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Norges Bank's role in cash distribution

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During the past few years, Norges Bank has made major changes in its cash operations. These changes have been designed to adjust and clarify the division of responsibility between the various parties involved in cash distribution. Tasks have been allocated in line with this purpose. Norges Bank's overriding consideration has been to adapt the central bank's cash policy so as to increase the efficiency of the payment system. In practice, this involved changes which have been implemented in three stages. 1) discontinuation of commercial services 2) changes in terms for banks' cash deposits in and withdrawals from Norges Bank and 3) changes in the depot structure and introduction of compensation in the form of interest for cash held in banks' own depots. The result of these changes is that the central bank has assumed a more clearly defined role as wholesaler and banks have taken more responsibility for the redistribution of cash amongst themselves.

Moreover, Norges Bank has assessed the organisation of the services and tasks for which the central bank is responsible. The practical consequence of these assessments is that Norges Bank's cash operations are based largely on outsourcing.

This article presents key assessments of the role Norges Bank wishes to have in cash distribution, as well as information about the changes that have been implemented in the period 2001-2005.

1. Background

Developments since the last part of the 1980s form the background for the changes in Norges Bank's role in the handling and circulation of notes and coins (cash distribution). At that time, Norges Bank provided commercial services to banks, in competition with other market participants. At the same time, these services were provided in connection with Norges Bank's tasks and activities as cash issuer (see Eklund and Veggum, 2002). This was unfortunate since the prices that market participants paid for cash distribution services did not fully reflect the real costs of the services. Therefore, it is probable that demand for these services was based on incorrect price information. In accordance with the Norges Bank Act's provisions concerning the promotion of an efficient payment system, Norges Bank therefore considered it important to find better solutions for cash distribution. The changes have also been part of Norges Bank's general efforts to concentrate on core tasks.

2. An efficient payment system

In accordance with the first paragraph of the Norges Bank Act, efficiency in the payment system is one of Norges Bank's objectives.

2.1 An efficient payment system

The total payment system includes all methods, arrangements and devices that may be used to execute or mediate payments. An efficient payment system is characterised by the existence of available means of payment and payment instruments that are adapted to needs and by the possibility of executing payments quickly, securely and with the lowest possible use of resources. When users are aware of the prices and features of the various alternatives, they will choose the solutions which are on the whole most attractive. If the prices encountered by users reflect the cost of producing the services, the users' choice will result in an efficient overall use of resources.

Payments are generally executed using two means of payment: account deposits and cash. Whereas moving account deposits largely involves the use of electronic instruments, moving cash requires a large degree of physical handling. This is the case when cash is circulating as a means of payment between banks, businesses and the general public and also when it is out of circulation and belongs to Norges Bank. Moving and storing notes and coins requires a large logistics apparatus and involves considerable costs for many operators. Norges Bank considers it important to facilitate optimal efficiency in the overall payment system. This means that there is an appropriate distribution between cash and account deposits, that cash is supplied and handled as rationally as possible and that security is satisfactory.

2.2 Efficient distribution and handling of cash

In order for cash to function as an efficient means of payment, it is necessary that:

- market participants have confidence in cash
- cash has features that are adapted to needs
- cash is available
- all cash processing is efficient

Confidence means that users of cash are in no doubt that cash represents claims on the central bank, i.e. that it is genuine central bank money.

Features adapted to needs refers to denominations, design and durability (that they withstand different types

of handling), that genuine notes and coins are easy to recognise etc.

Availability implies that cash is readily available to the general public and businesses, making it unnecessary to store large amounts of cash.

Efficient processing means that the scope of transport, counting, sorting, destruction etc. is correct and that there is an appropriate division of responsibility between Norges Bank and others who process cash, so that the tasks are executed with the lowest possible use of resources.

3. Norges Bank's cash distribution policy – important considerations

3.1 Formal framework

Within the framework of the Norges Bank Act, Norges Bank determines which functions and services in the overall cash distribution system the central bank is to be responsible for, the scope of these functions and services, and the terms for their use (including who covers costs). Further, Norges Bank determines which tasks within this area of responsibility the central bank is to perform and which are to be outsourced.

Responsibility

Under the Norges Bank Act, Norges Bank has the exclusive right to issue notes and coins. This implies a primary obligation to supply cash, i.e. an obligation to issue notes and coins to meet the needs of the economy. This also implies a secondary obligation to supply cash, which means that Norges Bank shall ensure that an adequate supply of the notes and coins issued is available to the public.

Notes and coins in circulation must be of a certain quality in order to function as an efficient means of payment. Norges Bank has an overriding responsibility for maintaining this quality as well as an obligation to accept worn and damaged notes and coins and replace them with notes and coins of acceptable quality.

Norges Bank is further obligated to accept deposits from banks, but in special cases may also accept deposits from others. This means that as a rule only banks can make cash deposits in and withdrawals from Norges Bank.

Tasks

Of the responsibilities imposed by the Norges Bank Act, there is one statutory responsibility that only Norges Bank can discharge. This is the actual issuing of notes and coins, i.e. functioning as debtor for notes and coins in circulation, as well as determining conditions related to issuing. The other tasks ensuing from this responsibility, such as the production and destruction of notes, may be performed by others, but Norges Bank must ensure that these tasks are performed.

Even though Norges Bank has responsibility for a task, the costs may be covered by others.

3.2 Cash supply functions and services for which Norges Bank should be responsible

In addition to fulfilling direct statutory requirements, Norges Bank should in general only have responsibility for functions that the market is unable to provide efficiently or that Norges Bank can provide more efficiently than the market. Even though Norges Bank is responsible for a function, it may, as mentioned above, choose to allow others to perform all or part of the tasks ensuing from this responsibility.

Production and design of notes and coins

As issuer, Norges Bank is responsible for designing notes and coins and for ensuring that an adequate quantity is produced and that both design and quality are appropriate. Notes and coins must be designed in such a way that they are difficult to copy, that they include features that make it possible to differentiate between genuine and counterfeit notes and that they also have features that allow them to function efficiently as a means of payment. Norges Bank is also responsible for ensuring that the authenticity features are widely known. This is especially important in relation to the average consumer who does not have access to special tools to verify that notes and coins are genuine. Norges Bank follows developments closely with a view to preventing counterfeiting. Norges Bank decides on the actual design, whereas the notes and coins can be produced by external suppliers.

Supply

The central bank is basically responsible for ensuring that society has access to cash (obligation to supply cash). Norges Bank is the banks' bank and supplies cash to banks. Banks in turn supply their customers through ATMs and over the counter at bank branches. In other words, Norges Bank acts as a cash wholesaler. Standards and packaging requirements in connection with banks' withdrawal and deposit of notes and coins in Norges Bank should thus be designed in such a way as to underpin Norges Bank's role as wholesaler.

Given full information concerning costs, prices and quality, the market (market participants) is best qualified to find good solutions for cash distribution. Norges Bank wishes to encourage market participants to constantly seek the best solutions based on cost/benefit analyses, and to ensure that distribution sites and processing solutions change in line with the assessments of market participants. This would initially imply that Norges Bank supplies banks from just one business site. Security and logistics considerations may however necessitate having emergency stocks at more than one site. In addition, Norges Bank appears better equipped than banks to transport large amounts over long distances. This may imply that Norges Bank should have additional depots and business sites and handle the transport between them in a system

that can constitute the "central nerve" of the supply and distribution of cash. Within a region, banks should be responsible for supplying cash to their customers and for redistributing cash among different banks and bank branches.

Processing
Norges Bank is responsible for the destruction of notes and coins and for authenticating cash that is to be destroyed. The actual destruction and authentication may be performed by others, assuming that the central bank has established a satisfactory control system.

Experience shows that in order to protect themselves against losses due to counterfeiting, market participants wish to verify themselves that the cash accepted is genuine. This implies that there is no need for further authentication by Norges Bank other than that performed in connection with destruction. To verify that market participants' authentication procedures are satisfactory, Norges Bank should nevertheless authenticate a random sample of notes and coins delivered to the central bank for redistribution. In addition, the central bank should establish rules for quality control so that notes and coins that are not fit for redistribution are actually removed from circulation.

Market participants are demanding other types of processing services, such as sorting and packaging. They should determine the scope and form of these services on the basis of their needs and the costs of various alternatives. This will pave the way for efficient solutions where market participants demand a "correct" volume of services and these services are delivered by those who can do so most efficiently. Therefore, Norges Bank should not be responsible for nor provide such processing services.

3.3 More on cost coverage

In principle, users should cover the costs of using cash just as they do for using other means of payment. However, there are certain factors that indicate that Norges Bank should cover certain costs:

- Norges Bank assumes that its responsibility to issue notes and coins also includes a responsibility to replace cash, which implies an obligation to cover certain costs connected with redemption and destruction of worn and damaged notes and coins as well as notes and coins withdrawn from circulation.
- In principle, everyone who is in possession of notes and coins gives an interest-free loan to the central bank. This enables the bank to invest and achieve a return on capital equivalent to this interest-free loan, thereby providing the Bank with income, called seigniorage. Therefore, it may be argued that users cover certain costs connected with cash. If users in addition were to cover all costs related to cash distribution, they would cover more than the costs of using cash, and this would not be desirable in terms of efficiency. It would be difficult, however, to find a system where this net income is returned to those bearing the costs. A more appropriate solution is that Norges Bank covers some costs in connection with cash distribution. These should be costs that are otherwise difficult to allocate to the "correct" market participant without disturbing incentive structures that are desirable in terms of efficiency.

On the basis of these assessments, Norges Bank will cover the following costs:

- costs related to the design and production of notes and coins
- information to users
- costs related to receipt of damaged or worn notes and coins, as well as delivery of notes and coins of acceptable quality to replace them, so-called "free-of-charge services" (Banks cover costs connected with ordinary deposits in and withdrawals from the central bank of cash fit for redistribution.)
- authentication and destruction of damaged and worn notes and coins
- storage of cash in central bank depots and costs of transporting cash between these depots

4. Changes made by Norges Bank over a five-year period

During the period 2001-2005 Norges Bank has made a number of changes in the light of the cash distribution policy and considerations outlined in section 3. The changes concern the type of functions and services for which Norges Bank is responsible and the conditions attached to market participants' use thereof. The changes also concern the organisation of the tasks for which Norges Bank is responsible.

4.1. Changes in Norges Bank's role

The changes have taken place in three main stages.

Stage 1 – discontinuation of commercial services
Substantial changes in the cash flow between banks and the public in the 1980s and 1990s, including increased use of ATMs and night safes, provided a basis for new commercial cash processing services. Cash that was delivered by way of night safes had to be sorted, counted and checked before it could be redistributed. Notes for dispensing through ATMs had to be of a certain minimum quality, which placed greater demands on quality sorting. Unfit notes also had to be removed and delivered to Norges Bank for destruction. Norges Bank, for its part,

had to count and check notes in connection with destruction. Norges Bank had high capacity banknote-sorting machinery which could carry out authentication, quality sorting and automated destruction of notes in the same operation. It was thus possible to exploit economies of both scale and scope in the processing, as services for banks (counting, sorting and quality control) were carried out alongside destruction. During the 1990s, Norges Bank became an increasingly important player in the area of cash processing, in competition with other operators in this area.

On the one hand, the central bank was competing in the market for services, while on the other there was increasing focus on core tasks. It was clearly necessary to distinguish between central bank tasks ensuing from Norges Bank's statutory responsibility for issuing notes and coins and operations of a more commercial nature. However, it was considered desirable that such a distinction should not be made at the expense of economies of scope and scale in the automated processing.

Norges Bank has a general responsibility to ensure that central bank tasks are discharged in the most appropriate manner possible, which implies cost-effectiveness. Therefore, it was also considered important to ensure that market participants demanded a "correct" volume of services and that these services were provided by the best qualified operators. This presupposes that the price for these services is cost-based.

To this end, Norges Bank had the choice between

a) discontinuing all commercial activities, so that the Bank only carried out statutory services
b) establishing an internal profit centre in Norges Bank that took account of the distinction between central bank tasks and other services
c) spinning off the activity into a separate company

When the various options were assessed, it became clear that if option a) was not to be chosen, a form of organisation had to be found with the flexibility required in a competitive market. The conclusion was to spin off the activity into a separate company. Norsk Kontantservice AS (NOKAS) was therefore established on 1 July 2001, owned jointly by private banks and Norges Bank. The company took over employees, machinery and equipment from the owners. Since the establishment of NOKAS, Norges Bank has had a 33.5 per cent ownership share, but this is currently under consideration.

This restructuring meant that all commercial services that Norges Bank had provided for banks were discontinued. The distinction between central bank services and services for others had been established, and formed a better basis for cost-based pricing of the various services. Stage 1 of the clarification of the division of responsibilities and work between Norges Bank and banks in the area of cash distribution had thus come to an end.

Stage two – new rules for banks' deposits with and withdrawals of cash from Norges Bank

The establishment of NOKAS was an important step towards a more efficient distribution and processing of notes and coins. However, there proved to be aspects of cash distribution that still did not function according to Norges Bank's wishes.

For a number of years, Norges Bank had been responsible for much of the cash distribution among banks and their branches without charging them cost-based prices. Banks had geared their activities and routines accordingly, and it was doubtful whether demand for the various types of cash distribution services was of the correct magnitude and optimal in terms of overall efficiency. The establishment of NOKAS did not change this situation appreciably as long as the conditions for deposits with and withdrawals from Norges Bank, and hence for redistribution via Norges Bank, were unchanged.

Norges Bank's aim is to act as wholesaler. In practice, however, the central bank was functioning more like a retailer, as the distribution of cash among banks and among branches of individual banks largely went through Norges Bank. Banks also appeared to be frequent users of Norges Bank's depots for storing cash that would normally constitute banks' stocks for short-term transactions, as a large number of banks delivered cash in the evening only to withdraw the same amount the next morning. As a result, there was an undesirably large amount of cash coming into Norges Bank, and a large number of small transactions.

Chart 1 outlines the principles for the distribution of cash between Norges Bank and banks, as it functioned both before and after the establishment of NOKAS.

There were a number of reasons for Norges Bank assuming the role of cash distribution retailer and contributing to this type of distribution between banks and their branches:

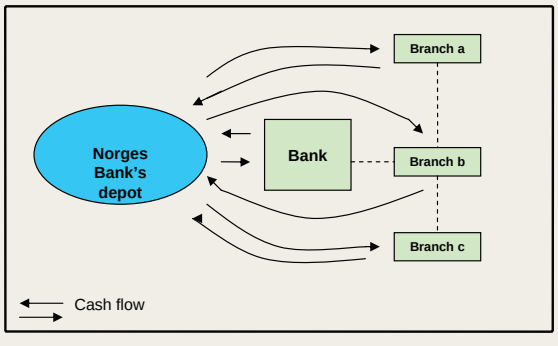


Chart 1. Previous situation: redistribution of cash

- Norges Bank pays interest on banks' overnight deposits. By depositing their short-term excess stocks in Norges Bank, banks earned interest income while avoiding storage and security expenses. By coordinating transports with regular schedules, banks minimised the marginal expenses associated with transporting larger quantities. Banks have been able to deliver and withdraw money around the clock, and interest has been calculated on the basis of transactions made up to midnight.
- Geographically, Norges Bank's depot network has had a finer mesh than can be justified by the obligation to distribute cash and by contingency considerations. This has made Norges Bank very easily accessible to banks and their branches, as they have often been close to a depot which could be used without major transport costs.
- Norges Bank had established small standard units[1], which made transactions involving relatively small amounts possible.

Norges Bank therefore was therefore paying interest and spending resources on inflows of notes and coins in a manner that was not justified by the Bank's objectives. It was doubtful whether Norges Bank's covering the costs of services that were demanded by and the responsibility of banks formed a satisfactory basis for efficient use of resources.

Chart 2 illustrates the desired situation, where the banks themselves are responsible for redistribution within a geographical region of a certain size. This region is "served" by one central bank depot, and the intention is that transactions between depots and banks should be few and sizeable.

Norges Bank evaluated a number of means of achieving the desired situation. Banks had to be given greater incentives to assume responsibility themselves for the distribution of liquidity at the retailer level. Furthermore, the means used and the changes made must not be in conflict with the desire to retain the economies of scope and scale in cash processing.

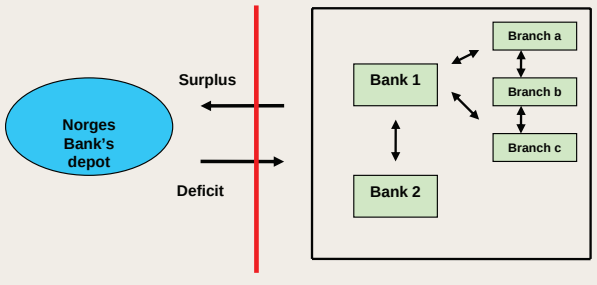


Chart 2. Desired situation: Ordinary distribution within a region is dealt with by banks. Norges Bank is only involved in cases of a real liquidity surplus or deficit. Cash is distributed where it is used.

The conclusion in Stage 2 was to amend Norges Bank's framework conditions regarding banks by changing the terms for deposits in and withdrawals from the central bank. Following a consultative round in the banking sector, the changes were adopted with effect from 1 January 2005, and contributed to raising the "threshold" for central bank depots (illustrated by the red line in Chart 2). The changes were as follows:

- *Value date rules*
  The value date was changed so that notes and coins must be sorted into two qualities, fit and unfit for redistribution, before they can be accepted as deposits in Norges Bank. Sorting according to quality is the banks' responsibility and the associated costs are covered by the banks. Norges Bank has provided information that allows banks or operators performing these services for banks to distinguish between fit and unfit notes.

  As mentioned, the obligation to supply cash means that Norges Bank must replace unfit notes with fit notes free of charge. It has been difficult to achieve such simultaneous exchange in practice as long as it has not been required that unfit notes be delivered separately to Norges Bank. By introducing a requirement of sorting prior to delivery it was possible to define and provide services that were free of charge.

- *Standard units – larger minimum amount per denomination for delivery of notes and coins*
  Norges Bank increased the size of standard units from 500 to 1000 for 500-, 100- and 200-krone notes, and from 100 to 500 for 500- and 1000-krone notes. These amounts are moderate compared to the practice in other, comparable countries. The standard unit for coins was made 150 rolls for all denominations, which was an appreciable increase on previous practice.

- *Change in packaging*
  Since Norges Bank required that notes be sorted into two qualities before delivery, it was possible to make note processing more efficient by requiring that the units delivered be sealed. Notes that are fit for redistribution can thus be sent directly from central bank depots without any inspection other than ensuring that the seal is unbroken.

  Norges Bank had previously accepted deposits of coins in various types of packaging (rolls, bags, boxes etc.). The Bank regarded it as more efficient to have only one type of packaging, and in consultation with the banking associations chose rolls. This is the same type of packaging that is used for new coins.

- *Charges for deposit/withdrawal services*
  For a number of years, banks have been paying handling fees for ordinary deposits and withdrawals of unfit notes

[1] "Standard units" means the smallest quantity that could be delivered or withdrawn from the central bank. Before 1 January 2005, the smallest unit for 50-krone, 100-krone and 200-krone notes was a package of 500. The smallest unit for 500-krone and 1000-krone notes was 100 notes (a bundle). Norges Bank can at any time stipulate the content of a "standard unit" (cf. Section 20 of the Norges Bank Act).

from Norges Bank. Since NOKAS was established, these handling costs have been invoiced by NOKAS, sometimes in combination with other services requested by banks. As a result the price of the actual handling services was not sufficiently visible to the banks. This made it difficult for banks to demand the "correct" volume of deposit/withdrawal services. In Stage 2, it was therefore decided that Norges Bank should invoice banks for handling costs accruing in NOKAS, the central bank's depot manager.

Some other central banks impose penalties if cash is not delivered in accordance with their requirements. Norges Bank has chosen to observe developments before introducing such penalties.

The Stage 2 changes thus made the division of responsibility and work between the parties involved clearer and the costs of the various services more visible. The rules for deposits in and withdrawals from Norges Bank were also more consistent with the central bank's desired role as cash wholesaler.

In practice the changes rapidly led to fewer and larger cash transactions with Norges Bank.

Stage 3 – change in depot structure and introduction of interest compensation for cash in private depots

In Stage 2, it was proposed reducing the number of central bank depots and the period of the day during which banks can deliver and withdraw money at a central bank depot with interest-earning effect. The banking associations were not in favour of this and cited banks' need for depots for interim storage and redistribution. The banking associations also requested that an arrangement with private depots be considered. This implied an arrangement governed by certain rules whereby banks could store their cash stocks themselves and at the same time receive some form of remuneration as though the cash had been deposited with Norges Bank. It was accordingly decided to postpone changes in the depot structure and reconsider this question. After a further review, the following changes were arrived at, and implemented as Stage 3:

- *The number of central bank depots is to be reduced, and private depots are to be allowed*

  Norges Bank is reducing the number of central bank depots from eleven to five. The first stage of the downsizing was completed on 1 February 2005, when the central bank's depots in Finnmark (Vardø and Hammerfest) were closed. Prior to this, Norges Bank and the banks had worked together to find satisfactory solutions for the distribution of cash in Finnmark County. In the course of 2005, the other four central bank depots will be wound up.

- *Introduction of compensatory payment in the form of interest by Norges Bank to banks for stocks kept in private cash depots*

  The decision to reduce the number of central bank depots was accompanied by a decision to pay interest compensation according to specific rules for private cash depots. Private depots will be established if banks find it more appropriate to carry out distribution and interim storage at such depots rather than going by way of the central bank depots. According to the compensatory payment arrangement, banks will be paid the same interest whether the cash is stored in a private depot or a central bank depot. The change contributes to ensuring that banks' decisions regarding the establishment of such depots, and the choice of management solutions, are based as far as possible on real costs, and not on where the cash must be stored in order to earn interest.

  The cash stocks in the private depots are the banks' property. Banks bear the costs associated with the depots and determine the scope and location of the services. They can operate the depots themselves or use external service providers such as NOKAS, Securitas etc. Norges Bank has not limited the number of private depots with interest compensation, but this issue will have to be reviewed if there is greater than expected interest in this solution.

- *Changes in business hours at central bank depots – value dating rules*

  At private depots banks can decide on their own business hours and terms for deposits and withdrawals, on the basis of the costs of the various solutions. Private depots with interest compensation may also be established at the same place as central bank depots. The business hours and value dating of central bank depots will then be of less importance to the banks' behaviour, and Norges Bank can base them on internal considerations. By the end of 2005, the period of the day during which deposits/withdrawals must be made at central bank depots in order to earn interest will therefore coincide with ordinary business hours.

When Stage 3 of the changes has been implemented in the course of 2005, the depot structure will be as shown in Chart 3, with a number of private cash depots established by the banks and five central bank depots.

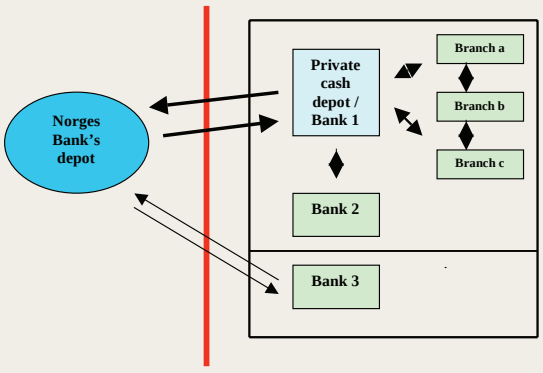


Chart 3. New situation 2005: Ordinary redistribution within a region is handled by banks via a private depot. Norges Bank is only involved in the event of a real liquidity surplus/deficit, but is still obligated to accept cash or deliver cash directly to banks.

4.2. Changes in the organisation of the tasks for which Norges Bank is responsible

NOKAS provides business services (quality sorting, packaging etc.) for banks in competition with other market operators (Securitas, banks etc.). Norges Bank has chosen to outsource the destruction of notes to NOKAS. As far as we are aware, no other central bank has outsourced this task to the same extent. A condition for this solution was that Norges Bank could be assured of the necessary control during the destruction process. The solution was that the Bank, in collaboration with the machinery suppliers, developed a surveillance system (see Veggum and Natvig, 2002). Economies of scope and scale are thus also achieved in note processing, as control and sorting for banks and destruction of notes for Norges Bank are carried out in one and the same process.

In addition, Norges Bank has chosen so far to use NOKAS as its depot manager. This means that NOKAS is commissioned by Norges Bank to deal with the administration of the actual depot vaults and the stocks kept there. Banks therefore meet NOKAS employees when they come to a central bank depot to deposit or withdraw cash.

Det Norske Myntverket AS (formerly the Royal Norwegian Mint) was initially part of Norges Bank. In 2001, the mint was spun off into a separate limited company, and in 2003 Norges Bank sold the shares in the company. At the same time, a long-term delivery agreement was signed. The Mint is now an external supplier of coins. When the delivery agreement expires in 2009, Norges Bank will invite tenders for the production of coins from a number of mints.

Norges Bank has also decided to wind up its Printing Works in 2007. This means that notes will subsequently also have to be bought from external producers.

5.Conclusion

By reviewing the division of responsibilities and work in the area of cash distribution, and changes in the means employed, Norges Bank has attempted to contribute to a clearer and more appropriate distribution of roles between various operators. Those operators requiring storage and processing services are also being offered more cost-based prices than previously, which provide them with a more rational basis for the choice of both type and scope of services. This helps to improve the efficiency of both cash distribution and the payment system as a whole. Norges Bank will evaluate the effects of the restructuring carried out in consultation with the banking industry, make adjustments as needed and take further steps to improve efficiency.

Norges Bank has also changed the organisation of the services for which the central bank is responsible by outsourcing a large portion of the services. This underpins the changes that have been made in the role of the central bank to improve the efficiency of the payment system as a whole.

References

Eklund, Trond and Leif Veggum (2002): "Change in the organisation of the supply of notes and coins". *Economic Bulletin* 2/02, pp. 58-62.

Veggum, Leif and Peder Natvig (2002): "Destruction of banknotes outside the central bank". *Economic Bulletin* 1/03, pp. 21-23.

What influences the number of bankruptcies?

Dag Henning Jacobsen, economist in the Financial Markets Department, and Thea Birkeland Kloster, assistant director in the Financial Markets Department.[1]

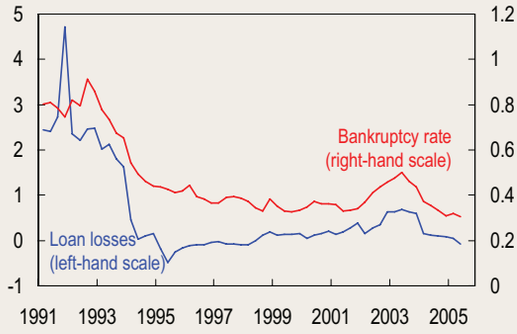
After having remained relatively stable from the mid-1990s, the number of bankruptcies rose sharply in 2002 and 2003, but then fell again last year and in the first six months of 2005. Using an empirical model, we analyse factors underlying developments in bankruptcies. We find that changes in profit margins, competitiveness and real interest rates, as well as cyclical fluctuations in the Norwegian and international economy, have been among the most important driving forces since 2002. The analysis indicates that deteriorating competitiveness in 2002 as a result of a strong krone exchange rate and high wage growth contributed in particular to the marked increase in the number of bankruptcies. The depreciation of the krone exchange rate in 2003 and into 2004, combined with moderate wage growth from 2003, helped to improve competitiveness in Norwegian enterprises. This explains a considerable portion of the recent fall in the number of bankruptcies.

1 Introduction

One of Norges Bank's primary responsibilities is to promote a robust and efficient financial system. Norges Bank therefore monitors trends that may threaten stability in the financial sector. A substantial increase in the number of corporate failures could constitute such a threat, as a higher number of bankruptcies normally results in higher loan losses in banks.

Although the bulk of banks' lending is to households, experience shows that banks normally incur greater losses on loans to enterprises than on loans to households. This was particularly true during the banking crisis from 1988 to 1992. From the mid-1990s until 2002, the bankruptcy rate, i.e. the number of bankruptcies in relation to the number of enterprises, was relatively low and stable (see Chart 1). In 2002, however, the bankruptcy rate rose considerably. It was substantially lower than during the banking crisis, but banks' loan losses rose markedly. There was an increase in losses on loans to the manufacturing sector in particular.[2] Loan losses continued to rise into 2003 and resulted in poorer earnings in banks. Since end-2003, the bankruptcy rate has fallen again and banks' profits have improved, primarily due to lower loan losses.

Chart 1 Banks' loan losses as a percentage of gross lending and number of bankruptcies (seasonally adjusted) as a percentage of number of enterprises[1)]
Quarterly figures. 1991 Q1 – 2005 Q2



[1)]Number of enterprises in 2005 Q1 and Q2 is based on estimates from *Inflation Report* 2/05.

Sources: Statistics Norway, the Brønnøysund Register Centre and Norges Bank

Norges Bank has previously developed an empirical model for estimating individual bankruptcy probabilities for Norwegian limited companies.[3] Among other things, the model includes idiosyncratic accounting variables as explanatory factors. The accounting variables capture changes in each limited company's profitability, financial strength and liquidity. Movements in such accounting variables will often closely follow macroeconomic developments in Norway and abroad. Furthermore, many macroeconomic variables are often published both earlier and more frequently than accounts figures. Norges Bank therefore also monitors macroeconomic variables in its assessment of banks' credit risk. The purpose of this article is to increase our understanding of the relationship between macroeconomic conditions and changes in the number of bankruptcies by means of an empirical model. The model was previously presented in *Financial Stability* 1/05. In this article we will look more closely at the driving forces underlying developments in bankruptcies. In particular, we will try to answer the following questions:

- What are the most important macroeconomic explanatory factors for the number of bankruptcies in the period 1991–2004?
- How swiftly and strongly do changes in these factors influence the number of bankruptcies?
- What has driven changes in the number of bankruptcies since 2002?
- What will the bankruptcy rate be in the period ahead if the Norwegian economy develops in line with the analyses in *Inflation Report* 2/05?

The estimated model contains effects of:
- Domestic demand and activity level
- Foreign demand and activity level

[1] We are grateful to Nina Langbraaten, Kjersti-Gro Lindquist, Bent Vale, Bjørne Dyre Syversten, Bjørn E. Naug, Kai Larsen, Arne Kloster, Birger Vikøren, Kjersti Haugland and Snorre Evjen for their help and useful comments. The analysis was carried out using PcGive 10.1 (Hendry and Doornik 2001).

[2] See *Financial Stability* 1/03.

[3] See Sæther and Larsen (1999), Bernhardsen (2001) and Eklund, Larsen & Bernhardsen (2001).

- Competitiveness
- Real interest rates
- Real labour costs
- Real material input costs
- Enterprises' real gross debt
- Real price of commercial property
- Number of enterprises

The macroeconomic factors that may influence changes in the number of bankruptcies are discussed in the next section. The empirical model is presented in section 3 and in section 4 we discuss the most important macroeconomic driving forces underlying developments in bankruptcies since 2002.

2 Changes in the number of bankruptcies and macroeconomic factors

The purpose of this empirical analysis is to identify the macroeconomic factors underlying changes in the number of bankruptcies. We will start by discussing which variables might be expected to be of importance to developments in bankruptcies on the basis of economic theory. First we will look at a profit-maximising enterprise and consider general factors that influence the probability of that enterprise going bankrupt. The presentation in this section largely follows Wadhwani (1986):[4]

(i) The enterprise produces a product using labour *(L)*, material inputs *(V)* and real capital *(K)*. The company wage level is W and the input price is *Q*. Real capital, *K*, is given in the short term, and for the sake of simplicity is excluded in the further derivation of the model.

(ii) The only source of uncertainty is the product price, which is a stochastic variable with an expected value equal to $\tilde{P}$ and a standard deviation of σ. The enterprise has to take the product price as given.

(iii) The enterprise has borrowed the sum *D* to finance the real capital that is necessary for production. The enterprise has interest expenses equal to *iD* in each period, where *i* is the interest rate.

(iv) *NV* expresses the expected present value of the enterprise's future cash flow and is therefore equal to the value of the enterprise. *S* expresses its equity. If the enterprise cannot meet current commitments for a period, it will be able to finance itself with the amount $S = NV - D$, as long as $NV \geq D$.

Under these assumptions, it is optimal for the enterprise to choose the amount of labour and material input that maximise the expected profit:

(1) max $E(\Pi) = \tilde{P}G(L,V) - WL - QV$ with respect to *L* and *V*,

where *E* is the expectations operator, Π is the profit and *G*( ) is the production function. An enterprise will normally be bankrupt if the value of its assets is less than its liabilities and it cannot meet its current commitments. On the basis of this definition, the enterprise we are considering would be bankrupt if the realised price, *P*, was such that the sum of the enterprise's profit and equity in this period was negative:

$$PG(L,V) - WL - QV - iD + S < 0$$

(2) $\Leftrightarrow$

$$PG(L,V) - WL - QV - (1+i)D + NV < 0.$$

However, creditor(s) will often be better served by continued operations if the costs of initiating bankruptcy proceedings are greater than the expected loss in the event of continued operations, or if there is some probability that the negative value will return to a positive value in later periods. Such assessments are probably closely linked to the cyclical situation, i.e. developments in total demand and the activity level in the economy. We can therefore express the probability of the enterprise going bankrupt as:

(3)

$$\mu = \Pr\left[\tilde{P}G(L,V) - WL - QV - (1+i)D + NV < 0 \,|\, AD\right]$$

where μ denotes the probability of bankruptcy and Pr[ ] is the probability function. The probability of the enterprise going bankrupt is now conditional on total demand, *AD*.[5] By combining (1) and (3), the amount of labour that maximises the expected profit can be expressed as:

(4) $L = L(W, Q, i, D, NV, \tilde{P}, \sigma)$

and similarly for material inputs:

(5) $V = V(W, Q, i, D, NV, \tilde{P}, \sigma)$

By inserting (4) and (5) into (3), L and V can be substituted out of the equation for the probability of bankruptcy:

(3') $\mu = \mu(\tilde{P}, \sigma, W, Q, i, D, NV, AD)$

where

$$\mu_{\tilde{P}} < 0, \quad \mu_{\sigma} > 0, \quad \mu_{W} > 0, \quad \mu_{Q} > 0,$$
$$\mu_{i} > 0, \quad \mu_{D} > 0, \quad \mu_{NV} < 0, \quad \mu_{AD} < 0.$$ [6]

μ_j expresses the partial derivative of μ ( ) with respect to factor *j*.

Higher demand, *AD*, will generally boost an enterprise's earnings through increased sales and/or a higher price, $\tilde{P}$.

4 Davis (1995) and Vlieghe (2001) also follow a similar (theoretical) approach to that of Wadhwani (1986) in the specification of their empirical models.

5 According to Wadhwani (1986) *AD* can also be included in the expression for the probability of bankruptcy if one assumes imperfect competition in the product market: the enterprise chooses a production level to maximise profit and takes the other enterprises' production as given. *AD* will then be included in equations (4) and (5) and the probability of bankruptcy is thus also a function of *AD*.

6 See Wadhwani (1984) for a derivation of the signs for the partial derivatives.

Increased earnings will improve the enterprise's ability to pay its costs, service debt and strengthen its equity. Conversely, for a given productivity level and product price, higher input prices, *W* and *Q*, will increase the enterprise's costs and thus weaken its profitability and ability to service debt. Hence, higher earnings result in a lower probability of bankruptcy for the enterprise, whereas higher costs have the opposite effect.

The probability of bankruptcy increases in step with the variation in the product price, σ, as higher price variation entails a greater probability that the sum of the profit and equity in a period is negative.

Higher interest rates, *i*, raise the enterprise's debt servicing costs. At the same time, higher interest rates reduce the value of the enterprise through a lower present value of future earnings. Higher interest rates will therefore result in a higher probability of bankruptcy. The more debt, *D*, an enterprise has relative to the value of its assets, *NV*, the more likely it is that the enterprise will go bankrupt. The probability of bankruptcy therefore increases with debt, but decreases with the value of the enterprise.[7]

Other possible explanatory factors

Equation (3') shows the probability of bankruptcy for a single, profit-maximising enterprise. An empirical model for the number of bankruptcies is presented in the next section. In the specification of the empirical model, we have used aggregated sizes of variables that are included in the function in equation (3'). We have also taken into account that other macroeconomic factors may influence the number of bankruptcies. Equation (3') is therefore extended to include competitiveness, *E*, commercial property prices, *PN*, inflation, $\dot{P}$, and the number of enterprises, *F*. μ is now interpreted as the average probability of bankruptcy for all enterprises:

(6) $\mu = \mu\left(\tilde{P}, \sigma, W, Q, i, D, NV, AD, E, PN, \dot{P}, F\right)$

where

$$\mu_{\tilde{P}} < 0,\ \mu_{\sigma} > 0,\ \mu_{W} > 0,\ \mu_{Q} > 0,\ \mu_{i} > 0,$$
$$\mu_{D} > 0,\ \mu_{NV} < 0,\ \mu_{AD} < 0,$$
$$\mu_{E} < 0,\ \mu_{PN} < 0,\ \mu_{\dot{P}} > 0,\ \mu_{F} > 0.$$

In an open economy, many domestic enterprises compete with foreign producers in both domestic and export markets. When we look at enterprises as a whole, the (average) probability of bankruptcy will increase if foreign demand for the home country's products declines. We must also take into account that the probability of bankruptcy for internationally exposed enterprises will be influenced by their competitiveness in relation to foreign companies. If domestic factor prices (per unit produced) rise faster than the foreign competitors' factor prices (per unit produced), competitiveness will deteriorate. An approximate measure of this factor is hourly labour costs in manufacturing in Norway relative to its trading partners, measured in local currency. However, competi-tiveness will also depend on the krone exchange rate. Relative labour costs calculated in a common currency are therefore used as a measure of competitiveness (equal to a real exchange rate) in the empirical analysis. If the krone exchange rate appreciates, international product prices measured in NOK will fall. This will result in lower earnings in both export-oriented and import-competing industries. The effect may be reduced somewhat if domestic demand shifts from sheltered to exposed products. This would then contribute to a deterioration in profitability in sheltered industries. We would therefore expect weaker competitiveness, *E*, as a result of higher domestic cost inflation compared with other countries or a stronger krone exchange, to increase the probability of bankruptcy.[8]

It is widespread practice for enterprises to use commercial property as collateral for loans. Such loans will normally be extended at a lower interest rate than other loans with weaker or no collateral. Banks' and other creditors' lending policies depend on the customers' (expected) ability to pay and collateral values.[9] If commercial property prices, *PN*, fall, collateral values may fall below the value of some loans. Creditors may then demand that loans without sufficient security are paid back and, more generally, banks may be more reluctant to extend loans. A number of enterprises may therefore be faced with such unfavourable borrowing terms that they no longer want to raise loans. An enterprise with a limited ability to pay may therefore go bankrupt if it does not have enough collateral to finance its activities with a new loan. Changes in property prices will also have a direct effect on profitability in the real estate and construction industries.

According to Wadhwani (1986), changes in inflation can influence developments in bankruptcies. An enterprise with a loan that has a variable interest rate and is not price-indexed may experience a reduction in earnings when inflation rises, if the increase in interest expenses is greater than the increase in earnings.[10] For higher

[7] We could also express the probability of bankruptcy as a function of the enterprise's equity instead of its value (see equation (2)).

[8] The appreciation of the krone exchange rate may be partly offset by an increase in total demand if the price level falls. Another possible offsetting effect on the probability of bankruptcy is that debt raised in foreign currency, calculated in NOK, declines when the krone exchange rate appreciates. If enterprises' earnings are (primarily) in the domestic currency, it will be easier to service debt. However, a survey carried out by Norges Bank indicates that enterprises with debt in foreign currency will also often have assets in foreign currency, see Børsum & Ødegaard (2005).This indicates that the probability of bankruptcy is only influenced to a small extent by changes in the krone exchange rate via debt in foreign currency.

[9] See Stiglitz (1992, sections 6.2-6.3) for a theoretical discussion.

[10] Debt in Norwegian non-financial firms is normally not price-indexed. Wadhwani (1986) illustrates the hypothesis with an example: If $i = 0.01$ and $D = 1000$, the enterprise's interest expenses are equal to 10 in each period. With an (expected) inflation rate of zero, $i = r$, where r is the real interest rate. Inflation is expressed by $\dot{P}$ and i is determined by the formula $(1+i) = (1+r)(1+\dot{P}) \Leftrightarrow i = r + \dot{P} + r\dot{P}$. If inflation rises from 0 to 10% , the nominal interest rate will increase to 11.1% and interest expenses will rise to 111. Based on the assumption that the enterprise's (product price and therefore) earnings increase by 10 per cent, higher inflation will result in a lower cash flow. With a price-indexed loan, on the other hand, real earnings and real interest expenses would increase by the same amount. If debt is not price-indexed, or if the enterprise cannot borrow an amount equal to 100 to index the loan itself, higher inflation will reduce the cash flow, which increases the probability of bankruptcy.

Box A model of the number of bankruptcies

$$\Delta b_t = \underset{(1.9)}{2.03} + \underset{(3.7)}{1.76}\,\Delta_3 (w-p)_t - \underset{(4.6)}{1.32}\,\Delta_3 e_{t-2} - \underset{(3.2)}{0.74}\,\Delta_2 (pn-p)_{t-1} - \underset{(2.8)}{0.06}\,\Delta y_{t-5} + \underset{(2.8)}{0.48}\,\Delta_2 (d-p)_{t-2}$$

$$- \underset{(9.6)}{0.93}\,[(k_{t-1}-f_{t-3}) - \underset{(4.5)}{3.44}\,R_{t-1} - \underset{(6.4)}{0.36}\,u_{t-2} - \underset{(3.5)}{2.77}\,(w-p)_{t-3} - \underset{(5.4)}{2.10}\,(q-p)_{t-1} + \underset{(7.9)}{1.90}\,e_{t-4}] + \varepsilon_t.$$

$R^2 = 0.90$, $\sigma = 0.05$, $AR_{1-4}: F(4, 36) = 2.02$, $ARCH_{1-4}: F(4, 32) = 0.34$, $NORM\chi^2(2) = 0.28$,
HET: F(26, 13) = 0.46, $RESET$: $F(1,39) = 1.01$.

Estimation period: 1991 Q1 – 2004 Q4.
Estimation method: least squares method.
Absolute *t-values* are shown in brackets under the estimates. The equation satisfies the requirements (diagnostic tests) that are relevant for a well-specified model. It also passes (recursive) Chow tests for structural breaks at a 1% significance level over the last five years of the estimation period.
Δ is a difference operator: $\Delta X_t = (X_t - X_{t-1})$, $\Delta_2 X_t = (X_t - X_{t-2})$, $\Delta_3 X_t = (X_t - X_{t-3})$.

The variables are defined as (small letters indicate that a variable is measured on a logarithmic scale):

b	=	Number of bankruptcy proceedings initiated. Source: Statistics Norway.
w	=	Unit labour costs in mainland Norway, excluding the public sector. Source: Statistics Norway.
p	=	Price deflator for mainland GDP. Source: Statistics Norway.
e	=	Real exchange rate (competitiveness) measured by the trade-weighted exchange rate index and hourly labour costs in manufacturing for Norway and trading partners, respectively. The trade-weighted exchange rate index measures the Norwegian krone exchange rate against the currencies of Norway's 25 most important trading partners. Sources: The Technical Reporting Com-mittee on Income Settlements, The Ministry of Finance and Norges Bank.
pn	=	Price index for office and commercial property. The time series prior to 1996 has been extended backwards using the rate of increase in the real estate sector's house price index. Sources: Statistics Norway, the Norwegian Association of Real Estate Agents (NEF), the Association of Real Estate Agency Firms (EFF), FINN.no, ECON and Norges Bank.
y	=	Output gap for the OECD area. Source: OECD.
d	=	Gross debt in non-financial enterprises. Source: Norges Bank.
f	=	Number of enterprises (register count). Sources: Statistics Norway and the Brønnøy-sund Register Centre.
R	=	Real interest rate measured by banks' average lending rate to private non-financial enterprises less average four-quarter rise in p over four quarters. Source: Norges Bank.
u	=	Unemployment rate. Source: Directorate of Labour.
q	=	Cost index for material input. Source: Statis-tics Norway.
ε	=	Regression residuals (unexplained variation in left-hand variable).
R^2	=	Share of variation in left-hand variable that is explained by the model.
σ	=	Standard deviation of regression residuals.
AR_{1-4}	=	A test for fourth-order autocorrelation in the residuals.
$ARCH_{1-4}$	=	A test for fourth-order ARCH residuals.
$NORM$	=	A test to see if residuals are normally distributed.
HET	=	A test for heteroscedasticity.
$RESET$	=	A test of the functional form of the model.

The expression in square brackets measures the deviation from an estimated long-term relationship between the number of bankruptcies and the number of enterprises, real interest rate, the unemployment rate, real labour costs, real material input costs and competitiveness. The model also contains effects of seasonal variations and a dummy variable for 1993 Q4. The dummy variable must be viewed in connection with new registration rules for personal bankruptcies introduced at year-end 1993.

[11] The model used by Norges Bank to predict bankruptcy probabilities for Norwegian limited companies includes the enterprises' age as an explanatory factor (Bernhardsen, 2001; Eklund, Larsen and Bernhardsen, 2001). According to these analyses, enterprises with an age of 1-3 years have the greatest probability of bankruptcy, all else being equal.

inflation to impact earnings, it is a prerequisite that the enterprise has no opportunity to raise a new loan so that it can price-index its debt. According to Wadhwani (1986), higher inflation, $\widetilde{P}$, may therefore increase the probability of bankruptcy if the enterprise's debt is not price-indexed and the enterprise no longer has access to borrowing as a result of credit rationing.

If the number of enterprises, F, increases, the number of bankruptcies can also be expected to increase. New enterprises normally have a higher probability of bankruptcy than older enterprises.[11] This may, for example, be because demand for their products has proved to be lower than expected at the time they were established, or relevant skills in newly-established enterprises are of a lower standard than skills in older enterprises, or because new enterprises to a lesser extent have access to external funding.

3 An empirical model of the number of bankruptcies

We have estimated a model of the number of bankruptcies. Equation (6) in the previous section was the starting point for the specification of the empirical model. The time series for the number of bankruptcies is published quarterly by Statistics Norway and includes all legal objects where bankruptcy proceedings are initiated. Most bankrupt entities are either private limited companies or sole proprietorships, with limited companies accounting for the highest share. The model, shown in the box, is estimated on quarterly data over the period 1991–2004 (2004 Q4 was the last available observation when the model was estimated).

We tested for effects of the following variables (see section 2):

- Domestic demand (measured by GDP, the output gap or the unemployment rate)
- Foreign demand (measured by the output gap for the OECD area)
- Competitiveness (measured by the real exchange rate)
- Real interest rate
- Real labour costs (per unit produced)
- Real material input costs (measured including and excluding energy goods)
- Non-financial enterprises' real gross debt (from domestic and foreign lenders) and the (gross) debt to equity ratio
- Number of enterprises/new business start-ups
- Inflation (changes in producer prices measured by the percentage change over four quarters in the price deflator for mainland GDP)
- Product price variation (measured as the standard deviation of the price deflator for mainland GDP)

The list of potential explanatory factors is long compared with the number of observations during the sample period. It was therefore not possible to include all the variables in a single equation with any meaningful result. We therefore estimated a number of alternative models where we only included some of the variables. We then simplified the models by imposing restrictions on the coefficients that were not rejected by the data and that simplified the interpretation of the dynamics. The preferred model is presented in the box.

Both inflation and price variation had coefficients and t-values close to zero.[12] The insignificant effect of inflation indicates that enterprises have been credit-rationed to a very limited extent over the estimation period (see discussion in section 2). An alternative interpretation is that enterprises with weak profitability have been credit-rationed, but as inflation has been sufficiently stable over the estimation period, no (significant) effect on bankruptcies figures has been identified.[13] This may also explain the insignificant effect of price variation. Furthermore, it may be difficult to identify the possible effect of inflation when unemployment is included in the model. Higher inflation normally covaries negatively with a rise in unemployment, and unemployment is included in the model to capture the effect of domestic demand. Even though a change in inflation would have an effect on the number of bankruptcies in the short term, the inflation level would not be expected to affect the number of bankruptcies in the long term. We would initially not expect the inflation level to be of any significance to real prices or other real variables over time. As the number of bankruptcies is a real economic variable, in isolation inflation will not influence changes in the number of bankruptcies in the long term.

Models with real material input costs, excluding energy products, had a better fit than models with real input costs including energy goods. This may be because fewer enterprises with energy-intensive production have been declared bankrupt during the estimation period and/or changes in bankruptcies are due to conditions other than energy prices. The unemployment rate as a measure of domestic demand gave a better fit than developments in GDP, mainland GDP and the domestic output gap. We therefore included the unemployment rate as a measure of developments in domestic demand.[14]

An enterprise must normally have lost its equity in order to go bankrupt. However, the variable for the debt to equity ratio had insignificant t-values in the different models. This may indicate that the macroeconomic factors that explain developments in bankruptcies also capture the effect of changes in the debt-equity ratio. In line with the discussion in section 2, a permanently higher debt level could also be expected to have an effect on the number of bankruptcies over time. However, enterprises' real gross debt only has a short-term effect in the model.

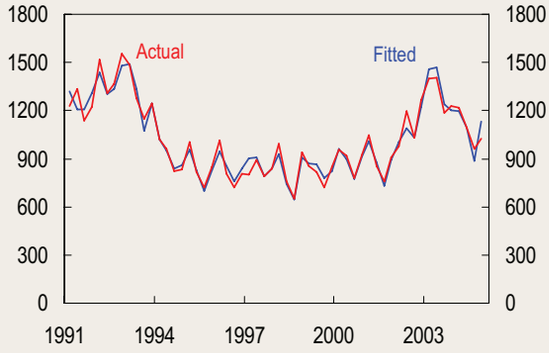
The model is an error correction model of the logarithm of the number of bankruptcies (see box). Chart 2 shows that the model fits well over the estimation period. The expression in brackets in Table 1 shows the long-term relationship between the number of bankruptcies,

[12] Wadhwani (1986) finds an effect from inflation, but not from variation in product prices. The model is estimated using data from 1964 Q1 to 1981 Q4.

[13] Average year-on-year rise in the price deflator for mainland GDP in the period 1991-2004 was 2.6%, with a standard deviation of around 1%.

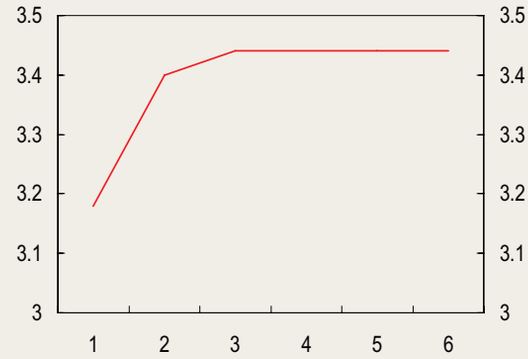
[14] In an empirical model for the liquidation rate for US enterprises, Platt and Platt (1994) also use unemployment as a proxy variable for aggregate demand.

Chart 2 Actual and fitted number of bankrupties. Quarterly figures. 1991 Q1– 2004 Q4



Sources: Statistics Norway and Norges Bank

Chart 3 Change in number of bankruptcies when the real interest rate increases permanently by one percentage point. Percentage change over time. Quarterly figures



Source: Norges Bank

the number of enterprises, the unemployment rate, real interest rate, real labour costs and real material input costs as well as competitiveness. The model also includes real prices for commercial property, enterprises' real gross debt and changes in foreign demand, but these factors only have short-term effects on the number of bankruptcies. The cofficient of -0.93 in front of the long-term relationship in brackets indicates that the number of bankruptcies increases (falls) by 0.93% cent in quarter *t* if the number of bankruptcies was 1% under (over) the estimated long-term relationship in quarter *t-1* (all else being equal).

How do changes in the explanatory factors influence the number of bankruptcies?

According to the model, the number of bankruptcies will increase if unemployment rises. If, for example, unemployment rose from 4% to 5% of the labour force and the other explanatory factors remained unchanged, the number of bankruptcies would increase by around 8¼% over time. A change in the unemployment rate has an effect on the number of bankruptcies after two quarters and the full effect is reached after one year. Unemployment is assumed to capture the effect of domestic demand. Husebø and Wilhelmsen (2005) show, among other things, that the negative covariation is strongest between unemployment in the current quarter and real mainland GDP two quarters earlier. The effect of a change in domestic demand on the number of bankruptcies is therefore probably sluggish, with the full impact coming around 1½ years later. According to the model, a change in foreign demand has an effect after 1¼ years, but this effect is only temporary and unwinds after two years. The lag in the impact of a change in demand may indicate that lower demand probably has a rapid impact on earnings, but that this takes time to translate into a deterioration of financial strength.

According to the model, the number of bankruptcies will increase by close to 3½ % in the long term if the real interest rate, i.e. the cost of servicing debt, increases by 1 percentage point (see Chart 3). Most of the impact is in evidence in the course of two quarters. Increased real debt will also push up the number of bankruptcies after two quarters, but according to the model, the effect is only temporary. After 6-7 quarters, the higher debt level has no effect on the number of bankruptcies.

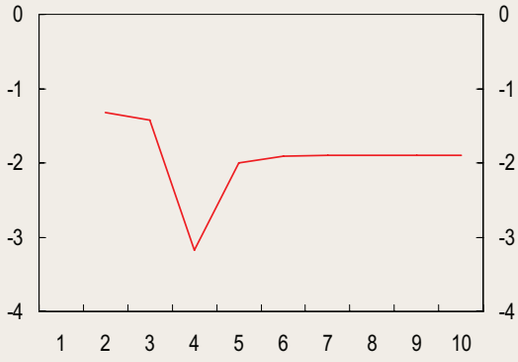
The model indicates that the number of bankruptcies increases by about 1¾ % in the first quarter and by close to 2¾ % over time if real unit labour costs increase by 1%. Similarly, the number of bankruptcies will rise by around 2% in the long term if real material input costs increase by 1%. The effect is achieved within one year. The analysis indicates therefore that changes in enterprises' profit margins have a relatively swift effect on the number of bankruptcies.

Competitiveness deteriorates if wage growth in the internationally exposed sector is stronger than among our trading partners or if the krone exchange rate appreciates. The model implies that the number of bankruptcies will increase by nearly 2% in the long run if competitiveness deteriorates by 1% (see Chart 4).[15] The effect after four quarters is 1¼ % stronger than the long-term effect. This indicates that many exposed enterprises are vulnerable in the event of a sustained deterioration in competitiveness. The somewhat weaker effect in the long term may be because exposed enterprises can (i) to a greater extent demand input factors other than labour if the deterioration in competitiveness is due to high domestic wage growth and (ii), make greater use of natural hedging techniques, such as buying inputs in the same currency as that in which they sell products, if competitiveness has been weakened by a stronger krone.

The model indicates that a fall in the real price of commercial property will result in more bankruptcies, but

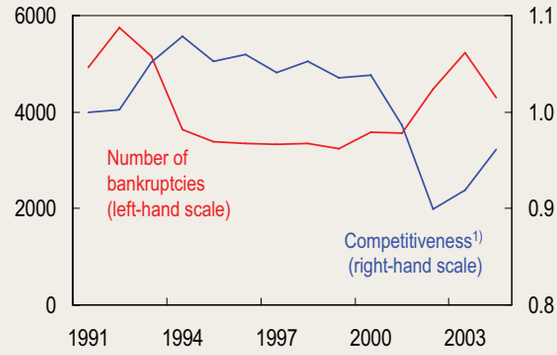
[15] Jacobson and Lindé (2000) find that the real exchange rate affects bankruptcy developments in Sweden. The empirical analysis is based on data from 1993 Q2 to 1998 Q1. Vlieghe (2001) also tests for effects of the real exhange rate using British quarterly data over the period 1975–1999, but finds no statistically significant effect on the rate of corporate business failures.

Chart 4 Change in number of bankruptcies when competitiveness (measured by a real exchange rate) improves permanently by 1 per cent. Percentage change over time. Quarterly figures



Source: Norges Bank

Chart 5 Number of bankruptcies and competitiveness. Competitiveness measured as hourly labour costs for manufacturing in Norway relative to trading partners, in common currency. Index: 1991=1. Annual figures. 1991-2004



1) A rising value denotes improved competitiveness

Sources: Statistics Norway, Technical Reporting Committee on Income Settlements, Ministry of Finance and Norges Bank

the effect is only short-term: one and two quarters after the fall in prices, the number of bankruptcies will increase by around ¾ % and then the effect will diminish and disappear after 6-7 quarters.[16]

An increase in the number of new business start-ups will fuel a rise in bankruptcies over time. The model implies that the number of bankruptcies increases by 1% over time if the number of enterprises rises by 1% and the full effect is achieved within four quarters.[17] Hence, in the long term, the bankruptcy rate will be constant for given values of the other explanatory factors.

4 What has driven recent changes in the number of bankruptcies?

In this section we will discuss factors that have driven developments in the number of bankruptcies over the past 3½ years, and how the rate of corporate business failures will develop in the period ahead, if the Norwegian economy develops in line with the projections in *Inflation Report* 2/05.[18] The number of bankruptcies rose sharply in 2002, after having remained at a low and relatively stable level since the mid-1990s. Banks' loan losses increased, with higher losses on loans to manufacturing industry in particular. Chart 5 indicates that changes in competitiveness may have been an important explanatory factor for the number of bankruptcies in recent years.

Decomposition of changes in the number of bankruptcies

Chart 6 shows the calculated contributions from the model's explanatory factors to the annual increase in the number of bankruptcies in the period from the first half of 2002 to the first half of 2005.[19] The decomposed contributions are based on the estimated model and changes in the explanatory variables.[20] Changes in profit margins, competitiveness and the real interest rate, as well as cyclical fluctuations in both the Norwegian and the international economy, were among the most important driving forces in this period. For example, weaker competitiveness pushed up the annual increase in the number of bankruptcies by 16–17 percentage points in 2002. With the exception of real labour costs, which also have an effect on the number of bankruptcies in the same quarter that there is a change in real labour costs, the other explanatory factors influence the number of bankruptcies with a (varying) time lag.

A number of our trading partners experienced sluggish economic growth in the period 2001–2003. This resulted in lower demand for goods from the Norwegian export industry. However, at the beginning of 2002, capacity utilisation in the Norwegian economy was still high and the turnaround only came towards the end of the year. The overall contribution from domestic and foreign demand pushed up the number of bankruptcies from 2002 and into the first half of 2004. It was not until 2004 that economic growth picked up markedly again in both the Norwegian and the international economy, and this helped to reduce the number of bankruptcies in the first half of 2005.

Changes in enterprises' profit margins (measured as the relationship between factor prices and product prices) also help to explain changes in the number of bankruptcies over the past 3½ years. Real material input

[16] Vlieghe (2001) also identifies a short-term effect from real prices for commercial property, with an estimated coefficient value of -0.76.

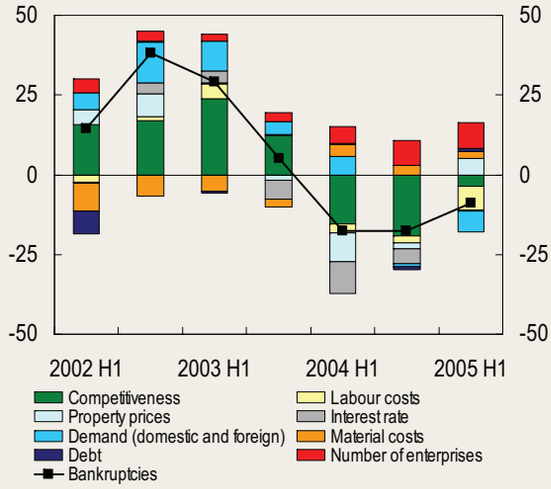
[17] This (long-term) homogeneity is a tested restriction that was not rejected by the data.

[18] The model passes tests for structural breaks over the last five years of the estimation period (see box). The parameters are relatively stable and we use the model to look more closely at the explanatory factors' contribution to changes in the number of bankruptcies in the recent past.

[19] Figures for commercial property prices in 2005 Q1 and for unit labour costs and the price deflator for mainland GDP in Q2 of the same year are based on projections in *Inflation Report* 2/05.

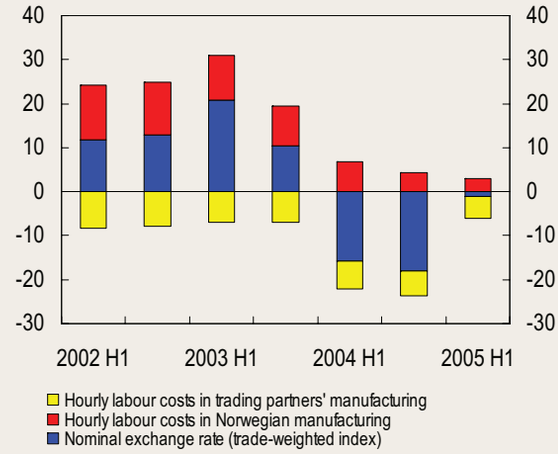
[20] The decomposition method is described in Jacobsen and Naug (2004).

Chart 6 Annual percentage change in bankruptcies and calculated contributions from explanatory variables in percentage points. Measured in real terms. 2002 H1 – 2005 H1



Sources: Statistics Norway and Norges Bank

Chart 7 Calculated contribution of decomposed competitiveness to bankruptcies. Contribution to annual change. Percentage points. 2002 H1 – 2005 H1



Sources: Technical Reporting Committee on Income Settlements, Ministry of Finance and Norges Bank

costs helped to reduce the number of bankruptcies from the first half of 2002 until end-2003, but had the opposite effect last year and in the first six months of this year. The sharp growth in real wages in 2002 pushed up the number of bankruptcies in the second half of that year and first half of 2003. Wage growth has been moderate since 2003, which has contributed to a reduction in the number of bankruptcies in the past eighteen months.

In addition to the effect on enterprises' margins, wage growth is also important to developments in bankruptcies via its effect on competitiveness. The competitiveness variable comprises the nominal exchange rate and domestic labour costs relative to trading partners' labour costs. In Chart 7, we decompose the calculated effect of competitiveness on changes in the number of bankruptcies.

Charts 6 and 7 show that a deterioration in competitiveness can explain a considerable portion of the increase in the number of bankruptcies in 2002 and 2003. In addition to high domestic wage growth, a strong krone contributed to the deterioration in competitiveness, pushing up the number of bankruptcies, particularly in the first half of 2003. The appreciation of the krone was in part due to a widening interest rate differential against other countries. The widening of the interest rate differential and the appreciation of the krone through 2002 must be seen in the light of the high level of activity and strong wage growth in Norway compared with trading partners.[21] The fall in interest rates from December 2002 to March 2004 contributed to a depreciation of the krone exchange rate, and wage growth has slowed since 2003. Competitiveness therefore improved again somewhat in 2003 and 2004. This made a substantial contribution to the decline in the number of bankruptcies last year.

Interest rates influence several of the other explanatory factors in the model, including domestic demand and competitiveness. Movements in the interest rate also have a direct effect on the number of bankruptcies. Following the cut in interest rates in December 2002, the real interest rate contributed to a fall in the number of bankruptcies in the second half of 2003 and in 2004. The real interest rate was probably also an important factor behind changes in commercial property prices. The fall in real commercial property prices in 2002 pushed up the number of bankruptcies that year. Following the cut in interest rates, property prices picked up again in the course of 2003, which helped to reduce the number of bankruptcies last year. However, commercial property prices fell somewhat from the first to the second half of 2004 and this pushed up the number of bankruptcies in the first half of 2005.

Higher growth in the Norwegian economy in 2004 also led to a pick-up in the number of new business start-ups and the contribution from new businesses has increased in the past eighteen months. The calculations show that changes in corporate debt have had little direct effect in the period as a whole.

Bankruptcies in different industries

Chart 8 shows the number of bankruptcies by industry as a percentage of the total number of bankruptcies, from 2000 Q1 to 2005 Q2. As a deterioration in competitiveness can explain a considerable portion of the rise in the number of bankruptcies in 2002 and 2003, it might be reasonable to expect that exposed manufacturing enterprises would account for a large share of the total number of bankruptcies in those two years. However, Chart 8 shows that the share of manufacturing

[21] For a more detailed discussion, see Naug (2003) and *Inflation Report* 1/03: "Factors behind movements in the krone exchange rate". These analyses show that special conditions in the international economy also contributed: the fall in prices on international stock markets and smaller fluctuations between main currencies contributed to the appreciation of the Norwegian krone because the interest rate differential was positive. The strengthening of the krone was also related to the rise in oil prices and the fact that the krone functioned as a geo-political safe-haven currency.

bankruptcies has been stable in recent years (at an average of around 8%): although the number of manufacturing bankruptcies rose sharply in 2002 and the first half of 2003, the number of bankruptcies in other industries also increased in the same period. Among the industries shown in the chart, the number of bankruptcies particularly increased in manufacturing, the construction industry, the hotel and restaurant industry and property management and commercial services.

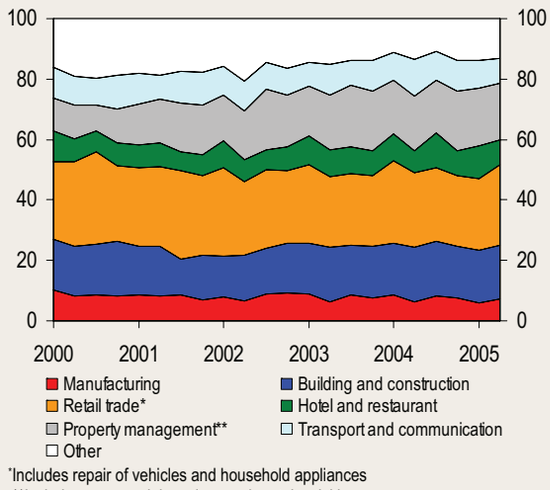
The stable and relatively low share of bankruptcies in manufacturing industry and the strong effect of changes in competitiveness on the number of bankruptcies in the same period indicate that industries other than manufacturing are also exposed. For example, both the fish farming industry and enterprises competing with imports in industries other than manufacturing are directly exposed to competition from abroad. Other enterprises, such as subcontractors to the export industry, will also be indirectly exposed to changes in competitiveness. Enterprises that are normally considered to be sheltered may also be affected. One example could be property enterprises that rent premises to exposed enterprises, or retail trade enterprises with premises near the Swedish border. Enterprises in the hotel and restaurant industry may also find that profitability is affected. For example, an appreciation of the krone will make it relatively cheaper to be a tourist abroad than in Norway.

An open economy

Enterprises can hedge against fluctuations in the krone exchange rate, using currency derivatives and through natural hedging, such as buying inputs in the same currency as that in which they sell their products. In summer 2004, Norges Bank carried out a survey among Norwegian enterprises regarding their currency hedging practices (see Børsum and Ødegaard (2005)). The survey indicates that currency hedging using derivatives is widespread, particularly among larger enterprises, but natural hedging is also frequently used. Natural hedging is, however, not really an option for enterprises that use specific Norwegian inputs in their production process. Furthermore, derivatives contracts are largely short-term with maturities of up to one year. One of the conclusions in Børsum and Ødegaard is therefore that enterprises – beyond the scope of natural hedging – are as a whole vulnerable to a relatively sustained appreciation of the krone. This conclusion is supported by the empirical analysis presented above.

Monetary policy in Norway is oriented towards low and stable inflation. When Norges Bank sets the interest rate, the krone exchange rate is important as it influences inflation and total production.[22] With shifting themes in the foreign exchange market, the conditions that influence the krone exchange rate in the short term can easily become unstable. As the krone exchange rate is the price of our money measured in foreign currency, conditions in other countries may also be of significance to the krone exchange rate. Over time, however, a number of fundamental forces influence the krone exchange rate, including the phasing-in of petroleum revenues and business cycles. In the long term, competitiveness will be determined by real economic factors. Furthermore, the real exchange rate has a tendency to revert if there is a deviation over a longer period of time.[23]

Chart 8 Number of bankruptcies by industry as a percentage of the total number of bankruptcies. Quarterly figures. 2000 Q1– 2005 Q2



*Includes repair of vehicles and household appliances
**Includes commercial services and rental activities

Source: Statistics Norway

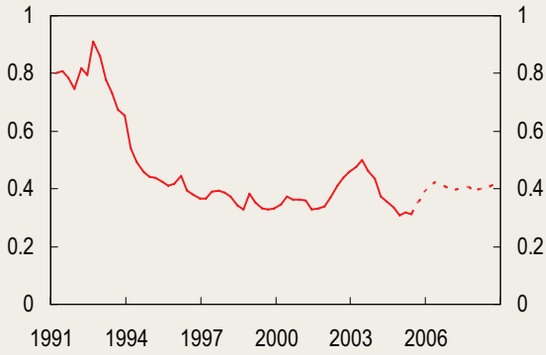
Future developments in the number of bankruptcies

Chart 9 shows that if the explanatory factors move in line with the projections in *Inflation Report* 2/05, the model implies that around 0.4% of all enterprises will go bankrupt each year in the next three years. According to calculations based on the model and the projections in the *Inflation Report*, changes in demand, real interest rates and competitiveness will be the most important driving forces in the period ahead. If interest rates rise gradually, as projected in the *Inflation Report*, and inflation develops as anticipated, real interest rates will increase somewhat through the projection period. The krone exchange rate is assumed to remain stable in the next 3½ years and wage growth is expected to be stronger than wage growth among our trading partners. Competitiveness will therefore deteriorate somewhat in the period to end-2008. Higher real interest rates and weaker competitiveness will, in isolation, lead to an increase in the number of bankruptcies. However, the gradual tightening of monetary policy reflects strong growth in the Norwegian economy, and capacity utilisation is projected to be above normal in the projection

[22] See, for example, Gjedrem (2003).

[23] See for, example, Akram (2002) and Sarno and Taylor (2002).

Chart 9 Number of bankruptcies (seasonally adjusted) as a percentage of number of enterprises. Quarterly figures. 1991 Q1 – 2008 Q4[1)]



[1)] Projections for 2005 Q3 – 2008 Q4

Sources: Statistics Norway, the Brønnøysund Register Centre and Norges Bank

period. According to the *Inflation Report*, such a path for interest rates would provide a reasonable balance between the objective of bringing inflation up to target and the objective of stabilising developments in output and employment. Growth in total demand contributes to reducing the number of bankruptcies. Overall, contributions from the explanatory factors will therefore result in stable and moderate developments in bankruptcies in the period ahead.

5 Conclusion

After having remained relatively stable since the mid-1990s, the number of bankruptcies rose substantially in 2002 and 2003, but has since declined. We have analysed the factors underlying developments in bankruptcies, based on an empirical model. According to the analysis, changes in profit margins, competitiveness and real interest rates, as well as cyclical fluctuations in both the Norwegian and the international economy, have been among the most important driving forces in the past 3½ years. We find that changes in competitiveness, in particular, may explain a considerable portion of developments in bankruptcies since 2002. In 2002, competitiveness deteriorated as a result of both strong wage growth and an appreciation of the krone exchange rate. Competitiveness therefore pushed up the number of bankruptcies in both 2002 and 2003. The krone depreciated through 2003 and into 2004 and wage growth has slowed in the past two years. Competitiveness has therefore improved somewhat and contributed to the recent fall in the number of bankruptcies.

An increase in the number of bankruptcies normally leads to higher loan losses for banks. The empirical analysis therefore shows that changes in the krone exchange rate and domestic production costs in relation to costs abroad may be important to financial stability.

If the explanatory factors develop in line with the projections in *Inflation Report* 2/05, the estimated model implies that the number of bankruptcies in relation to the number of enterprises will stabilise at around 0.4% over the next three years. The calculations indicate that the most important driving forces in the period ahead will be changes in demand, real interest rates and competitiveness. Overall, the explanatory factors result in stable and moderate developments in bankruptcies to end-2008.

References

Akram, Farooq Q. (2002): "PPP in the medium run despite oil shocks: The case of Norway". Working Paper 2002/4, Norges Bank. To be published in *Journal of Macroeconomics* 28 (4), 2006

Bernhardsen, Eivind (2001): "A model of bankruptcy prediction". Working Paper 2001/10, Norges Bank

Børsum, Øystein G. and Bernt Arne Ødegaard (2005): "Currency hedging in Norwegian non-financial firms". *Economic Bulletin* 3/05, pp. 133-144

Davis, E. Philip (1995): *Debt, financial fragility and systemic risk.* Clarendon Press, Oxford.

Eklund, Trond, Kai Larsen and Eivind Bernhardsen (2001): "Model for analysing credit risk in the enterprise sector". *Economic Bulletin* 3/01, pp. 99-106

Gjedrem, Svein (2003): "Economic perspectives". *Economic Bulletin* 1/03, pp. 4-12

Hendry, David F. and Jurgen A. Doornik (2001): *Empirical econometric modelling using PcGive 10.* London: Timberlake Consultants

Husebø, Tore Anders and Bjørn-Roger Wilhelmsen (2005): "Norwegian business cycles 1982-2003". *Staff Memo* 2005/2, Norges Bank

Jacobsen, Dag Henning and Bjørn E. Naug (2004): "What influences the growth of household debt?". *Economic Bulletin* 3/04, pp. 103-111

Jacobson, Tor and Jesper Lindé (2000): "Credit rating and the business cycle: can bankruptcies be forecast?) *Economic Review* 4/2000, pp. 11-33. Sveriges riksbank

Naug, Bjørn E. (2003): "Faktorer bak utviklingen i kronekursen – en empirisk analyse" (Factors underlying movements in the Norwegian krone exchange rate –

an empirical analysis). Chapter 7 in Ø. Eitrheim and K. Gulbrandsen (ed.): *Hvilke faktorer kan forklare utviklingen i valutakursen?,* Norges Bank's Occasional Papers no. 31

Platt, Harlan D. and Marjorie B. Platt (1994): "Business cycle effects on state corporate failure rates". *Journal of Economics and Business* 46, pp. 113-127

Sarno, Lucio and Mark P. Taylor (2002): "Purchasing power parity and the real exchange rate". IMF Staff Papers 49, no. 1, pp. 65-105

Stiglitz, Joseph E. (1992): "Capital markets and economic fluctuations in capitalist economies". *European Economic Review 36*, pp. 269-306

Sæther, Pål and Kai Larsen (1999): "Kredittrisiko knyttet til foretakssektoren" (Credit risk associated with the enterprise sector). *Penger og Kreditt* no. 4/1999, pp. 546-554

Vlieghe, Gertjan W. (2001): "Indicators of fragility in the UK corporate sector". *Working Paper* no. 146, Bank of England

Wadhwani, Sushil B. (1984): "Inflation, bankruptcy default premia and the stock market".
Discussion Paper no. 194, Centre for Labour Economics, London School of Economics

Wadhwani, Sushil B. (1986): "Inflation, bankruptcy default premia and the stock market".
The Economic Journal 96, no. 381, pp. 120-138

The IMF's stress testing of the Norwegian financial sector

Jan Hagen, Arild Lund, Kjell Bjørn Nordal and Emil Steffensen[1]

Following a thorough examination of the Norwegian financial system, the IMF concluded in summer 2005 that the system is sound and well managed.[2] Shorter-term vulnerabilities are low. This conclusion is based partly on the results of stress tests of the financial system that were performed by the IMF in cooperation with Norges Bank and Kredittilsynet (The Financial Supervisory Authority of Norway). In this article we provide a more detailed description of these stress tests. We also discuss stress tests and their use more generally.

1. Introduction

The International Monetary Fund (IMF) monitors the economic policy of member countries and promotes dialogue among the countries on the national and global consequences of their economic policy. Exchange rate policy, monetary policy and fiscal policy have long held a central place in the IMF's surveillance work. However, the series of banking and financial crises in the 1990s, in both developing and industrialised countries, prompted the IMF to pay increasing attention to issues relating to financial markets and the state of the countries' financial sectors.

The financial crises of the 1990s showed that unstable financial markets could lead to substantial economic costs. Great importance was once again attached to financial stability, as it had been in the interwar years. Financial stability was moved up on the agenda in international organisations such as the IMF, the World Bank and the ECB. The increased weight attached to financial stability formed the background to the establishment of the Financial Stability Forum, in which central banks and supervisory authorities participate. Financial stability was also in focus on the national level, among central banks, supervisory authorities and ministries of finance.

In the IMF's work to prevent financial market instability through surveillance of the economic policy of member countries, special emphasis was placed on the situation in the financial sector. In addition, the IMF, in collaboration with the World Bank, established a Financial Sector Assessment Programme (FSAP) in 1999. Most IMF member countries have had an FSAP assessment of their financial sectors, including the Nordic countries: Iceland and Finland in 2001, Sweden in 2002 and Norway in 2005. Denmark's assessment will be completed in 2006. No FSAP has yet been carried out for countries like China and the US.

The purpose of an FSAP is to assess the strengths and weaknesses of member country financial sectors and to assess the challenges facing their financial systems. The IMF's primary focus is on the financial system as a whole, and not on individual institutions. All aspects of the financial system are assessed: markets, financial institutions and financial infrastructure (including payment and settlement systems). The most important sources of risk associated with the macroeconomic situation and the financial situation of households and enterprises are assessed. The resilience of financial institutions to any macroeconomic shocks is of central importance to financial stability, and stress tests play a key part in these assessments. Important structural aspects of the financial system are examined, and great emphasis is placed on an assessment of institutional factors, including responsibilities, cooperation and the framework for oversight of financial stability, regulation and supervision of the financial sector, crisis management and a safety net for the financial sector. Measures that in the view of the IMF will contribute to strengthening the financial system are recommended to the authorities.

Norway's FSAP assessment was carried out during autumn 2004 and spring 2005. Meetings were held with Norwegian authorities (the Ministry of Finance, Norges Bank and Kredittilsynet) and a number of financial institutions and trade organisations. An important part of an FSAP consists of evaluating the country's compliance with international standards for supervision and regulation of various parts of the financial sector. In Norway's case, supervision and regulation of banks, insurance and payment systems were examined. The IMF's assessment is summarised in an FSSA (Financial System Stability Assessment), which also covers Norway's compliance with these international standards. The report was published in June 2005. In addition, Financial Action Task Force (FATF) conducted an examination in January 2005 of Norway's observance of recommendations for combating money-laundering and the funding of terrorism.

The assessments of Norway were generally positive. It was concluded that "Norway's financial system appears sound, well managed and competitive and shorter-term vulnerabilities appear low overall". Recommendations were provided in various areas associated with stability, structural issues and institutional conditions (see box).

[1] Arild Lund is director of Norges Bank's Financial Institutions Department and Kjell Bjørn Nordal is senior advisor in Norges Bank's Research Department. Emil Steffensen is Head of Section and Jan Hagen adviser with Kredittilsynet's (The Financial Supervisory Authority of Norway) Department for Finance and Insurance Supervision.

[2] The examination formed part of a Financial Sector Assessment Programme (FSAP). FSAPs are intended to help countries identify and remedy structural weaknesses in the financial sector, and thereby enhance their resilience to macroeconomic shocks and cross-border contagion. The IMF's report (IMF 2005) is available at www.imf.org.

Main recommendations following the IMF FSAP assessment of Norway[1]

Key short-term stability-related issues:

- Continue carefully monitoring the evolution of household debt and the housing market; and examine whether banks have concentrations of exposures to more vulnerable sub-groups of household borrowers.
- Given the reduced risk weighting of mortgages under Basel II, carefully consider whether additional capital requirements should be required for banks under "Pillar 2".
- Continue to carefully monitor the risk of spillovers, in extreme events, resulting from the two-tier payments arrangements, and examine the scope for increasing the use of collateral in interbank market exposures.
- In the securities settlement system (VPO), ensure that measures are taken to reduce market and liquidity risk in the event of a key bank failing to settle. In addition, in the retail payments system, examine the scope for shifting more payments from NICS Retail (Norwegian Interbank Clearing System) to Norges Bank's real time gross settlement system (NBO), and/or introducing more settlement cycles in NICS Retail during the day.
- Continue working with other Nordic authorities on the evolving framework for cross-border crisis management and coordination of last resort lending; and domestically, ensure appropriately coordinated contingency plans in the unlikely event of a major problem at the largest, partly state-owned bank.
- Formalise more regular high-level meetings between Kredittilsynet, Ministry of Finance and Norges Bank on financial stability issues, and consider establishing a formal tripartite financial stability Memorandum of Understanding on respective roles and responsibilities.

Key structural and longer-term issues

- Reexamine key aspects of the deposit guarantee arrangements, including whether and how to achieve greater international comparability in coverage levels.
- Examine whether the clearing of medium and smaller interbank payments in NICS SWIFT net could be phased out.
- Review the continued desirability of state ownership in DnB NOR. In the interim, consider further entrenching commercial autonomy and accountability for the bank through clearly specifying – in law, regulation or at least in a public policy statement – the principles that will be followed with respect to the government's relationship with DnB NOR.

Refinements to supervisory arrangements and other technical recommendations

- Increase the level of powers delegated to Kredittilsynet in respect of licensing and similar authorisations, and for issuing prudential regulations and supervisory decisions; strengthen and make more explicit some aspects of the regulations relating to, e.g., connected lending, treatment of insiders and enforcement measures; and complete the development of risk management guidelines for various other types of risk.
- Formalise and publish supervisory requirements and standards for payments and securities settlement systems, and formalise monitoring, in Norges Bank's Payment System Department, of NBO's compliance with standards.
- Further strengthen Norges Bank's risk management arrangements in relation to the collateral it accepts from banks.

[1] The recommendations are published on page 6 of IMF (2005).

2. Stress tests

It is usual to conduct stress tests in connection with an FSAP. The financial crises of the last few decades have shown how important it is to be aware of the financial system's vulnerability to different types of economic disturbances, or shocks. A stress test is a method that has been developed to identify this vulnerability. *Its purpose is to estimate the effect on the result and solidity of a portfolio (for example one or more financial institutions) of extreme - but not implausible - economic shocks*. Stress tests were originally developed to gauge market risk, i.e. changes in the value of a portfolio as a result of major changes in market prices for securities or in exchange rates. They were gradually developed to identify all types of risk in a portfolio. Today stress tests are used both in individual financial institutions and, as in FSAPs, to measure the vulnerability of the financial sector as a whole.

Stress tests are also increasingly used in the authorities' oversight of financial institutions. The supervisory authorities impose increasingly stringent requirements on financial instutions to conduct quantitative tests of the risk associated with their activities. The new Basel rules on banks' capital adequacy emphasises the use of stress tests to identify their vulnerability to various extreme events (see box).

Stress tests may be designed to examine the isolated effect of an unexpected, major change in a single economic variable, or the effect of an economic shock scenario where account is also taken of the second-round effects of the original shock on the economy. Both types of tests were carried out in connection with the FSAP.

Basel II and stress testing

Basel II, which is expected to apply from 1 January 2007, introduces the use of stress testing in banks (some of the rules will not apply until 1 January 2008). In accordance with "Pillar 1", institutions that use an internal model for measuring credit risk (internal rating-based method - IRB) will be subject to a minimum capital requirement based on expected losses given a modelled economic downturn. In order to be allowed to use an IRB method, an institution must have a stress testing system that complies with certain rules, and the results of the stress testing must be integrated into the institution's ordinary reporting. The stress tests must also be included in an assessment of the institution's total capital requirements according to Pillar 2. The use of stress tests for IRB institutions is comparable to today's market risk capital requirements, according to which an institution that uses internal models must also have a stress testing programme and use the results of the testing to estimate the need for capital over and above that implied by the models.

Current regulations for insurance companies and pension funds require that the institutions regularly carry out stress testing to cover the risk of loss in the event of a slide in asset values in financial markets. The impending EEA regulations (Solvency II) will probably contain stress test requirements similar to the Basel II requirements for banks.

2.1 Norwegian authorities' use of stress tests

Both Kredittilsynet and Norges Bank have been carrying out stress tests for several years. Kredittilsynet has used a method for assessing the vulnerability of life insurance companies to adverse changes in securities market prices. Tests of institutions' vulnerability to changes in important economic variables are also used in the oversight of banks and other financial institutions. At the same time, the results of the companies' own stress tests are evaluated, including insurance companies' assessment of the effect that a fall in equity and fixed income markets would have for the value of their securities portfolios and their financial strength.

Norges Bank has presented macroeconomic stress tests in its *Financial Stability* reports. Shocks of various types have been used, but a sharp rise in interest rates and a sharp fall in asset prices have been important ingredients. The loss increase resulting from the shocks has been estimated and compared with banks' ability to absorb losses, i.e. their capital over and above the statutory minimum requirement. Norges Bank has also used stress tests to show how it may be necessary in monetary policy to strike a balance between the objective of attaining the inflation target and the objective of financial stability (see Evjen et al. 2005).

2.2 Evolution of stress tests over time

As the use of stress tests has been extended to take account of ever new risk types, both the execution of the tests and the interpretation of the results have become increasingly complex. It is relatively simple to assess the change in value of an equity portfolio as a result of a sharp fall in share prices. It is considerably more complicated to design a consistent negative macroeconomic scenario and then calculate the effect it will have on the whole financial sector, including the effects of the adjustments that financial institutions will make in response to the shock. In the next round, these adjustments will influence both the macroeconomic situation and the situation of other financial institutions. However, this is the direction in which stress tests have evolved.

3. Stress tests in the Norwegian FSAP

The stress tests looked at both the short-term effect of changes in individual factors, such as house prices, and at scenarios in which the full impact of a shock is taken into account. The individual factors usually considered are share prices, interest rates, exchange rates and property prices. In Norway, both the banks and the insurance companies in the survey were asked to estimate the impact of single-factor shocks. However, much of the work was spent on designing and conducting the scenario stress test. We will consider this first and return to the effects of individual factors.

The work in a stress test based on a macroeconomic scenario can normally be divided into the following four activities:

1. Identifying vulnerabilities in the financial system (Are there any asset price bubbles? Do any particular sectors have very high debt levels?)
2. Designing a consistent macroeconomic scenario that sheds light on the vulnerabilities.
3. Estimating the losses suffered by financial institutions as a result of the macroeconomic developments. This also entails establishing a relationship between developments in financial institutions' balance sheets or profit and loss accounts and macroeconomic variables.
4. Summarising and evaluating the results.

Steps 1 and 2 were carried out in a close collaboration between Norwegian authorities and the IMF. Step 3 was carried out partly by financial institutions and partly by Norges Bank and Kredittilsynet.

In Step 4, Norges Bank and Kredittilsynet contributed to summarising the results, but the actual assessment was carried out by the IMF. Two approaches were used: direct estimation of financial sector losses (top down approach) and an analysis based on individual institutions' own loss estimates (bottom up approach)

3.1 The macroscenarios

The vulnerability of some areas and sectors of the economy will vary both across countries and within individual countries over time. The IMF has no standard regarding the sort of vulnerability and accordingly the sort of shock whose impact they should be investigating in their FSAPs. Through their ongoing monitoring of factors with a bearing on financial stability, Norwegian authorities have a good picture of current vulnerabilities in the financial system[3]. First, system risk is primarily associated with banks, because of their dominant position, though insurance companies are also of significance, both because they are important players in securities markets and because they form substantial parts of financial conglomerates. Second, banks have little exposure to the securities market. Therefore, the credit risk associated with their lending to households and enterprises is of most importance. Third, in recent years there has been strong growth in household debt and in house prices, which has increased banks' exposure to the household sector and to housing markets.

There is a close connection between household financial developments and enterprise profitability developments. A sharp adjustment in the household sector, for example as a result of an interest rate rise, a fall in house prices or increased unemployment will reduce demand for services from the enterprise sector. When enterprises default on their loans in consequence, financial institutions incur losses. Financial institutions may also incur substantial direct losses on their loans to households. The strong growth in household debt and rise in house prices therefore means increased vulnerability for the financial system.

At the outset, four different initial shocks to the economy were considered: domestic cost shock, reduced domestic demand as a result of severely weakened confidence in the future, improved terms of trade and weakened terms of trade[4]. Scenarios with a domestic cost shock and weakened terms of trade were finally chosen.

The scenarios were developed using Norges Bank's models and the new core model (see Husebø et al. 2004). In addition to the core model, the partial relationships for household debt and house prices were used (see Jacobsen and Naug 2004a and 2004b). These relationships had no repercussions for the core model. Nor was any attempt made to estimate second round effects in the banking sector. In designing the scenarios, emphasis was placed on achieving an impact on macroeconomic variables that are important to financial stability.

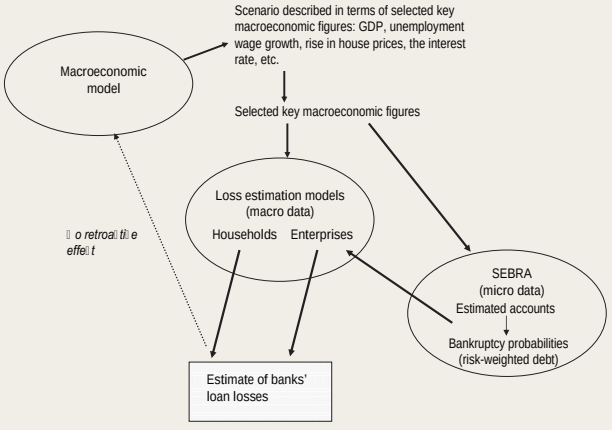
The economic shocks were assumed to occur at the beginning of 2005. As it takes time for adverse economic developments to be reflected in loan losses, a horizon of 3 years was used. Projections from Norges Bank's *Inflation Report* 3/04 were used as a baseline scenario.

The scenarios are described in detail in a separate box.

3.2 Direct estimation of overall losses (top down)

The approach used in direct assessment of losses is described in Frøyland and Larsen (2001) and Evjen et al. (2005). The main points of the method are as follows: The point of departure for the calculations is a macroeconomic scenario defined by a number of key economic variables such as unemployment, interest rate, GDP growth etc. (see Chart 1).

Chart 1. Schematic overview of the method for direct estimation of bank losses



For the household sector, variables from the macroeconomic scenario are applied directly. The equation for assessing losses in the household sector is (t-values for coefficients in brackets):

$$lossrel_t = \underset{(0.5)}{1.5} + \underset{(4.4)}{3.6\ dburd_t} - \underset{(-4.2)}{1.7\ rhous_t} + \underset{(3.2)}{10.4\ R_t} + \underset{(4.0)}{28.6\ UMP_t} - \underset{(-21.4)}{7.1\ DUM97} \quad (1)$$

The equation is based on data for the period 1978-2003. Losses relative to debt (*lossrel*) increase with increasing debt burden (*dburd*), falling housing wealth (*rhous*), increasing interest rate (*R*) and increasing unemployment (*UMP*). The equation also includes a dummy variable that is equal to 1 for 1997 and 0 otherwise (*DUM97*). This dummy variable is included to correct for especially low losses in 1997. Small letters indicate that the logarithm of the variable is being used.

For the enterprise sector, figures for mainland GDP growth, wage growth, debt growth and interest rate

[3] In Norway, systematic work on oversight of financial stability started in the mid-1990s. Today, systematic assessments of financial stability are published by Norges Bank in the semi-annual publication *Financial Stability* (www.norges-bank.no/english/publications/) and by Kredittilsynet in the annual report The Financial Market in Norway (www.kredittilsynet.no), while the Ministry of Finance assesses financial stability in the Credit Report (www.odin.dep.no/fin/norsk/dok/regpubl/stmeld/bn.html - Norwegian text). In addition, Kredittilsynet publishes quarterly analyses of financial institutions' accounts.

[4] Terms of trade is the ratio between export and import prices.

Summary of the macroeconomic scenarios[1]

Baseline scenario

The baseline scenario is based on *Inflation Report* 3/04 from Norges Bank and represents a modelled path for the development of the Norwegian economy in the absence of macroeconomic disturbances.

Table A. Baseline scenario. Percentage change on previous year unless otherwise specified

	2004	2005	2006	2007
GPD, real value	2.7	3.2	2.8	2.0
Household consumption, real value	5.0	4.6	3.9	2.6
Unemployment level. Per cent	4.4	4.1	3.8	3.8
Consumer prices[1]	0.3	1.4	1.7	2.2
Interest rate (level)[2]	2.0	2.3	3.2	4.0
House prices	11.6	3.5	1.9	3.1

[1] Adjusted for tax changes and excluding energy products.
[2] 3-month nominal money market rate.

Scenario 1: Domestic cost shock

Background: Domestic inflation rises as a result of higher domestic labour costs. The central bank responds by increasing the interest rate by 5 percentage points in the course of 2005 and 2006. This dampens the rise in inflation.

The rise in interest rates causes the Norwegian krone to appreciate. This, coupled with the higher costs, reduces the competitiveness of Norwegian manufacturers. The consequence is a decline in domestic production, continued weak investment developments and a rise in unemployment. Households' financial situation deteriorates as a result of both higher unemployment and higher interest rates. This cools down the housing market, and house prices fall. Prices for commercial property follow the same trend as house prices.

Table B. Scenario 1. Percentage change on previous year unless otherwise specified. Deviation from the baseline scenario in percentage points in brackets[1]

	2005		2006		2007	
GPD, real value	2.4	(-0.8)	1.6	(-1.2)	1.9	(-0.1)
Household consumption, real value	2.9	(-1.7)	0.6	(-3.3)	0.0	(-2.6)
Unemployment level. Per cent	4.5	(0.4)	4.9	(1.1)	5.0	(1.2)
Consumer prices[2]	1.8	(0.4)	2.2	(0.5)	2.7	(0.5)
Interest rate (level)[3]	5.3	(3.0)	6.9	(3.7)	6.2	(2.2)
House prices	-6.7	(-10.2)	-6.4	(-8.3)	2.8	(-0.3)

[1] The baseline scenario is specified above.
[2] Adjusted for tax changes and excluding energy products.
[3] 3-month nominal money market rate.

Scenario 2: Depreciation of the Norwegian krone as a result of the fall in oil prices

Background: As a result of a substantial increase in the global oil supply, oil prices are halved and remain at a low level for a long time. The Norwegian krone depreciates and prices on the Oslo Stock Exchange slide. Prices for imported goods increase, and the central bank raises the interest rate to counteract the higher inflation pressures. This dampens the depreciation, but NOK has still depreciated by about 20 per cent in relation to other currencies.

Despite the fact that the depreciation improves the competitiveness of Norwegian internationally exposed enterprises, the fall in oil and equity prices makes both households and enterprises more pessimistic. Both consumption and investment fall in consequence, and the market for homes and commercial property cools appreciably. Again, prices for commercial property are assumed to follow the same trend as house prices.

Table C. Scenario 2. Percentage change on previous year unless otherwise specified. Deviation from the baseline scenario in percentage points in brackets[1]

	2005		2006		2007	
GPD, real value	-0.3	(-3.5)	-0.7	(-3.5)	2.4	(0.4)
Household consumption, real value	0.4	(-4.2)	-2.6	(-6.5)	-2.2	(-4.8)
Unemployment level. Per cent	6.0	(1.9)	7.7	(3.9)	7.8	(4.0)
Consumer prices[2]	1.8	(0.4)	2.8	(1.1)	2.5	(0.3)
Interest rate (level)[3]	7.3	(5.0)	5.4	(2.2)	3.1	(-0.9)
House prices	-20.2	(-23.7)	-14.7	(-16.6)	-2.1	(-5.2)

[1] The baseline scenario is specified above.
[2] Adjusted for tax changes and excluding energy products.
[3] 3-month nominal money market rate.

[1] More details are provided in Jacobsen, Berge and Lindquist (2005).

developments are used to estimate the future profit/loss and balance sheet developments of limited companies. This is done for each company in Norges Bank's accounts database, which contains the accounts of limited companies in Norway. On the basis of the projected profit and loss accounts, bankruptcy probabilities are then calculated for the companies using the SEBRA bankruptcy prediction model. This model is described in more detail in Bernhardsen (2001) and in Eklund, Larsen and Bernhardsen (2001). The debt of each company is then multiplied by the associated bankruptcy probability to find "risk-weighted debt". The aggregate risk-weighted debt expresses expected losses to financial institutions due to bankruptcy if the whole amount owed by the enterprises affected is lost (loss given default is 100 per cent). Risk-weighted debt for all limited companies is included in the loss equation together with a variable that reflects changes in asset values. The loss equation for the enterprises is:

(2)

$$loss_t = \underset{(-6.8)}{-28.5} + \underset{(8.6)}{4.4 rwd_{t-1}} \underset{(-6.2)}{-6.2 \Delta rph_t} \underset{(-5.9)}{-2.5 DUM95}$$

Financial sector losses on loans to the enterprise sector (*loss*) increase with risk-weighted debt (*rwd*) and falling asset prices (Δrph). The last variable is closely related to the collateral posted for the amounts borrowed. Note that falling asset prices have an immediate effect on losses, whereas a rise in risk-weighted debt affects losses with a time lag of one year.

3.3 Institutions' assessments (bottom up)

The eight largest banks in Norway estimated the loan losses that would arise in each of the two macroscenarios. The specified variables in the scenarios do not provide a foundation for direct calculation of losses, but together they provide a description of developments that will impact banks through a deterioration in credit quality and ensuing losses in the lending portfolio. The losses are calculated by means of internal models such as credit management models, regression analyses of historical losses and/or qualitative assessments. Banks' estimates of the macroscenarios show the effect on loan losses and thus describe only banks' credit risk.

Regression analyses of historical losses may yield distorted estimates if the credit quality of the current lending portfolio is different from the quality during the regression period. A number of banks point out that improved credit management has resulted in portfolios today having a higher credit quality than in the past, and that estimates based on historical losses therefore overestimate future losses. Some banks, but not all, corrected for this by making qualitative downward revisions to estimated expected losses.

None of the banks have used models that include all variables in the scenarios. The variables unemployment and private consumption have proved particularly difficult to include in the models. The results of the individual banks are therefore based on simplified assumptions, differing choices of method and qualitative assessments. This makes it somewhat difficult to compare the results of individual banks.

3.4 Scenario results

Table 1 presents the estimated effect of the macroeconomic scenarios on the capital adequacy of Norwegian banks. The loss estimates of the two methods have been scaled up in the table so that the figures may be compared.[5] The table shows the capital adequacy of Norwegian banks assuming no change in any variable other than losses. Therefore, expected profits (pre-loss) are not taken into account and the listed capital adequacy (especially at the three-year horizon) is therefore lower than what might be expected if the scenarios should actually occur.

As expected, the effect of cumulative losses at the three-year horizon is considerably larger than at the one-year horizon. This is a reflection of period lengths but also of the time it takes before adverse economic developments result in considerable loan losses. On the whole, capital adequacy is above the statutory minimum requirement of 8 per cent in both scenarios.

Scenario 2 involves a more negative economic development than scenario 1 and therefore also results in higher loan losses and lower capital adequacy than scenario 1. In scenario 2, GDP growth is negative in the first two years. The interest rate is also high in the first year. In addition, asset values fall during the entire period. This fall is especially sharp during the first two years. Unemployment rises sharply to just below 8 per cent. All of this contributes to a sharp increase in losses. With the direct calculation for scenario 2, losses on loans to the household sector are higher than losses on loans to the enterprise sector (the household sector accounts for roughly 55 per cent of losses). The increase in losses on loans to households is primarily a result of the rise in unemployment and the fall in house prices. Losses on loans to enterprises increase first as a result of a fall in asset values, i.e. collateral for loans deteriorates. After that, a higher risk of bankruptcy and default contributes to a substantial increase in risk-weighted debt.

In scenario 1, GDP growth is positive for all years, even though growth is lower than in the baseline scenario. Therefore, increased losses are primarily a result of a fall in asset values and higher interest rates. The directly calculated losses show that the enterprise sector accounts for the largest share of losses (approximately 55 per cent). Again it is the fall in asset values that first contributes to higher losses. In the next two years, it is an increase in risk-weighted debt that contributes to a high

[5] The eight banks represent 65 per cent of total assets in the banking sector. Total loss estimates for these banks have therefore been scaled up by a factor of 1/0.65. Using the direct method, losses in the banking sector only are estimated at 65 per cent of losses on loans to the household sector and 70.5 per cent of losses on loans to the enterprise sector. Using the direct method, the equation that determines financial institutions' losses on loans to the household sector is calculated on the data for the period 1978-2003. In the period 1978-2002, banks' losses accounted for 65 per cent of total losses. Financial institutions' losses on loans to the enterprise sector were calculated on data for the period 1989-2003. In the period 1989-2002, banks' losses accounted for 70.5 per cent of total losses on loans to the enterprise sector.

Table 1. Calculated capital adequacy for all banks in the two macroeconomic scenarios. Capital adequacy in per cent

Scenario	Period	Directly calculated *	Banks' calculations **
Scenario (domestic cost shock)	1 year	11.5	11.2
	3 year	10.2	9.8
Scenario 2 (Depreciation of NOK as a result of a fall in oil prices)	1 year	10.9	11.0
	3 year	8.0	9.1

Capital adequacy is calculated on the basis of data as of 30.09.2004. Capital adequacy was 11.8 per cent at that time.
* Total losses are calculated by adding 65 per cent of financial institutions' losses on loans to the household sector to 70.5 per cent of financial institutions' losses on loans to the enterprise sector.
** Total losses are calculated by multiplying loss estimates for the eight banks in the survey by 1/0.65.

loss level. In the household sector, higher interest rates and a higher debt burden are the first factors that contribute to higher losses. The high loss level is subsequently sustained by increased unemployment.

Banks did not report losses by household and enterprise sector. However, they did report that scenario 2 results in heavier losses in the enterprise sector than scenario 1. More specifically, losses increase in the sheltered sector as a result of a decline in private consumption. Banks reported, however, that the effect on the exposed sector is dampened by an exchange rate that is lower in scenario 2 than in scenario 1. According to banks, in scenario 2 loan losses occur in the household market as a result of high unemployment and a substantial fall in house prices, whereas in scenario 1, losses occur in the household market due to a persistently high interest rate level.

The developments described by scenario 2 resemble developments during the banking crisis. In both periods, GDP fell. House prices fall more in scenario 2 than they did during the banking crisis, and the real interest rate increases and is high in both periods. Nevertheless, the increase in losses and thus the decline in capital adequacy are considerably less pronounced in scenario 2 than during the banking crisis. One reason for this is that the share of bank lending to the household market has increased from 45 per cent to nearly 60 per cent of total credit. Bank losses on loans to the household market averaged 1.3 per cent annually in the period 1990-1992 as a whole, while the figure for the corporate market was 5.3 per cent. On the other hand, we cannot rule out that the most exposed households are currently more vulnerable to the shocks mentioned here than they were during the banking crisis. The SEBRA model, which is used in the direct calculation of losses, shows that the probability of bankruptcy in enterprises is clearly lower than before the banking crisis. This is partly due to favourable profitability developments in recent years with a similar increase in buffers in the form of equity in enterprises. Consequently, losses in the enterprise sector are lower than during the banking crisis.

Five to six years elapsed between the cyclical peak in 1986 and the culmination of the banking crisis in 1991-1992. If adverse developments persist over a sufficiently long period, any financial system will experience problems irrespective of how solid it was at the outset. A three-year horizon is not always long enough to assess the overall negative effects of a shock. On the other hand, a stress period that is longer than three years would be difficult to model. It is difficult to take into account financial institutions' adjustments when loss levels rise. For example, lending policies may change, institutions may merge and new capital may be raised to boost the institutions' financial strength. All of this must be taken into account when assessing the size of calculated losses.

We have no basis for commenting in advance on which of the two calculation methods will generate the highest losses. Losses estimated in the top down approach are based on models estimated on historical data. Due to an improvement in banks' risk management and internal control in recent years, the models may have overestimated losses. This suggests that the losses may be too high with a direct calculation. On the other hand, it is possible that banks have underestimated the indirect effects of large macroeconomic adjustments. Indirect effects are, for example, changes in unemployment which coincide with changes in asset prices and interest rates.

Both methods give the highest calculated losses and lowest capital adequacy in scenario 2. For scenario 1, losses differ only slightly when calculated by the two methods. At the end of the three-year period, capital adequacy based on banks' estimates is 0.4 percentage point lower than when the direct method is used. The differences for the two methods are somewhat more pronounced for scenario 2. After three years, capital adequacy based on direct calculations is 1.1 percentage point lower than capital adequacy based on bank's calculations.

There was a spread between banks' calculated losses. At the three-year horizon, calculated capital adequacy varied from 5 to 11 per cent. A specific macroeconomic shock will affect the individual financial institutions differently. The effect will depend on a number of factors: the type of macroeconomic shock, the institutions' exposures, the quality of risk management and not least the institutions' initial capital adequacy. The IMF places emphasis on the financial system and not the individual insti-

tutions in its FSAPs. Stress tests such as the ones performed during the FSAPs for Norway do not take into account the spillover effects to other institutions of problems with financial strength or liquidity in individual institutions.

3.5 Effect of changes in individual factors

The eight banks have also conducted sensitivity analyses of the effect of immediate and unconnected changes in individual factors. The factors mainly describe market risk and show how, for example, changes in equity prices and the interest rate level affect the value of banks' assets, debt items and off-balance sheet items. The exception is the analysis of changes in house prices, which reflect credit risk. Here, banks have estimated loan losses using credit assessment models and/or qualitative assessments.

Table 2 shows the assumptions underlying the sensitivity analyses and the results of these. The results show the effect on overall capital adequacy. The figures have been scaled up to cover the banking sector as a whole in the same manner as in Table 1.

Table 2. Immediate effect on banks' capital adequacy in the event of a change in individual factors

Capital adequacy in per cent

Changes in individual factors	Capital adequacy
Starting point (30.09.2004)	11.8
Yield level, parallel shift + 5 percentage points	11.6
Yield level, parallel shift -1 percentage points	11.9
Equity prices + 40 per cent	11.9
Equity prices -40 per cent	11.8
Exchange rate NOK + 20 per cent	11.8
Exchange rate NOK -20 per cent	11.8
House prices – 25 per cent (credit risk)	11.7

The table shows that market risk has relatively limited implications for banks. The effect is most pronounced when there is a parallel positive shift in the yield curve of 5 percentage points and the value of bond holdings and holdings of other interest-bearing securities declines. The effects are also minimal here, however, due in part to hedging instruments and the predominance of variable interest rates on bank lending. Banks have estimated relatively low loan losses in the event of an isolated 25 per cent decline in house prices. The effect is limited because banks have not taken into account changes in other variables that will probably coincide with falling house prices. Scenario stress tests are an effective means of shedding light on these factors.

3.6 Stress tests of insurance companies

For banks, the main risk of loss is associated with generally unfavourable economic developments with resultant loan losses, as described in the two macroeconomic scenarios. The situation is different for insurance companies. Lending represents a small share of insurance companies' total assets (currently less than 4 per cent for life insurance and less than 2 per cent for non-life insurance), and credit risk is of relatively limited importance compared with market risk. Insurance companies are also exposed to insurance risk, i.e. the risk that current premiums and provisions are inadequate to cover future claims and related costs.

The three largest life insurance companies (market share of 86 per cent of Norwegian companies) and the three largest non-life insurance companies (market share of 61 per cent of Norwegian companies) have performed sensitivity analyses of immediate and separate changes in individual factors. The analyses are generally based on the same assumptions as for banks. One exception is the assumption that property prices, and not house prices, will decline by 25 per cent. Insurance companies have considerable investments in commercial properties and will experience a direct loss in value if prices for these properties fall.

Sensitivity to insurance risk has also been calculated for insurance companies. Life insurance companies have estimated the effect of an immediate 50 per cent increase in provisions for future disability pensions. Non-life insurance companies have calculated the effect of a general 15 per cent increase in provisions for outstanding claims combined with a further 20 per cent increase in workers' compensation and motor liability insurance. These two sectors are long-tailed, i.e. claims are often set a long time after the premiums have been paid in, and are therefore often exposed to higher risk than other sectors.

Table 3 shows the results of the sensitivity analyses for the insurance companies in the survey. The table shows the average effect on solvency margin capital as a per cent of the solvency margin capital requirement.[6]

The table shows that a 40 per cent fall in equity prices will have the largest negative effect for life insurance companies. A positive parallel shift in the yield curve of 5 percentage points also weakens considerably the solvency margin in life insurance companies. For non-life insurance companies, an increase in technical provisions as specified above will have the largest impact.

In contrast to banks, insurance companies would incur considerable losses in the event of pronounced and immediate changes in financial markets. If such major changes occur over time, companies will probably try to gradually reduce their exposure through the disposal of securities and property portfolios so that overall losses are lower than the results indicated here.

6 Norwegian insurance companies are subject to the EU's solvency margin rules. The solvency margin requirements are calculated on the basis of the insurance fund in life insurance and premium and claims costs for non-life insurance. Solvency margin capital consists of own capital and other solvency margin capital (including 50 per cent of supplementary provisions in life insurance and parts of the fluctuation provisions in non-life insurance).

Table 3. Immediate effect on banks' capital adequacy in the event of a change in individual factors. Change as a percentage of minimum requirement

Changes in individual factors	Change in solvency margin capital	
	Life insurance	Non-life insurance
Starting point[1] (30.09.2004)	158	339
Yield level, parallel shift + 5 percentage points	-65	-27
Yield level, parallel shift -1 percentage point	13	6
Equity prices + 40 per cent	128	29
Equity prices - 40 per cent	-119	-25
Exchange rate NOK + 20 per cent	-5	0
Exchange rate NOK - 20 per cent	5	0
Property prices - 25 per cent	-45	-16
Increased provisions (see specification in the text)	-42	-95

[1] With a value of 100, the capital will match the minimum requirement.

4. Summary and possible further extensions

Stress testing of financial institutions' robustness to macroeconomic shocks is an important tool both for the institutions themselves and in connection with the authorities' oversight of financial stability. Stress tests of the Norwegian financial system conducted by the Norwegian authorities in cooperation with the IMF showed that the banking sector as a whole could withstand the consequences of a reduction in the quality of loan portfolios resulting from relatively substantial changes in key macroeconomic variables. Whereas market risk is of less importance for Norwegian banks, it is a substantial risk factor for insurance companies. Stress tests showed that a sharp fall in equity prices would substantially reduce solvency margins and buffer capital in life insurance companies, whereas non-life insurance companies were most vulnerable in the event of considerable changes in their technical provisions.

Results from the stress tests showed that the risk of stability problems in the Norwegian financial system is limited in the near term. Losses were calculated on the basis of macroeconomic scenarios that were extreme but still plausible and that touch on potential vulnerabilities in the financial system. If such vulnerabilities increase further before a shock occurs, the losses may be more substantial than calculated here. For example, if house prices and the debt burden climb to a very high level, a decline in house prices may be augmented if households and banks are forced to sell at the same time as there is a clear reversal of expectations concerning future price developments.

Different kinds of stress tests have been used by financial institutions and public authorities for a long time, but they have been used to test market risk more frequently than credit risk. Using stress tests to assess the robustness of the financial system has become more common in recent years. This has been encouraged in part by the IMFs use of such tests in their FSAPs. Stress testing is undoubtedly an important tool, but there are still a number of weaknesses. It is difficult to take into account the correlation between different types of risk, such as market risk and credit risk, and it can be difficult to calibrate the various types of shock. Nor is it satisfactory to add up the risk in individual institutions to get a picture of the systemic risk that can arise or be augmented through exposures across institutions. In financial conglomerates in particular, stress tests must take into account the correlation between the various types of risk faced by the conglomerate. Macroeconomic stress tests often have a horizon of one to three years. Even a three-year horizon may be too short to analyse the full effects of major economic disturbances. A significant weakness of most stress tests is that they do not take into account the institutions' adjustments and collective effects on markets and the economy. In addition, there may often be uncertainty attached to the parameters in the macroeconomic models. One should be aware of all of these factors when assessing the results of the FSAP for Norway.

Stress tests are also an important tool for Norges Bank and Kredittilsynet in their monitoring of financial stability. Institutions' own stress tests are part of the supervision of individual institutions. In addition, they provide valuable information about the vulnerability of the financial system. The use of macroeconomic stress tests based on extreme but plausible macroeconomic shocks, explained at both the aggregate and institutional level, will continue. Experience has shown that financial instability is often triggered by unexpected, negative macroeconomic shocks which take root through effects on the most vulnerable households, enterprises and financial institutions. In Norway, micro data for enterprises, households and individual financial institutions are readily available, and it will be a challenge to assess the contagion effects associated with macroeconomic stress scenarios.

References

Bernhardsen, Eivind (2001): "A model of bankruptcy prediction". Working Paper 2001/10, Norges Bank.

Eklund, Trond, Kai Larsen and Eivind Bernhardsen (2001): "Model for analysing credit risk in the enterprise sector". *Economic Bulletin* 3/01, pp. 99-106.

Evjen, Snorre, Arild J. Lund, Kjersti Haare Morka, Kjell Bjørn Nordal and Ingvild Svendsen (2005): "Monetary and financial stability in Norway: what can

we learn from macroeconomic stress tests?". BIS Papers No. 22 - Investigating the relationship between the financial and real economy, pp. 409-430.

Frøyland, Espen and Kai Larsen (2001): "How vulnerable are financial institutions to macroeconomic changes? An analysis based on stress testing". *Economic Bulletin* 3/02, pp. 92-97.

Husebø, Tore Anders, Sharon McCaw, Kjetil Olsen and Øistein Røisland (2004): "A small calibrated macromodel to support inflation targeting at Norges Bank". Staff Memo 2004/3, Norges Bank.

IMF (2005): "Norway: Financial system stability assessment, including reports on the observance of standards and codes on the following topics: Banking supervision, insurance regulation and payment systems". *IMF Country Report* 05/200, June 2005.

Jacobsen, Dag Henning and Bjørn E. Naug (2004a): "What influences the growth of household debt?" *Economic Bulletin* 3/04, pp. 103-111.

Jacobsen, Dag Henning and Bjørn E. Naug (2004b): "What drives house prices?" *Economic Bulletin* no. 1/2005, pp. 29-41.

Jacobsen, Dag Henning, Tor Oddvar Berge and Kjersti-Gro Lindquist (2005): "Stress test scenarios for Norway", unpublished VPM Notat No. 03/2005, Norges Bank.

Jones, Matthew T., Paul Hilbers and Graham Slack (2004): "Stress testing financial systems: What to do when the governor calls". IMF Working Paper 04/127.

Sorge, Marco (2004): "Stress testing financial systems: an overview of current methodologies". BIS Working Papers No. 165.

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Norges Bank publishes more detailed statistics on its website, www.norges-bank.no. The Bank's statistics calendar, which shows future publication dates, is only published on this website.

Financial institution balance sheets

Table 1. Norges Bank. Balance sheet. In millions of NOK

	31.12.2004	31.07.2005	31.08.2005	30.09.2005	31.10.2005
FINANCIAL ASSETS					
Foreign assets	**268 399**	**294 415**	**287 278**	**280 736**	**280 141**
International reserves	268 360	294 296	287 160	280 620	280 028
Other assets	39	118	118	116	113
Government Petroleum Fund investments	**1 015 471**	**1 204 782**	**1 228 707**	**1 280 530**	**1 279 017**
Domestic claims and other assets	**3 995**	**3 074**	**3 002**	**3 478**	**29 298**
Loans	494	494	497	515	26 497
Other claims	1 815	934	865	1 320	1 162
Fixed assets	1 395	1 356	1 349	1 352	1 348
Gold collection	291	291	291	291	291
TOTAL ASSETS	**1 287 865**	**1 502 271**	**1 518 987**	**1 564 744**	**1 588 456**
LIABILITIES AND CAPITAL					
Foreign liabilities	**51 167**	**77 086**	**66 888**	**63 594**	**62 940**
Deposits	309	1 043	387	398	364
Borrowing	48 993	74 197	64 663	61 260	60 707
Other liabilities	289	264	265	349	296
Counterpart of Spesial Drawing Rights allocation in IMF	1 575	1 581	1 572	1 587	1 572
Government Petroleum Fund deposits	**1 015 471**	**1 204 782**	**1 228 707**	**1 280 530**	**1 279 017**
Domestic liabilities	**173 925**	**163 948**	**167 031**	**160 020**	**190 941**
Notes and coins in circulation	47 595	46 128	45 411	45 317	45 263
Treasury	88 816	87 748	67 632	50 795	126 128
Other deposits	37 158	22 745	45 360	62 220	11 810
Borrowing	0	1	31	0	0
Other debt	356	7 326	8597	1688	7 739
Equity	**47 302**	**47 302**	**47 302**	**47 302**	**47 302**
Financial result	**0**	**9 154**	**9 060**	**13 298**	**8 256**
TOTAL LIABILITIES AND CAPITAL	**1 287 865**	**1 502 271**	**1 518 987**	**1 564 744**	**1 588 456**
Commitments					
Allotted, unpaid shares in the BIS	258	258	258	258	258
International reserves					
Derivatives and forward exchange contracts sold	83 020	86 016	99 779	97 992	106 975
Derivatives and forward exchange contracts purchased	87 931	86 001	99 873	91 459	108 458
Government Petroleum Fund					
Derivatives and forward exchange contracts sold	534 611	454 095	548 761	639 397	688 799
Derivatives and forward exchange contracts purchased	526 161	455 927	544 189	621 614	689 020
Rights [1)]					
International reserves:					
Options sold	341	393	9	43	0
Options purchased	598	2 668	3 684	1 149	413
Government Petroleum Fund:					
Options sold	2 232	1 851	62	290	0
Options purchased	3 992	11 654	16 011	5 430	1 653

[1)] Options presented in terms of market value of underlying instruments as from December 2003.

Table 2. Norges Bank. Specification of international reserves. In millions of NOK

	31.12.2004	31.07.2005	31.08.2005	30.09.2005	31.10.2005
Gold	0	0	0	0	0
Special drawing rights in the IMF	2 181	1 907	1 923	1 916	1 883
Reserve position in the IMF	5 250	4 686	4 188	4 336	4 178
Loans to the IMF	535	455	440	422	405
Bank deposits abroad	77 923	68 367	64 197	57 007	66 223
Foreign Treasury bills	112	386	288	296	577
Foreign Treasury notes	0	9	0	0	0
Foreign certificates	928	367	432	529	372
Foreign bearer bonds [1)]	126 733	155 437	155 658	151 996	141 300
Foreign shares	54 500	63 216	62 994	65 877	63 842
Accrued interest	199	-535	-2 960	-1 760	1 249
Total	268 361	294 295	287 160	280 619	280 029

[1)] Includes bonds subject to repurchase agreements.

Source: Norges Bank

Table 3. State lending institutions. Balance sheet. In millions of NOK

	30.09.2004	31.12.2004	31.03.2005	30.06.2005	30.09.2005
Cash holdings and bank deposits	2 496	2 930	2 733	2 731	2 641
Total loans	189 623	189 435	191 887	191 961	191 117
Of which:					
To the general public [1)]	186 585	186 607	188 866	189 063	188 290
Claims on the central government and social security administration	-	-	-	-	
Other assets	5 558	3 898	6 196	3 927	6 941
Total assets	197 677	196 263	200 816	198 619	200 699
Bearer bond issues	20	16	16	13	11
Of which:					
In Norwegian kroner	20	16	16	13	11
In foreign currency	-	-	-	-	
Other loans	188 139	187 718	190 261	190 276	189 251
Of which:					
From the central government and social security administration	188 139	187 718	190 261	190 276	189 251
Other liabilities, etc.	5 736	4 853	6 826	4 757	7 831
Share capital, reserves	3 782	3 676	3 713	3 573	3 606
Total liabilities and capital	197 677	196 263	200 816	198 619	200 699

[1)] Includes local government administration, non-financial enterprises and households.

Sources: Statistics Norway and Norges Bank

Table 4. Banks.[1] Balance sheet. In millions of NOK

	30.09.2004	31.12.2004	31.03.2005	30.06.2005	30.09.2005
Cash	4 390	4 649	4 636	4 893	4 577
Deposits with Norges Bank	29 768	37 017	34 514	19 592	62 369
Deposits with Norwegian banks	21 230	18 383	18 375	31 523	19 557
Deposits with foreign banks	25 867	27 174	56 767	77 787	58 171
Treasury bills	5 074	6 451	5 896	6 597	9 371
Other short-term paper	11 759	8 429	11 626	8 303	18 040
Government bonds etc.[2]	7 862	6 858	5 728	7 704	7 954
Other bearer bonds	118 235	125 075	125 398	132 111	134 224
Loans to foreign countries	52 597	51 570	53 315	59 448	71 266
Loans to the general public	1 277 267	1 303 676	1 346 914	1 402 381	1 456 220
Of which:					
In foreign currency	82 131	72 915	73 015	73 592	73 704
Loans to mortgage and finance companies, insurance etc.[3]	92 022	92 839	102 082	108 406	109 948
Loans to central government and social security admin.	713	637	2 384	2 866	185
Other assets[4]	149 879	122 754	131 778	140 406	134 338
Total assets	1 796 663	1 805 512	1 899 413	2 002 017	2 086 220
Deposits from the general public	813 423	844 811	862 174	904 430	919 171
Of which:					
In foreign currency	28 727	29 028	34 593	33 879	45 306
Deposits from Norwegian banks	21 254	18 927	20 249	34 187	21 708
Deposits from mortg. and fin. companies, and insurance etc.[3]	53 165	53 008	67 218	70 605	64 721
Deposits from central government, social security admin. and state lending institutions	8 008	6 198	6 447	9 094	11 638
Funds from CDs	77 116	77 938	87 173	87 542	100 999
Loans and deposits from Norges Bank	5 502	5 275	3 296	3 976	3 099
Loans and deposits from abroad	226 177	222 298	268 067	289 134	337 799
Other liabilities	471 127	451 256	463 818	477 235	496 882
Share capital/primary capital	31 714	31 767	32 025	32 161	32 086
Allocations, reserves etc.	78 125	79 526	84 907	84 695	84 172
Net income	11 052	14 508	4 039	8 958	13 945
Total liabilities and capital	1 796 663	1 805 512	1 899 413	2 002 017	2 086 220
Specifications:					
Foreign assets	175 553	152 371	188 013	221 617	221 755
Foreign debt	492 052	460 835	507 225	549 619	611 017

[1] Includes commercial and savings banks.

[2] Includes government bonds and bonds issued by lending institutions.

[3] Includes mortgage companies, finance companies, life and non-life insurance companies and other financial institutions.

[4] Includes unspecified loss provisions (negative figures) and loans and other claims not specified above.

Sources: Statistics Norway and Norges Bank

Table 5. Banks.[1] Loans and deposits by sector [2]. In millions of NOK

	30.09.2004	31.12.2004	31.03.2005	30.06.2005	30.09.2005
Loans to:					
Local government (incl. municipal enterprises)	14 165	7 873	18 798	18 330	21 606
Non-financial enterprises[3]	363 014	357 722	369 438	383 717	400 504
Households[4]	905 340	938 061	966 443	1 007 908	1 043 273
Total loans to the general public	1 277 267	1 303 657	1 346 914	1 402 381	1 456 220
Deposits from:					
Local government (incl.municipal enterprises)	42 208	41 189	52 213	56 271	55 736
Non-financial enterprises[3]	235 285	261 599	261 925	258 793	284 761
Households[4]	541 045	542 012	556 073	597 681	587 567
Total deposits from the general public	813 423	844 801	862 174	904 430	919 171

[1] Includes commercial and savings banks.

[2] Includes local government administration, non-financial enterprises and households.

[3] Includes private enterprises with limited liability etc., and state enterprises.

[4] Includes sole proprietorships, unincorporated enterprises and wage earners, etc.

Sources: Statistics Norway and Norges Bank

Table 6. Mortgage companies. Balance sheet. In millions of NOK

	30.09.2004	31.12.2004	31.03.2005	30.06.2005	30.09.2005
Cash and bank deposits	4 699	2 263	6 708	4 370	7 980
Notes and certificates	3 366	4 288	1 815	1 520	3 728
Government bonds [1]	1 606	137	625	135	135
Other bearer bonds	59 585	53 791	59 338	68 237	70 671
Loans to:					
Financial enterprises	43 542	47 222	51 265	51 272	53 627
The general public [2]	225 171	236 800	241 111	244 967	248 437
Other sectors	9 115	9 188	8 948	12 567	12 353
Others assets [3]	5 090	6 485	8 961	7 868	7 240
Total assets	352 174	360 174	378 771	390 936	404 171
Notes and certificates	26 755	7 126	8 913	5 711	6 887
Bearer bonds issues in NOK [4]	53 468	55 764	51 519	50 562	52 373
Bearer bond issues in foreign currency [4]	136 285	159 559	177 152	189 431	196 709
Other funding	117 646	119 515	122 801	127 740	128 744
Equity capital	13 140	12 721	13 133	13 586	14 605
Other liabilities	4 880	5 489	5 253	3 906	4 853
Total liabilities and capital	352 174	360 174	378 771	390 936	404 171

[1] Includes government bonds and bonds issued by state lending institutions.

[2] Includes local government administration, non-financial enterprises and households.

[3] Foreign exchange differences in connection with swaps are entered net in this item. This may result in negative figures for some periods.

[4] Purchase of own bearer bonds deducted.

Sources: Statistics Norway and Norges Bank

Table 7. Finance companies. Balance sheet. In millions of NOK

	30.09.2004	31.12.2004	31.03.2005	30.06.2005	30.09.2005
Cash and bank deposits	2 162	2 299	2 095	3 009	2 176
Notes and certificates	134	53	88	88	88
Bearer bonds	0	61	61	61	61
Loans [1] (gross) to:	99 460	103 514	104 038	109 734	113 403
The general public [2] (net)	94 650	98 262	97 654	103 417	107 476
Other sectors (net)	4 559	5 028	6 142	6 034	5 577
Other assets [3]	2 394	2 347	3 246	3 307	2 863
Total assets	104 150	108 274	109 528	116 199	118 591
Notes and certificates	0	0	30	35	100
Bearer bonds	657	657	165	200	200
Loans from non-banks	12 472	13 180	13 402	14 091	13 182
Loans from banks	74 981	78 606	79 125	83 944	87 003
Other liabilities	6 567	6 661	6 983	7 027	6 632
Capital, reserves	9 473	9 170	9 823	10 902	11 474
Total liabilities and capital	104 150	108 274	109 528	116 199	118 591

[1] Includes subordinated loan capital and leasing finance.

[2] Includes local government administration, non-financial enterprises and households.

[3] Includes specified and unspecified loan loss provisions (negative figures).

Source: Norges Bank

Table 8. Life insurance companies. Main assets. In millions of NOK

	30.09.2004	31.12.2004	31.03.2005	30.06.2005	30.09.2005
Cash and bank deposits	21 879	21 393	24 511	27 518	23 271
Norwegian notes and certificates	20 078	28 418	28 253	30 482	32 227
Foreign Treasury bills and notes	2 761	5 509	8 801	8 799	9 208
Norwegian bearer bonds	146 334	141 636	145 202	145 043	152 030
Foreign bearer bonds	130 826	128 066	130 729	133 140	130 219
Norwegian shares, units, primary capital certificates and interests	61 116	66 330	70 277	73 994	81 776
Foreign shares, units, primary capital certificates and interests	60 724	65 879	68 155	72 248	77 553
Loans to the general public [1)]	18 380	17 918	17 566	17 706	17 567
Loans to other sectors	650	948	945	939	924
Other specified assets	61 061	59 385	58 989	57 726	63 819
Total assets	523 809	535 482	553 428	567 595	588 594

[1)] Includes local government administration, non-financial enterprises and households.

Source: Statistics Norway

Table 9. Non-life insurance companies. Main assets. In millions of NOK

	30.09.2004	31.12.2004	31.03.2005	30.06.2005	30.09.2005
Cash and bank deposits	5 854	5 856	6 658	7 132	6 685
Norwegian notes and certificates	13 144	15 537	12 109	10 680	10 828
Foreign notes and certificates	2 097	4 292	5 686	8 161	7 738
Norwegian bearer bonds	20 320	20 026	20 196	20 328	22 099
Foreign bearer bonds	12 425	11 796	15 179	17 569	19 031
Norwegian shares, units, primary capital certificates, interests	9 182	9 583	11 014	12 213	12 530
Foreign shares, units, primary capital certificates, interests	8 063	6 168	6 833	7 277	9 538
Loans to the general public [1)]	1 338	1 396	1 426	1 399	1 398
Loans to other sectors	200	239	264	269	258
Other specified assets	40 169	41 334	44 756	43 007	40 261
Total assets	112 792	116 227	124 121	128 035	130 366

[1)] Includes local government administration, non-financial enterprises and households.

Source: Statistics Norway

Table 10a. Securities funds' assets. Market value. In millions of NOK

	30.06.2004	30.09.2004	31.12.2004	31.03.2005	30.06.2005
Bank deposits	7 132	7 059	5 624	8 173	6 790
Treasury bills, etc. [1)]	4 131	3 887	5 604	4 712	4 170
Other Norwegian short-term paper	21 218	19 464	16 508	16 850	18 910
Foreign short-term paper	236	245	279	318	297
Government bonds, etc. [2)]	5 435	6 278	6 132	5 498	5 658
Other Norwegian bonds	30 379	34 073	37 102	39 568	40 122
Foreign bonds	6 950	7 232	8 256	9 424	8 722
Norwegian equities	32 627	33 617	35 854	37 631	40 937
Foreign equities	53 674	56 304	64 169	73 840	73 822
Other assets	4 157	4 334	4 680	5 123	5 234
Total assets	165 937	172 492	184 208	201 138	204 661

[1)] Comprises Treasury bills and other certificates issued by state lending institutions.

[2)] Comprises government bonds and bonds issued by state lending institutions.

Sources: Norges Bank and Norwegian Central Securities Depository

Table 10b. Securities funds' assets under management by holding sector. Market value. In millions of NOK

	30.06.2004	30.09.2004	31.12.2004	31.03.2005	30.06.2005
Central government and social security administration	586	511	450	369	269
Banks	2 225	2 396	2 642	2 740	1 664
Other financial enterprises	40 107	45 977	53 293	58 513	61 349
Local government admin. and municipal enterprises	13 799	14 109	14 847	15 254	15 433
Other enterprises	23 669	22 244	21 474	25 220	24 558
Households	75 699	76 507	79 626	83 851	84 741
Rest of the world	6 508	7 403	8 531	11 844	13 299
Total assets under management	162 592	169 148	180 863	197 792	201 315

Sources: Norges Bank and the Norwegian Central Securities Depository

Securities statistics

Table 11. Shareholdings registered with the Norwegian Central Securities Depository (VPS), by holding sector. Estimated market value. In millions of NOK

Holding sector	30.09.2004	31.12.2004	31.03.2005	30.06.2005	30.09.2005
Central government and social security administration	330 408	336 151	357 770	405 255	475 318
Norges Bank	3	3	3	3	3
State lending institutions	21	3	3	3	1
Banks	15 806	18 432	20 367	22 998	17 935
Insurance companies	32 226	33 355	32 668	35 440	38 897
Mortgage companies	7	1	1	2	2
Finance companies	3	3	3	3	3
Mutual funds	36 659	38 868	41 328	44 407	52 898
Other financial enterprises	28 491	27 785	29 600	29 143	27 980
Local government administration and municipal enterprises	4 996	5 158	5 425	5 590	7 298
State enterprises	7 188	7 356	8 198	8 849	8 872
Other private enterprises	168 838	192 688	198 528	221 011	251 881
Wage-earning households	54 423	58 397	62 678	66 141	75 370
Other households	2 632	2 522	2 601	3 013	3 244
Rest of the world	316 727	343 992	398 321	433 450	529 427
Unspecified sector	496	355	312	341	660
Total	998 924	1 065 067	1 157 804	1 275 650	1 489 791

Sources: Norwegian Central Securities Depository and Norges Bank

Table 12. Share capital and primary capital certificates registered with the Norwegian Central Securities Depository, by issuing sector. Nominal value. In millions of NOK

	30.09.2004	31.12.2004	31.03.2005	30.06.2005	30.09.2005
Banks	30 140	31 195	31 453	31 763	31 605
Insurance companies	1 584	1 561	1 561	1 600	1 600
Mortgage companies	2 244	2 244	2 244	2 244	2 244
Finance companies	5	5	5	5	5
Other financial enterprises	16 995	16 587	16 689	16 726	16 575
Local government administration and municipal enterprises	197	197	197	197	197
State enterprises	17 945	17 797	17 801	17 735	17 472
Other private enterprises	47 199	48 627	48 988	49 535	51 569
Rest of the world	7 250	6 772	7 230	9 555	10 165
Unspecified sector	0	0	0	0	0
Total	123 560	124 985	126 168	129 360	131 431

Sources: Norwegian Central Securities Depository and Norges Bank

Table 13. Net purchases and net sales (-) in the primary and secondary markets of shares registered with the Norwegian Central Securities Depository, by purchasing, selling and issuing sector[1]. Estimated market value. In millions of NOK

2005 Q3	Purchasing/ selling sector																
Issuing sector	Cent.gov't and social security	Norges Bank	State lending inst.	Banks	Insur. com-panies	Mort. com-panies	Fin. com-panies	Secur. funds	Other financ. enterpr.	Local gov't & munic. enterpr.	State enterpr.	Other private enterpr.	Wage-earning house-holds	Other house-holds	Rest of the world	Unsp. sector	Total[2]
Banks	0	0	0	-270	-377	0	0	-236	-364	0	-16	-754	-474	-106	2 484	-2	-116
Insurance companies	0	0	0	12	1	0	0	-12	56	-50	-2	18	13	1	105	0	141
Mortgage companies	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Finance companies	0	0	0	0	0	0	0	0	0	0	0	3	-3	0	0	0	0
Other financial enterpr.	332	0	0	-411	-2 921	0	0	-491	216	-18	5	-885	-808	-86	5 343	32	308
Local gov't. admin. and municipal enterprises	0	0	0	0	-4	0	0	95	-3	-15	0	-50	-9	2	-17	0	1
State enterprises	-13 726	0	0	1 108	396	0	0	145	-582	-57	-3	-1 762	-4	-10	14 238	76	-182
Other private enterprises	-2 464	0	-2	-271	-1 983	2	0	-3 181	-1 404	-350	-53	3 789	-6 044	-166	24 753	193	12 819
Rest of the world	121	0	0	9 662	-377	0	0	252	-4 356	-22	2	-441	-85	-13	-1 342	29	3 430
Unspecified sector	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	-15 737	0	-2	9 830	-5 266	2	0	-3 428	-6 435	-513	-67	-82	-7 414	-379	45 563	328	16 400

[1] Issues at issue price + purchases at market value – sales at market value – redemptions at redemption value.

[2] Total shows net issues in the primary market. Purchases and sales in the secondary market result in redistribution between owner sectors, but add up to 0.

Sources: Norwegian Central Securities Depository and Norges Bank

Table 14. Bondholdings in NOK registered with the Norwegian Central Securities Depository, by holding sector. Market value. In millions of NOK

	30.09.2004	31.12.2004	31.03.2005	30.06.2005	30.09.2005
Central government and social security administration	27 256	34 470	30 231	32 967	33 126
Norges Bank	7 963	0	0	0	0
State lending institutions	101	82	78	61	57
Banks	92 251	90 599	86 817	93 369	85 351
Insurance companies	230 185	225 084	228 508	229 717	239 121
Mortgage companies	17 785	16 461	17 044	13 616	14 559
Finance companies	135	113	148	148	148
Mutual funds	41 894	44 966	46 656	46 963	51 327
Other financial enterprises	9 119	9 093	8 952	7 472	4 417
Local government administration and municipal enterprises	23 979	23 228	22 444	23 910	24 153
State enterprises	2 857	2 829	3 410	3 064	2 793
Other private enterprises	25 821	27 136	27 259	29 736	31 424
Wage-earning households	22 481	22 560	23 327	23 832	24 610
Other households	7 804	7 694	8 065	7 890	8 186
Rest of the world	72 241	67 815	74 366	78 493	84 170
Unspecified sector	216	113	89	79	113
Total	582 091	572 245	577 396	591 320	603 556

Sources: Norwegian Central Securities Depository and Norges Bank

Table 15. Bondholdings in NOK registered with the Norwegian Central Securities Depository, by issuing sector. Nominal value. In millions of NOK

	30.09.2004	31.12.2004	31.03.2005	30.06.2005	30.09.2005
Central government and social security administration	159 945	134 748	138 348	145 848	145 622
State lending institutions	119	98	94	73	68
Banks	180 675	185 988	191 410	195 609	206 561
Insurance companies	252	252	252	252	252
Mortgage companies	60 651	61 791	57 035	54 746	56 778
Finance companies	625	625	125	200	200
Other financial enterprises	2 699	3 671	3 671	3 973	5 053
Local government administration and municipal enterprises	59 047	60 616	60 309	62 080	60 450
State enterprises	33 404	33 595	33 595	26 994	25 169
Other private enterprises	34 898	37 210	39 518	44 441	47 176
Households	99	96	35	13	213
Rest of the world	21 657	22 255	22 299	22 730	23 665
Unspecified sector	0	0	0	0	0
Total	554 072	540 946	546 690	556 960	571 208

Sources: Norwegian Central Securities Depository and Norges Bank

Table 16. Net purchases and net sales (-) in the primary and secondary markets for NOK-denominated bonds registered with the Norwegian Central Securities Depository, by purchasing, selling and issuing sector.[1] Market value. In millions of NOK

2005 Q3	Purchasing/ selling sector																
Issuing sector	Cent.gov't and social security	Norges Bank	State lending inst.	Banks	Insur. com-panies	Mort. com-panies	Fin. com-panies	Secur. funds	Other financ. enterpr.	Local gov't & munic. enterpr.	State enterpr.	Other private enterpr.	Wage-earning house-holds	Other house-holds	Rest of the world	Unsp. sector	Total[2]
Central government and social security admin.	-2 479	0	0	-59	3 233	-5	0	-482	-1 276	-217	-87	15	-11	-85	12 357	0	10 905
State lending inst.	0	0	-25	-4	-1	0	0	0	0	0	0	0	0	0	0	0	-29
Banks	792	0	0	236	13 648	-100	35	5 508	-481	718	-26	843	280	894	468	18	22 833
Insurance companies	0	0	0	-5	33	0	0	3	0	2	0	3	0	0	-38	0	-2
Mortgage companies	-374	0	0	-2 079	-1 813	-1 660	0	1 273	65	71	24	-21	178	-196	-180	0	-4 712
Finance companies	0	0	0	-255	7	0	0	-46	0	42	0	-14	-11	3	-151	0	-425
Other financial enterprises	0	0	0	467	228	0	0	515	73	58	11	151	-27	14	-36	-1	1 452
Local gov't. admin. and municipal enterprises	-457	0	0	330	1 530	-42	0	-570	-813	643	42	-109	-41	-22	484	8	984
State enterprises	93	0	0	-3 247	-4 209	-25	0	62	-1 054	112	267	-361	-53	-114	105	0	-8 426
Other private enterprises	-194	0	0	1 246	3 305	25	0	1 376	-1 064	108	-35	3 555	259	161	2 606	13	11 361
Households	0	0	0	13	0	0	0	0	0	0	0	85	4	2	66	0	169
Rest of the world	3	0	0	-560	-487	0	0	-431	-27	36	0	503	1 365	41	965	2	1 410
Unspecified sector	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	-2 616	0	-25	-3 916	15 473	-1 807	35	7 207	-4 578	1 573	197	4 649	1 943	697	16 647	39	35 519

[1] Issues at issue price + purchases at market value – sales at market value – redemptions at redemption value.

[2] Total shows net issues in the primary market. Purchases and sales in the secondary market result in redistribution between owner sectors, but add up to 0.

Sources: Norwegian Central Securities Depository and Norges Bank

Table 17. NOK-denominated short-term paper registered with the Norwegian Central Securities Depository by holding sector. Market value. In millions of NOK

	30.09.2004	31.12.2004	31.03.2005	30.06.2005	30.09.2005
Central government and social security administration	1 812	11 741	9 512	11 115	9 683
Norges Bank	10 117	0	0	0	0
State lending institutions	0	0	0	0	0
Banks	17 117	16 938	18 273	14 905	32 807
Insurance companies	43 489	54 064	48 787	51 632	51 174
Mortgage companies	3 145	3 162	1 361	620	1 050
Finance companies	3	0	0	0	0
Mutual funds	23 781	22 610	22 072	23 233	22 467
Other financial enterprises	4 158	4 604	3 990	3 911	2 963
Local government administration and municipal enterprises	2 022	1 593	1 216	1 653	1 162
State enterprises	4 348	4 418	7 415	2 818	3 647
Other private enterprises	2 276	2 358	2 306	2 053	3 293
Wage-earning households	17	22	29	30	30
Other households	880	913	685	709	708
Rest of the world	6 533	4 882	5 473	7 140	7 420
Unspecified sector	0	0	0	0	0
Total	119 698	127 304	121 118	119 820	136 404

Sources: Norwegian Central Securities Depository and Norges Bank

Table 18. Outstanding short-term paper, by issuing sector.[1] Nominal value. In millions of NOK

Issuing sector	30.09.2004	31.12.2004	31.03.2005	30.06.2005	30.09.2005
Central government and social security administration	61 051	66 000	53 000	54 000	54 000
Counties	694	554	565	505	334
Municipalities	5 287	4 631	4 919	4 403	4 187
State lending institutions	0	0	0	0	0
Banks	42 675	40 910	48 298	39 400	49 168
Mortgage companies	997	3 322	1 797	1 120	2 505
Finance companies	0	0	0	0	0
Other financial enterprises	19	0	0	0	155
State enterprises	2 425	2 325	2 450	4 350	4 500
Municipal enterprises	6 666	7 687	6 672	8 894	9 194
Private enterprises	6 989	6 602	7 787	11 206	9 838
Rest of the world	2 600	2 700	2 600	2 950	3 150
Total	129 403	134 731	128 088	126 828	137 031

[1] Comprises short-term paper issued in Norway in NOK by domestic sectors and foreigners and paper in foreign currency issued by domestic sectors.

Source: Norges Bank

Credit and liquidity trends

Table 19. Credit indicator and money supply

	Volume figures at end of period NOKbn			Percentage growth				
				Over past 12 months			Over past 3 months, annualised rate[4]	
	C2[1]	C3[2]	M2[3]	C2[1]	C3[2]	M2[3]	C2	M2
December 1996	992.5	1 163.9	564.4	6.2	5.9	6.4	7.8	4.6
December 1997	1 099.1	1 306.7	578.5	10.2	10.4	1.8	10.2	3.0
December 1998	1 192.8	1 457.9	605.3	8.3	12.7	4.4	6.5	5.4
December 1999	1 295.0	1 622.9	670.1	8.4	8.6	10.5	10.0	8.4
December 2000	1 460.9	1 842.6	731.8	12.3	11.2	8.8	12.2	7.3
December 2001	1 608.2	2 010.5	795.4	9.7	7.8	9.3	9.3	10.5
December 2002	1 724.9	2 114.6	855.3	8.9	7.8	8.3	10.1	9.0
December 2003	1 846.5	2 217.3	873.1	6.8	5.4	1.9	7.3	1.8
July 2004	1 937.8	2 335.1	912.4	7.8	6.3	4.8	8.5	4.6
August 2004	1 947.7	2 328.0	897.6	7.8	5.7	3.7	8.6	3.1
September 2004	1 961.9	2 359.4	902.3	8.0	6.1	5.6	9.0	2.9
October 2004	1 977.1	2 370.0	906.3	8.4	6.2	4.6	9.8	9.2
November 2004	1 992.8	2 375.2	930.4	8.5	6.6	8.9	10.3	11.3
December 2004	2 005.6	2 370.8	933.7	8.9	6.8	7.3	10.1	13.3
January 2005	2 019.6	2 399.9	938.6	8.9	7.0	7.0	9.6	5.9
February 2005	2 032.9	2 411.9	947.1	9.1	6.9	8.4	9.6	7.4
March 2005	2 055.7	2 448.6	967.3	9.6	8.0	9.4	11.0	11.5
April 2005	2 083.7	2 477.5	959.5	10.3	8.0	8.8	12.7	16.3
May 2005	2 104.8	2 506.1	965.5	10.5	8.6	8.7	13.5	14.3
June 2005	2 127.6	2 513.0	1 003.7	10.6	8.2	9.4	13.3	10.6
July 2005	2 146.7	2 537.6	1 005.1	11.3	8.7	10.4	12.3	9.9
August 2005	2 159.7		993.9	11.3		11.0	12.3	12.5
September 2005	2 184.7		1 013.9	11.7		12.5	12.8	10.8
October 2005	2 218.4		1 006.2	12.4		11.0		

[1] C2 = Credit indicator. Credit from domestic sources; actual figures.

[2] C3 = Total credit from domestic and foreign sources; actual figures.

[3] M2 = Money supply (see note to Table 21).

[4] Seasonally adjusted figures.

Source: Norges Bank

Table 20. Domestic credit supply to the general public[1], by source. In millions of NOK. 12-month growth as a percentage

	31.12.2002		31.12.2003		31.12.2004		31.10.2005	
	Amount	%	Amount	%	Amount	%	Amount	%
Private banks	1 097 144	8.2	1 185 722	7.8	1 303 675	9.9	1 467 585	13.9
State lending institutions	185 932	5.3	188 593	1.4	186 542	-1.1	189 405	1.5
Mortgage companies	182 006	10.9	210 326	15.3	236 799	12.9	258 504	14.1
Finance companies	83 234	9.9	89 257	7.0	98 339	14.9	109 074	16.9
Life insurance companies	23 124	-5.5	20 628	-10.8	17 919	-13.1	17 706	-2.9
Pension funds	3 936	5.2	3 295	-16.3	3 295	0.0	3 295	0.0
Non-life insurance companies	926	-0.9	1 285	38.8	1 396	8.6	1 399	2.9
Bond debt[2]	107 399	19.8	114 147	6.3	123 801	8.5	123 506	0.7
Notes and short-term paper	26 145	10.1	19 614	-25.0	21 413	9.2	35 372	62.3
Other sources	15 036	33.1	13 646	-9.2	12 426	-8.9	12 573	1.5
Total domestic credit (C2)[3]	1 724 882	8.9	1 846 513	6.8	2 005 605	8.9	2 218 419	12.4

[1] Comprises local government administration, non-financial enterprises and households.

[2] Adjusted for non-residents' holdings of Norwegian private and municipal bonds in Norway.

[3] Corresponds to Norges Bank's credit indicator (C2).

Source: Norges Bank

Table 21. Composition of money supply. In millions of NOK

Actual figures at end of period	Notes and coins	Transaction account deposits	M1[1]	Other deposits[2]	CDs	M2[3]	Change in M2 last 12 months, total
December 1996	43 324	208 073	247 938	294 741	21 686	564 365	34 108
December 1997	46 014	227 382	269 597	278 741	30 200	578 538	14 173
December 1998	46 070	237 047	279 189	292 820	33 322	605 331	26 793
December 1999	48 020	300 128	343 494	295 820	30 802	670 116	64 785
December 2000	46 952	328 816	371 339	326 350	34 152	731 841	61 725
December 2001	46 633	344 110	386 148	370 171	39 048	795 367	63 526
December 2002	44 955	360 341	400 623	409 704	45 001	855 328	59 961
December 2003	46 249	387 309	428 996	407 337	36 806	873 139	17 811
July 2004	43 735	422 117	461 620	419 108	31 643	912 371	41 477
August 2004	43 191	406 141	445 281	421 549	30 792	897 622	30 452
September 2004	43 103	409 565	448 700	422 173	31 435	902 308	47 011
October 2004	43 232	414 667	453 881	419 012	33 377	906 270	37 350
November 2004	43 902	421 022	461 052	431 965	37 399	930 416	73 482
December 2004	47 595	430 092	473 432	423 196	37 068	933 696	60 557
January 2005	45 175	430 080	471 134	433 248	34 237	938 619	58 357
February 2005	44 599	433 726	474 259	439 826	33 017	947 102	69 856
March 2005	44 679	445 990	486 433	443 036	37 874	967 343	80 626
April 2005	44 461	439 778	480 084	440 264	39 117	959 465	75 675
May 2005	44 416	448 997	489 325	436 632	39 574	965 531	75 967
June 2005	45 967	482 172	523 748	446 708	33 258	1 003 714	84 451
July 2005	46 128	485 093	526 644	443 686	34 750	1 005 080	92 709
August 2005	45 411	472 184	513 563	446 631	33 709	993 903	96 281
September 2005	45 317	486 509	527 673	452 092	34 090	1 013 855	111 547
October 2005	45 263	484 811	526 336	449 117	30 754	1 006 207	99 937

[1] Narrow money, M1, comprises the money-holding sector's stock of Norwegian notes and coins plus the sector's transaction account deposits in Norges Bank, commercial banks and savings banks (in NOK and foreign currency).

[2] Excluding restricted bank deposits (BSU, IPA, withholding tax accounts, etc).

[3] Broad money, M2, comprises the sum of M1 and the money-holding sector's other bank deposits and CDs (in NOK and foreign currency) excluding restricted bank deposits (BSU, IPA, withholding tax accounts, etc).

Source: Norges Bank

Table 22. Household financial balance. Financial investments and holdings, by financial instrument. In billions of NOK

	Financial investments					Holdings				
	Year			Q2		Year			At 30 June	
	2002	2003	2004	2004	2005	2002	2003	2004	2004	2005
Currency and deposits	47.8	26.4	30.5	34.4	42.5	529.1	556.9	587.0	597.8	641.0
Securities other than shares	1.8	2.8	1.1	1.5	0.5	23.0	27.9	29.6	29.6	31.1
Shares and other equity	14.9	30.2	39.6	13.0	12.7	148.3	161.5	188.5	172.3	204.6
Mutual funds shares	-2.1	4.1	1.1	-1.1	-0.8	59.8	78.3	86.4	81.9	93.3
Insurance technical reserves	32.0	49.4	49.2	10.1	12.6	506.3	571.5	630.8	597.2	670.1
Loans and other assets[1]	20.1	31.2	23.3	-2.0	-1.1	169.4	201.9	226.8	209.9	237.0
Total assets	114.5	144.2	144.9	55.9	66.5	1 436.0	1 598.1	1 749.2	1 688.7	1 877.1
Loans from banks (incl. Norges Bank)	72.0	92.2	113.7	30.0	41.5	727.8	822.1	938.6	876.0	1 008.4
Loans from state lending institutions	7.5	2.5	0.2	0.0	0.5	156.0	158.5	158.6	158.4	161.3
Loans from private mortgage and finance companies	13.8	15.9	15.0	4.9	3.3	80.5	96.2	106.0	104.6	109.7
Loans from insurance companies	0.4	-2.3	-1.3	0.2	0.3	16.5	14.1	12.8	14.2	12.8
Other liabilities[2]	8.0	-0.5	3.5	10.9	12.7	143.2	143.2	151.0	147.4	154.0
Total liabilities	101.7	107.8	131.1	46.0	58.4	1 124.0	1 234.1	1 366.9	1 300.6	1 446.3
Net financial investments / assets	12.8	36.5	13.8	9.9	8.1	312.0	364.0	382.3	388.0	430.9

[1] Loans, accrued interest, holiday pay claims and tax claims.

[2] Other loans, securities other than shares, tax liabilities and accrued interest.

Source: Norges Bank

Table 23. Money market liquidity. Liquidity effect from 1 January to end period. In millions of NOK

	1.1 - 31.12		1.1 - 31.10	
Supply+/withdrawal–	2003	2004	2004	2005
Central government and other public accounts (excl. paper issued by state lending institutions and government)	-13 408	-43 666	-70 082	-131 122
Paper issued by state lending institutions and government	-41 322	19 008	17 203	-7 233
Purchase of foreign exchange for Government Petroleum Fund	14 620	46 870	45 590	91 160
Other foreign exchange transactions	0	75	75	622
Holdings of banknotes and coins [1] (estimate)	-1 337	-1 266	2 183	526
Overnight loans	0	0	0	0
Fixed-rate loans	12 000	0	-12 000	28 000
Other central bank financing	18 716	-12 079	180	-137
Total reserves	-10 731	8 942	-16 851	-18 184
Of which:				
Sight deposits with Norges Bank	-10 731	8 942	-16 851	-18 184
Treasury bills	0	0	0	0
Other reserves (estimate)	0	0	0	0

[1] The figures are mainly based on Norges Bank's accounts. Discrepancies may arise between the bank's own statements and banking statistics due to different accruals.

Source: Norges Bank

Interest rate statistics

Table 24. Nominal interest rates for NOK. Averages. Per cent per annum

	1-month		3-month		12-month		Interest rate on banks' overnight loans in Norges Bank	Interest rate on banks' sight deposits with Norges Bank
	NIDR	NIBOR	NIDR	NIBOR	NIDR	NIBOR		
July 2004	2.1	2.0	2.1	2.0	2.3	2.2	3.8	1.8
August 2004	2.1	2.0	2.2	2.0	2.4	2.2	3.8	1.8
September 2004	2.1	2.0	2.1	2.0	2.2	2.1	3.8	1.8
October 2004	2.1	2.0	2.1	2.0	2.3	2.1	3.8	1.8
November 2004	2.1	2.0	2.1	2.0	2.3	2.1	3.8	1.8
December 2004	2.1	2.0	2.1	2.0	2.3	2.2	3.8	1.8
January 2005	2.0	1.9	2.1	2.0	2.3	2.2	3.8	1.8
February 2005	2.0	1.9	2.0	1.9	2.3	2.2	3.8	1.8
March 2005	2.1	2.0	2.2	2.0	2.6	2.4	3.8	1.8
April 2005	2.2	2.0	2.2	2.1	2.6	2.5	3.8	1.8
May 2005	2.1	2.0	2.2	2.1	2.6	2.5	3.8	1.8
June 2005	2.2	2.1	2.3	2.2	2.6	2.5	3.8	1.8
July 2005	2.3	2.2	2.3	2.2	2.6	2.5	4.0	2.0
August 2005	2.3	2.2	2.4	2.3	2.7	2.6	4.0	2.0
September 2005	2.3	2.2	2.5	2.4	2.8	2.6	4.0	2.0
October 2005	2.5	2.4	2.6	2.5	2.9	2.8	4.0	2.0
November 2005	2.6	2.5	2.7	2.5	3.1	3.0	4.2	2.2

Note: NIDR = Norwegian Interbank Deposit Rate, a pure krone interest rate.
NIBOR = Norwegian Interbank Offered Rate, constructed on the basis of currency swaps.

Source: Norges Bank

Table 25. Short-term interest rates[1] for selected currencies in the Euro-market. Per cent per annum

	DKK	GBP	JPY	SEK	USD	EUR	Interest rate differential NOK/EUR
July 2004	2.2	4.8	0.0	2.1	1.6	2.1	-0.2
August 2004	2.1	4.9	0.0	2.1	1.7	2.1	-0.2
September 2004	2.1	4.9	0.0	2.1	1.9	2.1	-0.3
October 2004	2.1	4.8	0.0	2.1	2.1	2.1	-0.2
November 2004	2.1	4.8	0.0	2.1	2.3	2.2	-0.3
December 2004	2.1	4.8	0.0	2.1	2.5	2.2	-0.3
January 2005	2.1	4.8	0.0	2.0	2.6	2.1	-0.3
February 2005	2.1	4.8	0.0	2.0	2.8	2.1	-0.3
March 2005	2.1	4.9	0.0	2.0	3.0	2.1	-0.2
April 2005	2.1	4.9	0.0	2.0	3.1	2.1	-0.2
May 2005	2.1	4.8	0.0	2.0	3.2	2.1	-0.1
June 2005	2.1	4.8	0.0	1.7	3.4	2.1	-0.1
July 2005	2.1	4.6	0.0	1.5	3.6	2.1	0.0
August 2005	2.1	4.5	0.0	1.6	3.8	2.1	0.0
September 2005	2.1	4.5	0.0	1.6	3.9	2.1	0.1
October 2005	2.2	4.5	0.0	1.6	4.1	2.2	0.2
November 2005	2.4	4.6	0.0	1.6	4.3	2.3	0.1

[1] Three-month rates, monthly average of daily quotations.

Sources: OECD and Norges Bank

Table 26. Yields on government bonds[1]. Per cent per annum

	3-year	5-year	10-year
July 2004	3.1	3.8	4.5
August 2004	3.0	3.6	4.3
September 2004	2.8	3.5	4.2
October 2004	2.8	3.5	4.2
November 2004	2.7	3.3	4.0
December 2004	2.7	3.2	3.9
January 2005	2.7	3.2	3.9
February 2005	2.7	3.2	3.8
March 2005	2.9	3.4	4.0
April 2005	2.9	3.3	3.9
May 2005	2.8	3.2	3.7
June 2005	2.7	3.1	3.6
July 2005	2.7	3.0	3.6
August 2005	2.8	3.1	3.6
September 2005	2.8	3.1	3.5
October 2005	3.1	3.3	3.7
November 2005	3.4	3.7	4.0

[1] Whole-year interest rate paid in arrears. Monthly average. As of 1 January 1993 based on interest rate on representative bonds weighted by residual maturity.

Source: Norges Bank

Table 27. Yields on government bonds[1] in selected countries. Per cent per annum

	Germany	Sweden	France	UK	Japan	US	Interest rate differential NOK/DEM[2]
July 2004	4.3	4.6	4.3	5.1	1.8	4.5	0.2
August 2004	4.2	4.5	4.1	5.0	1.6	4.3	0.1
September 2004	4.1	4.4	4.1	4.9	1.5	4.2	0.1
October 2004	4.0	4.3	4.0	4.8	1.5	4.1	0.2
November 2004	3.9	4.2	3.9	4.7	1.5	4.2	0.2
December 2004	3.7	4.0	3.6	4.5	1.4	4.2	0.3
January 2005	3.6	3.9	3.6	4.6	1.4	4.3	0.3
February 2005	3.6	3.8	3.6	4.6	1.4	4.2	0.1
March 2005	3.8	3.9	3.8	4.8	1.5	4.5	0.2
April 2005	3.6	3.6	3.6	4.6	1.3	4.4	0.3
May 2005	3.4	3.4	3.4	4.4	1.3	4.2	0.3
June 2005	3.2	3.1	3.2	4.3	1.2	4.0	0.3
July 2005	3.3	3.1	3.3	4.3	1.3	4.2	0.3
August 2005	3.3	3.2	3.3	4.3	1.4	4.3	0.3
September 2005	3.1	3.0	3.1	4.2	1.4	4.2	0.4
October 2005	3.3	3.2	3.3	4.3	1.5	4.5	0.4
November 2005	3.5	3.4	3.5	4.3	1.5	4.6	0.4

[1] Government bonds with 10 years to maturity. Monthly average of daily quotations.

[2] Differential between yields on Norwegian and German government bonds with 10 years to maturity.

Sources: OECD and Norges Bank

Table 28. Banks. Average interest rates and commissions on utilised NOK loans to the general public at end of quarter. Per cent per annum

	Loans, excl. non-accrual loans							
						Credit lines	Repayment loans	
	Total loans	Local govern-ment	Non-financial public enter-prises	Non-financial private enter-prises	House-holds	Overdrafts and building loans	Housing loans	Other loans
2004 Q3								
All banks	4.12	2.88	2.83	4.27	4.09	7.01	3.77	4.21
2004 Q4								
All banks	4.04	2.90	2.78	4.13	4.02	6.87	3.69	4.11
2005 Q1								
All banks	3.97	2.89	2.94	4.04	3.96	6.74	3.63	3.97
2005 Q2								
All banks	3.86	2.65	3.04	3.94	3.84	6.13	3.54	3.95
2005 Q3	3.97	3.10	3.03	4.00	3.97	6.13	3.67	4.02
All banks								

Source: Norges Bank

Table 29. Banks. Average interest rates on deposits in NOK from the general public at end of quarter. Per cent per annum

	Total deposits	Local govern-ment	Non-financial public enterprises	Non-financial private enterprises	House-holds	Deposits on transaction accounts	Other deposits
2004 Q3							
All banks	1.28	1.82	1.70	1.28	1.24	1.02	1.52
2004 Q4							
All banks	1.27	1.78	1.71	1.26	1.22	1.04	1.48
2005 Q1							
All banks	1.30	1.81	1.70	1.31	1.25	1.09	1.50
2005 Q2							
All banks	1.30	1.92	1.87	1.34	1.22	1.09	1.50
2005 Q3	1.48	2.10	1.98	1.51	1.40	1.24	1.71
All banks							

Source: Norges Bank

Table 30. Life insurance companies. Average interest rates by type of loan at end of quarter. Per cent per annum

	Housing loans	Other loans	Total loans
30.09.2004	3.6	5.1	4.4
31.12.2004	3.6	4.8	4.3
31.03.2005	3.6	4.7	4.3
30.06.2005	3.4	4.5	4.0
30.09.2005	3.5	4.5	4.0

Source: Norges Bank

Table 31. Mortgage companies. Average interest rates, incl. commissions on loans to private sector at end of quarter. Per cent per annum

	Housing loans	Loans to private enterprises	Total loans
30.09.2004	4.8	4.8	4.0
31.12.2004	4.2	4.6	3.7
31.03.2005	4.0	4.3	3.5
30.06.2005	3.9	4.2	3.4
30.09.2005	3.8	4.1	3.4

Source: Norges Bank

Profit/loss and capital adequacy data

Table 32. Profit/loss and capital adequacy: banks[1]. Percentage of average total assets

			Q3	
	2003	2004	2004	2005
Interest income	5.8	4.2	4.2	4.2
Interest expenses	3.9	2.4	2.4	2.6
Net interest income	1.9	1.8	1.8	1.7
Total other operating income	0.9	0.9	0.8	0.9
Other operating expenses	1.6	1.6	1.5	1.4
Operating profit before losses	1.2	1.1	1.1	1.2
Recorded losses on loans and guarantees	0.4	0.1	0.1	-0,1
Ordinary operating profit (before taxes)	0.7	1.1	1.1	1.3
Capital adequacy ratio[2]	12.4	12.2	11.8	11.3
Of which:				
Core capital	9.7	9.8	9.3	8.8

[1] Parent banks (excl. foreign branches) and foreign-owned branches / subsidiary banks.

[2] As a percentage of the basis of measurement for capital adequacy.

Source: Norges Bank

Table 33. Profit/loss and capital adequacy: finance companies[1]. Percentage of average total assets

			Q3	
	2003	2004	2004	2005
Interest income	8.5	6.4	6.3	6.6
Interest expenses	3.8	2.1	2.1	2.2
Net interest income	4.7	4.3	4.3	4.4
Total other operating income	2.3	2.0	1.4	2.0
Other operating expenses	4.0	3.6	3.0	3.7
Operating profit before losses	3.0	2.6	2.7	2.7
Recorded losses on loans and guarantees	1.0	0.6	0.6	0.4
Ordinary operating profit (before taxes)	2.0	2.0	2.1	2.4
Capital adequacy ratio[2]	10.9	11.4	11.1	11.0
Of which:				
Core capital	9.4	9.6	9.3	9.0

[1] All Norwegian parent companies (excl. OBOS) and foreign-owned branches.

[2] As a percentage of the basis of measurement for capital adequacy.

Source: Norges Bank

Table 34. Profit/loss and capital adequacy: mortgage companies[1]. Percentage of average total assets

			Q3	
	2003	2004	2004	2005
Interest income	4.4	3.3	3.3	3.1
Interest expenses	3.8	2.7	2.8	2.7
Net interest income	0.7	0.5	0.5	0.5
Total other operating income	0.0	0.0	0.0	0.0
Other operating expenses	0.1	0.1	0.1	0.1
Operating profit before losses	0.5	0.4	0.4	0.3
Recorded losses on loans and guarantees	0.0	0.0	0.0	-0,0
Ordinary operating profit (before taxes)	0.5	0.4	0.4	0.4
Capital adequacy[2]	12.2	12.3	12.3	12.1
Of which:				
Core capital	9.6	9.3	9.4	9.3

[1] All Norwegian parent companies.

[2] As a percentage of the basis of measurement for capital adequacy.

Source: Norges Bank

Exchange rates

Table 35. The international value of the krone and exchange rates against selected currencies. Monthly average of representative market rates

	Trade-weighted krone exchange rate[1]	1 EUR	100 DKK	1 GBP	100 JPY	100 SEK	1 USD
July 2004	104.82	8.4751	113.98	12.73	6.32	92.16	6.91
August 2004	103.06	8.3315	112.04	12.45	6.19	90.70	6.84
September 2004	103.42	8.3604	112.40	12.27	6.22	91.96	6.84
October 2004	101.52	8.2349	110.71	11.91	6.06	90.87	6.60
November 2004	100.18	8.1412	109.55	11.65	5.98	90.48	6.27
December 2004	100.90	8.2181	110.55	11.83	5.91	91.52	6.13
January 2005	100.99	8.2125	110.38	11.76	6.06	90.77	6.26
February 2005	102.51	8.3199	111.79	12.06	6.09	91.58	6.39
March 2005	100.63	8.1871	109.95	11.83	5.90	90.09	6.20
April 2005	100.62	8.1763	109.75	11.97	5.89	89.19	6.32
May 2005	99.66	8.0773	108.50	11.81	5.97	87.88	6.37
June 2005	98.05	7.8932	106.02	11.80	5.97	85.22	6.49
July 2005	97.63	7.9200	106.19	11.52	5.88	84.01	6.58
August 2005	97.62	7.9165	106.12	11.55	5.82	84.76	6.44
September 2005	96.48	7.8087	104.70	11.52	5.74	83.66	6.37
October 2005	96.64	7.8347	104.99	11.50	5.68	83.16	6.52
November 2005	96.46	7.8295	104.96	11.53	5.61	81.89	6.64

[1] The nominal effective krone exchange rate is calculated on the basis of the NOK exchange rate against the currencies of Norway's 25 main trading partners, calculated as a chained index and trade-weighted using the OECD's weights. The weights, which are updated annually, are calculated on the basis of each country's competitive position in relation to Norwegian manufacturing. The index is set at 100 in 1990. A rising index value denotes a depreciating krone.
Further information can be found on Norges Bank's website (www.norges-bank.no).

Source: Norges Bank

Table 36. Exchange cross rates. Monthly average of representative exchange rates

	GBP/USD	EUR/GBP	USD/EUR	EUR/JPY	JPY/USD
July 2004	1.8422	0.6657	1.226	134.0781	109.32
August 2004	1.8188	0.6693	1.217	134.5203	110.50
September 2004	1.7932	0.6813	1.222	134.4870	110.08
October 2004	1.8059	0.6914	1.249	135.9705	108.89
November 2004	1.8593	0.6986	1.299	136.0822	104.77
December 2004	1.9291	0.6947	1.340	139.0986	103.79
January 2005	1.8777	0.6986	1.312	135.6150	103.38
February 2005	1.8866	0.6897	1.301	136.5290	104.93
March 2005	1.9087	0.6922	1.321	138.8740	105.12
April 2005	1.8944	0.6829	1.294	138.8290	107.31
May 2005	1.8552	0.6838	1.269	135.3574	106.70
June 2005	1.8185	0.6689	1.216	132.2125	108.69
July 2005	1.7507	0.6875	1.204	134.7413	111.94
August 2005	1.7939	0.6852	1.229	135.9676	110.62
September 2005	1.8085	0.6776	1.225	136.0598	111.03
October 2005	1.7633	0.6813	1.201	138.0397	114.90
November 2005	1.7347	0.6793	1.178	139.5904	118.45

Source: Norges Bank

Balance of payments

Table 37. Current and financial accounts. [1]) In millions of NOK

			January-June	
	2003	2004	2004	2005
Balance of goods	192 390	217 263	105 086	135 737
Balance of services	19 426	20 850	14 335	12 739
Balance of income and current transfers	-11 472	-10 321	-17 849	-11 264
Current account balance	200 344	227 792	101 572	137 212
Distributed among:				
Petroleum activities	277 264	331 843	149 849	184 371
Shipping	17 506	18 045	8 981	12 030
Other	-94 426	-122 096	-57 258	-59 189
Capital transfers to abroad, net	-4 712	1 028	430	-2 922
Net lending \ net financial transactions	205 056	226 764	101 142	140 134
Distributed among:				
Norwegian foreign investment	333 923	470 268	382 063	301 712
Foreign investment in Norway	196 070	276 418	279 462	186 508
Unallocated (incl. errors and omissions)	67 203	32 914	-1 459	24 930
Distributed by sector:				
Government administration [2)]	134 546	175 279	78 038	91 436
Norges Bank	13 580	29 082	3 213	8 864
Banks	-29 093	-36 209	-12 230	-14 397
Insurance	24 850	57 763	31 119	29 887
Other financial enterprises	-24 554	-49 661	-10 200	-4 062
Non-financial enterprises etc.	85 728	50 510	11 202	28 406

[1)] The financial accounts differ from the balance of payments published by Statistics Norway. This is largely due to the way direct investments are posted. Norges Bank uses the gross recording principle whereas Statistics Norway uses the directional recording principle.

[2)] Including the Petroleum Fund

Sources: Statistics Norway and Norges Bank

Table 38. Norway's foreign assets and debt. In billions of NOK

	31.12.2003			31.12.2004			31.03.2005		
	Assets	Debt	Net	Assets	Debt	Net	Assets	Debt	Net
Government administration [1]	1 174	381	793	1 428	463	965	1 572	468	1 104
Norges Bank	262	62	201	282	63	219	338	102	236
Banks	193	489	-296	149	471	-321	223	570	-348
Insurance	221	25	197	261	18	243	291	18	273
Other financial enterprises	131	242	-111	149	314	-165	178	332	-154
Non-financial enterprises etc.									
- Public enterprises	143	173	-30	213	193	20	231	229	2
- Private enterprises	371	523	-152	349	582	-233	369	637	-268
- Households and non-profit organisations	89	32	57	97	37	60	107	39	68
Unallocated (incl. errors and omissions)	6	-1	6	47	0	47	71	0	71
All sectors	2 591	1 926	665	2 976	2 141	835	3 379	2 396	984

[1] Including the Petroleum Fund.

N.B. There is uncertainly associated with the underlying data. This applies among other things to non-residents' ownership of Norwegian shares, where estimates have been used to arrive at market values. Statistics Norway uses nominal values, which gives rise to differences.

Sources: Statistics Norway and Norges Bank

International capital markets

Table 39. Changes in banks' international assets.[1] In billions of USD

				Q1		Outstanding
	2002	2003	2004	2004	2005	At 31.03.05
Total	740.1	1 076.7	2 284.8	240.0	1 083.9	20 263.2
Of which vis-à-vis:						
Non-banks	315.2	546.1	917.1	48.8	299.2	7 328.9
Banks (and undistributed)	425.0	530.6	1 367.7	191.3	784.6	12 934.2

1) International assets (external positions) comprise
- cross-border claims in all currencies
- foreign currency loans to residents
- equivalent assets, excluding lending.

Source: Bank for International Settlements

Table 40. Banks' international claims by currency. Percentage of total international assets

	December			Q1	
	2002	2003	2004	2004	2005
US dollar (USD)	42.4	39.8	38.3	39.9	40.4
Deutsche mark (DEM)	..	..	..	..	..
Swiss franc (CHF)	2.0	1.8	1.7	1.7	1.6
Japanese yen (JPY)	5.6	4.9	4.8	4.7	4.5
Pound sterling (GBP)	5.3	5.5	5.5	6.1	5.5
French franc (FRF)	..	..	..	..	..
Italian lira (ITL)	..	..	..	..	..
EURO	33.7	37.7	39.4	36.8	37.8
Undistributed [1]	11.0	10.3	10.3	10.8	10.2
Total in billions of USD	13 370.3	15 999.4	19 197.6	17 341.4	20 263.2

[1] Including other currencies not shown in the table, and assets in banks in countries other than the home countries of the seven currencies specified.

Source: Bank for International Settlements

Foreign currency trading

Table 41. Foreign exchange banks. Foreign exchange purchased/sold forward with settlement in NOK.[1] In billions of NOK at end of month

	Purchased net from:					Purchased gross from:		Sold gross to:	
	Central gov't[2]	Other financial inst.[3]	Non-financial sector	Foreign sector	Total	Non-financial sector	Foreign sector	Non-financial sector	Foreign sector
October 2004	0.0	25.0	32.9	123.5	181.4	68.4	329.7	35.5	206.2
November 2004	-0.2	26.1	35.4	130.6	191.9	75.9	346.4	40.5	215.8
December 2004	-0.4	20.7	39.8	147.1	207.2	80.4	343.5	40.6	196.4
January 2005	-0.3	13.2	41.2	147.4	201.5	78.9	294.8	37.7	147.4
February 2005	-0.6	24.1	52.9	120.4	196.8	91.9	277.4	39.0	157.0
March 2005	0.0	26.8	49.1	139.4	215.3	95.2	342.9	46.1	203.5
April 2005	0.0	42.9	50.6	125.4	218.9	99.8	348.9	49.2	223.5
May 2005	0.0	33.0	42.2	126.6	201.8	102.1	366.5	59.9	239.9
June 2005	0.0	35.0	47.3	135.5	217.8	114.1	398.5	66.8	263.0
July 2005	-0.2	33.4	44.2	143.3	220.7	113.9	347.5	69.7	204.2
August 2005	-0.3	45.3	47.1	147.9	240.0	117.0	365.6	69.9	217.7
September 2005	-0.3	53.2	48.1	143.6	244.6	122.9	361.3	74.8	217.7
October 2005	-0.4	20.9	27.9	171.8	220.2	106.6	385.4	78.7	213.6

[1] Excl. exchange rate adjustments.

[2] Central government administration, social security administration and Norges Bank.

[3] Incl. possible discrepancies between forward assets and forward liabilities within the category of foreign exchange banks.

Source: Statements from commercial and savings banks (registered foreign exchange banks) to Norges Bank

Table 42. Foreign exchange banks. Overall foreign currency position. In millions of NOK

	30.09.2004	31.12.2004	31.03.2005	30.06.2005	30.09.2005
Foreign assets, spot	236 109	211 492	239 298	256 460	264 339
Foreign liabilities, spot	434 817	420 406	470 564	483 748	544 764
1. Spot balance, net	-198 708	-208 914	-231 266	-227 288	-280 425
2. Forward balance, net	196 350	202 197	216 859	215 800	250 249

Source: Norges Bank

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