

# Banks' counterparty risk – results of a survey conducted by Norges Bank and the Banking, Insurance and Securities Commission

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**Norges Bank has overall responsibility for promoting financial stability and works systematically to identify conditions that could trigger a systemic crisis. As part of this work, Norges Bank, in collaboration with the Banking, Insurance and Securities Commission, has conducted a survey of Norwegian banks' exposures to their largest counterparties. The aim of the survey is to assess the risk of liquidity or solvency problems at Norwegian banks as a result of the failure of an important counterparty to fulfil its obligations. One exception is exposures to some large counterparties in foreign exchange transactions, but the credit risk associated with this type of transaction is expected to be reduced significantly when the krone is included in the international currency settlement system CLS in the first half of 2003. However, liquidity risk will not be reduced to the same extent.<sup>1</sup>**

## 1 Introduction

Over the past 20-30 years, many countries have experienced banking crises that have had considerable consequences for the real economy (Hoggarth and Saporta, 2001). In Norway, the banking crisis between 1988 and 1992 coincided with the deepest downturn since the Second World War. The work to prevent a crisis from affecting large parts of the financial system has been assigned high priority by the authorities and international organisations, and the supervisory authorities' role has been strengthened in many countries. Regulations and supervisory practices have increasingly been based on incentives that motivate the banks to have buffers which reflect the risk of unexpected large losses (capital adequacy rules) or reduced liquidity (liquidity rules<sup>2</sup>), or to limit the concentration of risk in a portfolio (rules on large exposures). In the new proposal on capital adequacy rules (Basel II), emphasis is placed on providing banks with incentives to use risk-reducing techniques and advanced risk systems.

Regulations and supervision are to a large extent oriented towards ensuring stability in individual institutions, not necessarily towards the financial system as a whole. Even though solid and liquid individual institutions contribute to stability in the financial system as a whole, theoretical and empirical studies conducted in recent years have shown that analyses of risks in individual institutions provide limited information about the risks to the system as whole (Summer, 2002). First, banks may be exposed to different risks that can be diversified to a limited extent. Second, liquidity or solvency problems in one bank may spread to the wider financial system via a network of uncollateralised interbank exposures. Third, a loss of confidence may result in funding problems for several institutions. The causes of a systemic crisis are

discussed further in a separate box. In practice, a systemic crisis will be caused by a combination of these three factors, but this article considers the risk of a systemic crisis as a result of direct contagion of liquidity or solvency problems.

Norges Bank and the Banking, Insurance and Securities Commission have collected information on large Norwegian banks' uncollateralised exposures to their largest counterparties at the end of the second quarter for the past three years. The information was collected pursuant to the Banking, Insurance and Securities Commission's general mandate. Sweden's Riksbank (the central bank) has conducted this type of survey on a quarterly basis since June 1999, and our survey is largely modelled on the Swedish one, which is described in Blåvarg and Nimander (2002).

Chapter 2 provides a more detailed description of the survey. Chapter 3 analyses the results of the survey. Chapter 3.1 describes the banks' exposures. The risk associated with different types of exposures may vary. Chapter 3.2 divides counterparties into sectors. This breakdown shows how exposed banks can be to direct contagion of liquidity and solvency problems abroad and the possibility of direct contagion between banks in the survey. The risk linked to large, uncollateralised exposures will also depend on how diversified the Norwegian banking system's counterparties are. This aspect is examined in Chapter 3.3. Chapter 3.4 estimates the size of possible losses as a percentage of Tier 1 capital should several counterparties default. Chapter 3.5 assesses the liquidity risk associated with delayed payment by a counterparty. Chapter 4 assesses foreign exchange settlement risk and the implications of Continuous Linked Settlement (CLS). Chapter 5

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<sup>2</sup> Cf. Basel Committee on Banking Supervision (2000): Sound Practices for Managing Liquidity in Banking Organisations.

## Types of risk

- Liquidity risk: The risk of losses when a counterparty does not settle an obligation when due, but on some unspecified date thereafter.
- Credit risk: The risk of losses when a counterparty does not settle an obligation when due or at time thereafter.
- Systemic risk: The risk that the banking system's ability to perform its main functions such as credit intermediation and risk management is disrupted to such a severe extent that financial stability is threatened. Such risk is also linked to the risk that liquidity and solvency problems spread throughout the banking system.

provides a summary of the survey results.

## 2 Survey procedure

Norges Bank and the Banking, Insurance and Securities Commission have conducted semi-annual surveys of Norwegian banks' largest counterparty exposures (30 June 2001, 31 December 2001 and 30 June 2002). The 10 largest Norwegian banks were requested to report the following exposures in total and their exposures to the 15 largest counterparties:

- *Positive market value of derivatives.* Banks have different financial assets where the value is linked to the underlying asset. Depending on developments in the price of the asset, the bank may record an asset or a liability on the reporting date. If the contract value is positive, the bank will incur a loss if the counterparty defaults. The banks were requested to state both the gross and net value of the derivatives exposures, i.e. the value both before and after legally binding netting agreements are taken into account.
- *Value of securities issued by the counterparty.* Such securities comprise equities or interest-bearing instruments (bonds). Although banks risk that the value of the shares will be written down to zero should a counterparty become insolvent, there will normally be some recovery if it owns bonds.
- *Uncollateralised deposits/loans.* Banks tend to invest surplus liquidity as uncollateralised deposits in or as loans to other banks. Banks will therefore experience liquidity problems if the deposits cannot be withdrawn as agreed, or a direct loss if the counterparty becomes insolvent.
- *Guarantees and unutilised committed credit lines.* An issued guarantee is a conditional claim, which the counterparty can apply if a third party does not fulfil its obligations. An unutilised credit line also repre-

sents an exposure that could give rise to losses if an insolvent counterparty uses it.

- *Principal amount in foreign exchange transactions:* The banks normally deliver foreign exchange sold before receiving confirmation of the foreign exchange purchased. If one party does not fulfil its obligations, the counterparty can in the worst case incur a loss equivalent to the principal amount. This risk is referred to as Herstatt risk, and implies that banks' currency options can be regarded as uncollateralised loans.
- *Collateralised loans.* Banks also have collateralised loans that have been extended to their largest counterparties to uncollateralised exposures. The estimated value of the collateral has been deducted. However, collateral values may fall and potential losses on such loans may thus prove to be larger.

In the ranking of the banks' counterparties, foreign exchange settlement exposures or collateralised loans are not taken into account. The reason that foreign exchange transactions are not taken into account is that most of the credit risk here will probably be eliminated when the krone is included in CLS. CLS will reduce this risk through the introduction of Payment versus Payment (PvP) in foreign exchange settlement, i.e. a bank will only receive foreign exchange purchased when it has fulfilled its payment obligations in CLS (see Chapter 4). A drawback associated with this system is that large counterparties to foreign exchange transactions are not included among the 15 largest counterparties. The banks were therefore asked to specify their 10 largest counterparties to foreign exchange transactions, both in total and broken down by currency pairs.

Extending collateralised loans to households and non-financial enterprises is the most important activity of most banks, but the focus of this survey is on uncollateralised exposures. Collateralised loans are therefore included only as supplementary information to provide a more complete picture of counterparties to such transactions.

The scope of the survey is limited in that only 10 banks were requested to report their exposures to their 15 largest counterparties (and total exposure to all counterparties). The banks were not asked to provide information that could be of significance to the risk linked to various exposures (e.g. maturity). However, these limitations do not necessarily represent a shortcoming. The risk of a systemic crisis as a result of problems at a small or medium-sized bank seems limited. For the same reason, the Riksbank only included the four largest banks in its surveys because the Swedish banking market is far more concentrated than the Norwegian market. As only large counterparties can cause serious liquidity or solvency problems in a bank, banks' exposures to the 15 largest counterparties provide a sufficient basis for the survey. As regards information on conditions that may influence the risk associated with the exposures, it should be noted that the aim of the survey was

## How do systemic crises arise?

A systemic crisis in the banking sector may arise in at least three different ways:

First, a large portion of the banking sector may be exposed to risks that feature a strong positive correlation, and which banks cannot eliminate through diversification. The use of credit derivatives and collateral can, for example, reduce a bank's risk of losses as a result of default on the part of borrowers. However, a macroeconomic crisis may reduce the debt servicing capacity of counterparties in the credit agreements and the value of the collateral. Exposure to risks that can be diversified to a limited extent makes the banks vulnerable to the same type of conditions, with sluggish economic developments and falling asset values. According to Hellwig (1995) deregulation and intensified competition since the mid-1970s have increased this type of risk in the banking sector. The banks' scope for building up buffers against large losses by operating with a high interest margin has become more limited as a result of stronger competition, at the same time as the possibilities for eliminating risk through diversification have been reduced. For example, Borio and Lowe (2002) cite wide swings in macroeconomic developments, property prices and credit conditions as important factors behind many crises that have affected parts of various countries' financial systems over the past 20 years. This was, for example, the explanation for the crisis in the Nordic countries 10 years ago and the crisis that affected the savings bank industry in the US (S&L crisis) in the 1980s and a large group of smaller banks in the UK in 1991.

Second, a systemic crisis can be triggered by crises in individual banks. Experience shows that crises at large financial institutions can occur without warning. Baring Brothers failed unexpectedly in 1995 because of certain traders' derivatives transactions, and the hedge fund Long Term Capital Management (LTCM) failed in 1998 as a result of a high debt burden and negative market effects. The LTCM case in particular shows that uncollateralised exposures between financial institutions can trigger a systemic crisis. Furfine (1999) has analysed this more closely. Large exposures between banks generally occur as a result of banks' different activities. A smoothly functioning

interbank market enhances the liquidity of each bank and the effectiveness of monetary policy. The interbank market also provides opportunities for earnings, gains and risk mitigation, but also makes the banking system vulnerable to crises at individual banks. Exposures in the interbank market are often uncollateralised. In principle, this risk can be eliminated if the central bank is a counterparty, and guarantees settlement finality, but this entails a considerable degree of moral hazard (Rochet and Tirole, 1996).

Third, a systemic crisis may occur as a result of a loss of market confidence with an associated liquidity shortage. Triggering factors behind a loss of confidence may be a negative macroeconomic shock, an interest rate increase or unexpected, large losses at several banks. Banks that are not exposed to direct contagion or a negative macroeconomic shock could still be affected if markets believe this to be the case. The risk of a loss of confidence may arise because banks' depositors, creditors and investors have limited information about a bank's liquidity and financial strength (asymmetrical information) (Jacklin and Bhattacharya, 1988).

In practice, a systemic crisis will occur as a result of a *combination* of the factors above. Inasmuch as a large portion of the banking system is vulnerable to a negative macroeconomic shock and a fall in asset prices, a crisis can be intensified by large, uncollateralised exposures between banks. Furthermore, a loss of confidence may cause a crisis to develop into a systemic crisis. For example, Barings did not lead to a systemic crisis (Logan, 2000), and the reason was that favourable macroeconomic conditions reduced the likelihood of a loss of confidence in the financial system. The LTCM crisis did, however, fuel fears of severe problems in financial markets, both directly because LTCM was an important operator in many markets, and indirectly as a result of a general confidence crisis (Greenspan, 1998). There was already considerable uncertainty in financial markets after the crisis in Asia in 1997/1998 and in Russia in 1998. The Federal Reserve Bank of New York contributed to a smooth resolution of the crisis, with private financial institutions taking over control of the LTCM Fund without the use of government funds.

primarily to assess the banks' capacity to bear potential large losses, not to assess the likelihood that such losses might occur.

However, a more important shortcoming is that the banks have only reported their exposures at three different points in time. Since the exposures may show con-

siderable variations between the reporting dates, the results must be interpreted with caution.

Moreover, there will be overlapping between exposures that are to be reported to the Banking, Insurance and Securities Commission pursuant to the regulation on large exposures, and exposures in the separate survey on

banks' largest counterparty exposures as they are conducted at the same time. To some extent, the banks may therefore be particularly cautious about keeping exposures within the regulation's limits on the reporting dates. The survey of the largest counterparties may thus to some extent show systematically low figures compared with the exposures in the periods between reporting dates. Exposures linked to foreign exchange and securities transactions are, however, not subject to the regulation, which means that the banks can, in principle, have unlimited large exposures in connection with such transactions.<sup>3</sup>

### 3 The importance of large, uncollateralised counterparty exposures for the Norwegian banking system

#### 3.1 Uncollateralised exposures by type

Chart 1 provides a summary of total exposures by type for the 15 largest counterparties of each of the 10 banks included in the survey. The Chart shows that:

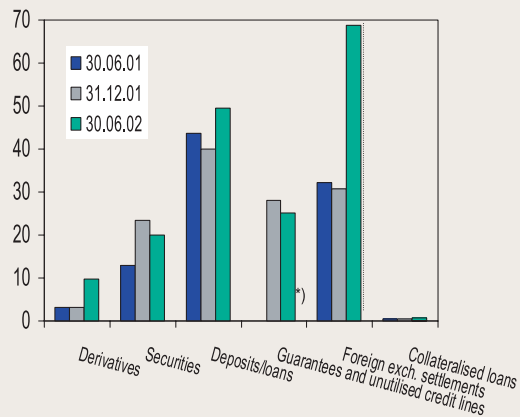
- Positive market value for derivatives came to about NOK 3 billion on the two first reporting dates and close to NOK 10 billion in the most recent survey. Chart 2 shows that legally binding netting agreements sharply reduce actual exposures. As a result, exposures in the form of derivatives are of limited importance compared with other financial instruments, but the value of such exposures can change considerably with pronounced effects as a result of changes in underlying asset prices. Foreign financial institutions are the most important counterparties to such agreements.
- Securities holdings came to NOK 20-30 billion on the two most recent reporting dates, but were considerable lower on the first reporting date because of the omission of one bank. The banks' securities holdings comprise both securities issued by other financial institutions and by non-financial enterprises.
- Uncollateralised exposures in the form of deposits/loans totalled NOK 40-50 billion in all three surveys. Such exposures are the natural result of activity in the interbank market where other Norwegian banks are the main counterparties.
- Guarantees and unutilised credit lines came to NOK 25-30 billion in the two most recent surveys, but were not included in the first survey conducted. Guarantees and credit lines are extended to both financial and non-financial institutions.
- Foreign exchange settlement exposures came to NOK 107.91 and 134 billion, respectively, in the three surveys. This indicates that foreign exchange settlement exposures tend to be high and variable. The main counterparties are international financial institutions, although smaller Norwegian banks use larger

Norwegian banks as counterparties.

- The value of uncollateralised loans to the same counterparties came to NOK 0.4 and 0.7 billion in the three surveys, and can thus be regarded as very limited.

The results of the survey show that the banks have relatively large exposures in the form of securities holdings, uncollateralised deposits/loans, guarantees and unutilised credit lines, but that the absolute largest exposures are foreign exchange settlement exposures. The

**Chart 1** 15 largest counterparty exposures for different types of exposure.<sup>1) 2)</sup> In billions of NOK



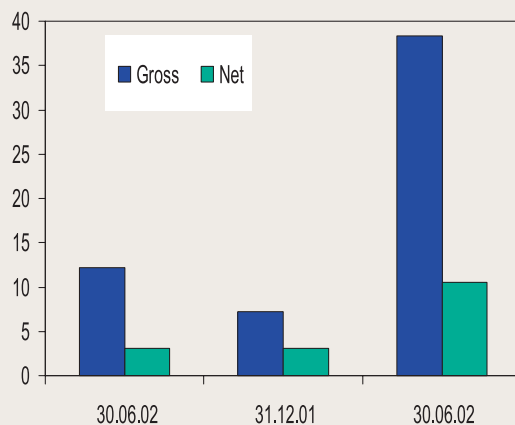
<sup>1)</sup> Guarantees and unutilised lines of credit were not included 30.06.01, but in some cases may be included under deposits/loans.

<sup>1)</sup> Foreign exchange settlement exposures and collateralised loans (adjusted for value of collateral furnished) are supplementary information.

<sup>2)</sup> One bank is omitted in connection with reporting 30.06.01.

Sources: Banking, Insurance and Securities Commission and Norges Bank

**Chart 2** Sum of gross and net<sup>1)</sup> derivatives exposures for the 15 largest counterparties.<sup>2)</sup> In billions of NOK



<sup>1)</sup> Gross derivatives exposures minus the value of legally binding netting agreements or similar collateral

<sup>2)</sup> One bank is omitted in connection with reporting 30.06.01.

Sources: Banking, Insurance and Securities Commission and Norges Bank

<sup>3</sup> The following exposures are not subject to the regulation: i) exposures in foreign exchange transactions that are part of ordinary settlement within 48 hours after payment, and ii) exposures in transactions linked to the purchase and sale of securities that are part of ordinary settlement within five business days after payment date, or after the date of delivery of securities if delivery occurs first.

planned inclusion of the krone in CLS may thus make a considerable contribution to the work aimed at reducing risk in the Norwegian banking sector. Derivatives are of less importance, primarily because of the measures taken to reduce the counterparty risk linked to such agreements.

### 3.2 What types of counterparties are important for banks?

The distribution of exposures by type of counterparty can influence the risk of a systemic crisis, partly because the risk varies according to type of counterparty. However, an equally important factor is whether the banks in the survey are exposed to the Norwegian banking industry (to banks both included and not included in the survey). If no such exposures exist, a systemic crisis due to liquidity or solvency problems spreading from bank to bank cannot occur. In a closer examination, we have divided counterparties into the following categories: foreign financial institutions, foreign non-financial enterprises, Norwegian non-financial enterprises and Norwegian banks and financial institutions.

The survey shows that the banks included in the survey have large, uncollateralised exposures to different types of counterparties (see Charts 3a and b). Exposures to foreign financial institutions are the largest, and are particularly sizeable when taking account of foreign exchange settlement exposures. Even though some of these financial institutions have been given a lower rating as a result of weak economic developments in recent years, the Norwegian banks' largest counterparties still have high ratings from international rating agencies. The risk of payment default can thus be regarded as marginal. Moreover, the largest uncollateralised exposures

to such counterparties are linked to foreign exchange transactions, and with the inclusion of the Norwegian krone in CLS the credit risk associated with these exposures will be reduced markedly.

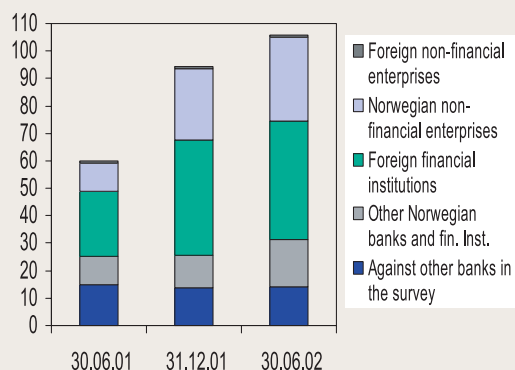
Exposures to Norwegian banks (included and not included in the survey) are the second largest. However, the three surveys would indicate that the largest Norwegian banks' exposures to each other are so small that there is no systemic risk in isolation. An exception to this could be some foreign exchange settlement exposures, but the credit risk associated with these exposures is expected to be eliminated with the inclusion of the krone in CLS. The sum of large and uncollateralised exposures to other Norwegian banks is then likely to fall to less than 50 per cent of the banks' Tier 1 capital.

Exposures to Norwegian non-financial enterprises make up the third largest category of exposures. With the exception of the largest enterprises, they are rarely rated, and the banks' risk exposure to such enterprises can be difficult to assess. However, it can be assumed that the banks' risk exposure to this category of counterparties will largely depend on developments in the Norwegian economy, and for some of the larger enterprises on global economic developments.

The surveyed banks' exposures to foreign non-financial enterprises were smallest. If the exposures in the three surveys are representative, the risk of a bank experiencing serious problems as a result of payment default on the part of one of these counterparties is very limited. Developments in the international economy thus have a limited direct impact on the risk associated with uncollateralised exposures, unless the developments were to give rise to a solvency and liquidity crisis at larger foreign banks.

A significant difference between exposures to domestic and foreign counterparties is that exposures to for-

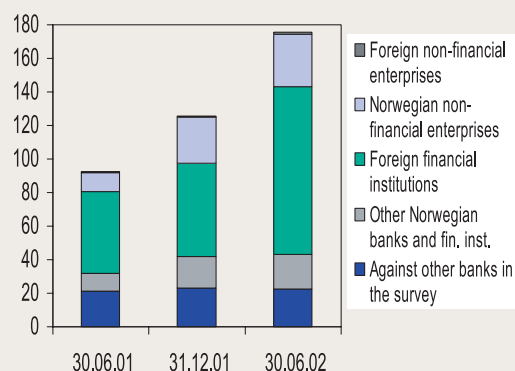
**Chart 3a** Sum of the 15 largest counterparty exposures grouped by counterparty type.<sup>1)</sup> (Ex. foreign exchange settlements and collateralised loans) In billions of NOK



<sup>1)</sup> One bank is omitted in connection with reporting 30.06.01.

Sources: Banking, Insurance and Securities Commission and Norges Bank

**Chart 3b** Sum of the 15 largest counterparty exposures by counterparty type.<sup>1)</sup> (Incl. foreign exchange settlements and collateralised loans) In billions of NOK



<sup>1)</sup> One bank is omitted in connection with reporting 30.06.01.

Sources: Banking, Insurance and Securities Commission and Norges Bank

foreign counterparties primarily involve foreign exchange transactions. The portion of uncollateralised exposures to foreign counterparties is thus expected to decline when the krone is included in CLS. As a result, Norwegian banks' credit risk exposure to Norwegian counterparties is expected to increase over time, but this does not necessarily imply that liquidity risk will increase to the same extent.

### 3.3 How diversified is the Norwegian banking system?

If several Norwegian banks have large exposures to one and the same counterparty, can payment default on the part of that counterparty have a direct and serious impact on the Norwegian banking industry? The five largest counterparties to the banks in the survey are shown in Chart 4. The counterparties are ranked by totalling the exposures of each bank in the survey to each counterparty. The exposures involving foreign exchange transactions and collateralised loans were not taken into account in the ranking. The ranking shows that the largest counterparties for the banks in the survey were foreign financial institutions and Norwegian non-financial enterprises.

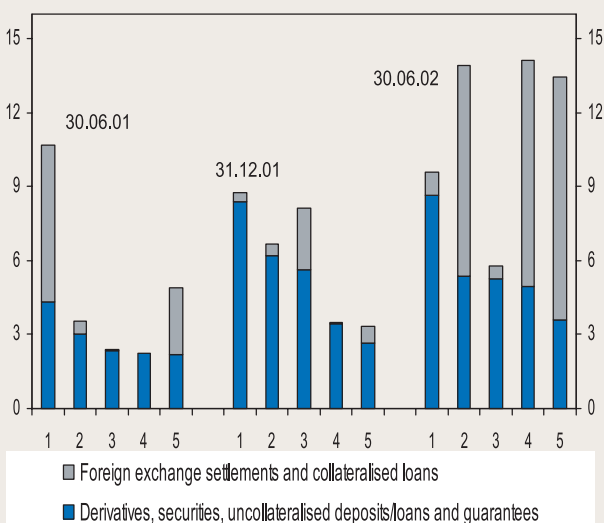
The size of the banks' total exposures to the largest counterparty seem to be broadly the same in the three surveys. In the most recent survey and the second survey, the largest total exposure was to the same counterparty, at NOK 8.6 and 8.4 billion respectively, if one excludes exposures involving foreign exchange trans-

actions and collateralised loans. The size of these exposures cannot be directly compared with the largest total exposure in the first survey, as one of the banks was not included. A comparison of total exposures for the nine banks that were included in each survey does not indicate that there was any considerable difference in the exposure to the largest counterparty in the three surveys.

The survey indicates that it is highly unlikely that one or several banks would be directly affected by a large counterparty becoming illiquid or insolvent. In the most recent survey, the exposures to the largest, second largest and fifth largest counterparty were concentrated on one bank. On the other hand, five banks were exposed to the third largest counterparty and four banks to the fourth largest counterparty. With regard to financial stability, it is unclear whether it is an advantage for exposures to be spread among several banks or not. On the one hand, the risk of a liquidity or solvency crisis at a bank will be reduced if the exposure to a large counterparty is spread among several banks. On the other hand, such a spread of exposure means that there is a risk that several banks will become illiquid or insolvent as a direct result of payment default on the part of a counterparty.

The inclusion of foreign exchange settlement exposures increases the banks' exposures considerably. Each of the counterparties that are ranked as two, four and five will then entail exposures of NOK 14-15 billion for the banks in the survey (see Chart 4). Moreover, the largest foreign exchange settlement exposures are not stated on the ordinary form, but only in the supplementary reporting forms (see Chapter 4). (This is not shown in Chart 4, which only includes the largest counterparties in other types of exposure.) It can therefore be concluded that the banks' largest exposures involved foreign exchange transactions in the three surveys.

**Chart 4** The five largest counterparties for banks, ranked by exposures *excl.* foreign exchange settlements and collateralised loans.<sup>1)</sup> In billions of NOK



<sup>1)</sup> One bank is omitted in connection with reporting 30.06.01.

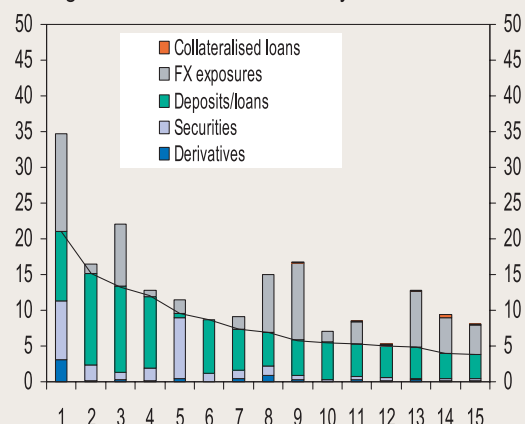
Sources: Banking, Insurance and Securities Commission and Norges Bank

### 3.4 The importance of the largest counterparty exposures

In addition to the size of the exposures, the risk associated with the banks' uncollateralised exposures will depend on their ability to sustain losses. Measured as a percentage of Tier 1 capital, the banks included in the survey show some increase in exposures to the 15 largest counterparties (see Charts 5a-c). If only the nine banks included in all three surveys are taken into account, the increase is not equally clear. Moreover, some of the uncollateralised exposures are very short-term and can show a pronounced change in the periods between the surveys, particularly foreign exchange settlement exposures. The size of the exposures declines sharply from the largest to the 15th exposure.

In the most recent survey, the banks' average exposure to the largest counterparty accounted for 32 per cent of Tier 1 capital. In this case, uncollateralised

**Chart 5a** Exposures to the 15 largest counterparties<sup>1)</sup>, measured as a percentage of Tier 1 capital. Weighted average for the banks in the survey 30.06.01<sup>2)</sup>

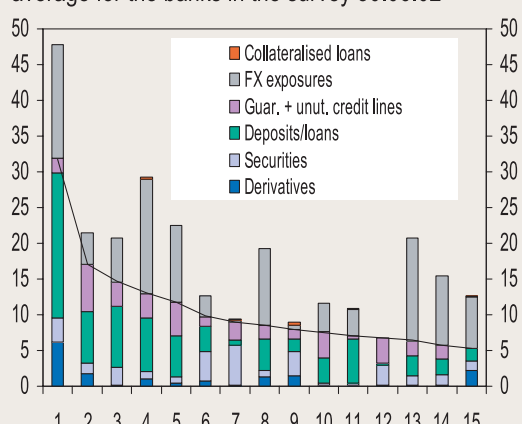


<sup>1)</sup> Foreign exchange settlement exposures and collateralised loans (adjusted for value of collateral furnished) are supplementary information and are not taken into account in the ranking.

<sup>2)</sup> One bank is omitted in connection with reporting 30.06.01.

Sources: Banking, Insurance and Securities Commission and Norges Bank

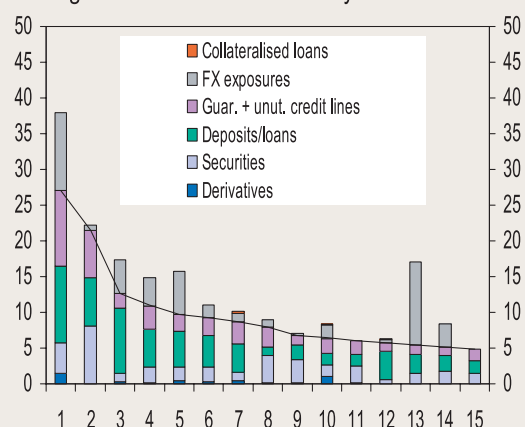
**Chart 5c** Exposures to the 15 largest counterparties<sup>1)</sup>, measured as a percentage of Tier 1 capital. Weighted average for the banks in the survey 30.06.02



<sup>1)</sup> Foreign exchange settlement exposures and collateralised loans (adjusted for value of collateral furnished) are supplementary information and are not taken into account in the ranking.

Sources: Banking, Insurance and Securities Commission and Norges Bank

**Chart 5b** Exposures to the 15 largest counterparties<sup>1)</sup>, measured as a percentage of Tier 1 capital. Weighted average for the banks in the survey 31.12.01



<sup>1)</sup> Foreign exchange settlement exposures and collateralised loans (adjusted for value of collateral furnished) are supplementary information and are not taken into account in the ranking.

Sources: Banking, Insurance and Securities Commission and Norges Bank

deposits/loans were particularly large, accounting for 20 per cent of Tier 1 capital while derivatives accounted for 6 per cent. When foreign exchange settlement exposures and uncollateralised loans are included, the exposure to the largest average counterparty increases to as much as 48 per cent of Tier 1 capital. This is primarily attributable to foreign exchange settlement exposures.

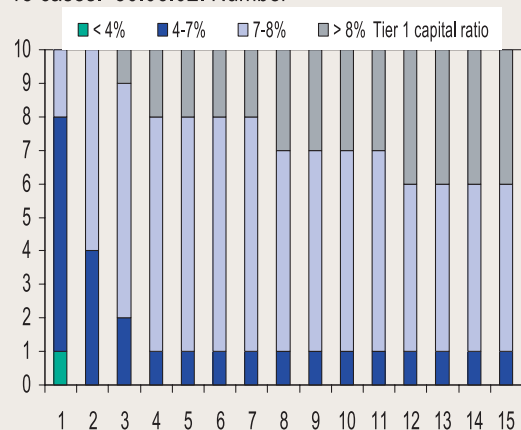
There are fairly wide variations among the banks. For example, the most exposed bank would have lost 33, 53 and 57 per cent, respectively, of Tier 1 capital on the three survey dates if the bank's largest counterparty had become insolvent, with no recovery.

Charts 6a and b show the distribution of Tier 1 capital ratios after losses for each of the ten banks included in the survey in the case of a loss of each of the 15 largest exposures with a direct effect on Tier 1 capital. Chart 6a does not include foreign exchange settlement exposures and uncollateralised loans. In this case, the Tier 1 capital ratio would fall below the minimum statutory requirement of 4 per cent for only one bank if the largest exposure is lost.<sup>4</sup> If the Bank does not satisfy the statutory minimum requirement, measures are implemented by the Banking, Insurance and Securities Commission. The question can be raised as to how a bank's creditor or investor will react to such a situation, or to a situation where the bank's earnings deteriorate and the bank barely satisfies the statutory minimum requirement.

If the largest counterparty exposure is lost, seven banks will have a Tier 1 capital ratio between 4 and 7 per cent. With Tier 1 capital ratio below 7 per cent, the Banking, Insurance and Securities Commission's minimum requirement for raising subordinated term debt is not satisfied. This implies a limitation on the banks' possibilities for satisfying the minimum capital adequacy requirement of 8 per cent. Two banks will have a Tier 1 capital ratio between 7 and 8 per cent if the largest counterparty exposure is lost. These banks would have

<sup>4</sup> Pursuant to Regulation no. 875 of 22 October 1990 relating to minimum capital adequacy requirements applying to financial institutions, etc., the institutions are to have a capital adequacy ratio of 8 per cent of the basis of calculation, cf. §2. Regulation no. 435 of 1 June 1990 defined the required capital composition. According to this regulation, Tier 2 capital shall not make up more than 100 per cent of Tier 1 capital, cf. §8. This means that Tier 1 capital cannot fall below 4 per cent. The same section also stipulates that subordinated loan capital with a fixed maturity shall not exceed 50 per cent of Tier 1 capital. The size of subordinated loan capital and its composition will determine the rules that will be binding if a loss results in a reduction in Tier 1 capital. For example, even if the Tier 1 capital ratio exceeds 4 per cent, the 8 per cent capital adequacy requirement may be breached if the bank is unable to raise the supplementary capital required to fill the gap. If the Tier 1 capital ratio falls below 4 per cent, the bank will have breached the minimum total capital adequacy requirement of 8 per cent.

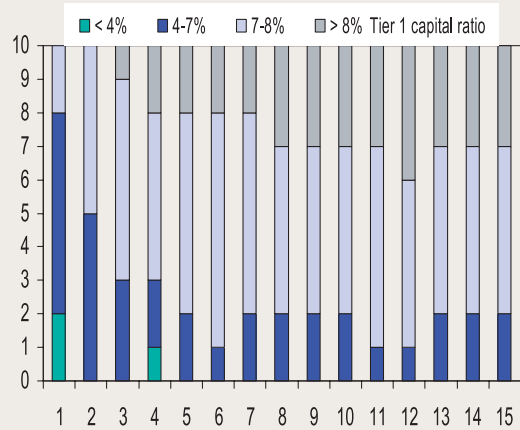
**Chart 6a** Effect on the Tier 1 capital ratio of the loss of the exposures against each of the 15 largest counterparties<sup>1)</sup> (*excl.* foreign exchange settlements and collateralised loans). Banks in the survey (10) are distributed by Tier 1 capital ratio after loss in each of the 15 cases. 30.06.02. Number



<sup>1)</sup> It is assumed that there is no dividend from the estate.

Sources: Banking, Insurance and Securities Commission and Norges Bank

**Chart 6b** Effect on the Tier 1 capital ratio of the loss of the exposures against each of the 15 largest counterparties<sup>1)</sup> (*incl.* foreign exchange settlements and collateralised loans). Banks in the survey (10) are distributed by Tier 1 capital ratio after loss in each of the 15 cases. 30.06.02. Number



<sup>1)</sup> It is assumed that there is no dividend from the estate.

Sources: Banking, Insurance and Securities Commission and Norges Bank

the possibility of raising subordinated term debt even after such a potential loss. None of the banks would satisfy the capital adequacy requirements with Tier 1 capital alone. If a less important counterparty were to default, the effect on Tier 1 capital would naturally be more limited.

If foreign exchange settlement exposures and collateralised loans are included, potential losses increase considerably measured as a percentage of Tier 1 capital. Several of the banks in the survey would then have a Tier 1 capital ratio that is lower than the minimum statutory requirement of 4 per cent and the Banking, Insurance and Securities Commission's 7 per cent minimum requirement for raising subordinated term debt (see Chart 6b). Of the banks that satisfy the minimum Tier 1 capital requirement, several would have a total capital ratio that is below the minimum statutory requirement of 8 per cent.

The examples in this section illustrate that losses may be considerable if one or several of the banks' 15 largest counterparties default. The losses should be regarded as a ceiling. Normally, dividend payments from an estate in bankruptcy will substantially reduce losses. Nor will a loss reduce Tier 1 capital to the same extent if the bank has a positive result after losses from other activities.

### 3.5 Large counterparties and banks' liquidity risk

The survey shows the banks' exposures to their largest counterparties, and thus provides a basis for assessing the liquidity problems that a bank may face if a large counter-

party defaults. However, a problem here is that the maturity structure of the counterparty's obligations is not included in the survey, which makes it difficult to determine the associated liquidity effect on a given day. Moreover, it is difficult to make any certain assumptions about the effect on market confidence of large losses at bank as a result of counterparty default. If market confidence remains intact, the bank can procure liquidity by issuing bonds, for example, or by direct funding in the interbank market. However, if a bank loses market confidence, it may not even be able to cope with a minor liquidity problem. The previous banking crisis would indicate that foreign banks in particular tend to be more cautious about lending to Norwegian banks in turbulent periods.

The liquidity problems a bank may encounter in the NOK market can to some extent be assessed by comparing available liquidity with the size of the banks' exposures. In this context, a bank's liquidity refers to a bank's available funds in Norges Bank's Settlement System (NBSS), i.e. the bank's balance on its account in Norges Bank in addition to its access to borrowing funds against collateral furnished. If we assume that the largest counterparty's obligations mature on the same day, and that the counterparty cannot fulfil its obligations, most of the banks in the survey will show a liquidity reduction equivalent to 20-30 per cent of the banks' liquidity in NBSS. Some of the larger banks may, however, experience a somewhat larger decline in liquidity due to large foreign exchange settlement exposures.

The quantity of available liquidity varies widely among Norwegian banks, and the banks' ability to cope with



liquidity problems as a result of counterparty default thus depends on the timing. If this occurs when liquidity is ample, the bank may have sufficient liquidity to handle the situation alone. However, if this occurs in a period of tight liquidity, it may prove difficult to raise loans in the interbank market. However, the data would indicate that in most cases the bank will be able to cope with a reduction in liquidity as a result of a failure on the part of the largest counterparty to settle at the agreed time.

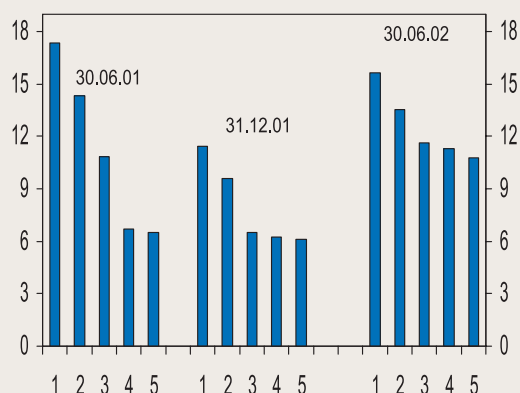
## 4 Foreign exchange settlement risk and CLS

In a foreign exchange transaction, the parties settle in two independent national payment systems. This involves an uncollateralised exposure for the banks as they normally deliver the foreign exchange sold before receiving confirmation of the foreign exchange purchased. Foreign exchange transactions involve particularly large exposures for banks (see Chart 7) The banks must therefore report their foreign exchange settlement exposures on a separate form. They are only to report exposures to their 10 largest counterparties, as the number of counterparties is normally lower for foreign exchange transactions than transactions involving other financial instruments. Generally, the counterparties are not the same as in the first part of the survey (see page 5), but may involve some of the same counterparties in cases where the banks in the survey have substantial exposures *both* in foreign exchange transactions and in the form of other types of exposures that are included in the survey (uncollateralised deposits, derivatives, etc.). The figures will therefore deviate from those in the rest of the article.

For the banks in the survey, total exposures in connection with foreign exchange transactions came to NOK 217, 147 and 195 billion, respectively, in the three surveys.<sup>5</sup> The risk to the Norwegian banking industry linked to these exposures will partly depend on how diversified the counterparties are, i.e. whether the transactions are concentrated on a few or many counterparties. Chart 7 shows that the largest overall exposure for 8 large Norwegian banks to one single counterparty was NOK 17.4, 11.4 and 15.6 billion in the three surveys. The banks' capacity for coping with such a loss will partly depend on the size of their Tier 1 capital. In the most extreme case, one bank would have lost 120, 41 and 71 per cent of its Tier 1 capital in the three surveys, assuming that the largest counterparty had become insolvent, with no recovery. Even if this may seem improbable, it should nevertheless be noted that the banks' credit risk linked to foreign exchange settlement is considerable.

With the aim of limiting this type of credit risk, large banks from several countries collaborated to establish the foreign exchange settlement system Continuous Linked Settlement (CLS). The main feature of CLS is Payment versus Payment (PvP) in the settlement of for-

**Chart 7** Foreign exchange settlement exposures against the same counterparty for 8<sup>1)</sup> large Norwegian banks. Five largest counterparties. In billions of NOK



<sup>1)</sup> Two of the banks supplied supplementary information about foreign exchange settlements that could not be coordinated with the others. The magnitude for these banks, however, is very little.

Sources: Banking, Insurance and Securities Commission and Norges Bank

foreign exchange transactions. Banks that participate in CLS will settle transactions in a common multi-currency bank, CLS Bank (CLSB). In CLSB, participating banks will have an account in all the currencies included in CLS. Banks' payments in CLSB will be between CLSB's accounts in the respective central banks. A transaction between two banks will only be settled and the amount disbursed if both parties have fulfilled their obligations. This means that a bank will not receive foreign exchange from a counterparty before it has fulfilled its obligations. CLS will thereby eliminate most of the credit risk in foreign exchange transactions.

At present, only 7 currencies are included in CLS<sup>6</sup>, but CLS has decided to include the Norwegian krone. Even if the krone is not yet included in CLS, Norwegian banks can participate in settlement involving other currencies included in CLS. However, settlements in CLS require that both parties settle their part of the transaction in CLS, and since Norwegian banks' foreign exchange transactions normally involve Norwegian kroner, the potential risk reduction for Norwegian banks will be limited in the first round. Once the Norwegian krone is included in CLS in the first half of 2003, most of the credit risk linked to Norwegian banks' foreign exchange transactions will be eliminated next year if Norwegian banks use CLS.

The liquidity risk linked to banks' foreign exchange settlement exposures will not be reduced to the same extent, however. If a bank does not use CLS, all or portions of a bank's foreign exchange transactions will not be settled in CLS. This means that banks' counterparties will see changes in their positions in individual currencies, and that they may not have sufficient cover for

<sup>5</sup> In the first reporting round, one bank submitted figures for exposures that had been registered one month later than the other banks.

<sup>6</sup> Australian dollar (AUD), Canadian dollar (CAD), Swiss franc (CHF), euro (EUR), pound sterling (GBP), Japanese yen (JPY) and US dollar (USD)

some currencies even if they have paid in a sufficient amount according to their own payment plan. To ensure that as many transactions as possible are settled, CLS will send a notice to such banks that they must increase the amount in the relevant currencies. If a bank is not in a position to increase the amount sufficiently in such a situation within a relatively limited period, transactions with other counterparties will not be settled. If CLS is to function as intended, it is therefore essential that the banks participating in CLS have a sound liquidity management policy.

## 5 Summary

A smoothly functioning interbank market promotes an efficient banking industry, but the exposures that arise can have destabilising effects if they are substantial. The results of our three surveys are to a large extent in line with the Riksbank's findings, and show that few banks have exposures that are so large that they would result in serious solvency or liquidity problems should a large counterparty fail to settle. This is the case even if the totality of one exposure is lost. The one exception to this is some of the banks' foreign exchange settlement exposures.

Uncollateralised foreign exchange settlement exposures are at times considerable and may exceed the banks' Tier 1 capital. This type of exposure is not subject to any extensive regulation, unlike most other types of financial instruments. Moreover, foreign exchange transactions are concentrated on a few counterparties, with the risk of direct contagion of liquidity and solvency problems to Norwegian banks at the same time if one of these counterparties defaults or does not settle at the agreed time. However, there seems to be little risk that large counterparties to foreign exchange transactions will create problems for Norwegian banks. These counter-

parties are all large international financial institutions with a solid rating. However, recent negative developments in the global economy have also affected these institutions, which indicates that this risk is not negligible.

The Norwegian krone will be included in CLS in the course of the first half of 2003. According to the survey, more than half of the uncollateralised exposures involve counterparties to foreign exchange transactions. The inclusion of the krone in CLS is thus expected to reduce substantially uncollateralised exposures to foreign counterparties. CLS will have a more limited impact on exposures to domestic counterparties, albeit with some reduction in the credit risk linked to exposures to these counterparties as well. Liquidity risk will remain unchanged, and may even increase when the krone is included in CLS.

The fairly solid capital position of Norwegian banks is one important reason why uncollateralised counterparty exposures do not represent a substantial systemic risk. If the banks adapt by reducing their capital ratios to the minimum requirement set out in the regulation, or their capital ratios fall for other reasons, some banks and the banking system as a whole may become more vulnerable to negative shocks. It may thus be appropriate to monitor developments in the banks' largest counterparty exposures as part of the work to promote financial stability. If counterparty exposures reach a high level, for example in relation to the banks' capital base, there may be a need for measures to reduce risk in the form of netting agreements and increased collateral requirements. Moreover, if the authorities are to manage a crisis successfully at one or several banks, the direct contagion effects have to be determined. A survey of crisis banks' largest counterparty exposures would constitute an important source of information in such a situation.

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