

Norges Bank's surveillance of financial stability

Trond Eklund, director and Bjarne Gulbrandsen, head of division, Financial Analysis and Market Structure Department in Norges Bank

This article presents the primary elements of the analyses performed by Norges Bank to monitor stability in the financial system.¹ Section 1 explains briefly why Norges Bank performs these analyses. Section 2 examines financial institutions' risk exposure and Norges Bank's methods for monitoring trends that can shed light on developments in risk exposure. Section 3 presents the Bank's analyses of developments in financial institutions.

1 Stability in the financial system is an important objective of the authorities

If the financial sector is unable to perform basic tasks, such as payment transmission services and the conversion of bank deposits into long-term lending, this may have significant effects on the market economy.

Many countries have experienced banking crises during the past decade. The experience of Norway, Finland and Sweden shows that the socio-economic costs of a banking crisis are high. In the first half of the 1990s, most major banks in these countries experienced such significant losses that it was impossible to continue operations without government intervention. Problems in parts of the financial sector spread to other parts of the sector, resulting in a systemic crisis. The recent crisis in Asia demonstrated that financial crises spread easily to other countries.

In Norway, the Ministry of Finance, the Banking, Insurance and Securities Commission and Norges Bank are jointly responsible for the authorities' efforts to secure financial stability. The Ministry of Finance has primary responsibility, whereas the Banking, Insurance and Securities Commission is responsible for surveillance of individual market participants. Norges Bank is responsible for fostering robust and efficient financial markets and payment systems, i.e. promoting financial stability. Should a situation arise that puts the financial system at risk, Norges Bank will, in consultation with the authorities, evaluate the need for and, if necessary, implement measures for strengthening confidence in the financial system. Norges Bank's preventive work consists of the following:

1. Continuous monitoring of conditions that may jeopardise stability in the financial sector and lead to systemic problems
2. Work to reduce risks related to the payment and settlement systems and to make these systems more robust
3. Assessment of the impact of monetary policy and other economic policy components on financial stability

In this article, we will focus on the most important analyses in connection with the continuous monitoring of the conditions mentioned in point 1 above. A report on financial stability is published every six months. This report is discussed in Norges Bank's Executive Board and submitted to the Ministry of Finance and the Banking, Insurance and Securities Commission. The report provides part of the basis for discussions about the situation in the financial system and the need for any measures by the authorities. The main elements of the report are also published.

The primary purpose of Norges Bank's efforts is to identify developments that can threaten financial stability. It is also important to expose mechanisms that contribute to the spread of problems from one part of the financial system to another. The analyses strive, therefore, to provide an overall picture of the situation and developments in the financial sector. The primary focus is on the banks' financial situation and trends, with a view to providing a picture of the banks' financial strength in relation to their risk exposure. The financial sector, however, comprises far more than banks. We concentrate on banks because they are large and are key participants in the financial sector, and also because the central bank has a distinct role in relation to banks. In view of Norges Bank's role, developments in individual banks receive little attention.

It is difficult to assess the value of historical information about earlier crises to the assessment of developments that can lead to new crises. In our opinion, such information is important. Historically, loan losses have been the most significant cause of problems in banks, and we still feel that it is very important to track the banks' credit risk. On the other hand, operational risk is receiving increasing attention at the individual institution, although it is impossible, based on available data, to cover this adequately in an external analysis.

Analyses of stability in the financial system are based on a combination of quantitative and qualitative information. Extensive data are analysed with a view to identifying developments that can increase the vulnerability of the financial system. More qualitative information

¹Lund and Solheim (1999) describe the authorities', and, in particular, Norges Bank's role in the work to ensure stability in the financial system.

about the participants' behaviour and strategies also help establish a general picture of potential developments. The aim of the analyses is to cover financial institutions' most significant risks and include:

- Credit risk
- Market risk
- Liquidity risk
- Settlement risk

The individual institution's risk exposure also depends on the financial system's overall risk exposure, macro-economic conditions and conditions that impact the structure of the financial system. Therefore, in addition to monitoring the individual institution, the authorities must monitor conditions that more generally affect financial institutions and financial markets.

2 Methods for monitoring financial exposure

In this section, we briefly describe different types of risk exposure and review Norges Bank's methods for monitoring developments in the financial sector.

2.1 Credit risk

Credit risk means a credit institution's risk of payment default due to borrower's unwillingness or inability to service debt. The higher the credit risk is, the greater the losses will normally be. Credit risk is considered to be the form of risk that can most significantly diminish earnings and financial strength for banks and most other credit institutions. Therefore, Norges Bank attaches great importance to its analyses of credit risk and conditions that may impair the ability of credit institution customers to service their debt. Although the willingness to service debt also varies, we have concentrated our analysis on debt-servicing capacity.

In the following discussion, we have treated enterprises and households separately, despite the fact that the interaction between these two sectors figures prominently in our analysis.

2.1.1 Credit risk in the enterprise sector

Our analysis of the enterprise sector is based partly on microdata extracted from accounting information for individual enterprises and partly on aggregated data from the national accounts. Regardless of the information source, our analyses of enterprises' debt-servicing capacity focus on earnings. We also look at financial strength and liquidity. Below, we describe a type of analysis that uses microdata to classify enterprises' credit risk. Then, we show how we use figures from the national accounts and Norges Bank's macro-model RIMINI.

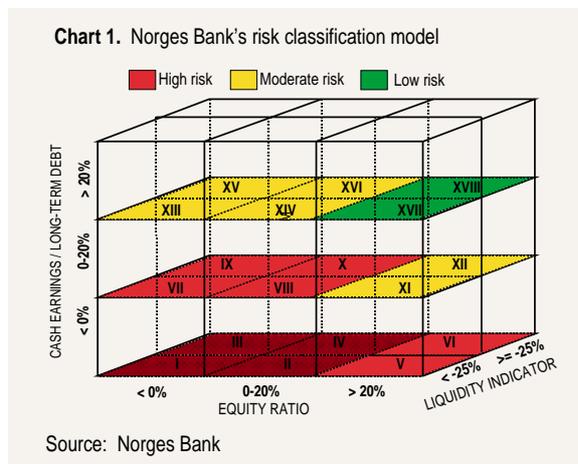
Microdata and risk classification

Bankruptcy may be the result of a number of conditions. Often, earnings have been too low. To be viable, an enterprise must have earnings that are positive in relation to payment obligations. Without satisfactory earnings, it will also be impossible for enterprises to raise other types of capital, such as loan capital and new equity capital. Therefore, our analyses focus on enterprise's earnings and whether they are adequate in relation to payment obligations. On this basis, we define cash earnings as a variable in the model. Since a lack of liquidity is a triggering factor in bankruptcy cases, we have included a variable that provides an indication of liquidity levels and developments. Enterprise's ability to withstand losses is usually assessed on the basis of financial strength. There are a number of problems connected with measuring an enterprise's financial strength. Asset valuation represents a particular challenge. Nevertheless, statistical tests indicate that this variable is useful in classification models. Therefore, this is the third variable in the model.

By using the variables above, where one variable has two levels and two variables have three levels, we obtain a risk classification model comprising 18 classes. This is often too detailed. Sometimes, we use eight risk classes and other times we use three. This is illustrated in Chart 1, where Roman numerals show the most detailed classification and the colours red, yellow and green the most compressed – high, moderate and low risk. Division into

Norges Bank's risk classification model

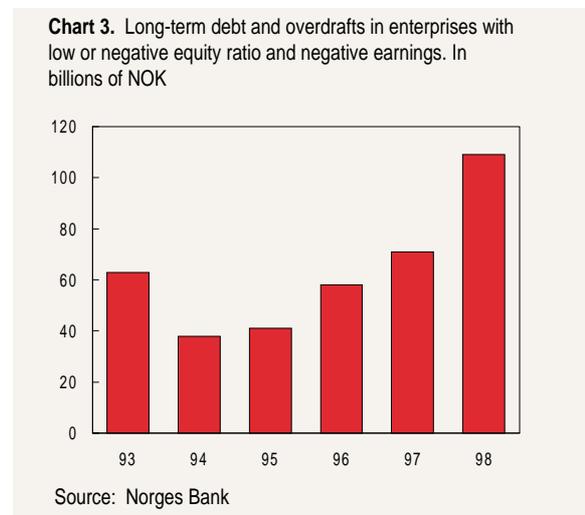
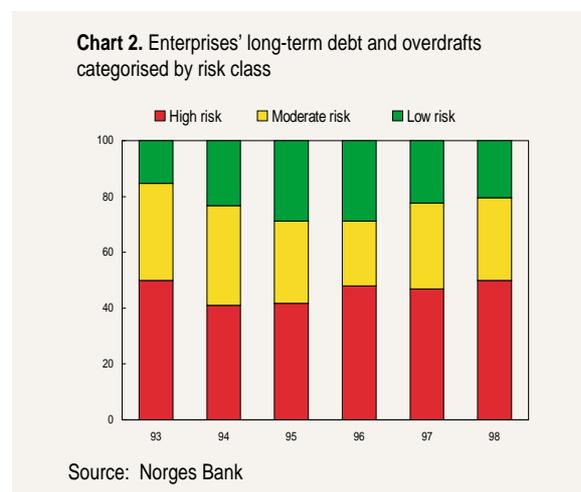
- *Cash earnings as a percentage of long-term debt*
The minimum requirement for cash earnings is that it covers dividends, loan repayments, part of the investment in fixed assets and any need for an increase in operating capital. A thorough analysis depends on additional information about the individual enterprise. In our situation, this is not feasible. The model divides the enterprises into three groups: those with negative cash earnings, those with cash earnings between zero and 20 per cent of long-term debt and those with cash earnings exceeding 20 per cent of long-term debt.
- *Liquid assets less current liabilities as a percentage of operating revenues*
The basis for this key figure is that insufficient liquidity is either shown as a decline in liquid assets or an increase in current liabilities. We differentiate between enterprises with values greater or less than –25 per cent.
- *Equity as a percentage of total assets*
Here, we operate with three groups; enterprises with negative equity, enterprises with an equity ratio ranging from zero to 20 per cent and enterprises with equity ratios in excess of 20 per cent.



these three categories must be seen as a relative evaluation of risk, and we emphasise that the high-risk group is not synonymous with bankrupt or loss-making enterprises. The model is estimated and tested using a wide range of data and is used to classify enterprises in one of 18 classes. The risk profile for the enterprise sector as a whole is thus the sum of the classifications of the individual enterprises.

The data input in the analyses consists of detailed accounts for all limited companies in Norway starting in 1988. In addition to the accounts, we have detailed information about the industry and geographic location as well as some information about payment history. This allows us to follow the sector as a whole as well as to monitor developments in enterprises' credit risk, divided by industry and geographic location.

Below are some examples of the charts used in our analyses. Using the classification model, we have classified enterprises' long-term debt and overdrafts into three groups - with high, moderate and low risk. Chart 2 shows the percentage of enterprises' combined long-term debt and overdrafts that falls into each of the three risk classes. Chart 3 presents the amount of debt in enterprises with the highest risk exposure, i.e. enterprises with low or negative equity and negative earnings (risk class I-IV in Chart 1).



Analyses based on national accounts figures and the RIMINI model

An important aspect of the analyses is to shed light on the effect of macroeconomic conditions on the debt-servicing capacity of households and enterprises, and, thereby, on credit risk in banks. Norges Bank uses the quarterly macroeconomic model RIMINI in its analyses. This model is the primary tool used in preparing macroeconomic projections that provide the basis for the bank's Inflation Reports. In recent years, the model has also been used increasingly to systematically shed light on financial exposure in households and enterprises.

This has been accomplished through the development of a set of indicators based on debt-equity ratio and interest burden that provide an indication of the financial exposure in the household and enterprise sectors.

RIMINI indicators of the debt and interest burden in the household and enterprise sectors

Households

- Interest expenses/cash income (disposable income + interest expenses)
- Interest expenses/interest income excluding interest on insurance claims
- Gross loan debt/disposable income
- Gross loan debt/gross claims excluding insurance claims
- Gross loan debt/value of housing wealth

Enterprises

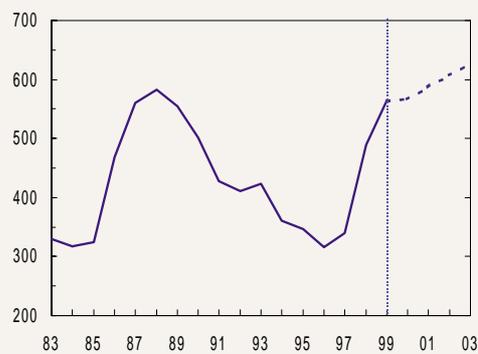
- Interest expenses/cash surplus (value added - wage costs + capital income)
- Gross interest-bearing debt/(cash surplus - interest expenses)
- Gross interest-bearing debt/gross interest-bearing asset
- Rise in interest-bearing debt the last four quarters/fixed investment the last four quarters

The indicators provide information about the share of household income or enterprise earnings used to cover interest expenses, debt in relation to that portion of income used to pay principal, and the relationship between gross debt and gross assets. All in all, the indicators will provide a good indication of whether households or enterprises are altering their behaviour in a manner that may lead to increased financial exposure.

A preliminary version of a sub-model for loan losses in the financial sector has been developed², based on the same indicators. It is important that the different indicators, which are intended to shed light on the same conditions and are produced on the basis of different data sources and different modelling tools, are based on the same underlying reasoning.

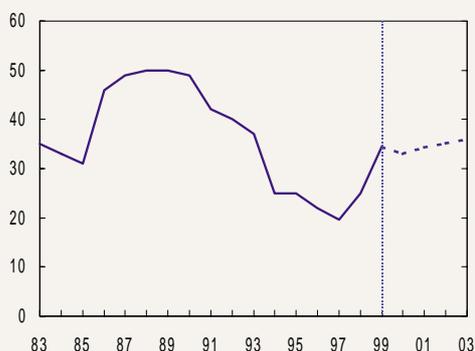
The model normally uses the same baseline scenarios as in the Inflation Report. By running the model, it is possible to test different scenarios for future developments in macroeconomic variables and find out how they influence credit risk in the two sectors. Efforts are currently underway to further develop the current model and to develop new relationships in the model to make it more suitable for monitoring financial stability. Chart 4 and 5 present developments in the two indicators.

Chart 4. Interest-bearing debt as a percentage of cash surplus excluding interest expenses. Private non-financial enterprises



Source: Norges Bank

Chart 5. Interest expenses as a percentage of cash surplus. Private non-financial enterprises



Source: Norges Bank

Chart 4 shows total interest-bearing debt as a percentage of cash surplus excluding interest expenses. Chart 5 illustrates the ability to pay interest by looking at interest expenses as a percentage of cash surplus. The two charts combined provide a fairly good indication of enterprises' future capacity to service debt.

2.1.2 Credit risk in the household sector

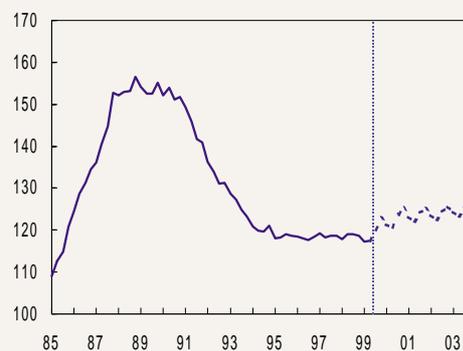
Lending to households accounted for 42 per cent and 70 per cent respectively of commercial and savings banks' total loans. A major portion of banks' total credit risk will therefore be tied to households' capacity to service their loans. In addition, the interplay between the household and enterprise sectors has a significant impact. Deterioration in the enterprise sector may lead to increased unemployment and reduced capacity to pay wages. This will weaken households' financial position, leading to diminished demand for enterprises' products and services and deterioration in enterprises' financial position.

Credit risk in the household sector also depends on willingness and ability to pay. Data that provide a basis for assessing the willingness to pay are unavailable. Therefore, the analyses focus on payment capacity. Microdata based on income and wealth statistics and aggregated national accounts and financial market statistics are also used in the evaluation of the household sector.

On the basis of national accounts and financial market statistics, we monitor indicators that reflect developments in the saving ratio, financial investments as a percentage of disposable income, the distribution of households' gross financial wealth and investments in various financial instruments and, not least, debt and interest burden.

The RIMINI model is used to make projections about households' gross loan debt as a percentage of disposable income and about interest expenses as a percentage of cash income. These projections are based on different scenarios for future developments in key macroeconomic variables, such as the interest rate level or unemployment.

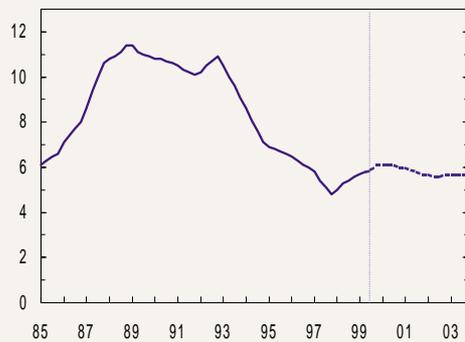
Chart 6. Gross borrowing as a percentage of disposable income. Four-quarter moving average. Household sector



Source: Norges Bank

²See Eitheim and Qvigstad (1998)

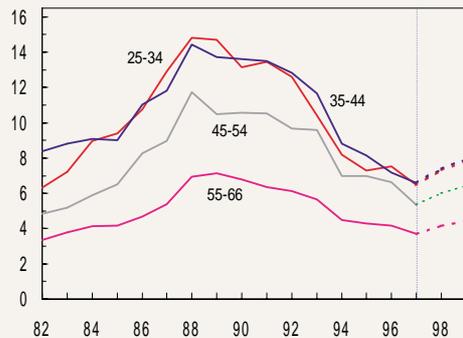
Chart 7. Interest expenses as a percentage of cash income. Household sector. Four-quarter moving average



Source: Norges Bank

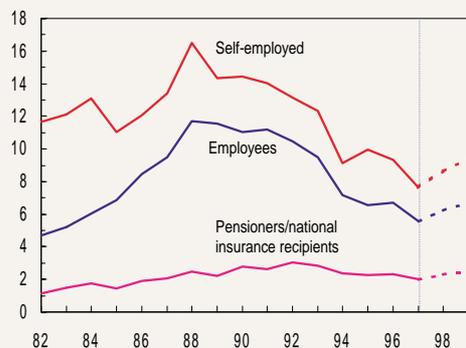
The indicators that are based on national accounts and financial market statistics provide information on, for example, total wealth and debt in the household sector, or the debt burden for an average household, if we consider total debt as a percentage of disposable income. The analyses that are based on income and wealth statistics aim at providing spread information as they provide an indication of the debt and interest burden for different household groups. The data provide the basis for analysing household groups by age, socio-economic group (self-employed, wage earner and pensioners), income and interest burden (interest expenses as a percentage of disposable income).

Chart 8. Interest expenses as a percentage of cash income by age group. Figures for 1998 and 1999 are estimates.



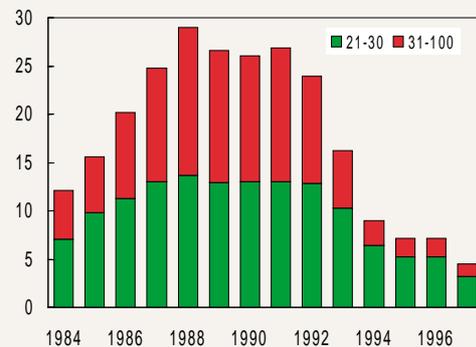
Source: Statistics Norway and Norges Bank

Chart 9. Interest expenses as a percentage of cash income by socioeconomic group. Figures for 1998 and 1999 are estimates.



Source: Statistics Norway and Norges Bank

Chart 10. Percentage of households with interest expenses (before tax) of 21-30 per cent and 31-100 per cent, respectively, of cash income



Source: Norges Bank

Charts 8 and 9 illustrate the ability of various household groups to pay interest expenses by showing the relationship between interest expenses (before tax) and cash income. Chart 10 shows the percentage of households with interest expenses in excess of 20 per cent of cash income. The purpose of this chart is to focus on households with the greatest risk exposure.

2.2 Market risk

Market risk is often used as a collective term for several types of risk, including risk of losses on on- and off-balance sheet items as a result of changes in market prices – primarily interest rates, exchange rates and equity values.

Monitoring of financial stability includes an ongoing follow-up of developments in securities markets. In addition to *price information*, emphasis has been placed on describing *volatility* and, not least, the *covariation* between pricing in the Norwegian and major international securities markets. National securities markets have become more closely integrated due to increasing globalisation. For example, share price changes in the US securities market will rapidly affect prices in the Norwegian securities market.

We also monitor *financial institutions' exposure* in securities markets. Insurance companies and securities funds invest most heavily in securities. Securities portfolios at banks and other credit institutions are fairly small. This means that the market risk in these institutions is limited. In addition, regulations stipulate that financial groups, including banks and insurance companies, must be organised in such a way that risk in the insurance sector is not transmitted to the banking sector.

A sharp fall in prices can, however, negatively affect banks' results through several channels. In addition to losses on securities, reduced trading income and a decline in earnings in bank-owned life insurance companies will weaken results. The banks' credit risk may also rise, whereas the effect on loan losses is both uncertain and far more difficult to quantify.

Financial institutions often have effective systems for managing market risk. Much of financial institutions' hedging of securities portfolios is designed to protect their operations from fluctuations in interest rates. Therefore, the authorities' role in connection with monitoring market risk may focus to a greater extent on the banks' own systems for managing risk.

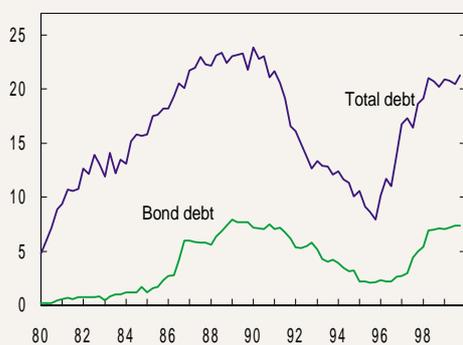
2.3 Liquidity risk

Liquidity risk is often defined as the risk that a financial institution is unable to meet its obligations when they fall due without incurring significant extra costs in connection with refinancing or the realisation of assets. The liquidity risk for banks (and other credit institutions) stems primarily from the fact that relatively long-term loan portfolios are financed mainly by short-term deposits or borrowing. The deposits or financing can be withdrawn, thereby creating major problems in connection with refinancing an illiquid loan portfolio. Banks' liquidity problems are of particular importance to the central bank since these problems can spread rapidly.

Regulations governing the banks include separate provisions that aim at covering the banks' liquidity risk. For example, a bank is obligated to ensure that it can at all times cover its obligations when they fall due. The regulations state: "Banks covered by these regulations shall have cash reserves amounting to at least 6 per cent of the individual bank's debt."

Experience has shown that foreign financing entails greater liquidity risk than other types of financing. This means that an increase in foreign financing will heighten liquidity risk, other things being equal. Experience has also shown that foreign financing can dry up when there is turbulence in financial markets. This was a real problem in the aftermath of the oil price fall in 1986 and in connection with the banking crisis at the beginning of the 1990s. Therefore, monitoring banks' liquidity risk focuses especially on the composition of and developments in banks' foreign funding.

Chart 11. Banks' foreign debt as a percentage of total assets. Quarterly figures



Source: Norges Bank

2.4 Settlement risk

Settlement risk is the risk associated with clearing and settlement systems, ie the risk that a counter-party to an agreement is unable to honour his contractual obligations within the delivery and/or payment date. Settlement risk normally comprises credit risk, liquidity risk and operational risk.

Since the banks are the dominant participants in the settlement systems, it is most important to follow developments in the banking sector. Since the banks have normally credited their customers before they actually receive settlement, there has been an element of credit provision in the settlement. This provision of credit has not been visible and has therefore not been subject to credit evaluations. During the last few years, central banks have initiated a number of measures to eliminate or limit this risk. Special emphasis has been placed on making this risk visible. Systems have also been developed to shed light on the trade-offs between risk-reducing measures and costs.

So far, Norges Bank has given little attention to this type of risk in its reports on financial stability. Efforts are being made, however, to include a more qualitative description of the relationship between payment and settlement systems and financial stability, by, among other things, describing participants' risk exposure and measures that are initiated to curb risk.

2.5 Other risks

The banks are also exposed to operational, legal and political risk. Norges Bank places little emphasis on these types of risk since they are to some extent connected with internal systems and routines. These types of risk will normally be monitored at the institutional level and are among risks monitored by the Banking, Insurance and Securities Commission.

During the last few years, however, there has been strong international focus on these risks by institutions such as the Bank for International Settlements (BIS). The BIS has attempted, for example, to survey financial institutions' routines for managing operational risk.

Operational risk is the risk that routines connected to the institutions' operations may lead to losses. The authorities' interest in this type of risk has grown, because there have been a number of international cases involving major losses during the last few years. Norges Bank is also interested in the potential consequences of the contagion effect of operational risk at individual institutions. This is monitored by examining inter-bank exposure, liquidity risk and settlement risk.

It is probably impossible or inappropriate to continuously monitor operational risk for the financial services industry or the banks as a whole. However, Norges Bank will attempt to provide a more qualitative description of conditions that affect operational risk in its reports on financial stability.

3 Strategic risk and earnings and financial strength in the financial sector

3.1 Strategic risk

Strategic risk is connected to the banks' strategic choices, which will significantly affect future earnings and risk exposure. In order to achieve adequate earnings in the future, the individual institution must be able to maintain its competitiveness. Changes in general parameters and internal conditions may represent both opportunities and threats. In order to utilise opportunities and ward off threats, the individual institution must possess the ability to analyse potential strategies and then select and implement the appropriate ones. Which strategies do different groups of Norwegian financial institutions select to adapt to internationalisation, consolidation and rapid technological developments? Are Norwegian institutions capable of maintaining their competitiveness and safeguarding earnings? Which strategies are being selected with regard to products, market segments and distribution channels? These are the kinds of questions that we raise in our work.

When we evaluate future competitiveness of the financial services industry, either as a whole or in part, we start by looking at the industry's environment and how it may influence the industry's future situation. We then assess the competitive situation within the industry and the driving forces (Porter's five forces).

Environmental factors

We use a so-called STEP analysis, which entails a review of Socio-cultural, Technological, Economic and Political-legal factors. The STEP analysis focuses on the primary characteristics of the environment and assesses the potential impact of these conditions on the industry's, and in particular banks', future operations.

Competitive forces

Our evaluation of the industry's, and in particular Norwegian banks', competitiveness and potential changes is based on Michael Porter's Five Forces Model. The five forces have a decisive impact on earnings since they affect prices and volume of production factors and end products/services. In addition, they influence growth and investment in the industry.

By analysing strategic risk, we achieve:

- a better basis for evaluating whether the industry's and banks' measures, which have been initiated to maintain competitiveness, contribute to limiting financial exposure in the financial sector
- a basis for the central bank's statements about conditions related to structural developments
- a basis for the assumptions about changes in margins and volumes in our forecasts for the banks' results and capital adequacy

Many of the conditions examined in such an analysis will remain stable from year to year. Therefore, the analysis will typically present an update of conditions that have changed and attempt to identify significant, new conditions that may affect future developments.³

3.2 Earnings and financial strength in the financial sector

Naturally, an analysis of banks' and financial institutions' earnings, liquidity and financial strength is important to the monitoring of financial stability. The primary emphasis is on the banks, although mortgage companies, finance companies and life insurance companies are also covered. The analyses are based on information provided in the institutions' quarterly reports to the Banking, Insurance and Securities Commission and to Norges Bank. A risk classification model is used to complement the analyses. This model evaluates the individual institution on the basis of financial strength, earning capacity and the quality of the loan portfolio.

The classification model utilises accumulated quarterly figures. Core capital as a percentage of risk-weighted balance sheet figures is used as an indicator for financial strength. Institutions with a core capital ratio of less than 5 per cent are classified as having weak financial strength. Moderate financial strength requires a core capital ratio of between 5 and 8 per cent, while institutions with ratios of 8 per cent or more are considered to have good financial strength.

The system divides institutions into three categories based on earnings capacity. Required earnings are defined as what earnings would have been with normalised losses, taxes and the required return on equity. The required return on equity is defined as the sum of risk-free interest (yield on long-term government bonds after tax) and a risk premium.

The quality of the loan portfolio is evaluated on the basis of net loan defaults as a percentage of net loans. The system assesses the institutions in relation to a threshold value of this key figure, and then divides the institutions into two categories, greater or less than 2 per cent.

This structure will give a risk classification system with 18 classes. It is easy to change the threshold values for the three variables so that the model may also be used for sensitivity analyses.

In addition to historical analyses, the central bank also makes annual forecasts for the bank's results and capital adequacy for the current year and the next three years. The forecasts are based on analyses of historical trends. Using these forecasts as a starting point, the central bank tries to incorporate relevant information from the evaluations of strategic risk, credit risk, liquidity risk and market risk that are covered in separate analyses. In addition, we use the macroeconomic projections from Norges Bank's macroeconomic model in our assessment

³Eika and Reistadbakk (1998) present the main content of such an analysis.

of monetary conditions. In this way, we establish a set of assumptions that include key variables such as interest margin, changes in lending and deposits, cost trends and losses. Several of the variables are based on other assumptions. The primary purpose of the analyses is to show the impact of different scenarios (obtained by changing the assumptions) on the banks' earnings and capital adequacy. In our forecasts, we try to combine the main features in the various analyses to provide an overall evaluation of future trends in the industry, with special emphasis on banks.

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