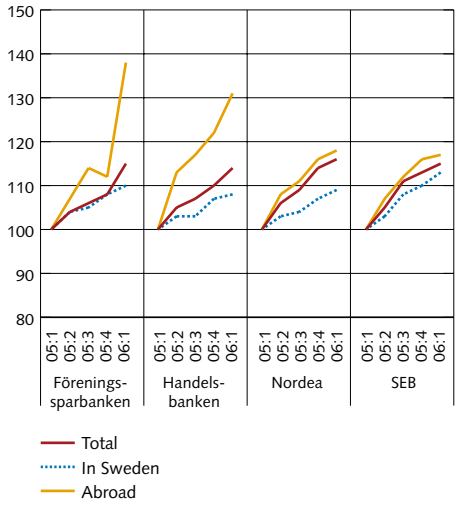
Figure 3:10. Lending by credit institutions to households in Sweden
Percentage 12-month change



Source: The Riksbank

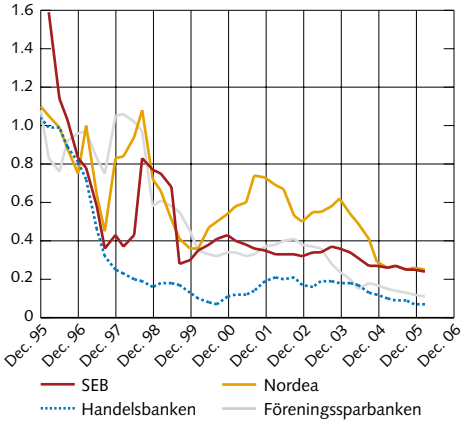
59 Expressed as the quarterly mean of twelve-month rates.

Figure 3:11. Lending to the public in Sweden and abroad
Index: 2005 Q1 = 100



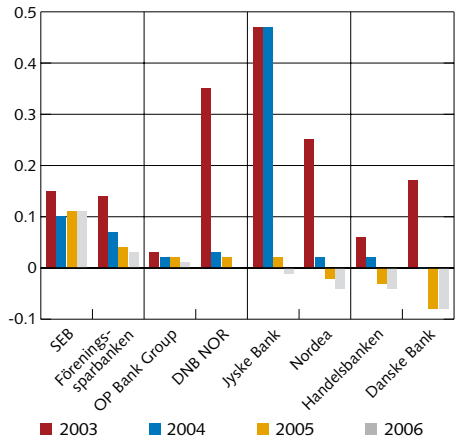
Sources: Bank reports and the Riksbank

Figure 3:12. Provisions for incurred and probable loan losses
Per cent of loan stock, accumulated over four quarters



Sources: Bank reports and the Riksbank

Figure 3:13. Loan losses, net
Per cent of loan stock



Note. DNB NOR 2003 is pro forma. 2006 is the latest four-quarter period.

Sources: Bank reports and the Riksbank

The considerably lower rate abroad for SEB, notwithstanding the exposures to the Baltic states, is partly explained by the lack of growth in lending in Germany.

CREDIT QUALITY

Indicators of the quality of a bank's loans are provided by the ratios of impaired loans and loan losses to the total loan stock.[60] Both these ratios concern existing or observable deteriorations in the quality of credit and therefore say nothing about the probability of further losses in the future.

The impaired loans ratio has continued to fall for the four major banks and at the end of the latest four-quarter period it was 0.7 per cent of the loan stock. Provisions by the major banks are not falling as much. On the contrary, for a number of the major banks the ratio of provisions to impaired loans has increased successively in recent years.

The level of net loan losses is more or less negligible in the latest four-quarter period. In the two preceding years, diminishing loan losses mirrored decreased provisions for new and probable loan losses (see Figure 3:12). In the latest four-quarter period, however, the reduction of loan losses was mainly due to increased recoveries, with little change in provisions relative to the loan stock. In Nordea and Handelsbanken, recoveries and reversals have actually exceeded provisions for a number of quarters.

In the other Nordic countries, loan losses also decreased in the latest four-quarter period and are likewise very low (see Figure 3:13). The reason is that the economic climate, with low interest rates, has helped to improve the financial situation of the banks' borrowers and thereby led to increased reversals. As in the case of Handelsbanken and Nordea, loan losses in Danske Bank and Jyske Bank had a positive effect on profits in the latest four-quarter period as a consequence of decreased provisions accompanied by large recoveries and reversals. It was in Jyske Bank that loan losses fell most in the period, mainly due to extensive reversals.[61]

With the comparatively favourable economic growth in the coming years that the Riksbank assumes in the February Inflation Report's main scenario, there are no cyclical grounds for expecting a marked increase in loan losses. This impression is strengthened by the assessment that the corporate debt-servicing ability remains sound and the expected default frequency is low (see Chapter 2).

As noted already, lending to the real-estate sector rose comparatively rapidly in 2005. The increased rate, together with a falling direct yield requirement from investors even though long-term interest rates are now tending to rise, leads to some uncertainty in the Riksbank's view of the future (see the box on pp. 31–32).

60 Impaired loans are gross before accumulated reserves; loan losses are calculated as the net of provisions for actual and expected loan losses after recoveries and reversals.
61 About 30 per cent of the reduction was due to changes in Jyske Bank's management of provisions.

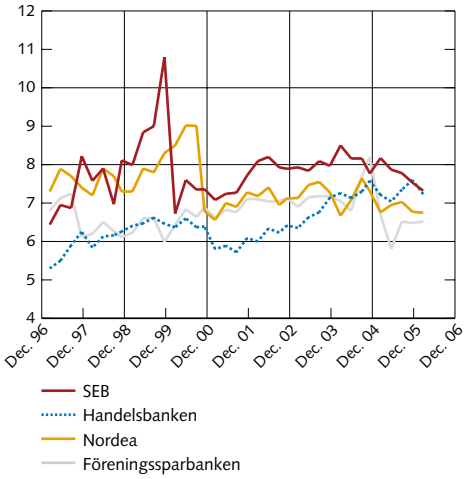
In the Baltic states, the rapid expansion of credit is associated, as before, with some risks. Imbalances can grow up that have consequences further on for both macroeconomic and financial stability. However, credit is rising from a level that is low compared with other European countries. Much of the lending is arranged in euro, so that borrowers carry an exchange risk which could entail debt-servicing problems in the event of a sudden weakening of the Baltic states' currencies.[62]

The major Swedish banks differ in their presence in the Baltic states (see Figure 3:1). SEB and Föreningssparbanken have the largest exposures and between 7 and 9 per cent of their total lending goes to these countries, which contribute around 13 per cent of their operating profits. So a change in the economic prospects in the Baltic states could have an appreciable effect on these banks' profitability.

In terms of their profits for the latest four-quarter period, the major Swedish banks could currently cope with total loan losses up to between 1.5 and 1.7 per cent of their loan stocks before their profit turned negative.[63]

At present, the development of these banks' lending and loan losses does not appear to pose any problems. Experience has shown, however, that it is in this stage that, by easing credit policies in various ways, banks pave the way to future loan losses. There is therefore reason to pay close attention to the quality of credit in different segments and markets.

Figure 3:14. Tier 1 capital ratios of the four major Swedish banks Per cent



Sources: Bank reports and the Riksbank

CAPITAL

The Tier 1 capital ratio and capital adequacy of the major Swedish banks at the end of the latest four-quarter period averaged 6.9 per cent and 9.6 per cent, respectively. Despite the improvement in profitability, the Tier 1 capital ratio was the same or lower than in the preceding four-quarter period (see Figure 3:14). Part of the explanation is that the banks have adjusted their capital structure by increasing their dividends and buying back equity. Moreover, risk-weighted assets rose faster than Tier 1 capital, partly as a consequence of lending growth and the higher market-related assets weighted for risk. The reduced capital of Föreningssparbanken is explained by the acquisition of the remaining equity in Hansabank at the beginning of 2005.

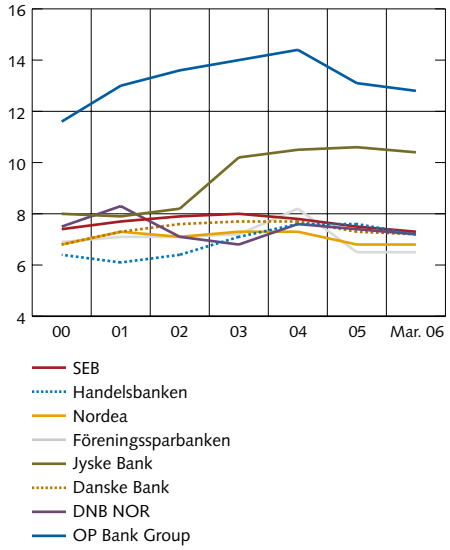
The banks have successively increased the element of hybrid capital in Tier 1 capital; for some of the banks its level is now close to 15 per cent, which is the upper limit in Sweden.[64] It follows that, excluding hybrid capital, the Tier 1 capital of the major banks has decreased. The limited possibility of including additional hybrid

62 Note, however, that companies with a large proportion of foreign currencies in their operations are not necessarily exposed to exchange risk in their borrowing.

63 The level is calculated on net loan losses and disregards the fact that increased loan losses entail decreased interest income.

64 Hybrid capital is a form of subordinated debt that is a cross between equity and loans. Finansinspektionen's rules limit this form of capital to 15 per cent of Tier 1 capital.

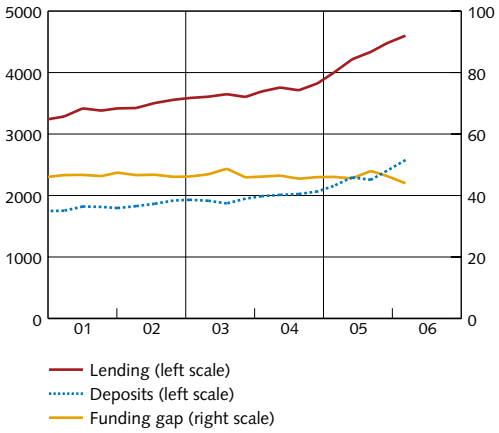
Figure 3:15. Tier 1 capital ratios of the major Nordic banks
Per cent



Note. DNB NOR 2000–2003 is pro forma. March 2006 includes the total profit or 50 per cent of this.

Sources: Bank reports and the Riksbank

Figure 3:16. The major Swedish banks' deposits, lending and funding gap
SEK billion and per cent



Sources: Bank reports and the Riksbank

capital, combined with the capital required for continued market growth, no doubt means that greatly increased dividends or large equity buy-backs are less likely in the near future.

A majority of the major Nordic banks have a Tier 1 capital ratio of around 7 per cent (see Figure 3:15). Two banks, Jyske Bank and OP Bank Group, deviate from this general trend. Jyske Bank's ratio is currently about 2 percentage points above the bank's target. The explanation for OP Bank Group's high level may be that the required return differs from that of the other, listed, banks, making it less pertinent to keep capital as low as possible. This is also clearly mirrored in the bank's profitability, measured as the return on equity (see Figure 3:7).

Funding – liquidity risk

FUNDING

A major social function of a banking system is the conversion of liquid liabilities, in the form of deposits and borrowed funds, into illiquid assets, in the form of credit. The nature of banking, with short-term deposits and long-term credit, renders banks vulnerable to problems with funding. The structure of funding is therefore a central issue for stability.

The major banks arrange about 75 per cent of their funding with interest-bearing liabilities. In the past ten years, almost half of these liabilities have consisted of deposits from the public and the other half has been market-funded. Deposits from the public are normally a stable source of funds, while market funding is probably more volatile because participants in the interbank and securities markets are sensitive to ratings and confidence. The latter sources of funds are therefore likely to be the first to dry up if a bank's debt-servicing ability is questioned.

The major Swedish banks have had a deposit deficit in their domestic market since the early 1980s (lending to the public has exceeded deposits). At the end of the latest four-quarter period, the deposit deficits of the four major banks totalled over SEK 2000 billion. As Figure 3:16 shows, however, lending and deposits have developed similarly in relative terms in recent years, which means that in principle the funding gap (net lending in relation to total lending) has been constant.[65] In the past two quarters, deposits have even risen faster than lending, thereby reducing the funding gap. This was mainly a consequence of a strong increase for deposits in operations abroad and in the corporate sector in Sweden.

The funding gap represents the proportion of bank lending that is not covered by deposits and therefore has to be funded in the market. All four of the major banks are dependent for funds on the interbank and securities markets, though to a varying degree.

65 (Lending–deposits)/lending.

Föreningssparbanken and Handelsbanken have funding gaps of about 60 and 50 per cent, respectively, while the gaps for Nordea and SEB are smaller, around 40 and 30 per cent. The differences between the banks' market funding requirements are explained by differences in the composition of the banks' operations. Föreningssparbanken and Handelsbanken have larger proportions of their operations in house mortgage lending, which entails a large securities funding requirement.

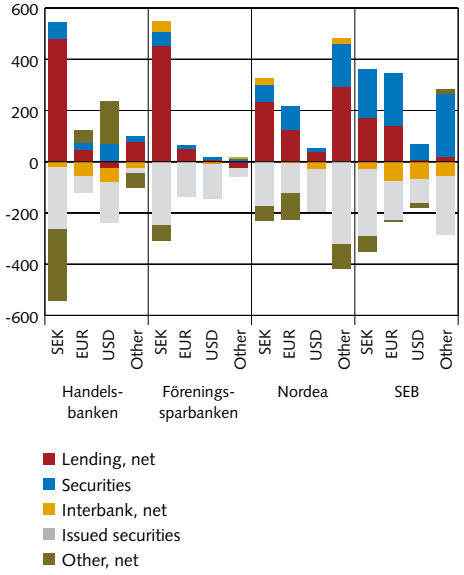
Foreign-currency market borrowing is a substantial item for the major Swedish banks. Their participation in foreign interbank and securities markets used to be confined to borrowing, as a source of funds for lending to the public in Sweden. Nowadays the major banks also undertake banking on behalf of the public in other countries, which means that they have to fund deposit deficits there as well. As derivatives are used to match the currency compositions of the loans and assets, funding in a different currency does not necessarily give rise to exchange risk.

Derivatives have been included in bank balance-sheets as of 2005 and there is now a closer match between assets and liabilities in each currency. The pattern of funding differs, however, between the four major banks, depending on the composition of their operations. As the major part of the operations of Föreningssparbanken and Handelsbanken is in the Swedish market, these two banks have large deposit deficits and thereby funding gaps in Swedish kronor. Handelsbanken covers this gap mainly by issuing US dollar securities, which are then largely swapped for Swedish kronor to eliminate the exchange risk.[66] Föreningssparbanken also relies on the US securities markets but also undertakes substantial funding in euro (see Figure 3:17).

Nordea undertakes sizeable net lending in Denmark and Norway and funds this mainly in the Danish securities market (Danish and Norwegian kronor are included in "other currencies"). Nordea's borrowing in US dollars and euro is also relatively large. SEB likewise obtains funds in the Danish market, while lending in Germany and the Baltic states appears to be funded mainly in the euro market.

In the interbank market, Handelsbanken and SEB are net borrowers in all currencies. The absence of corresponding lending positions suggests that to some extent these two banks use interbank borrowing to fund lending. For Nordea and Föreningssparbanken, on the other hand, interbank lending exceeds interbank borrowing.

Figure 3:17. The major Swedish banks' interest-bearing assets and liabilities, December 2005
SEK billion



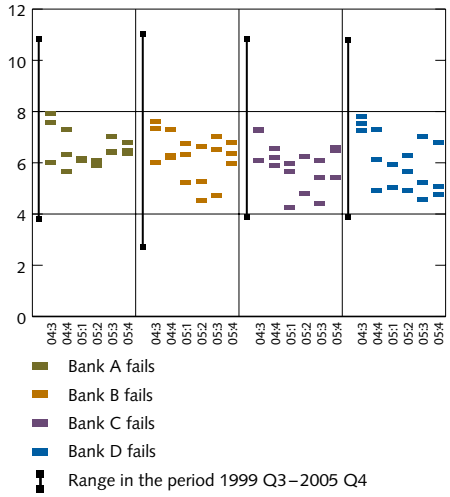
Sources: Bank reports and the Riksbank

COUNTERPARTY EXPOSURES

The central role of the major banks in the Swedish payment system, as well as in the Swedish markets for securities, currency and derivatives, entails considerable exposures to counterparties and settlements. The probability of default is low as a rule because the

66 A currency swap is an agreement to exchange one currency for another for a specified period.

Figure 3:18. Tier 1 capital ratios in the four major Swedish banks after one of them has defaulted
Per cent. Recovery 25 per cent



Note. The impact accordingly represents a situation where a 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 ratios in the figure should therefore be seen as outcomes of an extreme stress test.

Source: The Riksbank

exposures are primarily to other financial institutions and large non-financial companies. But if a default were to occur, the consequences for other major banks could be serious.

In order to monitor the risks of contagion, both within and from outside the Swedish banking system, since 1999 the Riksbank has compiled data on the major banks' counterparty and settlement exposures. Foreign exchange settlements made up the single largest exposure item prior to 2002. Since then, these exposures have decreased, after 2003 mainly a result of the Swedish krona's participation in Continuous Linked Settlement (CLS). However, exposures have increased in deposits in particular but also in securities.

The combined counterparty and settlement exposures of the four major banks in 2005 were about 15 per cent larger than a year earlier.

The loss by one of the major banks of a large exposure could lead to problems with solvency. The gravity of the solvency problem in the event of a counterparty failure depends not only on the size of the exposure but also on how much of the original claim the bank manages to recover. For stability, exposures to counterparties and settlements are of particular concern when the counterparty is a bank or other financial institution, because there is then a risk of problems for one bank spreading to other banks.

To gauge the risk of contagion between the major banks, tests are made on the interbank exposures the banks report at quarter ends. In each period, one bank is assumed to have suspended payments and the effect of this is observed in terms of the Tier 1 capital ratios of the other three banks. For example, given that bank A has defaulted, Tier 1 capital ratios are calculated for banks B, C and D. The calculations assume that 25 per cent of the exposure to the defaulting bank can be recovered with the aid of collateral.

The risk of contagion between the major Swedish banks is moderate. With the exposures reported for 2005, the suspension of payments by one of these banks would not have lowered any of the other banks' Tier 1 capital ratio below the statutory requirement of 4 per cent (see Figure 3:18).

Besides the risk of contagion within the Swedish banking system, there is the risk of the banks encountering problems because payments are suspended by a large company or a foreign bank. However, the counterparty exposures likewise show that in 2005, a suspension of payments by a major company or a foreign bank would not have led to solvency problems for any of the major Swedish banks.

Summary assessment

- Favourable conditions, such as a rapid increase in lending to both the household and the corporate sector, rising stock markets, lower interest rates and falling loan losses, have contributed to an improvement in the major banks' profitability in the latest four-quarter period.

- The pressure on the banks' margins is having a negative effect on net interest income. The growth of this income has therefore been contingent on an increased volume. Higher interest rates should have a positive effect on deposit margins. Apart from this, a continued increase in net interest income will depend on high volume growth in Sweden as well as in markets abroad.

- Rising stock markets were the primary factor behind the improvement in profitability because this led to marked increases in securities-related commissions in particular but also in equity-related changes in value. Just as a further improvement in bank profitability would no doubt depend on a continued increase in stock markets, so can a pronounced stock-market fall lead to appreciably poorer profitability.

- There are some indications of an increase in the banks' market risk. In an illustrative calculation, an increase of 100 basis points in market interest rates right across the yield curve from one day to the next would have lowered bank profits for 2005 by up to 21 per cent on account of changes in the value of interest-bearing assets and liabilities. However, this assumes that the banks chose to absorb the whole of the change in value.

- Loan losses have continued to fall and for the major banks their level in the latest four-quarter period was more or less negligible. Given the Riksbank's main scenario, a marked increase in loan losses for cyclical reasons seems unlikely. But there are some minor uncertainties, for instance the possibility that the strong growth in the Baltic states turns and leads to loan losses. The rising growth of lending to real-estate companies is also associated with some uncertainty.

- The risk of contagion between the major banks is moderate. Tests by the Riksbank indicate that in no case would a suspension of payments by one of these banks lower the Tier 1 capital ratio of any of the other banks below the statutory requirement of 4 per cent.

- The funding gap of the major banks continues to be about 45 per cent. The market-funding requirement is covered in the first place by issuing securities denominated in US dollars, euro and Danish kronor.

- The Riksbank considers that the major banks' capacity for absorbing unexpected losses remains strong.

The financial infrastructure

The Riksbank's assessment of the Swedish financial infrastructure shows that the important systems maintain a good international standard. Only minor criticism was made regarding transparency and regular checks of the participants a couple of the systems. It is reasonable that a country like Sweden should be fully compliant with internationally-agreed standards. However, none of these weaknesses was considered to offer a threat to financial stability.

The Riksbank's work on promoting a safe and efficient payment system also covers oversight of the financial infrastructure, i.e. the technical and administrative systems and account-based payment instruments that enable financial flows. This oversight consists of identifying structural weaknesses in the infrastructure, which can either themselves lead to disruptions in the financial system, or contribute to problems suffered by one participant or sub-market spreading to others. If the financial infrastructure functions efficiently, the risk of these contagion effects is reduced.

The annual assessments the Riksbank makes of important systems within the infrastructure comprise a central focus for the analysis. The assessments use internationally-agreed norms and standards as a basis.

This Chapter provides an overall presentation of the financial infrastructure, with a particular focus on the areas the Riksbank oversees. In addition, there is a summary of the results of the Riksbank's assessment for the financial year 2005. Finally, we discuss the changes currently being implemented in the cash market.

The Swedish payment system

In a modern economy, it must be possible to carry out financial transactions, that is, payments between the participants in the economy, in a simple and secure manner. These payments can be made either in cash or in the form of transfers between different accounts. In terms of value, account-based payments are entirely dominant. Unlike cash payments, account-based payments require payment intermediaries – mostly banks – and clearing organisations. If an account-based transfer takes place between customers of the same bank, it is possible to use the bank's internal systems. However, in most cases the senders and recipients of payments have different banks. This is when a payment system is required; an infrastructure between the banks to carry out payment orders and ensure that payments quickly reach the correct recipient.

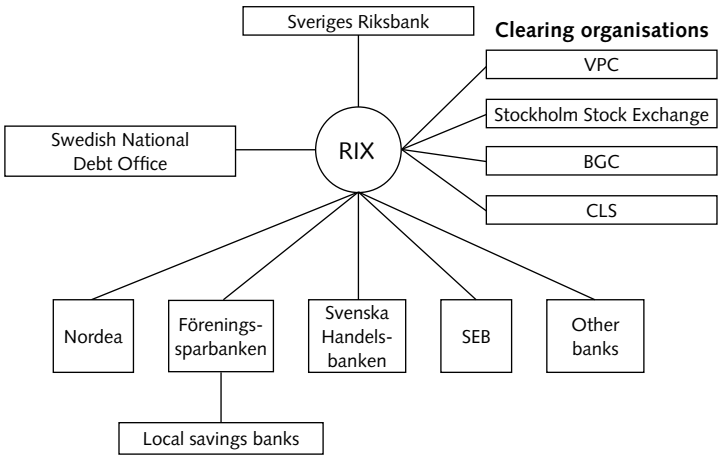
RIX IS THE CENTRAL JUNCTION

A payment system usually consists of a set of accounts, a regulatory framework for coding and various EDP systems for communicating and implementing the payments. The Riksbank's RIX system forms the central junction in the Swedish payment system, which is illustrated in Figure 1 below.

All of the banks have access to accounts in RIX, either directly or via an intermediary, that is, a clearing bank. When the banks make payments to one another they transfer funds via accounts in RIX.[67] The Riksbank can therefore be said to be the banks' bank. The participants in RIX include, in addition to the major Swedish banks and the Swedish National Debt Office, clearing and settlement organisations such as VPC, the Stockholm Stock Exchange and BGC, as well as a number of foreign banks, including the CLS.

Payments in both Swedish krona and euro can be sent through RIX. They are sent through two parallel systems, known as K-RIX and E-RIX respectively. Through the latter-mentioned system, the Riksbank participates in the European payment system known as TARGET (Trans-European Automated Real-time Gross settlement Express Transfer system), which links together the central payment systems within the EU.[68]

Figure 1. The Swedish payment system



Before a payment can be executed, a number of checks need to be made, including whether the payment order is correct and whether there are adequate funds to cover the payment. The actual clearing then consists of a compilation of instructions as to how the transfer should be completed. It is only when the checks are complete that the actual transfer is made to the recipient's account, that is to say, the payment is settled. Only the actual settlement occurs in RIX. In these contexts there is no counterparty risk, as it is the Riksbank which acts as counterparty.

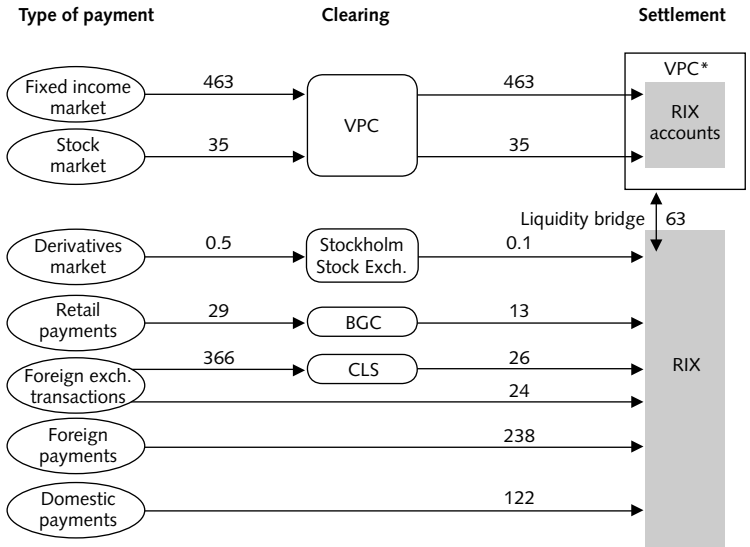
67 Payments between the participants who have accounts in RIX are often referred to as large-value payments, to distinguish them from payments made by individual companies and households. The latter are usually termed retail payments.

68 In November 2002 the Governing Council of the ECB decided to invest in a second generation of TARGET, TARGET2, which will replace the current system with effect from 2007. During discussions with the Riksbank, the participants in E-RIX have shown very little interest in participating in TARGET 2 via the Riksbank. Given this, and the expected high cost per transaction that connection to TARGET 2 would entail for the Riksbank, it was decided on 4 February 2005 that the Riksbank will not participate in TARGET 2 when it is launched in 2007. As a result, E-RIX will be taken out of operation at the end of 2006.

The clearing organisations also process transactions from the securities markets. These transactions consist of two parts; a payment and a transfer of the asset. In addition to the checks that need to be made for normal payments, there is also a check in this case that the seller can supply the asset. The compilation of instructions as to how the transfer shall be implemented now applies to both the payment and the security. The final settlement of the payment is also made in RIX, while the security is cleared through VPC.

The amounts transferred via the RIX system are very large. One week's turnover corresponds to the entire Swedish annual gross domestic product, GDP. The figure below shows the amounts daily processed in RIX during February 2006.

Figure 2. Payment flows in the RIX system (SEK billion)



* For settlement from the fixed-income market and the stock market, VPC administers accounts in RIX.

The RIX system's central position within the payment system means that any problems can rapidly lead to a liquidity shortage for many banks. The danger of this developing into a major problem is reinforced by the fact that the liquidity exposures arising in the system are very large in relation to the participants' balance sheets. To minimise the risks, the payment sender's account and the recipient's account are debited and credited according to the principle of Real Time Gross Settlement (RTGS). This means that payments are settled one at a time and that the funds transferred to participants' accounts become immediately accessible in the accounts and can be used for other payments. In addition, RIX participants may borrow from the Riksbank during the day for the purpose of evening out payment flows. There are no formal limits for this type of credit, as long as the participants have adequate collateral.

As the RIX system and the clearing organisations play such an important role in the Swedish payment system, they are regularly

assessed by the Riksbank. The Riksbank is solely responsible for overseeing the Swedish systems, while oversight of the international CLS system is carried out in cooperation with other central banks. This work is headed up by the Federal Reserve. The Riksbank also takes part in the oversight of SWIFT, which supplies important payment order services for financial agents. The oversight of SWIFT is carried out in largely the same way as that of the CLS; the difference being that the Belgian central bank heads the work.

Below follows a brief description of the different systems and the Riksbank's oversight of them.

VPC

VPC settles transactions in Swedish shares and debt securities and holds a register over who owns these securities. The VPC system also manages the pledging of securities. As the Riksbank requires collateral in the form of securities in its monetary policy transactions, the implementation of monetary policy is dependent on the VPC's system. All in all, this means that VPC plays a central role in the Swedish capital market.

The Riksbank's oversight of VPC is primarily focussed on the settlement system. When the parties in a transaction have entered their instructions into the system, the system matches them. This means that the system checks that the party, the security and the amount are correct. On the settlement date the system checks that the seller can supply the security and that the buyer has liquid funds to cover the purchase price. After this the transaction can be settled, which means that the security is transferred from the seller's account to the buyer's account at the same time as the payment is transferred from buyer's account to the seller's account. The amounts handled in these processes are very large. In 2005, the daily payment flows amounted to SEK 429 billion on average. These transactions lead to the banks having large exposures to one another. Any problems in clearing could thus entail considerable costs for the economy as a whole.

STOCKHOLM STOCK EXCHANGE AS A CENTRAL COUNTERPARTY

Stockholm Stock Exchange is the central marketplace for trading in shares and derivatives in Sweden. Its operations also cover debt securities, to a certain extent. However, it is primarily in its function as central counterparty and clearing organisation for derivatives that the Stockholm Stock Exchange has significance for the stability of the financial system and thereby for the Riksbank.

Buyers of derivatives are dependent on the seller being able to supply the underlying security, or the equivalent amount, when the derivative matures. The longer the time to maturity for the derivative instrument, the longer the buyer will be exposed to the seller. This

creates substantial risks for the participants. A clearing organisation can thus act as intermediary, i.e. as a central counterparty. This means that this counterparty acts as seller to all buyers and as buyer to all sellers. A buyer of a derivative instrument thus has no credit risk with regard to the original seller, only with regard to the clearing organisation. A market participant therefore does not need to assess the credit ratings of all of the other participants. It is sufficient to follow how the central counterparty manages its financial risks and its financial strength, as the risks are concentrated on this counterparty.

In other words, as central counterparty the Stockholm Stock Exchange takes on financial risks. If one counterparty in a transaction is unable to meet its commitments, Stockholm Stock Exchange must step in. The company limits its risks in several ways. For instance, it never takes any positions of its own, but acts as counterparty only when there are both buyers and sellers. Financial risks to the stock exchange only actually arise if a member is unable to meet its obligations. Customers who trade in derivatives must therefore pledge collateral to the stock exchange, which further reduces the risks. In addition, a central counterparty also has its own financial assets and insurances to cover potential losses.

BGC

BGC is the main intermediary of retail payments between the Swedish banks' customers. One important part of BGC's operations is to administer the bank giro system and to process the payments made through this system. It is mainly giro payments and transfers that pass through BGC's system. BGC also manages debit transactions, i.e. transactions initiated by the payment recipient rather than the payment sender. Examples of such transactions are direct debits. Another important part of BGC's operations is to manage the operation of the Dataclearing system on behalf of the Swedish Bankers' Association. The Dataclearing system manages transfers between accounts and cheque payments (including money orders).

The individual transactions cleared by BGC usually cover relatively small amounts and are therefore not a source of contagion risk. However, BGC's system supplies functions that are of essential importance to enable payments between individuals and companies, both large and small. Thus, BGC's system supplies functions central to society that could not be rapidly replaced if serious problems arose. For this reason, the Riksbank oversees BGC.

CLS

Continuous Linked Settlement (CLS) is an international system for clearing and settling foreign exchange transactions, with the aim of eliminating the risks that arise when payments in an international foreign exchange transaction –that is to say the exchange of two currencies- between commercial banks are not made simultaneously.

Operations began in 2002 at the initiation of some of the world's leading foreign exchange banks. The Swedish krona has been included in the CLS system since 8 September 2003.[69]

The delivery of one of the two currencies in the foreign exchange market has traditionally not been simultaneous with the delivery of the other one. This is partly because settlement in the national payment systems is governed by the time zone within which the system lies. One problem with this is that a bank that has supplied one currency is exposed to the risk that a counterparty will not succeed in supplying the counter currency. This can occur, for instance, if the counterparty goes bankrupt or experiences problems making payments. By linking together deliveries of bought and sold currencies, the CLS can eliminate this settlement risk.

The CLS Bank has 58 settlement members, and 566 user members. SEB, Handelsbanken and Nordea are settlement members of CLS, while Skandia, Swedbank and Volvo are user members. The Riksbank contributes by supplying accounts in RIX for the settlements of transactions in Swedish krona.

The turnover in the CLS system is very large. During January 2005, the daily turnover was five times Sweden's annual GDP. Because of the system's important role in the foreign exchange market, it is continually under the oversight of several central banks. As the CLS is incorporated in the United States, oversight of the bank is headed by the Federal Reserve. The other oversight work is carried out within the framework of the Bank for International Settlements' Committee on Payment and Settlement Systems (CPSS), of which the Riksbank is a member.

SWIFT

The Society for Worldwide Interbank Financial Telecommunication (SWIFT) is a Belgian company that supplies secure messaging services to more than 7,500 financial institutions in 202 countries. The major part of SWIFT's messaging services is related to the exchange of payment orders between banks within the correspondent bank arrangements. SWIFT also supplies messaging and communication services to an increasing number of infrastructure systems, such as the settlement systems for large-value payments established by many countries to limit settlement risk when managing interbank payments. The RIX system is one such system. CLS also uses SWIFT's services.

Although SWIFT is not a payment or settlement system, and is therefore not regulated by central banks or financial supervisory authorities, a large and growing number of systemically-important payment systems have become dependent on SWIFT. This means that disruptions in the flow of financial messages, which is based on SWIFT's services, create or pass on disruptions to other parts of the financial system. For this reason, the central banks in the Group of

69 The other currencies in the CLS system are: USD, JPY, Euro, GBP, CAD, CHF, DKK, NOK, HKD, SGD, KRW, ZAR, AUD and NZD.

Ten have come to the conclusion that SWIFT should be overseen and that this should be done in cooperation between the central banks. As SWIFT is incorporated in Belgium, it is the Belgian central bank that heads the oversight work.

The oversight of SWIFT focuses on issues such as security, operational availability, continuity and recovery capacity in SWIFT's systems. Representatives of the central banks involved and of the BIS meet twice a year to discuss to what extent SWIFT meets the targets set within these fields. These meetings are preceded by frequent meetings at a technical level and with SWIFT's management, internal auditors and personnel.

Assessment as part of the oversight assignment

The central point of the Riksbank's regular oversight of the financial infrastructure is an annual assessment of the central Swedish systems, i.e. RIX[70], VPC, the Stockholm Stock Exchange's derivatives clearing and BGC. These assessments are made in accordance with internationally accepted standards, which have been produced by the Bank for International Settlements' Committee for Payment and Settlement Systems (CPSS) and by the financial supervisory authorities' international umbrella; the International Organisation of Securities Commission (IOSCO).[71]

These different standards describe how the different systems should be regulated, organised and operated in order to minimise risks and efficiency losses. The emphasis is on the standards describing the requirements for risk management in connection with payments, securities settlement or central counterparty services. In addition, there are requirements regarding regulations in general, the provision of information (transparency) and governance. If any risks or efficiency losses are detected in the assessments, it is first and foremost the institutions themselves that should attend to the deficiencies discovered. The first comprehensive assessment of the financial infrastructure according to these standards was made in 2001. Most of the deficiencies that were identified in the assessment have now been dealt with. This means that all of the Swedish systems maintain a good international standard and a high degree of efficiency and security, which is shown in Figure 3, where the various international standards by which the systems are assessed are summarised under a limited number of headings.

70 The Riksbank has a double role with regard to the RIX system, to the extent that it both operates and oversees the system. A conflict between these two roles could give rise to problems of credibility. To deal with this potential conflict, the Riksbank has chosen to make a clear organisational distinction between these tasks.

71 The RIX system and BGC are assessed in accordance with the BIS Core principles for Systemically Important Payment Systems. The Recommendations for Securities Settlement Systems, which have been drawn up in collaboration between the BIS and IOSCO, are used for assessing VPC. The Stockholm Stock Exchange is assessed in accordance with the Recommendations for Central Counterparties, which were also produced by the BIS and IOSCO.

Figure 3. Assessment of the financial infrastructure

	RIX	VPC	SB	BGC
Legal risk				
Transparency				
Financial risks				
Settlement risks				
Operatinal risks				
Efficiency				
Access				
Governance				

Observed		Partially observed	
Broadly observed		Non-observed	

Despite the good marks achieved by the different systems, it is important to carry out regular assessments to ensure that this high standard is maintained and ensure that the minor deficiencies that were noted are corrected. For a country like Sweden, it is reasonable that all requirements are met in full in the long term. In addition, the assessments give the Riksbank a basis for regular dialogue with regard to the development of the systems. The following contains a brief summary of the most important results arising in the most recent assessment.[72]

RIX

As indicated in Figure 3, it was only in the area of transparency that RIX did not fully meet the requirements made by the international standards used for assessing the system. And even here the problems were minor. For instance, not all of the functions in the system are covered by the Rules and Regulations for RIX.

When the assessment was made, the Riksbank's oversight function expressed some further views, but these did not affect the assessment made.

It was pointed out, for example, that because of the Riksbank's monopoly, there may be a risk that the system is not operated in a sufficiently cost-efficient manner. The availability target for RIX should also be formulated on the basis of adequate risk analyses and a reasonable balance between risks and costs.

Furthermore, to increase operational security, joint exercises in moving system operation to an alternative site should be carried out by the Riksbank and other RIX participants. At present, only the Riksbank carries out such exercises. In addition, a fixed routine should be introduced to ensure that RIX participants continuously meet the entry criteria for the system.

Some of these problems will be resolved when the RIX system is replaced by a new system at the beginning of 2007. Unlike the present system, the new system is what is known as a hybrid system.

72 The full assessments of the systems can be found on the Riksbank's website, www.riksbank.se.

This means that in addition to real-time gross settlement (RTGS), it also has liquidity optimisation functions. These enable participants to reduce their liquidity exposures and in this way reduce their costs for liquidity. In addition, the new system has a larger capacity than the present system.

VPC

The emphasis in the Riksbank's assessment of securities trading in Sweden is on the functioning of the settlement system provided by VPC. The assessment shows that the settlement process, the regulations and routines are designed in such a way as to minimise settlement risks for the participants. The system functioned well in 2005. Both the percentage of transactions settled on the appointed date and the availability to participants were at a high level.[73] Figure 3 shows that VPC was the only system that entirely met all requirements following from the international standards against which it is assessed.

As settlement in VPC is carried out at only four specific times during the day, the Riksbank has previously expressed the view in connection with its assessments that VPC and its participants should continue their dialogue on the possibility of introducing continuous settlement. This is because having too few settlement times could lead to the risk of liquidity being locked into the system. This has not actually proved to be a problem so far, as the liquid banks transfer a large amount of liquidity to the system early in the day. Thus, the majority of the transactions in both the equity and fixed-income markets can be settled at the first settlement batch of the day. Directly after these settlement batches, the liquidity that is not needed for the remaining transactions can be transferred from the securities settlement system and used for other purposes.

In addition to its regular oversight, the Riksbank has also monitored VPC's activities in connection with the purchase of its Finnish counterpart APK from OMX Exchanges OY at the end of 2004. VPC intends initially to continue to pursue securities settlement activities in two separate legal units, one in Sweden and one in Finland, but to harmonise routines and regulations as far as possible. An example of the latter is that VPC has introduced the same application process in both VPC and APK. This makes it easier for Finnish market participants to become members of VPC and for Swedish participants to join APK. However, in the longer term, the aim is to attain a joint securities settlement system, while the registers will be held by separate legal units.[74] With the aim of achieving a more efficient and more uniform oversight, the Riksbank and the Bank of Finland have signed a cooperation agreement regarding oversight of the common parts of the two companies and also the group as a whole.

73 The percentage of transactions settled on the appointed date was 99.32 per cent for the equity market and 99.48 per cent for the fixed-income market. The availability to participants amounted to 99.99 per cent.

74 VPC endeavours to create standardised routines for settlement and for management of dividend payments and other corporate actions that could be adopted by VPC's counterparties in the other Nordic countries.

THE STOCKHOLM STOCK EXCHANGE

The Riksbank oversees the Stockholm Stock Exchange in its role as central counterparty and clearing organisation for trade in derivatives. The most recent assessment shows that the Stockholm Stock Exchange meets the stipulated requirements in the form of risk management, collateral requirement and capital strength.[75] This also applies to Stockholm Stock Exchange's technical systems for derivative trading and clearing, which maintain a high level of security. During the year 2005 as a whole, availability was 99.93 per cent during the Exchange's opening hours, 08.00 to 18.00.

On the other hand, further demands could be made regarding transparency, which is illustrated in Figure 3. Transparency is important for a central counterparty, as market participants must be able to assess the risk in their exposures to the counterparty. The Riksbank's assessment is that the need for transparency is particularly acute for a central counterparty like the Stockholm Stock Exchange, which has a direct relationship to end-customers, some of whom are not professional operators. At present the Exchange publishes information on its website with regard to issues concerning its risk management, regulations, counterparty function, organisation, financial results, etc. However, the Riksbank considers that this information should be updated more quickly and that it should include a description of the company's legal relation to other companies in the group. The Riksbank would also like to see more quantitative data on Stockholm Stock Exchange's commitments, for instance, the value of the collateral pledged.

BGC

The assessment of BGC shows that the international criteria are not fully met on two points; transparency and entry. With regard to transparency, it can be observed that BGC's agreement with its participants is on the whole clearly formulated and gives the participants a good opportunity to understand the financial risks that may arise through participation in the system. However, the assessment points out that all participants in the system should clarify what would happen if a bank were unable to meet its payment obligations at a particular settlement point. There are different measures that can be chosen here and the choice of measure is regulated in agreements between the individual banks and BGC. The Riksbank considers that it would be better to offer only one settlement measure to all participants. This would reduce complexity and eliminate the uncertainty regarding the participants' choices. Uncertainty over which measure the other participants have chosen could make it difficult for an individual participant to assess the liquidity risk to which it is exposing itself by taking part in the system.

75 Stockholm Stock Exchange's capital should be sufficient to cover a situation where the two participants with the largest risk exposures and all participants with equity capital of less than SEK 100 million are simultaneously unable to meet their payments in the event of large price fluctuations.

The comment regarding entry applies to BGC's checks of the existing participants. When participants first join the bank giro system, BGC checks that they fulfil the criteria established as a condition for participation in the system. However, there is no regular check after entry to ensure that the participants still meet these criteria. The Riksbank considers it highly desirable that such a follow-up be made at least every time the main agreement is renewed.

In addition to these two viewpoints, the Riksbank considers that the BGC system's regulatory framework should be clarified with regard to the time when a transfer is considered to have been entered into the system and the time when a transfer can no longer be revoked by a participant.

Changes in the cash market

The Riksbank also monitors developments in the Swedish cash market. This is natural as cash is an important means of payment that the Riksbank has a direct possibility to affect, in its capacity as sole issuer of banknotes and coins in Swedish kronor. This section contains a summary of the considerations behind the changes in the cash market that will come into effect on 1 July 2006.[76] In brief, the change entails the Riksbank concentrating its cash activities to Stockholm and Göteborg. At the same time, the banks are being given the right to open as many cash depots as they wish and to locate them as they see fit.

CASH REQUIRES PHYSICAL MANAGEMENT

When cash changes owner, it must be transported, checked, sorted and counted. The extent of this activity depends on the amount of cash being handled. The cash flow arises partly because individual persons and companies do not usually wish to hold very large amounts of cash. This is partly due to the risk of theft and partly to cash not bearing any interest. The banks also try to hold down their stocks of cash, for the same reasons.

The banks are the only participants in the cash market who have accounts with the Riksbank. When the banks collect cash from one of the Riksbank's local offices, the amount is entered as a loan on the account and charged interest. As cash is thus connected with a cost corresponding to the interest payment, the bank has a strong incentive to return cash that is not used. When the cash is returned to the Riksbank, it has to be physically transported. The bank may need the cash again the following day, which will once again require a physical transport. The interest saving the bank can make means that banknotes are transported to and from the Riksbank without any processing. It is therefore desirable from the point of view of society as a whole, that these transports should be minimised, as they also entail a greater risk of cash-in-transit robberies.

76 Recommended reading for a more detailed discussion of cash management in Sweden includes the article "Cash-supply efficiency", by Daltung, S and Ericson, M, in Sveriges Riksbank Economic Review 2004:3.

Reducing these costs to society has been an explicit target of the changes in the cash management system now being launched on 1 July 2006. The work has been based on the principle that the central government should not intervene unless there is particular reason in the form of market failure. Thus, the Riksbank should only be responsible for cash management activities where it is impossible to achieve efficiency without central government intervention. In addition, it is reasonable to assume that efficiency will benefit if those bearing the costs, which in this case are the companies that directly handle cash, can also influence them.

THE ROLE OF THE RIKSBANK

Given this, the Riksbank's role in the supply of cash can be limited to supplying the banks with cash of good quality that is difficult to counterfeit. The Riksbank should thus ensure that sufficient cash is produced and develop the security features on these. In addition, the Riksbank should hold sufficient cash in stocks in order to be able to meet demand from the banks at any given point in time. In addition, the Riksbank must have emergency stocks to meet extraordinary events. It is not reasonable to expect the banks to hold such stocks; it must be the Riksbank's responsibility to determine how large these should be and where they should be located.

For the time being, it is also the Riksbank's responsibility to destroy worn-out banknotes and coins and to ensure that authenticity checks are made to a satisfactory extent. However, in the long term it is possible that private agents could take over the destruction, although this would be under the supervision of the Riksbank. In addition, the Riksbank must ensure that deposits and withdrawals of cash through the banks' accounts in the Riksbank can be carried out in an efficient manner. To avoid preserving an inefficient logistics structure, the Riksbank will therefore not be responsible for more stocks than are considered necessary for reasons of emergency preparedness. There is a clear advantage in allowing the participants in the cash market to defray the costs of other cash stocks, as they can then weigh the advantages of a new depot against the costs of running this depot and the effects on the relevant security transport costs. After 1 July 2006, the Riksbank will only have two local offices, one in Tumba outside Stockholm and one in Mölndal outside Göteborg. These offices will be used to supply cash and to receive worn-out banknotes for destruction.[77]

In order to avoid unnecessary transports to and from these two offices, the banks have been given the right to open their own cash depots. The banks will be the owners of the cash stored in these depots, which means that they must pay interest to the Riksbank. However, they will receive full compensation for this interest cost.

77 In a broader perspective, this is the logical result of a process that has been in progress since the late 1980s when the number of local offices totalled more than 20. This development has gone hand in hand with the Riksbank's concentration of its activities on its core tasks regarding monetary policy and the promotion of a safe and efficient payment system.

The costs will thus be comparable to if the cash had been returned to the Riksbank's offices. One condition for the Riksbank to be able to provide interest compensation is that the bank can show that the cash in question is not in circulation. The Riksbank must also be able to check the value. All in all, this means that a bank can only receive interest compensation for cash held in depots that has been counted and authenticity checked.

The banks themselves may decide how many depots there will be in Sweden, how much cash will be stored in each depot and where the depots will be located.[78] This means that the banks no longer need to rely on Riksbank's decision about where its depots are located or how many there should be; they can themselves determine how many depots they need and where it is most economically-efficient to locate them, taking into account various risk aspects. So far in 2006, two bank-owned companies have been established, which will manage a number of cash depots.

78 The costs of the depots, including insurance services, will be paid by the banks.

PART 2. ARTICLES

Using external information to measure credit risk

The Riksbank regularly analyses the banks' resilience and tries to test it with regard to possible events. This article presents a model that enables us to test in a more coherent manner the development of the banks' credit risks – their largest risks – under different assumptions and different events. With the aid of a readily-available portfolio model and information from the annual reports, it is possible to better capture risks that are difficult to spot, such as diversification effects and concentrations and in this way better understand the dynamics of the banks' credit granting.

As a part of its stability analysis, the Riksbank assesses the banking system's resilience to various shocks that can arise in the economy. The banks' activities are dominated by lending, which means that credit risk is by far the largest individual risk factor in the banking system. A model for the banks' credit risks would enable a more coherent picture of how credit risks develop given different assumptions and sequences of events.

The Riksbank has therefore worked out a method of measuring credit risk in the four major Swedish banks, using a readily-available portfolio model and information from the banks' annual reports. The idea is that the resilience of the banks is reflected in the size of the capital buffer they hold in relation to the credit risk measured in their loan portfolios. Many banks use similar methods to calculate their credit risks. When the banks do this, they use information that is not publicly-available. We have chosen to use information to which all agents have access. However, this information is rough and does not take into account the banks' ability to judge risk and collect debts. The difference in the calculated credit risk among the banks relies solely on the exposures the banks have to various categories of borrowers.

Despite some deficiencies and simplifications, this method enables us to better capture risks that are difficult to spot, such as diversification effects and borrower concentrations. It also becomes possible to further link together the analyses of borrowers and banks. This increases the understanding of the dynamics in the banks' credit granting.

The article begins with a discussion of what a portfolio approach entails and which data are generally needed. After this, a portfolio model is applied to the four major Swedish banks. The third section presents the results for the banks' loan portfolios for the years 2002-2005. Finally, we demonstrate how the method can be used in the stability analysis, by stress testing the banks' loan portfolios in relation to various events, such as a deterioration in credit quality.

Portfolio analysis of credit risk

A credit granter who approves a loan must assess the probability that the borrower cannot repay the loan.[79] This expected probability for payment default can vary over time, which gives rise to credit risk.

Banks which have a large number of borrowers must take into account the fact that the expected default frequency may covary to some extent between different borrowers in order to assess the credit risk in their loan portfolios. A portfolio model makes it possible to calculate the probability that loan losses of various sizes may arise in existing portfolios. The focus of the analysis is thus on the risk of a negative outcome. The portfolio model takes into account how much risk an individual credit contributes to the total portfolio.

In order to calculate the risk in the loan portfolio, information is needed regarding:

- The composition of the portfolio

The composition of the portfolio is seen in the size of the credit exposures to different categories of borrower.

- The probability of default

This probability shows to what extent a borrower can be expected to default on payments on average.

- Recoveries

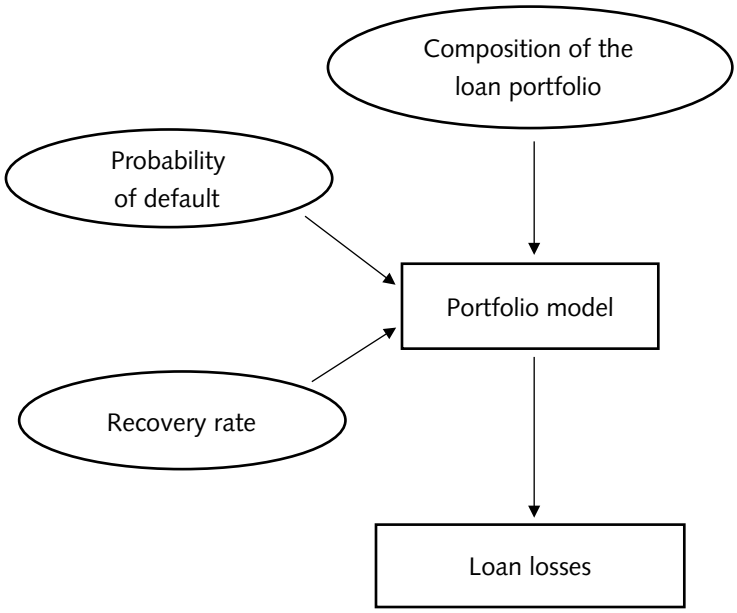
The size of the bank's loss given default (LGD) is affected by how much of the original debt can be recovered in bankruptcy proceedings. When the cost connected with the bankruptcy is low and the collateral that forms the basis for the credit can be realised at a value close to the original debt, the degree of recovery is high.[80] This means that the lender recovers a large part of the amount lent. Banks that usually only grant credit to borrowers with strong cash flows and acceptable collateral often have a high degree of recovery in their loans.

The analysis framework can be roughly summarised as shown in Figure 1.

79 This can be done either through making one's own assessment, using a credit rating, a reduced or structural model. One example of a structural model is Moodys' KMV Credit Monitor.

80 The recovery rate shows what part of the original amount lent the lender will receive in the event of a payment default.

Figure 1. Calculating loan losses with a portfolio model

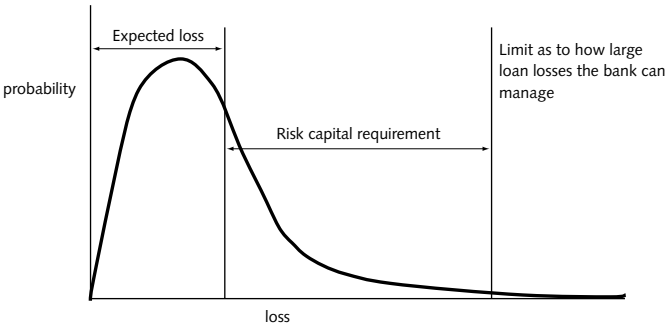


Calculation of losses – expected and unexpected

With this information it is possible to use a loan portfolio model to calculate potential loan losses in the form of a loan loss distribution. This shows with what probability loan losses of various sizes will occur – from the possibility of no loan losses occurring to the loss of the entire loan portfolio.

This approach makes it possible to study the banks' credit risks. We use two measures to quantify the loan losses the banks may face. These are the measure of the expected loss that states how much the bank expects to lose in its current portfolio, and the measure of how large additional losses on top of the expected losses might be. Figure 2 reproduces a loan loss distribution for a purely hypothetical loan portfolio.

Figure 2. Loss distribution for a hypothetical loan portfolio



The banks compensate themselves for the expected loss through a risk premium on the price of loans in their regular operations. If the expected loss in the portfolio increases, it may mean that the bank's costs increase as a result of increased reserve funds.

The banks hold a buffer to cover possible loan losses above those expected; let us call this the risk capital requirement. Loan loss distribution makes it possible for the banks to calculate the size of this need given a tolerance level.[81] The unexpected loan loss – and thereby the need for risk capital – also affects the prices the banks set for their loans. This is because holding capital entails a cost for the banks in the form of a return on investment requirement from the shareholders, and the banks must compensate themselves for this.

The amount of capital the bank requires to cover unexpected losses depends on the loan loss distribution. The greater the probability of extreme outcomes, that is to say, the more outcomes that lie far to the right of the distribution, the greater the need for risk capital.

If, in addition, the default frequency covaries between individual loans – there is a low degree of diversification – the need for risk capital will be even greater. The degree of diversification, and thereby the risk capital requirement, is affected by how much unique and how much systemic risk there is in the portfolio. Unique risk is the risk that is unique to the individual loan and can be eliminated by diversification with other loans in a portfolio. Systemic risk, on the other hand, affects all assets in the portfolio and cannot be eliminated by diversification.

The credit risk in a portfolio declines with increased diversification. An increase in diversification can be attained by increasing the number of exposures and the percentage of unique risk in the portfolio. A portfolio with exposures spread across many borrowers and with little covariation in the default frequency has a low credit risk. The portfolio is then said to be well-diversified. The reverse applies if the portfolio consists of exposures with a high covariation in the default frequency. If the portfolio is also dominated

81 The banks determine the tolerance level on the basis of how much of the possible total loan losses they can cover. Covering 100 per cent is unreasonable, as it would entail excessive costs. The commercial banks usually calculate their risk capital requirement at a tolerance level of 99.97 per cent. The choice of tolerance level reflects the credit rating the bank receives. A tolerance level of 99.97 corresponds to an AA rating.

by a few large exposures, it is said to have concentration. This further increases the total credit risk in the portfolio. With this kind of portfolio, a credit granter has to hold more capital as a buffer against unexpected loan losses in order to retain resilience than is necessary for a credit granter with a well-diversified portfolio.

The resilience a bank has to loan losses ultimately depends on the capital it holds in relation to the calculated risk capital requirement. It is not necessarily a bad thing for a bank to have a loan portfolio with a high credit risk, as long as the bank has sufficiently large capital. The banks' task is, among other things, to take on risk in order to provide borrowers with credit.

The total loan losses a bank suffers can therefore be much larger than expected. If the total loan losses were to exceed the bank's capital, the bank will experience problems. It is this type of extreme loan losses – far out on the right-hand tail of the distribution – that are of interest in the Riksbank's stability analysis. The portfolio model gives us the opportunity to test whether the banks are approaching this limit or perhaps even exceeding it.

Application of the portfolio model to Swedish banks

The Riksbank has used a readily available portfolio model, CR+, to calculate the credit risks in the four major Swedish banks for the years 2002–2005.[82] Information on the composition of the credit portfolios is collected from the banks' annual reports. However, all of the information necessary for a portfolio model is not available there. A description of our mode of procedure to apply this model to the major Swedish banks follows below.

THE COMPOSITION OF THE LOAN PORTFOLIO

The banks' annual reports describe how lending is broken down into regions (countries) and sectors (household, corporate sector, credit institutions and public sector). For the corporate sector there is also a description of different industries. We have also used the same degree of detail regarding the breakdown of the lending into different borrower categories in our credit risk analysis.[83]

Nordea is the bank that shows the largest geographical diversification, followed by SEB. Handelsbanken (SHB) and Föreningssparbanken (FSB) are both geographically concentrated on Sweden and have only minor operations abroad.

For some of the countries, particularly developing countries, there is no sector or industry breakdown in the annual reports. Here it is assumed that the borrower has the same credit rating as the country in question. A more detailed report of the banks' lending for the year 2005 is given in the box below.

82 The credit portfolio model drawn up by the Swiss investment bank Credit Suisse First Boston (CSFB) is available at their website http://www.csfb.com/institutional/research/assets/creditrisk.pdf. See also the article "A comparative anatomy of credit risk models" by Michael Gordy in the Journal of Banking and Finance 24 (2000) pp 119-149, for a description of CR+.

83 The credit risk analysis could be based on the borrowers' individual credit quality. However, this analysis contains a standard breakdown of the borrowers' credit quality in all four major banks. The borrowers are allocated a credit quality depending on which borrower category they belong to. The same allocation of credit quality according to borrower category is applied to all of the banks.

The major banks' lending

The major Swedish banks' lending activities differ with regard to where and to whom they lend money. Their various operations make them sensitive to different economic events. The banks' annual reports provide a rough estimate of how their lending is divided up into different countries and borrowers.

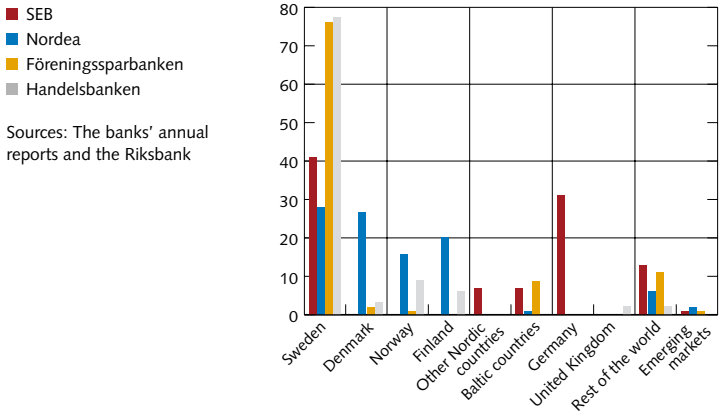
All of the four major banks have the largest percentage of their lending in Sweden, although the size of this percentage differs. SHB and FSB have more than three quarters of their total lending in Sweden, while the corresponding figure for SEB and Nordea is less than half.

SEB is geographically concentrated on Sweden and Germany, which together account for just over 70 per cent of the lending. However, lending in Nordea is relatively evenly distributed between Sweden, Denmark, Finland and Norway. Lending in these countries accounts for just over 90 per cent of Nordea's total lending. In the Baltic countries, it is primarily SEB and FSB that are active, with the share of their total lending amounting to 7 per cent and 9 per cent respectively.[84] All of the four major banks have only a marginal part of their lending to customers in emerging markets (See Figure B1).

When one looks at different customer categories, all of the four major Swedish banks have a relatively large part of their lending to the household sector, between 30 and 40 per cent. SHB has the largest percentage of lending to property companies, just over 30 per cent. Nordea has substantial lending to the remainder of the corporate sector, more than 30 per cent. Lending to public administration accounts for only a marginal part of the banks' lending activities, with the exception of SEB, where it amounts to just over 15 per cent of total lending by the bank (See Figure B2).

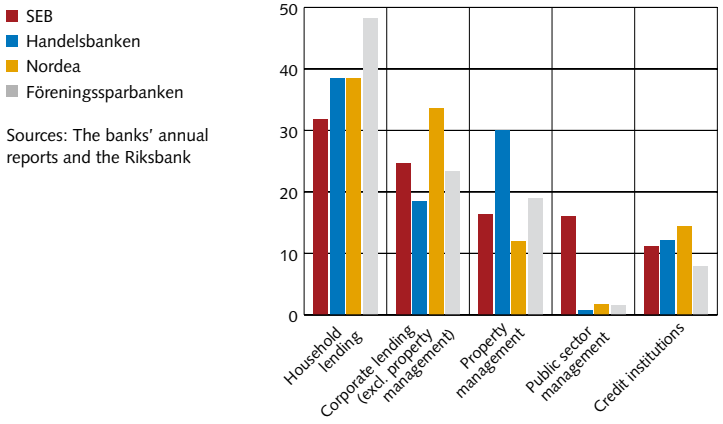
The corporate sector (excluding property management) is broken down into different industries in the banks' annual reports. For several of the major banks the manufacturing industry is the largest individual borrower category among companies (see Figure B3). SEB also lends a relatively large share to other service companies and SHB lends to the retail and service industries. Nordea has a relatively even spread across different company sectors,

Figure B1. Lending, geographical breakdown
Per cent



Sources: The banks' annual reports and the Riksbank

Figure B2. Lending, sector breakdown
Per cent



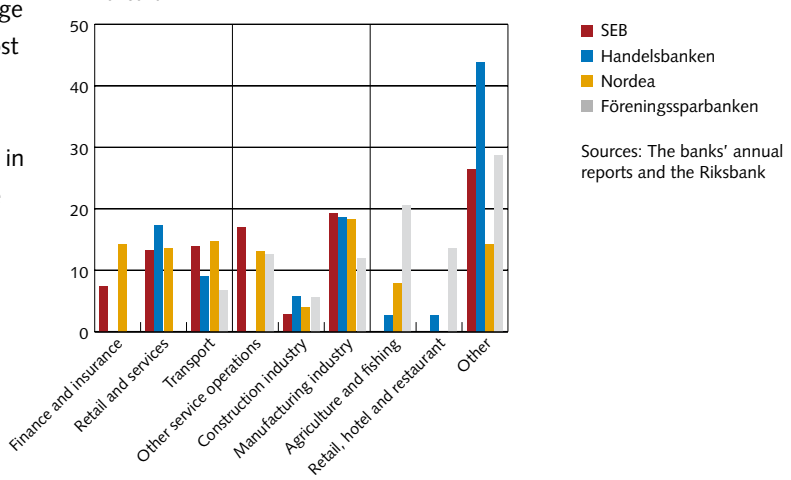
Sources: The banks' annual reports and the Riksbank

84 The major banks' lending in the Baltic countries is described in more detail in Financial Stability Report 2005:2 (box). The figure for SEB also includes operations in the Ukraine and Russia.

while FSB's individually largest corporate lending is to agricultural companies. SHB reports a large part of its corporate lending as "other" (almost 45 per cent).

To sum up, Nordea is the bank that demonstrates the largest geographical spread in its lending, followed by SEB. SHB and FSB are both geographically concentrated on Sweden and have only minor shares abroad.

Figure B3. Corporate lending, industry breakdown
Per cent



Sources: The banks' annual reports and the Riksbank

PROBABILITY OF DEFAULT

There is relatively good information on expected default frequency regarding companies. We have chosen to use available year-end and share data to calculate the default frequencies for this borrower group.[85] However, this model only includes data for listed companies, which have thus been used as the basis for a default measure for both listed and unlisted companies.[86]

There is no corresponding information on credit risk for households. Nor for the public sector. Default probabilities for these borrower groups must quite simply be based on assumptions regarding industry practice.

In order to capture the default probability linked to exposures to countries, we have used information from credit rating companies.

RECOVERY

There are no readily available, fully-comprehensive statistics on degrees of recovery in Swedish or other European banks' credit granting. We are therefore basing the assumptions on degrees of recovery for company exposures on US data regarding industry-specific degrees of recovery from the bond market. Studies show that the loss level for the observed companies is on average around 50 per cent.[87]

A recovery degree of 90 per cent has been assumed for the mortgage institutions' lending. This high degree is motivated by the underlying collateral for these loans. Here we have used discussions with industry representatives as a basis for making our own assumptions.[88]

Degrees of recovery linked to exposures to countries, primarily developing countries, have been assumed to be relatively low, 30 per cent. This is based partly on uncertainty regarding the underlying collateral and partly on economic developments in the country as a whole.

CREDIT QUALITY

In addition to these basic data in the model, we have divided the exposures into different credit qualities. This breakdown does not regard the entire exposure as one single credit. All borrowers who belong to an industry or sector are therefore not expected to fail simultaneously. This achieves a rough reflection of actual conditions. The Swedish banks that have internal systems for classifying their

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85 Expected default frequencies one year ahead can be obtained with the aid of Moody's-KMV (monthly data going back 5 years). A description of Moody's-KMV's Merton-based EDF measure can be found in "Modelling Default Risk", December 2003, Moody's-KMV. See also Persson & Blåvarg "The use of market indicators in financial stability analysis" in Sveriges Riksbank Economic Review 2003:2.

86 The reasoning behind this is that listed companies reflect the credit risk connected with the industry in which they operate and that problems in large, listed companies would have repercussions on sub-contractors and smaller companies. Therefore, we have used industry-wide EDFs based on information from listed companies as a proxy for both listed and unlisted companies in the same industry.

87 Altman, Edward I., and Vellore M. Kishore, "Almost Everything You Wanted to Know about Recoveries on Defaulted Bonds" Financial Analysts Journal, (Nov/Dec-1996).

88 A recovery rate of 90 per cent is also the highest permitted according to Basel II.

credits have many credit classes for exposures in their portfolios. [89] However, these could be roughly divided into three classes, and we have therefore chosen to divide the exposures included in the annual reports into this many categories:

- 10 per cent with quality below average
- 10 per cent with quality above average
- 80 per cent with average credit quality

Table 1 below shows how data entered into a credit portfolio model for a stylised bank with operations in Sweden, Norway and China could look:

Table 1. Data in the applied portfolio model

Country	Name	Exposure	LGD	Exposure *LGD	Average default probability	Standard deviation	Expected loss
Sweden	Household, *quality1*	100	20%	20.0	0.05%	0.05%	0.01
bank	Household, *quality2*	800	20%	160.0	0.10%	0.10%	0.16
	Household, *quality3*	100	20%	20.0	0.20%	0.20%	0.04
	Manufacturing, *quality1*	100	40%	40.0	0.13%	0.05%	0.05
	Manufacturing, *quality2*	800	40%	320.0	0.39%	0.20%	1.26
	Manufacturing, *quality3*	100	40%	40.0	1.18%	0.65%	0.47
Sweden	Household, *quality1*	100	10%	10.0	0.05%	0.05%	0.01
Mortgage	Household, *quality2*	800	10%	80.0	0.10%	0.10%	0.08
institution	Household, *quality3*	100	10%	10.0	0.20%	0.20%	0.02
	Manufacturing, *quality1*	100	10%	10.0	0.13%	0.05%	0.01
	Manufacturing, *quality2*	800	10%	80.0	0.39%	0.20%	0.32
	Manufacturing, *quality3*	100	10%	10.0	1.18%	0.65%	0.12
Norway	Household, *quality1*	60	30%	18.0	0.05%	0.05%	0.01
	Household, *quality2*	480	30%	144.0	0.10%	0.10%	0.14
	Household, *quality3*	60	30%	18.0	0.20%	0.20%	0.04
	Manufacturing, *quality1*	60	50%	30.0	0.28%	0.20%	0.08
	Manufacturing, *quality2*	480	50%	240.0	1.35%	1.09%	3.25
	Manufacturing, *quality3*	60	50%	30.0	4.78%	4.46%	1.44
China	Country	20	60%	12.0	0.05%	0.10%	0.01

The annual report gives exposures broken down by different sectors/industries for each country. According to the method above, these exposures are then divided into three credit qualities. Each credit quality has thus its own set of data; column 3 shows the exposure to the respective borrower category stated in the annual report. The forth column shows the percentage of the outstanding credit that is expected to be lost in a payment default, here referred to as LGD. The size of this LGD varies across different sectors/industries, but is the same for different credit qualities within the same sector/industry. For each credit class in the respective borrower category an average

89 This assumption is based on two Swedish banks' internal systems for classifying credits; Jacobsson, Lindé and Roszbach, the Riksbank's Working Paper series no 155 "Internal Rating Systems, Implied Credit Risk and the Consistency of Banks' Risk Classification Policies"

default proability and its standard deviation are reported in the two following columns.[90] To achieve the expected loss, EL, the exposure is multiplied by the LGD and the probability of default. The total of all exposures' expected losses comprises the portfolio's expected loss. This breakdown means there will be between 300 and 350 exposures in the banks' portfolios.

THE SIGNIFICANCE OF COVARIATION FOR THE RISK CAPITAL REQUIREMENT

In CR+ the credit risk is captured by the variation around the expected default probability for each individual exposure. This variation can consist of both the variation that is unique to the individual exposure and the variation that is common to all exposures.

The credit portfolio in the example above has two extreme cases regarding what governs the risk in the portfolio. In the one extreme case it is assumed that all variation around the probability of a payment default for each individual exposure is only affected by a systemic risk factor. This assumption enables us to capture all types of concentration risk that may exist in a portfolio, as the outcome for each individual exposure then covaries completely. In this extreme case, the risk capital requirement in the portfolio can be obtained by adding together the risk capital requirement for the individual exposures.

In the other extreme case, all variation in the EDFs is due to unique factors linked to each individual exposure. The risk capital in this extreme case will be lower than in the other extreme case described. The lower risk capital requirement is due to each independent credit entailing a diversification effect in the total portfolio.

As we want to be able to capture both concentration and diversification effects in the banks' portfolios, we have to distinguish which part of the variation in the EDF stems from a credit's unique characteristics and what can be ascribed to the variation common to all of the loans in the portfolio.

This breakdown has been made by estimating how large a part of the variation in an exposure's default probability covaries with the default probability for all exposures.[91] One of the features of the chosen method is that it is easy to change this breakdown in order to test the resilience of the banks.

90 Moody's KMV provides industry EDF measures per country. In order to take into account the different credit qualities, we have produced them for three different risk classes; the 25 per cent poorest, the median and the 25 per cent best credits for each industry. The standard deviation is estimated on the basis of monthly data regarding EDF for the past 5 years.

91 It would have been desirable to use information on each company in the portfolio. However, we must use information on listed companies, which have therefore had to serve as proxy for all companies. "All exposures" must therefore be represented by all listed companies included in KMV's database.

Some results from the model

Figure 1 shows the banks' expected losses as a percentage of their loan portfolios. SHB and FSB have the lowest outcomes. This is probably due to their large mortgage institutions. Lending via these institutions is linked to low risk, as the majority of the loans are mortgages with good collateral for the loans. The expected default probability is therefore low and the recovery rate is high, which leads to lower expected losses. All of the banks except SEB show a reduction in expected losses during the period 2002–2005, which indicates a reduction in loan losses in their portfolios. That is the actual development that can be seen in the banks during this period.

The reason why SEB's expected loss is high since 2004 is that their large exposures on the German market, particularly with regard to property companies, show an increased in expected default probability. [92]

The outcome for the major banks' risk capital requirement shows a relatively large spread between the banks, which can be seen in Figure 2. [93] However, the levels have moved closer to one another during the two latest years. At that point in time, the risk capital requirement declines for all of the banks except FSB. The fact that FSB's risk capital requirement increased in 2004 was largely because they acquired the whole of Hansabank. The expansion in the Baltic countries has two opposing effects on the risk capital requirement. On the one hand lending to borrowers in this region is associated with higher risk than credit granting in the remaining part of FSB's credit portfolios which results in a higher risk capital requirement. On the other hand, the expansion in the Baltic countries increases the geographic diversification which affects the risk capital requirement in the opposite direction.

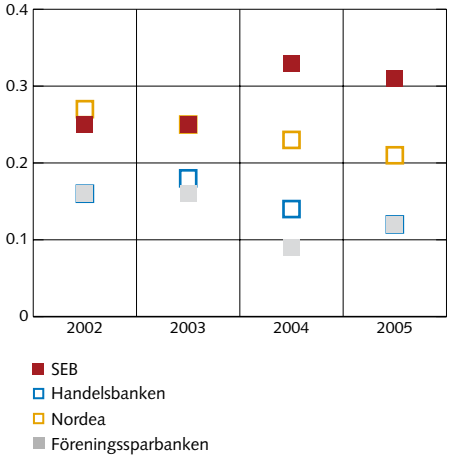
The result shows that the outcomes for expected loan losses and risk capital requirement for the different banks do not necessarily follow one another. It is therefore necessary to take into account both of these measures to obtain a comprehensive assessment of the banks' credit risks.

Figure 3 shows the banks' expected losses and risk capital requirement in relation to one another. [94] The further to the right of the Figure the bank is located, the greater the percentage of the portfolio that consists of expected loss, and the higher the bank's position in the Figure, the larger the percentage of risk capital.

According to the calculations, Nordea has a relatively high expected loan loss, but low risk capital requirement. The fact that the risk capital requirement is low is probably because Nordea has a broad geographical spread in its exposures – the portfolio is therefore more diversified and the risk of extreme cases is thus reduced.

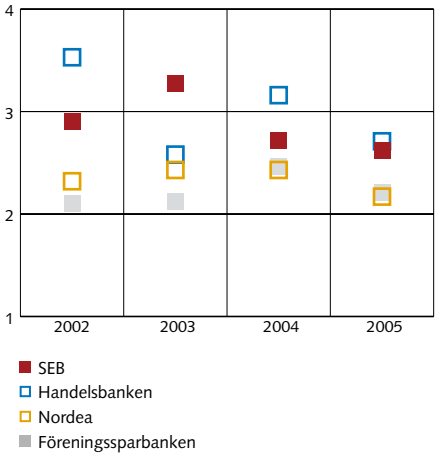
92 According to Moody's KMV's calculation of EDF.
93 In CR+ the financial capital has been calculated at a level of 99.9 per cent, while the banks themselves usually calculate financial capital at a level of 99.97 per cent.
94 The figures represent the banks' average expected losses and risk capital requirement for the period 2002–2005.

Figure 1. Expected loss as a percentage of the bank's credit portfolio
Per cent



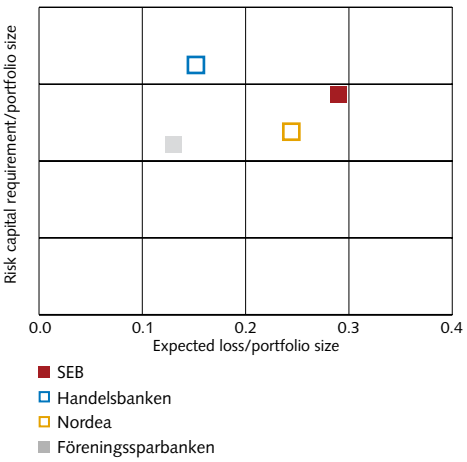
Source: The Riksbank

Figure 2. Risk capital requirement as a percentage of the bank's credit portfolio
Per cent



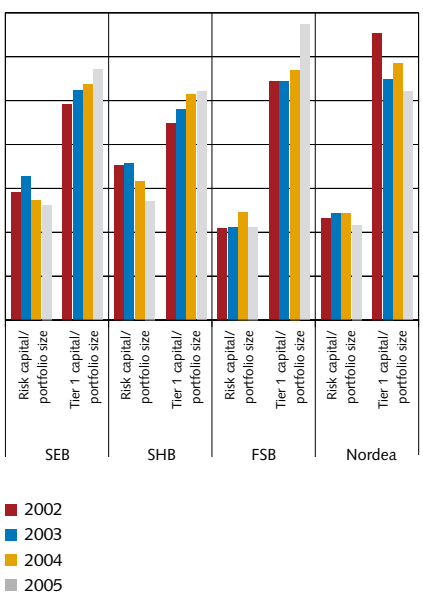
Source: The Riksbank

Figure 3. Expected loss and risk capital requirement as a percentage of the bank's credit portfolio



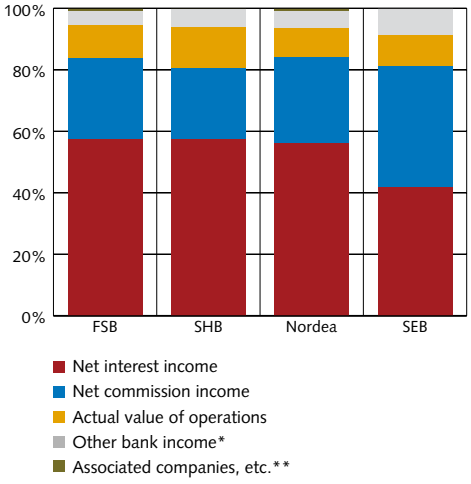
Source: The Riksbank

Figure 4. Risk capital and Tier 1 capital in the banks
Per cent



Source: The Riksbank

Figure 5. Income breakdown in the four major banks
Per cent



* Including dividends received

** Including insurance results

Source: The banks' annual reports and the Riksbank

The high expected loss is probably due to Nordea having a large part of its mortgage lending outside of Sweden. In the model all lending to non-Swedish public is assumed to be made via banks, regardless of whether it concerns mortgages or other loans. As recovery is assumed to be lower in banks, this means that the recovery for mortgages abroad is lower.

At the other extreme, SHB demonstrates a low percentage of expected loss and a high percentage of risk capital requirement. The main reason for this is the rough industry breakdown of SHB's corporate lending which leads to a high calculated risk capital requirement.

It is not self-evident that all banks should hold the same type of well-diversified loan portfolios. The banks' business strategies determine which risk profile they have in their loan portfolios. However, the important thing is that the banks compensate themselves for the risk they take on and that they maintain a sufficient buffer of capital against loan losses. To ensure that the credit market functions efficiently, it is most probably necessary to have several types of credit-granter to service different types of borrower.

Figure 4 compares the banks' risk capital requirement with the Tier 1 capital the banks actually hold. The comparison shows that the banks maintain a much higher Tier 1 capital than the capital they must hold to cover only credit risk, according to our calculations. The buffer against loan losses is thus much greater than is indicated by the risk capital requirement.

The risks in the loan portfolio are the largest risk factor the banks take into account when they determine the level of the Tier 1 capital. In addition to credit risk, Tier 1 capital should also cover other risks, such as market risks and operational risks. The size of the buffer against loan losses is thus also dependent on the importance of the bank's other operations. The larger part of the bank's earnings that come from net interest income, the closer the calculated capital for credit risk should come to the Tier 1 capital.[95] SEB's earnings from net interest income are lower than those of the other major banks (See Figure 5). The capital we have calculated for credit risk for SEB should thus comprise a minor part of their Tier 1 capital, compared with the other three.

Naturally, there are several factors involved when the banks choose the level of their Tier 1 capital. One important factor is that

95 More about the banks' earnings can be found in the box "Net interest income and costs".

the credit rating companies' assessments of which credit rating a bank should receive are largely based on the Tier 1 capital level. The credit rating in turn affects the banks' costs for financing.

Stress tests and sensitivity analyses

The method presented here makes it possible to use readily available data to measure the credit risks in the banks and thereby their resilience to various events in the economy. We can observe that, as expected, a large mortgage institution entails lower expected losses and that diversification (geographical, or by sector or industry) reduces the need for risk capital in the model. However, the real advantage of this method is the possibility to change the data we enter into the model and study how the banks are affected by different scenarios.

The variables included can be altered to see what this would entail in terms of increasing (or decreasing) expected loan losses or risk capital requirement. Another alternative could be to search for the set of variables in the input data that provide certain threshold levels for the banks, such as changing the portfolio and seeing when the bank's capital buffer is used up.

Below we present two scenarios, where we have experimented with the variables included.

In **scenario 1** it is assumed that *the credit quality deteriorates by 5 percentage points* so that the best credit class now only contains 5 per cent of the credits, while the worst contains 15 per cent. There are still 80 per cent of the credits that hold an average class.

The result shows that this deterioration in quality would mean that the expected loss in the banks' average portfolio increased by 27 per cent. This could be interpreted as the banks needing to increase their reserves by the same amount. At the same time, the banks' risk capital requirement would increase by an average of 9 per cent. The extra capital requirement may already exist within the bank. However, this would reduce the buffer against further negative outcomes and thereby reduce resilience in the bank towards external shocks.

In **scenario 2** it is assumed that *loss given default increases by 10 percentage points across the entire portfolio*.[96] The result shows that such a deterioration in the degree of recovery would increase both expected loss and risk capital requirement by roughly the same percentage as in scenario 1.

Table 2 Result of sensitivity analysis

	Δ Risk capital requirement	Δ Expected loss
Scenario 1	9%	27%
Scenario 2	15%	26%

Note. Change on average for the four major banks 2002–2005.

96 For example, changes in the preferential rights, which entail lower expected recovery.

Concluding comments

We have presented in this article a method for attempting to measure and assess the resilience of the banking system. This is based on the four major banks' annual reports to obtain a rough estimation of their loan portfolios. To gain a picture of the credit risk, we need a portfolio model. This type of analysis requires information regarding how much of a loss the bank recovers and the probability of the various borrowers defaulting on payments. The information on recovery is based primarily on US data. Default probabilities are based on accounting data and share data and, where this is not available, on industry practice. By then using this information in combination with a readily-available credit risk model, we can obtain an idea of the credit risk in a specific lending portfolio. As we do not make any assumptions about individual banks' ability to assess credit, etc. the differences between the banks are solely due to the composition of borrowers.

The method enables us to make different kinds of stress tests and scenario analyses. All of the variables included can be altered to see how this would affect the banks' loan losses and capital requirement. One possibility is to test an isolated event – a deterioration in a specific industry or a specific country – to see what impact it has on the different banks. More general macro scenarios, such as an economic downswing with a general deterioration for all borrowers can also be adapted to the input data and tested.

In our work on this method we have become aware that there are differences between the banks regarding the external information they report. Minor measures by the banks could significantly improve the possibilities for assessing credit risk in the banking system.

These measures largely concern two areas. The first is the banks' breakdown of corporate loans by industry. It would appear reasonable for this breakdown to follow the same standard in all of the banks, but that is not the case at present. The other area concerns the breakdown of the outstanding loans into different credit qualities. A breakdown into credit qualities/credit classes could provide a simple means for external analysts to assess information on how the risk of defaulting is distributed in the loan portfolio. The new capital adequacy rules that are to be implemented in Swedish legislation with effect from January 2007 will require that the banks provide external parties with this type of information.

Hedge funds and the financial system

In recent years, hedge funds have acquired increasing significance. They fulfil several useful functions in the financial markets – they increase penetration, improve pricing and create liquidity. At the same time, there is a debate on potential risks to the stability of the financial system as a result of the funds' own activities or of their role as important counterparties to other financial agents. This article describes the development of hedge funds, both internationally and in Sweden, and their possible significance for the financial system. The discussions concerning the regulation of these funds are also described. The Riksbank does not consider it necessary to introduce any special regulation for hedge funds, given that their counterparties – primarily the systemically-important institutions – can manage their risks correctly.

Interest in hedge funds is increasing rapidly, both in Sweden and abroad. In recent years, hedge funds have become available to an increasingly broad group of investors and the capital flow into these funds has risen dramatically. Today, hedge funds around the world manage a total of USD 1 000-1 500 billion, divided between more than 8 000 funds. This development brings up the question of the hedge funds' significance for the financial system.

From a stability perspective, hedge funds are interesting both because of their own activities and as important counterparties to large, systemically-important financial institutions. There is a risk that greater competition between hedge funds will lead to increased leverage and more aggressive investment strategies in the future to maintain the high earnings levels. The potential impact of hedge funds on the financial system was demonstrated by the course of events surrounding the hedge fund Long-Term Capital Management (LTCM) in autumn 1998. When LTCM was threatened by failure, the Federal Reserve considered the risk of systemically-important consequences so high that it was compelled to take measures.

One purpose of this article is to characterise the hedge funds and describe how the industry has developed, both internationally and in Sweden. Another purpose is to clarify the effects of the hedge funds' activities on the financial system and to summarise the debate on regulation of hedge funds.

What is a hedge fund?

The precursor to what are today called hedge funds was started up in the United States in 1949 by Alfred Winslow Jones. Jones bought shares he considered to be undervalued and sold short shares he considered to be overvalued.[97] Jones thought that the price of undervalued shares should rise relatively more on a rising market and that the price of overvalued shares would fall relatively

97 Edwards, Franklin R (1999) *Hedge Funds and the Collapse of Long-Term Capital Management*, The Journal of Economic Perspectives, Vol 13 No 2.

more on a falling market, and the fund would thereby earn money on both a falling and a rising market. As the net position in shares as a whole was small, the portfolio was insured, "hedged" against overall (systemic) market risk. The low risk level in the portfolio also opened up for the possibility of borrowing against it, which increased earnings. In addition, Jones introduced a performance-based fee of 20 per cent of the earnings to the asset manager, but he did not make any fixed charge. This meant that the asset manager's interests would coincide as far as possible with those of the investors.

The basic idea behind hedge funds was thus to take positions on the basis of the relative prices of the securities, and at the same time eliminating or reducing market risk. Today, however, hedge funds are a very heterogeneous group of funds, which in some cases have some common characteristics. Moreover, the concept hedge fund is misleading, as many of these funds do not hedge, but take large net positions.

Unlike traditional funds, where the earnings target is set in relation to a comparative index, hedge funds usually choose an absolute earnings target. Together with the performance-based fees, this gives the hedge fund managers a clear incentive to strive for a high return. It is also common that the managers themselves invest in the hedge fund; in Long-Term Capital Management the managers had invested almost 10 per cent of the total capital when the fund was started (see the box "the crisis at LTCM").

Unlike Jones' original fund, most hedge funds today also charge a management fee, usually between one and two per cent of the capital managed. LTCM, for example, charged a management fee of two per cent and a performance-based fee of 25 per cent.[98] Investments in hedge funds are often locked in for a long period of time. The length of time the capital is locked in to some extent determines the illiquidity of the positions the fund can take: a longer locked-in period means that one can invest in less liquid assets.

Hedge funds operate under a freer regulatory framework than ordinary investment funds. Within the EU, investment funds are regulated by the UCITS directive and come under the supervision of a financial authority. Investment funds have to operate under regulations on, for instance, which assets a fund may invest in, which information should be given to investors and how risks are spread.[99]

In Sweden, hedge funds are classified by Finansinspektionen (the Swedish Financial Supervisory Authority) as special funds (together with, for instance, index funds). The limits to which exceptions from the VCITS directive a special fund can be party to are not described in detail (such as number of holdings or percentage limits), but are determined by Finansinspektionen from case to case. The main rule is that the fund's resources, as in the case of securities funds, should be invested according to the principle regarding risk spread. Special funds

98 See Edwards (1999).

99 See "Hedge Funds Regulation in Europe – A comparative study", European fund and asset management association, November 2005 and "The regulation and distribution of hedge funds in Europe – Changes and challenges", Pricewaterhousecoopers, June 2005.

also have to provide their customers and Finansinspektionen with an account of what risk level they aim to achieve.[100]

The most common exemptions for which Swedish-registered hedge funds apply to Finansinspektionen are:

- Higher leverage and possibility to sell short
- Larger exposures in derivative instruments, more than 100 per cent of fund wealth
- Larger exposures to individual issuers

A commonly recurring requirement of hedge funds in various countries is that investment in these funds must exceed a certain minimum level. The purpose of this requirement is to limit the hedge funds' investor circle to wealthy and, presumably, well-informed individuals and thereby to protect "ordinary" consumers. For example, in Italy this level is EUR 500 000, in Ireland it is EUR 250 000, in Spain it is EUR 50 000, while in Sweden there is no minimum requirement.

INVESTMENT STRATEGIES IN HEDGE FUNDS

Hedge funds often describe themselves in terms of the overall investment strategies they employ. A rough categorisation distinguishes three overall strategies: market neutral, event-driven and trend. (A more detailed review of investment strategies can be found in the box below.)

Market neutral strategies aim to trade on price relations between related securities, while attempting to be immune to overall market risk. The volatility of these funds is usually very low, but a high leverage is required to achieve the desired return, as the price discrepancies they exploit are often very small. This category includes strategies such as "Equity Market Neutral" and "Fixed-Income Arbitrage".

Trend strategies identify macro economic trends and events and attempt to predict future market movements. Volatility is usually high in this group of funds, and they are usually highly leveraged. This category includes strategies such as "Global Macro" and "Managed Futures".

Event-driven strategies aim to identify securities whose prices will be affected by specific commercial events, such as acquisitions, mergers and bankruptcies. Prior to a corporate acquisition, this strategy may entail, for instance, purchasing shares in the company that is being acquired and selling shares in the acquiring company. These funds usually have a medium-high volatility and low to medium leverage.

100 "Handbook on investment funds, etc." (in Swedish), Finansinspektionen, May 2005.

Investment strategies

The investment strategy provides a description of which investments the hedge fund usually makes and the markets where it is active. Various commercial databases and indices have somewhat differing definitions. Below follow investment strategies as categorised by Credit Suisse and Tremont Hedge Fund, which are the largest indices in terms of market value.

A large number of funds are included in the categories Event-Driven, which accounted for just over 20 per cent of the CSFB/Tremont Index at the end of 2005, and Long-Short Equity, which comprised almost 30 per cent. However, it should be noted that a breakdown based on investment strategies only provides a rough picture of the strategies that are used and that it is not certain that individual hedge funds fit entirely into any particular category. Moreover, it is common for hedge funds to change strategy over time.

Convertible Arbitrage: Invests in convertible securities while hedging against market risk and trying to be market neutral.

Dedicated Short Bias: Aims to hold a short net position and invests mainly in equity.

Emerging Markets: Invests in all types of asset issued or traded in an emerging market. Within this strategy it is possible for a fund to focus on arbitrage, credit risk or to be event-driven.

Equity Market-Neutral: Trades on price relationships between different assets and often takes long and short positions in the same type of asset. Funds with this strategy try to be neutral to price changes in the market. The strategy often involves leverage in order to obtain a higher return.

Event-Driven: Trades on business transactions in companies and on these not yet being fully priced in the market, for instance, mergers and bankruptcies.

Fixed-Income Arbitrage: Trades on price differences between different securities, such as fixed-income swaps and government bonds, often globally and with the aim of generating a stable return and low volatility.

Global Macro: Was previously the most common of all strategies, but has declined in significance since the mid-1990s. This strategy involves both long and short positions in one of the asset types, where the position reflects the manager's view of macro economic events and trends. Funds with this investment strategy usually invest in liquid assets in order to be flexible.

Long-Short Equity: Invests short and long in equity without necessarily being market neutral. The equity concentration can change; positions can be in shares in companies with a low or a high value, large or small.

Managed Futures: Invests in futures for bonds, foreign exchange, equity and commodities. The most common trade strategies are trend-based.

Multi Strategy: Uses several of the above strategies and tries all the time to make use of the strategy that will provide the highest risk-adjusted return.

In addition to these strategies, there are funds that invest in hedge funds, known as Funds of Hedge Funds. [101]

101 CSFB/Tremont (www.hedgeindex.com), and ECB (2005) *Hedge Funds and Their Implications for Financial Stability*, Occasional Paper No. 34, August 2005.

Hedge funds internationally and in Sweden

As described earlier, the capital inflow to hedge funds has been substantial in recent years; since 1998 the amount of internationally managed capital has increased by an average of 28 per cent a year. Following the IT crash and the sharp fall in the stock market in 2001-2002, many investors sought alternatives to equity and traditional funds, a trend which continued in 2003 and 2004. However, both earnings and inflow slowed down in 2005.

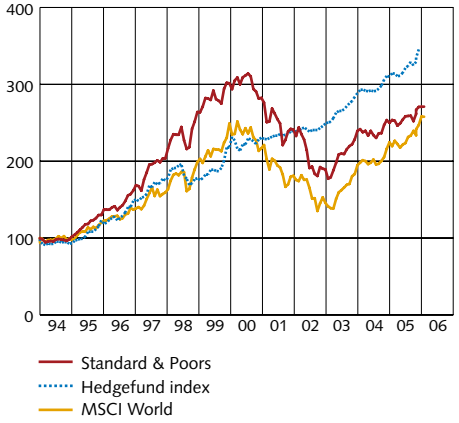
Interest in hedge funds has increased, from private investors and institutional investors as well as pension funds and university funds. According to an estimate, pension funds accounted for a good 15 per cent of the investments in hedge funds in 2004.[102] The return on most categories of hedge fund has been very good, particularly taking into account the low risk. In addition, the active management conducted by hedge funds has increasingly come to be regarded as an efficient means of increasing diversification and reducing market risk.

A large part of the capital inflow to hedge funds is currently through funds that invest in other hedge funds, Funds of Hedge Funds (FOHFs). As these have a relatively low minimum requirement on the invested capital, they have made hedge funds available to a larger group of private investors. These funds also involve an advantage in terms of enabling investment in hedge funds without the investor needing specific knowledge of each individual fund; on the other hand, they charge an additional fee on top of the hedge funds' own fees.

Most hedge funds are relatively small, the majority have fewer than USD 100 million in managed capital and almost half of them have less than USD 25 million.[103] This can be compared, for instance, with the state pension funds in Sweden, which each manage capital amounting to around USD 20 million. One reason for this is the performance-based charges in the hedge funds – many managers find it difficult to find good opportunities for return on capital if the capital is too large why they set a ceiling for the size of the fund.

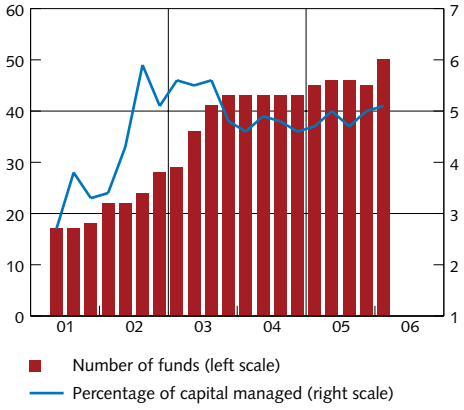
The hedge fund market has also developed rapidly in Sweden. Between 2001 and the first quarter of 2006 the number of hedge funds registered rose from 17 to 50. The managed capital has also increased, from around 3 per cent of the total capital managed in Swedish-registered funds to almost double that amount, which corresponds to around SEK 66 billion (see Figure 2).

Figure 1. Market index from 1994–2006



Source: Reuters Ecowin

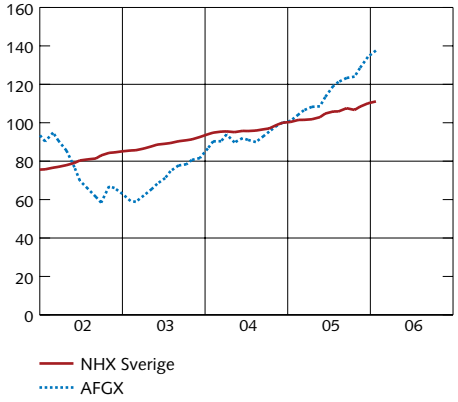
Figure 2. Number of hedge funds registered in Sweden and the percentage of capital managed (per cent)



Source: The Swedish Investment Fund Association

102 FSA, "Hedge funds: A discussion of risk and regulatory engagement." Discussion Paper 05/04, July 2005
103 ECB (2005).

Figure 3. Nordic Hedge fund index (NHX) Sweden and the Affärsvärlden general index 2002:1-2006:1



NHX Sweden contains 43 Swedish hedge funds. See Hedgenordic for calculations and limits, www.hedgenordic.com.

Source: Hedgenordic

Figure 3 shows how Swedish hedge funds have developed in comparison with the Affärsvärlden general index over the past four years. The Swedish hedge fund index shows much lower volatility, but during the large stock exchange upturn in recent years it has also showed a lower return than the general index. The size of the Swedish hedge funds, measured as assets managed, varies considerably. The largest Swedish hedge fund had a market value of SEK 26 billion at the end of June 2005 – which is considerable even in international terms – while the smallest fund had a negative market value of SEK 5 million. The median fund had at the same time a market value of around SEK 225 million. [104]

The debt-to-equity ratio also varies considerably between the funds, but is moderate on the whole. An implicit measure of the leverage (although this is not perfect) is to take the market value of the fund divided by its fund wealth. For the most indebted Swedish hedge fund this measure is 320 per cent, compared with a median of 80 per cent. [105] The degree of borrowing is highest in three of the largest funds, which together manage just over SEK 40 billion.

Table 1 below presents statistics for a sample of international hedge funds from the first quarter of 1994 to the first quarter of 2006, grouped according to investment strategy. The hedge funds' results may not appear very impressive at first glance, if one compares them with the large indices. However, if one takes into account the low risk in (most) hedge funds, the picture alters radically.

Table 1. Return, volatility and correlations for various investment strategies 1994:1 – 2006:1. Return in USD.

Strategy	annual return	Standard deviation	Correlation with MSCI World	Correlation with S&P 500	Sharpe quota
Dedicated short bias	-2.3%	17.6%	-0.76	-0.77	-0.35
Market neutral	9.5%	2.6%	0.39	0.39	2.16
Event driven	11.0%	5.3%	0.61	0.58	1.35
Arbitrage	6.2%	3.3%	0.46	0.44	0.70
Global macro	12.9%	10.0%	0.21	0.21	0.90
Long/Short	11.5%	9.5%	0.69	0.66	0.80
Hedge Fund index	10.4%	7.3%	0.56	0.54	0.89
MSCI World	8.1%	13.9%	1.00	0.93	0.30
S&P 500	10.7%	14.8%	0.93	1.00	0.46
3-month US T-Bills	3.9%	0.2%	-0.15	-0.03	0.00

Source: Tremont and own calculations

The category Market Neutral has, for instance, shown a nominal return of 9.5 per cent – in line with the large indices – but has a Sharpe ratio (which is a measure of risk-adjusted excess return) of more than 2. [106] This can be compared with the MSCI world index

104 The calculations are largely based on the funds included in Hedgenordic's Swedish index and are calculated on the data the funds have reported to Finansinspektionen, see The Nordic Hedge Fund Journal, April 2006.

105 A measure of less than 100 per cent means that the fund has non-listed assets, which are included in the fund wealth but not in the fund's market value. It is possible that the leverage in hedge funds is much higher than has been assumed. This is because off-balance sheet positions and implicit borrowing through derivative instruments are not included.

106 Sharpe ratio is defined as an asset's excess return regarding a risk-free asset, divided by its volatility (the standard deviation of the return). T-Bills have been used as the risk-free asset in these calculations.

with a Sharpe ratio of 0.3 and S&P 500 with a Sharpe ratio of 0.46. It can be noted that the category Dedicated short bias – whose strategies entail short positions in equity considered to be overvalued – has shown a negative return. The correlation between the hedge funds' return and the general index can be regarded as a measure of the diversification effect obtained from a particular strategy. All strategies have a fairly low correlation with the general index and thereby provide good diversification. However, it must be noted that these correlations change over time – in particular during extreme market events – why they may lead to an underestimation of risks to financial stability. [107]

In order to avoid tax and regulation, many hedge funds have their legal domicile in tax paradises such as Bermuda or the Cayman Islands. In addition to tax advantages, they also gain maximum investment freedom and are only required to meet minimum information requirements. Around 60 per cent of the hedge funds active in the EU are located off-shore. [108]

It is important to note that the incomplete information we have on hedge funds – partly as a result of hedge funds in many countries only reporting on a voluntary basis – makes it impossible to exactly calculate the hedge funds' size, risk and return. Some estimates indicate that the statistical sources of error in databases may mean that the hedge funds' annual return is generally overestimated by as much as 2–3 percentage points. [109] The box below describes some of the sources of error.

107 Unexpected increases in correlations between different assets strongly contributed to the LTCM crises.
108 ECB (2005). Despite this, around 84 per cent of all the hedge funds active in Europe are registered with a financial supervisory authority (the corresponding figure in the United States is 57 per cent).
109 ECB (2005).

Statistical sources of error regarding hedge funds

The information available on hedge funds is incomplete and the databases that compile the hedge fund statistics may contain several systematic sources of error. Three of the largest sources of error are discussed below.

Survivorship bias: A source of error arises as databases generally only include the funds that are currently active. The average lifetime of a hedge fund is remarkably short - after one or two years of poor returns a fund often ceases to operate. It is estimated that around 5 per cent of the existing hedge funds are closed down every year. This means that the databases make the return on hedge funds look higher than it actually is. The fact that hedge funds with a low return are often closed down is partly due to high watermarks in the bonus systems for the fund managers. A watermark rule means that a manager who has had a poor return one year must earn it back again in order to obtain a performance-based bonus in the future. In other words, if a fund has done badly several years in a row, it becomes very difficult for managers to pass their watermarks, which increases the incentive to close down the fund.

Self-selection bias: Hedge funds provide information to databases on a voluntary basis, primarily with the aim of marketing the fund to investors. The most probable cause of a fund ceasing to report is that it has had a very low return, which would affect the statistics in the database in the same way as a survivorship bias. To some extent this can be counterbalanced by funds that have done very well, and which cease reporting because they do not require any further marketing or capital.

Backfilling bias: This source of error arises when a new hedge fund is added to the database and the fund is then asked to report its history. If the fund in question had a weak return further back in time, its management may choose to report only a brief history, which could also lead to an overestimate of the hedge funds' return.

The importance of the hedge funds for the financial markets

POSITIVE EFFECTS OF HEDGE FUNDS

Hedge funds can be expected to have several positive effects on the functioning of the financial markets – their flexible investment strategies mean that they improve pricing and liquidity on many markets. One example of this is hedge funds that analyse companies and then invest in the shares they perceive as undervalued and take short positions in shares they perceive as overvalued. In this case, the hedge funds' actions lead to fairer market prices, which can lead to more efficient allocation of resources and better risk management. There are some indications that hedge funds in the United States sold short IT-related shares during the IT bubble and actually had a correcting effect on stock market developments.[110]

Another example is hedge funds that have specialised in identifying securities derivatives that are not consistently priced, that is to say, classical arbitrage activities. Hedge funds and other agents using arbitrage ensure that prices converge, which can enable trade that would not have been possible under the incorrect prices. As more and more assets are being traded on more geographical markets, hedge funds can thus have positive effects on global financial integration.

Another effect of hedge funds is that they supply the financial markets with liquidity. This effect is probably greatest in new and more complex markets, where hedge funds also act as risk-takers and take on net positions. According to the British Bankers' Association, hedge funds' share as sellers of credit protection in credit derivatives has increased from 5 per cent in 2001 to 15 per cent in 2003.[111] At the same time, their share as buyers of credit protection increased from 12 to 16 per cent. Another survey by Greenwich Associates finds that hedge funds account for 15 to 50 per cent of all trading in credit derivatives in New York and London. The presence of hedge funds on these markets has probably had a positive effect on market development and contributed to a global increase in risk spread and to other agents being better able to manage their risks. In Sweden, however, trade in credit derivatives is still insignificant.

In addition to the above effects on the efficiency of the financial markets, hedge funds also offer greater diversification potential for the individual investor. Both empirical and theoretical studies indicate that hedge funds can provide investors with opportunities for return and diversification that would not be possible through ordinary investment funds.

110 Brunnermeier and Nagel (Journal of Finance 2004) have studied hedge funds and the IT bubble and find some indications that hedge funds sold short IT-related shares before the bubble burst.
111 See British Bankers' Association (2004), Greenwich Associates (2006) and Fitch (2005).

NEGATIVE EFFECTS OF HEDGE FUNDS

Many analysts fear that the rapid growth in hedge funds could also have negative consequences for the financial markets and for financial stability.[112] There are both direct risks via the banks' exposure to hedge funds, and indirect risks through contagion effects in the markets. The complex and relatively large positions in certain markets make the contagion risks difficult to survey. The fact that the market itself cannot always neutralise liquidity crises was illustrated clearly by the LTCM crisis.

Unlike regulated financial institutions, hedge funds do not have any limits for the degree of their leverage. A high leverage increases both the probability of, and the effects of, a failure in one or more hedge funds. In addition to the direct capital loss for the banking sector, the failure of one of a number of large hedge funds would also entail a significant decline in commission income. One estimate indicates that hedge funds account for as much as 25 per cent of the income in many of the largest multinational banks.[113]

On the whole, however, leverage in hedge funds is relatively low. A study of the Hennesse Group in 2003 reported that the debt to equity ratio for 84 per cent of the funds studied was lower than 200 per cent and that only 2 per cent of the funds had a leverage of more than 500 per cent.[114] These are modest levels in comparison with financial institutions. The major Swedish banks have on average an equity/assets ratio of 4.3 per cent, which corresponds to a debt to equity ratio of more than 2 300 per cent. At present, it can be observed that the potential direct effects on the banks are not serious in relation to their balance sheets or total income.[115] However, there are signs that increasingly intensive competition among banks regarding the financing of the hedge funds has led to lower requirements for collateral from the hedge funds and to hedge funds' leverage increasing.[116]

The fact that the leverage in hedge funds is generally modest does not mean that it is risk-free. Hedge funds often have positions in very illiquid assets and the contagion risk between hedge funds is probably higher than that between other financial institutions. Indirect effects on the financial system may arise if the banks have exposures to other agents that in turn have exposures to hedge funds. One contributory factor to the contagion risk is that the hedge funds' positions are often unknown to other agents. Counterparty risk was an important part of the problems surrounding LTCM, where many

112 In connection with a crisis management exercise held by the ECB in April 2006, it was observed, for instance, that growth in hedge funds and trade in credit derivatives comprises a potential risk for the financial system. Financial Times, 9 April 2006.

113 Fitch Ratings, "Hedge Funds: An emerging Force in the Global Credit Markets." Special Report 18 July 2005.

114 Gupta and Liang (2004) found in their study of hedge funds that only 4 per cent of the funds would not have managed the capital adequacy requirement under Basel II.

115 See ECB (2005), "Large EU banks' exposures to hedge funds".

116 Greenwich Associates. "European Fixed Income: Focus on Hedge Funds", December 2005.

banks had indirect counterparty exposures through the interbank market and there was a significant contagion risk if the company had failed.

Although hedge funds still manage a small part of the total managed capital in international terms, approximately 5 per cent, they account for an increasingly large part of the liquidity in the market. If a large number of hedge funds were to fail and at the same time have a high degree of leverage, there is a risk that the financial markets would be affected. As mentioned above, this applies in particular to certain credit derivative markets, where liquidity risks disappearing altogether. A liquidity crisis could then spread to other markets.

Hedge funds are often accused of herd behaviour, that is, of imitating one another's behaviour and taking similar positions. This type of strategy risks reinforcing market fluctuations and having a destabilising effect. This applies in particular to macro funds, which take positions and invest on the basis of an expectation of macroeconomic developments. For example, it is often claimed that hedge funds were involved in and reinforced the effect during the ERM crises. However, there are no clear indications that hedge funds follow momentum strategies to a greater extent than other investors.[117] On the contrary, it can be claimed that the absolute, rather than relative, return requirement in hedge funds should reduce the incentives for herd behaviour.

117 A momentum strategy involves buying assets that have increased in value and selling assets that have decreased in value.

The LTCM crisis

LTCM was started up in the United States in 1994 and at that time managed a capital of USD 1.3 billion. The fund management included many prominent figures from Wall Street and the world of academia, including the recipients of the Riksbank's Economics prize, Robert Merton and Myron Scholes.

The fund's investment strategy partly consisted of buying high-risk bonds (with a high return), for instance in emerging economies or in companies with a low credit rating, and selling short in low-return bonds, such as US government bonds. LTCM's management was convinced that the spreads between high-risk and low-risk asset were unjustifiably high and that they would decline. [118]

This strategy worked very well initially, with return in 1995 and 1996 at around 40 per cent and in 1997 at around 20 per cent. The fund attracted an increasing number of investors, and at the end of 1997 the invested capital at LTCM amounted to more than USD 7 billion. In December 1997, the fund announced that investment opportunities had deteriorated, and that it therefore intended to pay out USD 2.7 billion to its investors (corresponding to 36 per cent of the fund capital). At the same time the fund had borrowed around 125 billion dollars. This resulted in a debt to equity ratio of more than 2 000 per cent which improved return on the capital invested. [119] The prominent people in the management and the fund's exceptionally good results probably contributed to investors accepting such a high degree of leverage – deliberately or out of ignorance.

In 1998 there were a number of events that led to unease on the international financial markets. During the summer Russia devalued the rouble and defaulted on payments on its foreign debt, which also had considerable effects on other markets. The credit ratings of many emerging markets were questioned, which led to the spread of higher-risk credit derivatives increasing rapidly. This was exactly the reverse of the developments predicted by LTCM and many other investors. The reaction was very extreme and led to liquidity almost disappearing in some markets.

It now became very costly for LTCM to withdraw from its positions. This, together with the high leverage, meant that the fund experienced difficulty in meeting its obligations towards its counterparties, who required more collateral. In September 1998 the fund sent a letter to its investors describing the problems and requesting more capital. This proved unsuccessful and the liquidity problems became increasingly acute.

The size of the fund and the fact that so many financial agents were involved in LTCM led to concern over a possible collapse. In addition to large credit losses for the fund's counterparties, there was a fear that a failure would have serious consequences for the financial markets in general. Furthermore, many other funds and investors held similar positions. This led to the Federal Reserve calling together a group consisting of fourteen banks and brokers with the aim of counteracting an uncontrolled collapse of LTCM. The bid that later came to be accepted by LTCM meant that the group invested USD 3.6 billion in the fund in exchange for 90 per cent of the assets. Control of the fund was transferred to a committee whose members were appointed by the new owners. However, the Federal Reserve itself did not supply any funds.

118 Edwards (1999).
119 Hedge Funds, Leverage, and the Lessons of Long-Term Capital Management, Report of the President's Working Group on Financial Markets, page 11.

Hedge funds and regulation

Today, hedge funds are in many ways unregulated. This applies in particular to funds that are located off-shore, where the authorities have little or no insight. As hedge funds have come to control an increasing amount of capital, and to attract an increasingly large group of investors, the international debate regarding the regulation of hedge funds has intensified. This debate has been further fuelled by a number of well-publicised cases of fraud in hedge funds in the United States in recent years. With effect from February 2006, the Securities and Exchange Commission in the United States has introduced a registration requirement for large hedge funds, including those located off-shore, and more countries in Europe are currently reviewing their regulations.

There are two main arguments in favour of regulating the hedge funds' operations. The first is based on a consumer protection perspective – individual investors and consumers should be protected from funds that take excessive risks. However, this type of reasoning is rather strange; if one considers that ordinary consumers' and pension savers' investments should be protected, it should be their investment opportunities that are limited, not the hedge funds' operations. The second argument is based on a stability perspective – as the hedge funds take on an increasingly important role with regard to the liquidity of the financial markets, there may be reason to limit their risks.

A natural proposal for reinforcing market discipline is that the hedge funds should provide the market with more information. If the hedge funds' positions are unknown or difficult for financiers to understand, there is a risk that market discipline will not work, and that the hedge funds will take on too much risk or increase their borrowing too much.

In Sweden, hedge funds are already required to register and report their holdings to Finansinspektionen. Until recently, Finansinspektionen has then published the funds' positions with a three-month time lag. However, it is doubtful whether this detailed spread of information has had any disciplinary effect, particularly bearing in mind that the hedge funds often have extremely complicated positions. On the other hand, it is not impossible that this is exploited by competitors and other funds.

One alternative to this complete provision of information is for hedge funds to provide a measure, or measures, which describe the risks in the fund, for example a value-at-risk measure or some measure of liquidity risk and leverage. This is the approach that Finansinspektionen intends to use in future.[120] This could be a much more transparent means of receiving information about individual hedge funds' risks, but on the other hand it does not provide any information on direct or indirect exposures to banks and other systemically-important institutions.[121] This information, like the banks' other counterparty exposures, must thus be collected from the banks themselves.

120 See "Changed routines for the publication of special funds' (including hedge funds) holdings and risk-taking". Finansinspektionen, memorandum 6 December 2005 and "Reporing of risk measures", Finansinspektionen, memorandum, 12 May 2006.

121 Value-at-risk measures and other risk measures can be problematic if a hedge fund has non-linear positions, but they could be supplemented with some form of stress tests.

A more direct form of regulation would be to regulate which positions hedge funds are allowed to take, or to introduce something similar to capital adequacy rules for them. The first type of regulation would limit the positive effects that hedge funds have on financial markets and reduce their efficiency. They could also mean that liquidity disappeared from markets when it was most needed and lead to increased volatility.

Advocates of stricter regulation of hedge funds face a fundamental obstacle; the funds' legal domicile is often a tax paradise, or can easily be moved to one. Increased regulation in Europe and the United States – for example through some form of capital adequacy rules – would probably lead to an increasing number of hedge funds registering themselves off-shore to avoid regulation.[122] However, even if this rule arbitrage could be prevented, it is difficult to see how possible systemic risks could best be tackled through regulation of hedge funds; it is probably more efficient to focus the regulations on systemically-important institutions. Improving the banks' risk management with regard to hedge funds has been the objective of a number of initiatives by the Basel Committee on Banking Supervision (BCBS) and other organisations ever since the LTCM crisis in 1998.[123]

Conclusion

From having been a form of investment limited to a small number of wealthy individuals, hedge funds now attract a large group of institutional investors and consumers. Pension funds in particular are attracted by the stable return shown by hedge funds and the diversification advantages they offer. Their arbitrage activities and their flexible investment strategies mean that hedge funds fulfil several valuable functions in the financial markets – they increase breadth and depth, improve pricing and create liquidity.

However, the substantial growth in hedge funds in recent years has triggered an international debate on the risks involved in their operations. Hedge funds' illiquid positions and occasionally high leverage mean that problems in individual funds can spread and lead to a major liquidity crisis. In addition, some types of hedge funds have become known for short-term speculation and herd behaviour, which may have destabilising effects on the financial markets.

The Riksbank's view on the question of further regulation is that the focus should be on the hedge funds' counterparties – particularly the systemically-important institutions – being able to manage their risks. If the major banks manage their counterparty exposures correctly, that is to say, take sufficient collateral and are capable of managing possible liquidity problems, there is no reason to introduce special regulation for hedge funds as a type of asset. To ensure this, it is possible that central banks and financial supervisory authorities make greater demands of the banks' reporting of counterparty exposures in future.

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122 One of those who strongly advocates capital adequacy rules for hedge funds – on an overall, international basis – is Jochen Sanio, head of the German financial supervisory authority. See, for instance, "Should hedge funds be regulated", speech held by Sanio at the conference "Top Ten Financial Risks to the Global Economy", September 2005.

123 See, for instance, "Hedge funds: Developments and policy implications". ECB Monthly Bulletin, January 2006.

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