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Nationalbank

Financial stability

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FINANCIAL STABILITY 2005

The small picture on the front cover is a section of the commemorative coin to mark the wedding of HRH Crown Prince Frederik and Miss Mary Donaldson. The wedding portrait was designed by the sculptor Karin Lorentzen.

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Introduction and Summary

Danmarks Nationalbank is responsible for monetary policy in Denmark, and its objectives include ensuring a stable krone and contributing to efficiency and stability in the payment systems and in the financial markets. This is stated in the Danmarks Nationalbank Act, according to which it is the task of Danmarks Nationalbank to "maintain a safe and secure currency system in this country, and to facilitate and regulate the traffic in money and the extension of credit". Monetary policy and financial stability are closely linked. On the one hand, credible monetary policy and a stable krone are the basis for financial stability. On the other hand, monetary policy is conducted via the financial system, and financial stability is thus crucial to the effective implementation of market-oriented monetary policy. At the same time, the financial system must be sufficiently robust to leave room to conduct the necessary monetary policy.

The annual publication *Financial Stability* assesses financial stability in Denmark, with emphasis on financial institutions, markets and payment systems. The most significant risks to the financial system are identified, including situations that are very unlikely to arise, but which might have major consequences for the economy. It is assessed whether the overall financial system is robust enough for any problems experienced within the sector not to spread and prevent the financial markets from functioning as providers of capital and financial services. It is the task of the Danish Financial Supervisory Authority to ensure that each financial institution is sufficiently robust.

The purpose of the publication is to create awareness of conditions that are of importance to maintaining financial stability in Denmark.

SUMMARY

In general, the financial institutions are doing well in these years. The background to their success is a slightly unusual combination of a favourable economic climate and low interest rates. The current robustness of the sector should be seen in this light. In the short term, nothing seems to be able to threaten financial stability, but at some point things will change. It could be external conditions, including a sudden rise in interest rates, a change in the consumption or business climate or sudden changes in economic policy that make the economic skies cloud over.

The favourable economic climate in 2004 had a positive impact on the profits of the banking institutions, primarily as a result of low losses and provisions and substantial growth in business volumes.

The high lending growth in the late 1990s has not, to the same extent as previously, resulted in increased losses and provisions in the subsequent period. The reason may be that the cyclical downturn in 2002 and 2003 was relatively modest. In addition, the banking institutions may have improved their risk management in connection with the preparation of the forthcoming capital-adequacy rules, Basel II. The introduction of new accounting standards (IAS/IFRS) has presumably also exerted downward pressure on the level of provisions.

The Danish banking institutions saw considerable growth in lending in 2004. This included growth in mortgage loans ("prioritetslån"), which are offered to households against real estate as collateral and thus compete with mortgage-credit loans offered by mortgage-credit institutes. These loans entail a relatively low risk. Growth in lending to the corporate sector has also been high. Danmarks Nationalbank's calculations show that banking institutions with relatively high lending growth also have the greatest credit risk on their lending portfolios.

The exposure to rising losses has increased slightly, particularly among the small Danish banking institutions. This is attributable to the high lending growth and reduced capital adequacy, among other factors. The Nordic groups, on the other hand, appear more robust in 2004 than in 2003.

On the basis of Danmarks Nationalbank's failure-rate model, the general robustness of the Danish corporate sector is assessed as unchanged in 2004 compared to 2003. The rising tendency for the estimated failure rates of the weakest 10 per cent of the companies seen in recent years has been broken in several sectors, and an increased dispersion of estimated failure rates has also stopped. The development in the estimated failure rates for the various sectors and the distribution of loans by sector point to the overall losses of the banking institutions remaining low in the near future.

During the past year, the finances of the households have improved owing to tax cuts, sustained low inflation, higher employment and very low interest rates. Real-estate prices have increased at the highest rate seen since 1998, which has also underpinned the finances of the households. On the other hand, household debt continued to rise at a faster rate than disposable incomes in 2004. The interest burden fell from 2003 to 2004, however, as a result of the low interest rates and more widespread use of loans with short fixed-interest periods.

An analysis of the households' interest-rate exposure shows that on average the interest expenses of Danish homeowners increase by 1 per

cent of gross income if the short-term interest rate goes up by 1 percentage point. The size of the adjustable-rate debt is thus equivalent to gross income on average. The average interest-rate exposure is almost the same across all income brackets, since the low-income brackets have the highest relative interest burden, while the high-income brackets have the highest ratio of adjustable-rate loans. However, there is a considerable dispersion, and many have an interest-rate exposure of more than 2 per cent.

Overall, the banking institutions reduced their interest-rate exposure in 2004, but the smallest institutions still have a relatively high exposure.

Long-term yields in the USA and particularly in Europe have been falling since the summer of 2004. The greater decline in European yields may be ascribed to uncertainty as to the strength of the economic upswing in Europe, as well as to prospects of continued monetary-policy tightening in the USA. The implied volatility of European yields has increased. This indicates growing uncertainty as to the development in interest rates in Europe, but part of the increase is also attributable to substantial demand for hedging of the risk of increasing interest rates.

For the banking institutions, a general rise in interest rates will result in direct losses, depending on their interest-rate exposure. In addition, the banking institutions' credit losses may be expected to increase, depending on the interest-rate exposure and robustness of the corporate sector and the households. On the other hand, rising interest rates will give the banking institutions better opportunities to broaden their interest margins and thus their earnings base.

It is important for the banking institutions to have adequate capital to withstand both direct and indirect impacts of potential interest-rate rises.

The capital adequacy of the small banking institutions is generally higher than that of the larger institutions. The banking institutions' total buffer against losses comprises cumulative provisions for losses on loans and guarantees, and the part of the capital that exceeds the statutory 8 per cent requirement. Overall, the sector's buffer was reduced in 2004 due to a fall in the excess capital adequacy, as well as lower provisions. The new IAS/IFRS accounting standards, effective from 1 January 2005, and the new capital-adequacy rules, Basel II, will both have an impact on the size and composition of the future buffers of the banking institutions.

In general, the banking institutions should exert caution in relation to minimising their buffers.

Financial stability analysis

The Financial Sector

The Danish banking institutions and the Nordic groups, including Danske Bank and Nordea, performed well in 2004. Though earnings were under pressure from lower interest margins, results were healthy, buoyed mainly by the historically low level of losses and provisions and rapidly expanding business volumes. The banking institutions thus benefited from the favourable domestic economic climate.

Costs rose in the large and small institutions, while decreasing in the Nordic groups.

Strong growth in lending entails increased exposure to losses, especially among small institutions. The Nordic groups appear more robust in 2004 than in 2003.

The decline in interest rates continued in 2004 to a very low level. Concurrently with this development, the banking institutions have reduced their interest-rate exposure – a trend which is most pronounced among the large institutions. It is important that the banking institutions are able to withstand both direct and indirect impacts of potential increases in interest rates.

The capital adequacy of the Danish banking institutions have decreased, but remain unchanged for the Nordic groups.

NORDIC GROUPS AND DANISH BANKING INSTITUTIONS

Earnings

Both the Nordic groups, category A, and the Danish banking institutions in categories B and C¹ recorded historically high results in 2004 – not allowing for the proceeds from the sale of Totalkredit shares.²

The pre-tax profit of the Nordic groups was kr. 70.4 billion, equivalent to a 26 per cent rise on 2003. Return on equity (ROE) increased from 13.7 to 16.2 per cent, see Table 1.³

The earnings in categories B and C were largely unchanged compared to 2003. Adjusted for the proceeds from the sale of Totalkredit shares,

¹ See Box 1 for a definition of the categories.

² In November 2003, Nykredit acquired Totalkredit, which was owned by 106 local and regional banking institutions, in what was partly a cash payment and partly a conditional payment over a number of years. The listed banking institutions' estimates of the capital gain on the sale total kr. 3.4 billion, just over 50 per cent of which was recognised in 2003.

³ For comparison, the return on equity after tax for banks in the euro area was 6.7 per cent in 2003. According to preliminary figures for 2004, ROE after tax is 8.3 per cent. Source: ECB, *Financial Stability Review*, December 2004.

PROFITS BEFORE TAX, 2003 AND 2004

Table 1

Kr. billion	Nordic groups, category A		Danish banking institutions, category B		Danish banking institutions, category C	
	2004	2003	2004	2003	2004	2003
<i>Income</i>						
Net interest income	94.7	99.4	10.0	10.0	2.2	2.1
Net fee and commission income	43.2	39.3	4.1	3.6	0.8	0.7
Value adjustment of securities, etc.	6.9	4.6	2.4	2.7	0.5	0.8
Value adjustment of capital investments	6.1	5.2	0.8	0.2	0.1	0.1
Other ordinary income	10.0	6.2	0.3	0.9	0.1	0.1
<i>Costs</i>						
Operating expenses, etc.	89.2	91.0	10.0	9.4	2.1	2.0
Losses and provisions	1.4	8.3	1.1	1.8	0.3	0.5
<i>Profit before tax</i>	70.4	55.8	6.5	6.3	1.3	1.4
<i>Of which proceeds (Totalkredit)</i>	-	-	0.6	1.7	0.2	0.5
<i>ROE after tax, per cent</i>	16.2	13.7	14.9	15.9	13.1	16.1
<i>Market share of Danish lending, per cent</i>	53.1	54.4	26.7	25.5	4.5	4.3

Note: For the purpose of currency translation of financial figures for the Nordic groups, an average of the exchange rates for the year is used as far as profit and loss accounts are concerned. For translation of balance sheets, exchange rates at year-end are applied. The market share is measured in terms of lending to domestic residents. Adjustment is made for mortgage-credit lending for the Nordic groups. The total market share of categories A, B and C amounts to 84.3 per cent in 2004. The remaining market shares are distributed on institutions not included in categories A, B or C, e.g. FIH and a number of small institutions.

Source: Annual accounts and Danmarks Nationalbank.

earnings increased by 28 and 41 per cent, respectively. ROE was just under 15 per cent in category B and just over 13 per cent in category C.

As high growth in lending has not compensated for declining interest margins in category A, net interest income has decreased. In category C, which recorded the strongest growth in lending, net interest income shows a modest increase.

The average lending rate of the banking institutions has fallen in response to strong growth in lending collateralised by real estate ("prioritetslån") in 2004, among other factors. At the same time, low interest rates have made it impossible for the banking institutions to lower their deposit rates in step with the decline in the money-market rate (so-called floor risk), cf. Chart 1. This exerts pressure on the interest margin of the banking institutions.

Fee and commission income has risen for all three categories in 2004, driven mainly by higher income from trading activities and payment services. Fee income accounts for an increasing proportion of total net interest and fee income, close to 30 per cent in 2004.

CATEGORIES APPLIED

Box 1

The analyses are based on the annual accounts of 52 selected banking groups and banking institutions, divided into Nordic groups (category A), large Danish banking institutions (category B) and small Danish banking institutions (category C). The banking institutions have been selected and grouped on the basis of their status at end-2003. They are assumed to belong to the same categories prior to end-2003¹.

OVERVIEW OF CATEGORIES APPLIED

Categories	Danmarks Nationalbank			Danish Financial Supervisory Authority			
	A	B	C	1	2	3	4
Handelsbanken	1						
Swedbank	1						
SEB	1						
DnB NOR	1						
Danske Bank	1			1			
Nordea	1			1			
Jyske Bank		1		1			
Sydbank		1		1			
Banking institutions with working capital in the range kr. 3 billion to kr. 25 billion		16			20		
Banking institutions with working capital in the range kr. 250 million to kr. 3 billion			28			71	
Banking institutions with working capital of less than kr. 250 million							79
Total number of groups/banking institutions	6	18	28	5	20	71	79
Balance-sheet total at end-2004, kr. billion	8,044	466	56	2,111	295	120	na.

Note: In categories B and C, the data are based on annual accounts for the parent companies, while category A is based on consolidated annual accounts. Consolidated annual accounts in foreign currencies are translated at the average rates for the year as far as the profit and loss accounts are concerned and at the year-end rates as far as the balance sheets are concerned. The Danish Financial Supervisory Authority's category 1 includes, apart from the institutions mentioned, FIH.

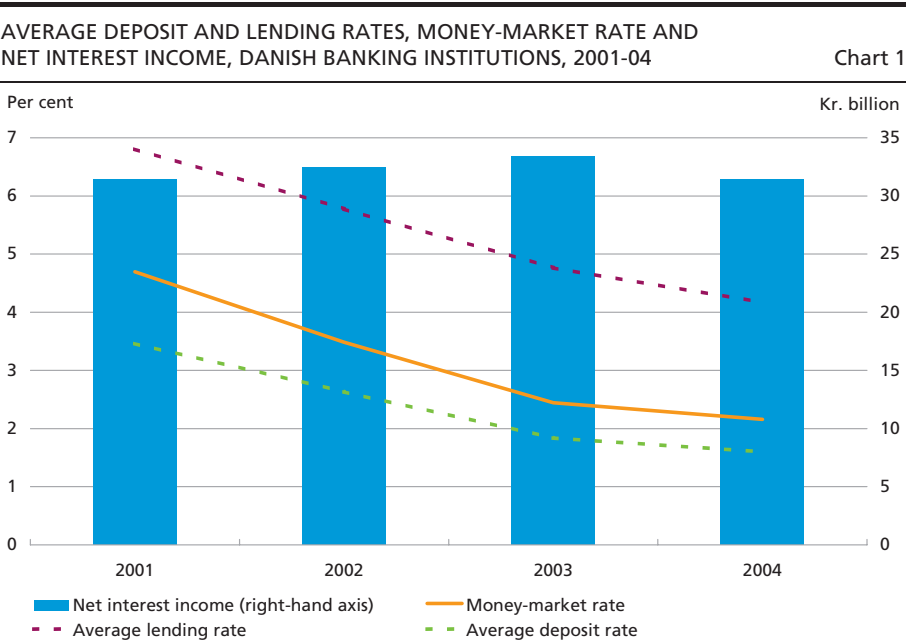
Source: Annual accounts and Danmarks Nationalbank (spot rates).

The rationale for including the Nordic groups as an independent category is that the largest Nordic banking groups to a large extent have a pan-Nordic orientation, which is reflected in their exposures. Moreover, the largest Nordic banking groups are comparable in terms of business areas and sizes, cf. the chapter on analysis of bank equity prices.

If the text or the Charts refer to "Danish banking institutions", the aggregate of categories B and C, as well as Danske Bank A/S and Nordea Danmark A/S, is applied. Analyses made on the basis of "Danish banking institutions" are typically performed where the information provided in the annual accounts of the other Nordic groups is insufficient.

Finally, in a few analyses, ad-hoc categories are used, based on available data. This is specified in the notes of the respective Charts and Tables.

¹ The figures may deviate from previous reports.



Note: The money-market rate is a reference rate for providing liquidity in the inter-bank market (in Copenhagen) on an uncollateralised basis. The money-market rate is a day-to-day rate.
Source: Annual accounts and Danmarks Nationalbank.

The Nordic groups reduced their cost ratios from 58.8 per cent of income in 2003 to 55.4 per cent in 2004 as a result of higher business volumes and staff reductions. For banking institutions in categories B and C, costs rose by 7 and 6 per cent, respectively, in response to an increase in the number of employees in the two categories, among other factors. Moreover, some institutions opened new branches in 2004. If the proceeds from the sale of Totalkredit shares are not included, the cost ratios showed a modest decline from 2003 to 2004 for categories B and C. In category B, 10 per cent of the institutions recorded a cost ratio exceeding 71 per cent, while the corresponding figure for category C was 69 per cent.

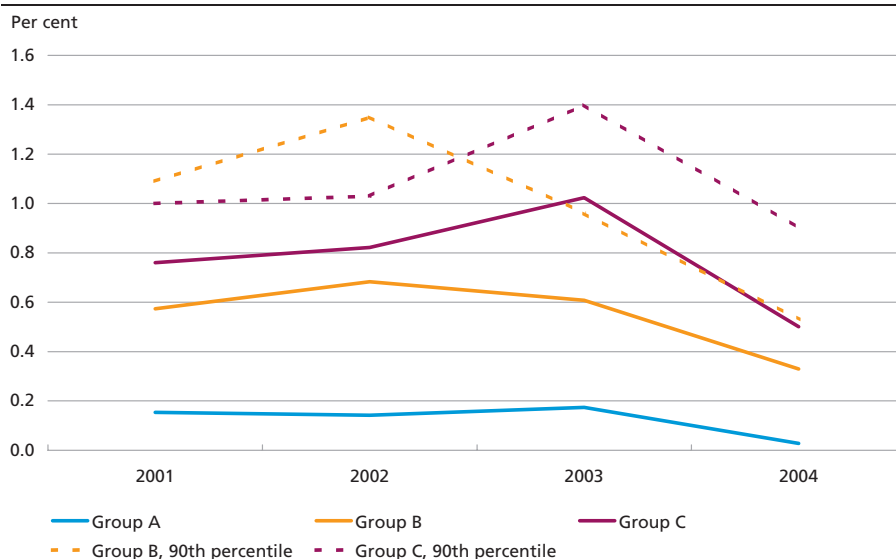
Banking institution results in 2004 are underpinned e.g. by the low level of losses and provisions. More than 90 per cent of the institutions in categories B and C recorded losses and provisions of less than 1 per cent in 2004, cf. Chart 2, and a few institutions even had net reversals.

Historically, periods of high lending growth have often been followed by rising losses and provisions, indicating that credit quality tends to deteriorate during periods of high lending growth.

However, the high lending growth in the late 1990s has not resulted in increased losses and provisions to the same extent as previously. A possible explanation is that the economic decline in 2002 and 2003 was relatively modest, causing the rate of unemployment to rise only slightly.

LOSSES AND PROVISIONS AS A RATIO OF LOANS AND GUARANTEES,
CATEGORIES A, B AND C, 2001-04

Chart 2

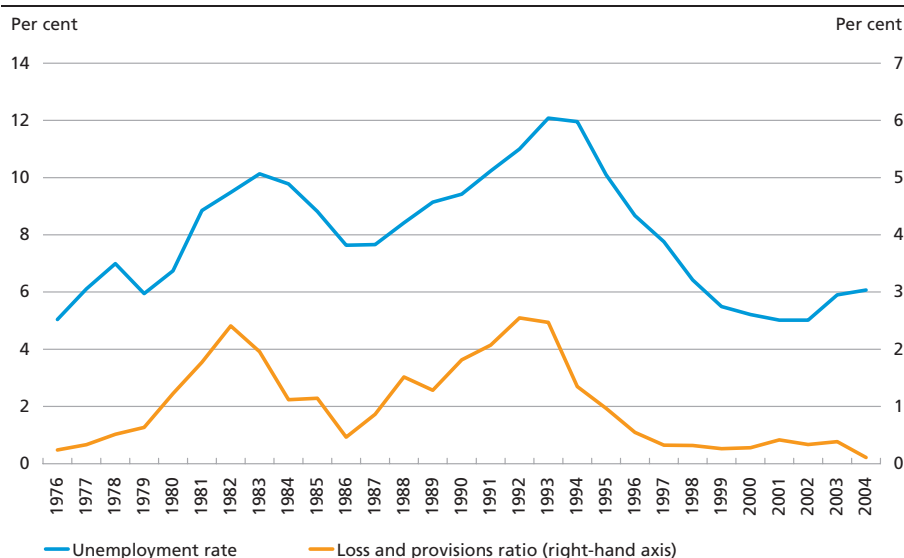


Source: Annual accounts.

Moreover, other vital factors, such as property prices, developed favourably. Unemployment can be seen as an expression of general macroeconomic conditions, and unemployment and losses and provisions match each other closely, cf. Chart 3.

UNEMPLOYMENT AND BANKING INSTITUTIONS' LOSSES AND PROVISIONS,
1976-2004

Chart 3



Note: The Chart is based on data from all banking institutions of the Danish Financial Supervisory Authority's categories 1, 2 and 3.

Source: The Danish Financial Supervisory Authority and Statistics Denmark.

STRUCTURAL DEVELOPMENT 2004	Box 2
FIH acquired by Kaupthing Bank On 14 June 2004, the Icelandic Kaupthing Bank announced that it had reached agreement with FöreningsSparbanken (Swedbank) on the acquisition of FIH at a total cost of kr. 7.1 billion. Financing was through issue of, <i>inter alia</i> , subordinated debt. With this acquisition, Kaupthing Bank more than doubled its total assets. The acquisition was approved by the Danish Financial Supervisory Authority in September 2004.	
Danske Bank acquires National Irish Bank and Northern Bank On 14 December 2004, Danske Bank announced that it had entered into an agreement with National Australia Bank on the acquisition of National Irish Bank and Northern Bank (based in Northern Ireland). The total cost of the share capital was GBP 967 million, equivalent to kr. 10.4 billion. The acquisition was the second-largest European cross-border acquisition of a bank in 2004, surpassed only by the Spanish Santander Group's acquisition of Abbey of the UK. The acquisition obtained the required regulatory approvals and was completed in February 2005.	

A number of technical and structural factors may have changed the correlation between lending growth and losses and provisions. The banking institutions may, for example, have enhanced their risk management through more sophisticated models developed in view of the introduction of the new capital-adequacy rules, Basel II, cf. the chapter on framework conditions for the financial system.

Moreover, new international accounting standards, IAS/IFRS, were introduced on 1 January 2005, cf. the same chapter. The new accounting standards entail a transition from the Danish prudential accounting principle to a neutrality principle for credit institutions' valuation. This will translate into a reduction of the institutions' provisions¹. The reduction appears from the opening balance sheets of the institutions for the 2005² financial year. There is a wide gap in the percentage reductions in accumulated provisions resulting from the new accounting rules – ranging from zero impact to a 41 per cent reduction. It cannot be ruled out that the introduction of the new accounting rules has already exerted downward pressure on the level of provisions in recent years and will continue to have an impact. Thus the adjustment to the new accounting rules will be gradual.

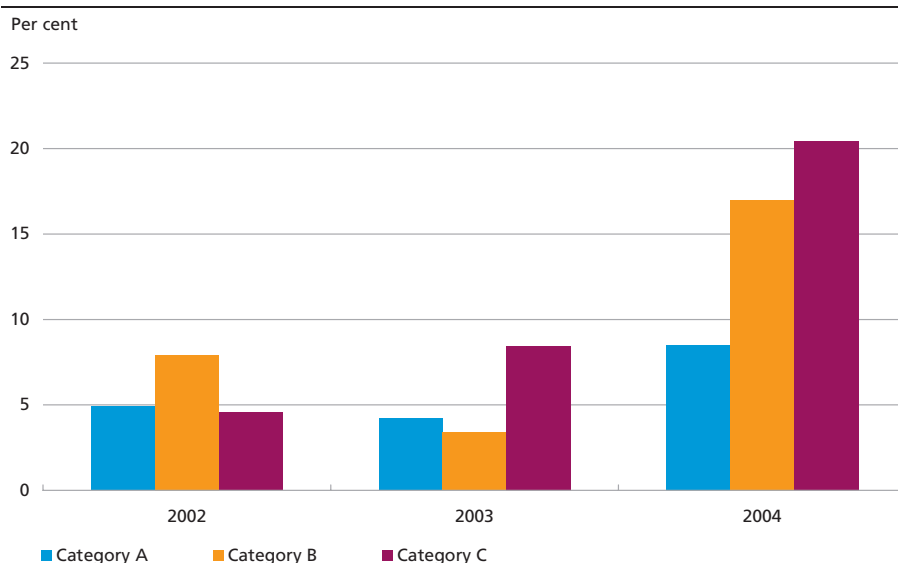
Lending growth

The banking institutions in categories B and C, in particular, experienced significant growth in lending in 2004, cf. Chart 4. The figures cover great

¹ In future, provisions will be replaced, for accounting technical purposes, by write-downs on the loan in question.
² The opening balance sheets have yet to be published, but most institutions have commented on the effect in their annual reports for 2004.

ANNUAL GROWTH IN LENDING, CATEGORIES A, B AND C, 2002-04

Chart 4



Note: Growth is calculated as a weighted average of the increase in lending in each of the three categories. The growth ratios of the Nordic groups allow for foreign-exchange adjustments, FöreningsSparbanken's (Swedbank) sale of FIH in 2004 and DnB NOR's sale of Elcon in 2004.

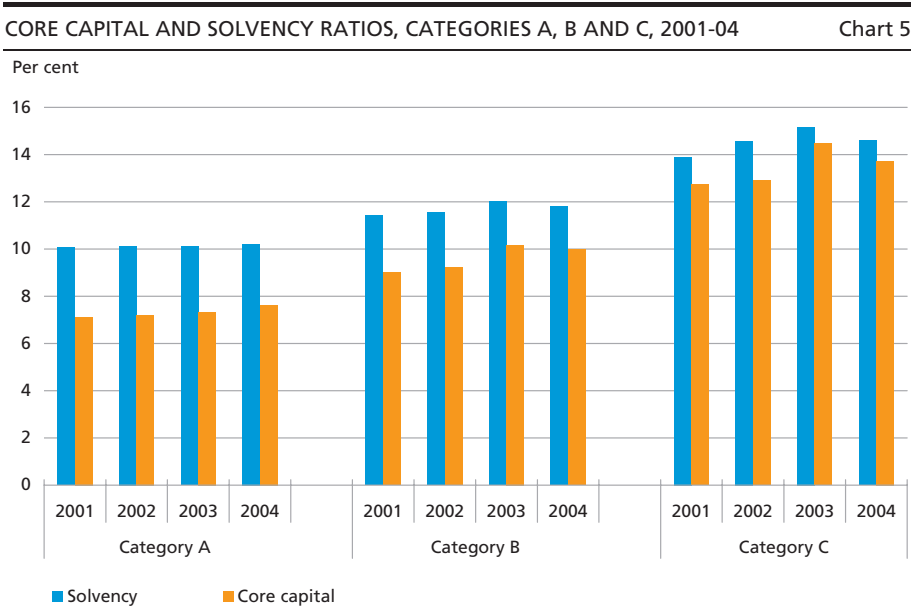
Source: Annual accounts.

variation from one institution to the next, however, ranging between 0 and 46 per cent. The 10 per cent of the banking institutions in category B with the strongest growth in lending saw an increase above 38 per cent, while the corresponding figure for category C was above 37 per cent. These figures represent a significant increase on the 2003 figures of 14 and 21 per cent, respectively.

The high growth in lending stems from both the corporate sector and the households. One of the key reasons for the strong growth in lending to households is an increase in home-financing loans ("prioritetslån") granted against real property as collateral and thus subject to relatively low risk. With these loans, a lending and a deposit account are set up in the borrower's name on the same interest-rate terms, typically at a higher rate than the rate on a mortgage-credit loan granted by a mortgage-credit institute.

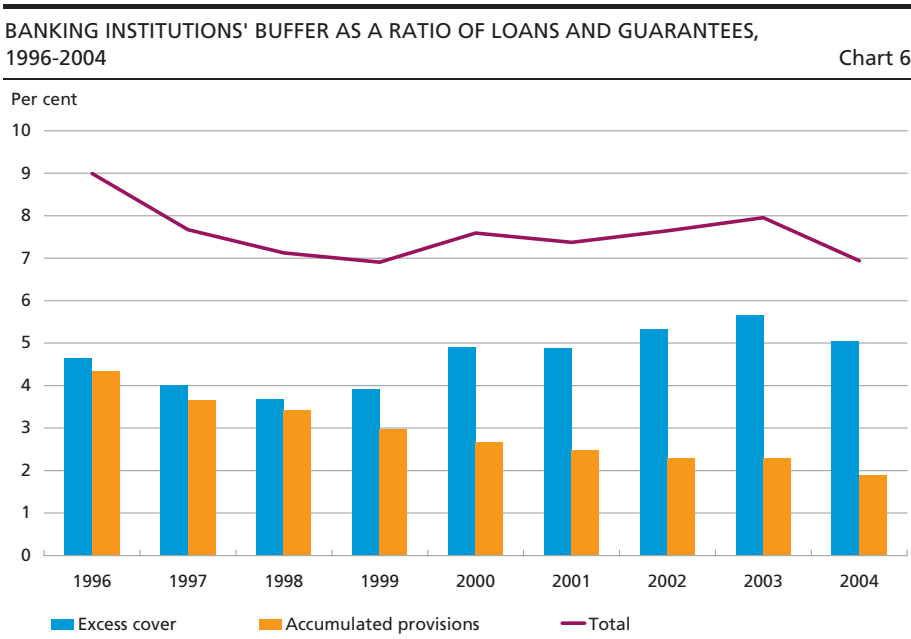
Capital structure

The capital adequacy in categories B and C decreased from 2003 to 2004, cf. Chart 5. The solvency ratio is unchanged for the Nordic groups, while the core capital (tier 1 capital) has increased. Since 2003, the Danish banking institutions have been able to issue loan capital that may be included in the core capital, i.e. hybrid core capital, cf. Box 3, and several banking institutions have availed themselves of this opportunity.



Source: Annual accounts.

Accumulated provisions on loans and guarantees, along with the portion of the capital exceeding the statutory 8 per cent requirement, constitute the banking institutions' total buffer to withstand losses. Overall, the Danish banking institutions' total buffer as a ratio of loans and



Note: The Chart includes all banking institutions in the Danish Financial Supervisory Authority's categories 1-4. Excess cover is capital in excess of the 8 per cent requirement.
Source: The Danish Financial Supervisory Authority.

HYBRID CORE CAPITAL

Box 3

Since 2003, banking institutions have been allowed to issue hybrid core capital which may be included in core capital provided, among other factors, that the following conditions are met:

- The capital must be paid to the banking institution, i.e. only debt instruments issued directly by the banking institution may be included.
- The debt must be of a permanent nature and thus must not have a fixed term. It must be ensured that the capital is available for the activities of the banking institution on an ongoing basis and not just for a limited period of time. The earliest possible redemption at the banking institution's initiative is after a period of 10 years and only subject to regulatory approval (in special circumstances, redemption after 5 years may be permitted).
- The debt must be subordinate to all other not-subordinated debt (e.g. deposits and other creditors) and tier 2 capital. No guarantees etc. may be issued that effectively change this ranking.
- Interest on the debt lapses if the banking institution has no free reserves (retained earnings from previous years and profit carried forward). Thus the borrower is not entitled to receive interest for years during which a loss is recorded (interest payments are non-cumulative).
- It must be possible to use debt and non-paid interest to cover losses, whether or not the banking institution is allowed to continue its operations.
- Hybrid core capital must not exceed 15 per cent of the core capital.
- Other core capital (excluding hybrid core capital) must, after deductions, account for at least 5 per cent of risk-weighted items.

Hybrid core capital is regulated by section 132 of the Danish Financial Business Act.

Note: For further details on hybrid core capital, see: Bundgaard, Birgitte and Suzanne Hyldahl, Structure of the Banks' Capital – New Statutory Requirements and Opportunities, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 2002.

guarantees was reduced in 2004. The reduction is a result of lower solvency ratios and a fall in accumulated provisions, both in absolute terms and as a ratio of loans and guarantees, cf. Chart 6.

As already mentioned, the new IAS/IFRS accounting standards, effective from 1 January 2005, and the future capital-adequacy rules, Basel II, will both have an impact on the size and composition of the future buffers of the banking institutions.

RISK FACTORS FACING DANISH BANKING INSTITUTIONS

Assessment of the banking institutions' credit risks

Danmarks Nationalbank's failure-rate model, cf. the chapter on the corporate sector and the households, can be used to analyse the credit risk

CALCULATION OF BANKING INSTITUTIONS' CREDIT RISK ON THEIR LENDING PORTFOLIOS

Box 4

The calculation is based on Danmarks Nationalbank's failure-rate model, which estimates Danish public and private limited liability companies, cf. the chapter on the corporate sector and the households. 59 per cent of the companies in the failure-rate model provide information about which bank they use. The analysis includes only banking institutions serving at least 30 companies in 2004, a total of 42 banking institutions. The lending ratios of each individual banking institution – both at sector level and to households – are disclosed in their annual accounts. As an approximation for the estimated failure rate of the households ($P^{\text{households}}$) and the agricultural sector ($P^{\text{agriculture}}$)¹, the current year's average loss ratios for each of the two groups are used. Subsequently, an overall credit-risk measure is calculated for the lending portfolio of the individual banking institution. The calculation of the credit risk of banking institution i on its lending portfolio is based on the formula:

$$\text{Credit risk measure}_i = p_i^{\text{corporate}} \cdot U_i^{\text{corporate}} + p_i^{\text{agriculture}} \cdot U_i^{\text{agriculture}} + p_i^{\text{households}} \cdot U_i^{\text{households}}$$

$P_i^{\text{corporate}}$ is the weighted estimated failure rate of the companies using banking institution i . The estimated failure rate of the individual company served by the individual banking institution is weighted by the debt of the enterprise relative to the debt of all companies served by the individual banking institution. U_i is the lending ratio of banking institution i to the corporate sector (excluding agriculture), households and agriculture, respectively.

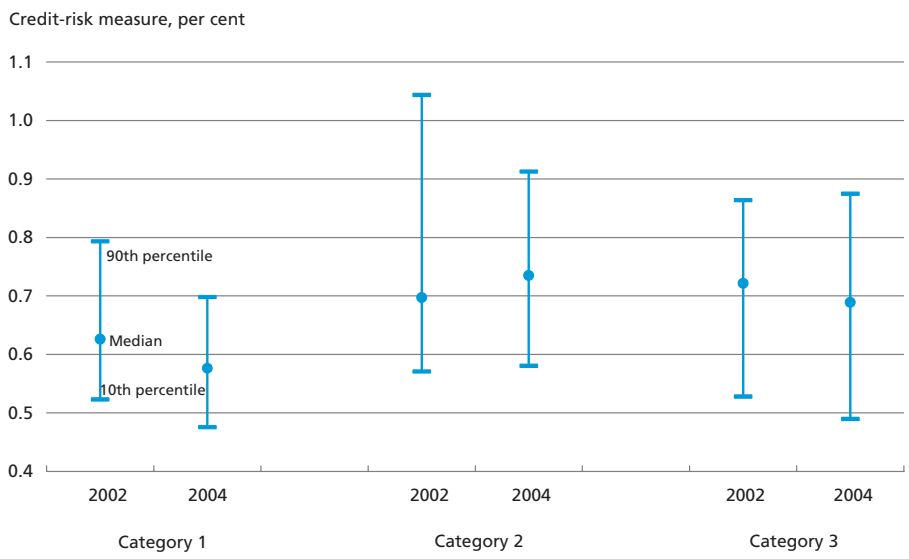
¹ The loss ratio is losses as a ratio of loans and guarantees. The 2004 loss ratio is assumed to be equal to the loss ratio a year earlier.

on the lending portfolios of the Danish banking institutions. To that end, a credit-risk measure is established that can be used to rank the banking institutions according to the degree of credit risk on their lending portfolios. The higher the credit-risk measure, the higher the credit risk of the lending portfolio, cf. Box 4.

Chart 7 shows the credit-risk measure for each of the Danish Financial Supervisory Authority's banking-institution categories in 2002 and 2004. The credit risk on the lending portfolio is lowest for category 1, and it has declined since 2002. In 2004, the credit risk was highest for the banking institutions in category 2, and the median has risen since 2002. In 2004, the largest dispersion was in category 3.

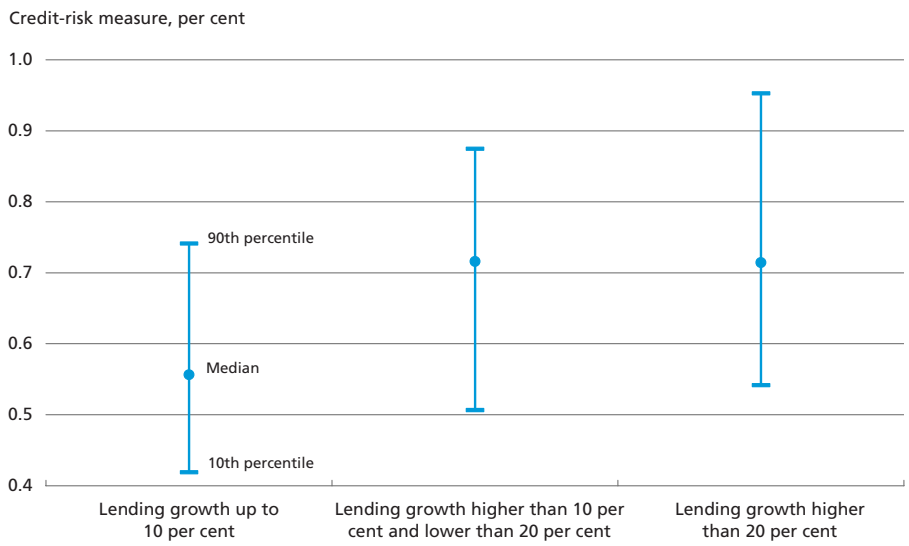
As previously mentioned, the banking institutions in general increased their lending growth in 2004 and the number of banking institutions recording lending growth of more than 10 per cent increased considerably from 2003 to 2004. The analysis shows that banking institutions with relatively high lending growth have the highest credit risk on their lending portfolios, cf. Chart 8.

10TH, 50TH AND 90TH PERCENTILES FOR CREDIT RISK ON THE LENDING PORTFOLIOS IN THE DANISH FINANCIAL SUPERVISORY AUTHORITY'S BANKING INSTITUTION CATEGORIES 1-3, 2002 AND 2004 Chart 7



Note: The banking institutions are classified according to the Danish Financial Supervisory Authority's grouping of banking institutions in categories 1-3.
Source: Own calculations.

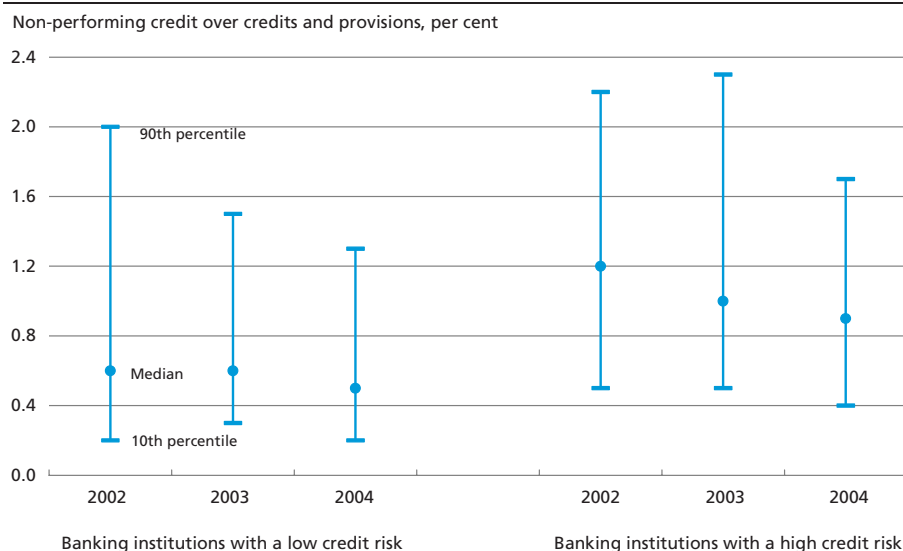
10TH, 50TH AND 90TH PERCENTILES FOR CREDIT RISK ON THE LENDING PORTFOLIOS OF BANKING INSTITUTIONS AND LENDING GROWTH, 2004 Chart 8



Note: The 10th percentile indicates that 10 per cent of the banking institutions have a credit-risk measure lower than or equal to the value in question. The median indicates that 50 per cent of the banking institutions have a credit risk higher than the value in question. 10 per cent of the banking institutions have a credit-risk measure higher than or equal to the 90th percentile.
Source: Own calculations.

**BANKING INSTITUTIONS' CREDIT RISK ON THEIR LENDING PORTFOLIOS
AND NON-PERFORMING LOANS, 2002-04**

Chart 9



Note: Non-performing credit over credits and provisions are the Danish Financial Supervisory Authority's key performance indicator 12 for banking institutions. The banking institutions are classified according to credit-risk measure with 50 per cent in each category.

Source: The Danish Financial Supervisory Authority and own calculations.

Banking institutions with a high credit risk on their lending portfolios also have higher non-performing credit over credits and provisions¹, cf. Chart 9. In general, non-performing credit over credits and provisions has, however, decreased in recent years.

Uncollateralised day-to-day money market

The banking institutions and the mortgage-credit institutes have claims on other credit institutions, of which some are in the uncollateralised day-to-day money market for Danish kroner. Table 2 shows the average exposure in 2004 among credit institutions in the uncollateralised day-to-day money market, calculated on the basis of transactions in Danmarks Nationalbank's payment system, Kronos².

Each group in category A has an average daily exposure of kr. 714 million to other credit institutions, more than 50 per cent of which is towards other category A groups. On average, foreign credit institutions, not including Nordic groups, have just over 12 per cent of the market for uncollateralised day-to-day money-market loans denominated in Danish

¹ The Danish Financial Supervisory Authority's key performance indicator 12 for banking institutions.

² The method is described in Danmarks Nationalbank, *Financial stability 2004* and in Abildgren, Kim and Henrik Arnt, The Activity in the Danish Money Market, Danmarks Nationalbank, *Monetary Review*, 2nd Quarter 2004.

AVERAGE DAILY EXPOSURE PER CREDIT INSTITUTION IN THE
UNCOLLATERALISED DAY-TO-DAY KRONE MONEY MARKET IN 2004

Table 2

Lending by institutions, kr. million	To category A	To category B	To category C	To other Danish credit institutions	To foreign credit institutions, excl. Nordic groups	Total
Category A	392	176	10	12	124	714
Category B	38	31	4	13	7	94
Category C	1	2	1	0	0	4
Other Danish credit institutions ...	11	11	2	1	6	30
Foreign credit institutions, excl. Nordic groups	70	35	0	0	14	120

Source: Danmarks Nationalbank.

kroner. Average amounts cover a significant variation between days and institutions. Table 3 shows the highest average exposure per credit institution in 2004 for the various categories. For the Nordic groups in category A, the maximum exposure is just under kr. 3 billion, or more than four times the average daily exposure.

Foreign exposure

Geographically, Danish credit institutions are exposed mainly to the other Nordic countries, which is also the case for the institutions of the other Nordic countries, cf. Chart 10, thus suggesting that a relatively high degree of integration exists between the Nordic financial markets. A number of these exposures are exposures within the Nordea group. As far as other countries are concerned, the Danish institutions are relatively more exposed to the UK, whereas the other Nordic countries are more exposed to Germany and North America.

Interest-rate risk

The interest-rate risk of the banking institutions is measured in terms of the proportion of the core capital (tier 1 capital) that is lost on a parallel

MAXIMUM DAILY EXPOSURE PER CREDIT INSTITUTION IN THE
UNCOLLATERALISED DAY-TO-DAY KRONE MONEY MARKET, 2004

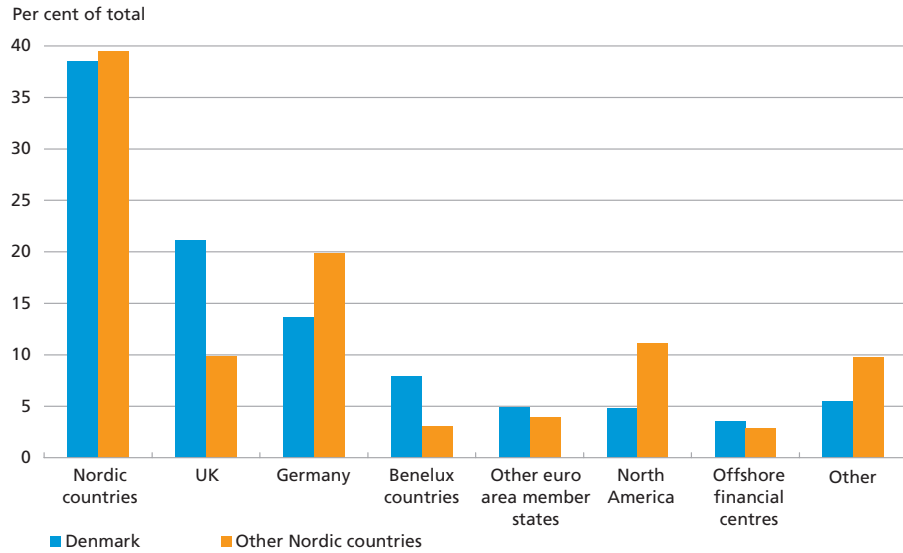
Table 3

Kr. million	Maximum exposure per credit institution (average for the category)
Category A	2,950
Category B	627
Category C	47
Other Danish credit institutions	273
Foreign credit institutions, excluding Nordic groups	722

Source: Danmarks Nationalbank.

CREDIT INSTITUTIONS' FOREIGN CLAIMS CALCULATED ON A CONSOLIDATED BASIS, END-SEPTEMBER 2004

Chart 10



Note: For the portion of data relating to Norwegian credit institutions' foreign claims, the most recent data available are from March 2004.

Source: BIS.

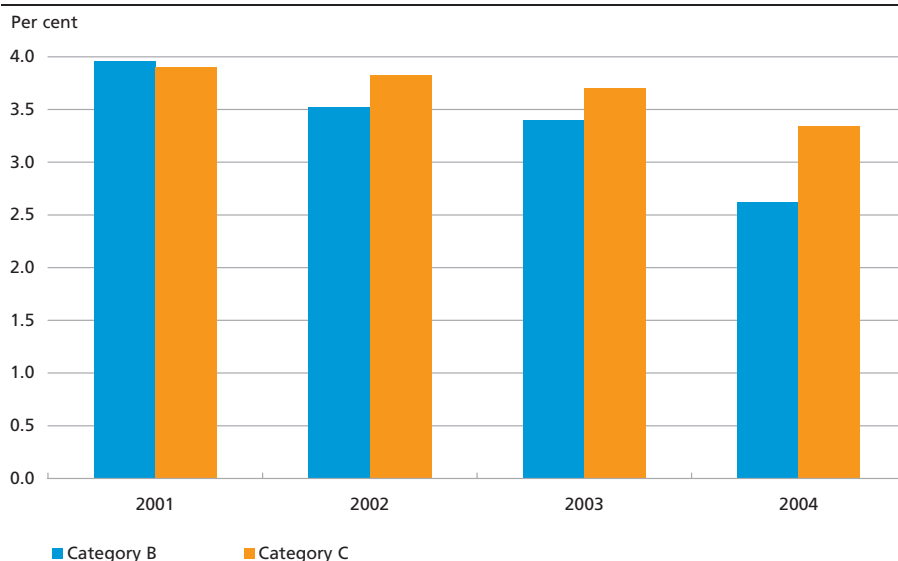
shift in the yield curve of 1 percentage point¹, cf. Chart 11. In general, the banking institutions in categories B and C have been reducing their interest-rate exposure since 2001 in step with the general decline in interest rates. The institutions in category C still have a relatively high interest-rate exposure, however. In category B, 10 per cent of the institutions had an interest-rate risk exceeding 5.6 per cent in 2004, while 10 per cent of the institutions in category C had an interest-rate risk exceeding 5.4 per cent.

For comparison, Danske Bank A/S and Nordea Danmark A/S compiled their interest-rate risk at 0.6 and 3.0 per cent, respectively, at the end of 2004, compared with 2.2 and 6.8 per cent a year earlier. Interest rates are very low and it is vital that the banking institutions have sufficient capital to withstand both direct and indirect impacts of any interest-rate rises.

The chapter on financial markets elaborates on market expectations of interest rates.

¹ Calculated on the basis of the Danish Financial Supervisory Authority's key performance indicator 6, interest-rate risk over tier 1 capital.

INTEREST-RATE RISK: PROPORTION OF CORE CAPITAL LOST IN CASE OF A 1-PERCENTAGE-POINT RISE IN INTEREST RATES, CATEGORIES B AND C, 2001-04 Chart 11



Note: Category A is not included in the Chart, since groups based outside Denmark do not calculate the key performance indicator "interest-rate risk", on which the calculations of the Chart are based. The figures are weighted averages.

Source: Annual accounts and own calculations.

STRESS TESTING OF THE NORDIC GROUPS AND THE DANISH BANKING INSTITUTIONS

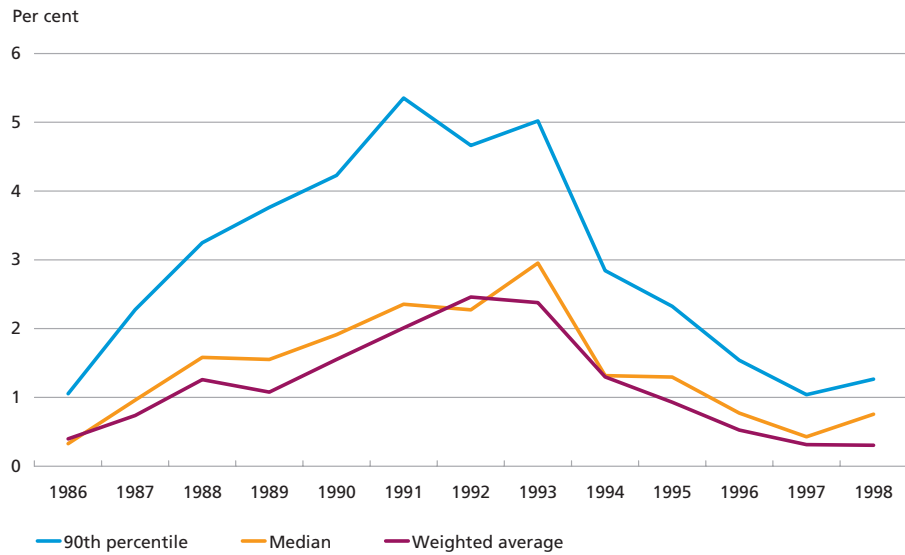
The resilience of the banking institutions to a number of hypothetical scenarios is analysed through stress tests. The implications of, respectively, an interest-rate rise, higher losses and the failure of the most important counterparty in the uncollateralised day-to-day money market are specifically analysed below. The stress tests are static and cover a period of one year. Thus no allowance is made for the possibility of the banking institutions adjusting to the scenarios. Therefore, the stress tests are not suitable for analysing the resilience of the institutions in the longer term.

In 1992 and 1993, the Danish banking institutions' losses and provisions amounted to, respectively, 2.5 and 2.4 per cent on average of total loans and guarantees. Chart 12 shows the development in losses and provisions in the troubled years in the early 1990s.

This is the rationale for the choice of scenarios in the stress tests, under which losses are increased by up to 2.5 percentage points. As will appear from the 90th percentile of the Chart, several banking institutions suffered significantly higher losses during the period in question.

BANKING INSTITUTIONS' ANNUAL LOSSES AND PROVISIONS AS A RATIO OF LOANS AND GUARANTEES IN THE PERIOD 1986-98

Chart 12



Note: The Chart is based on data for all banking institutions in the Danish Financial Supervisory Authority's categories 1-4.
Source: The Danish Financial Supervisory Authority and own calculations.

As a result of the strong growth in lending and less revenue from the sale of Totalkredit shares than in 2003, the banking institutions in categories B and C have become more exposed to higher losses compared with 2003, cf. Table 4. Failure of the most important counterparty on the worst day imaginable of 2004 would have affected a large portion of the banking institutions in categories B and C. The category B institutions have become less exposed to interest-rate rises, reflecting that, overall, they have reduced their interest-rate exposure, while the impact on the small institutions remains unchanged.

In scenario 2, in which losses are increased by 2.5 percentage points, all six Nordic groups will experience negative results. However, none of the groups will fall below the statutory 8 per cent solvency requirement. In category B, four institutions will be unable to meet the solvency requirement under scenario 4, failure of counterparty banks, while only two institutions in category C will have problems meeting the solvency requirement. Overall, one and ten institutions in categories B and C, respectively, will be unable to meet the solvency requirements under scenarios 8 and 9.

The part of the banking institutions' capital that exceeds the statutory 8 per cent requirement helps to ensure that operations can continue in situations of rising, unexpected losses. In Chart 13, banking institutions with a solvency ratio below 8 are shown as a function of the increase in losses.

NUMBER OF BANKING INSTITUTIONS AND GROUPS WITH NEGATIVE RESULTS BEFORE TAX, CATEGORIES A, B AND C, 2003-04

Table 4

Scenarios	Category A		Category B		Category C	
	2004	2003	2004	2003	2004	2003
Basis, ordinary operating result	0	0	0	0	0	0
<i>Credit risk</i>						
1 An increase in losses by 1 percentage point	0	0	0	1	0	0
2 An increase in losses by 2.5 percentage points	6	6	16	10	22	14
3 An increase in losses by 1 percentage point for households and 2.5 percentage points for corporate customers	6	6	9	6	7	0
4 Failure of largest counterparty bank in uncollateralised day-to-day money market	0	na.	12	na.	11	na.
<i>Interest-rate risk</i>						
5 An increase in interest rates by 1 percentage point	na.	na.	0	0	0	0
6 An increase in interest rates by 3 percentage points	na.	na.	4	5	6	6
<i>Combinations</i>						
7 Scenarios 1 and 5 simultaneously ...	na.	na.	4	4	1	1
8 Scenarios 2 and 6 simultaneously ...	na.	na.	17	17	27	24
9 Scenarios 3 and 4 simultaneously ...	na.	na.	17	na.	18	na.
Total number of institutions	6	6	18	18	28	28

Note: Scenario 4, failure of the largest counterparty bank in the uncollateralised day-to-day money market, includes only accounts between institutions holding a current account with Danmarks Nationalbank.

Source: Annual accounts, Danmarks Nationalbank and own calculations.

It is not until losses rise by 4 percentage points that the solvency ratio falls below 8 in one category B institution.

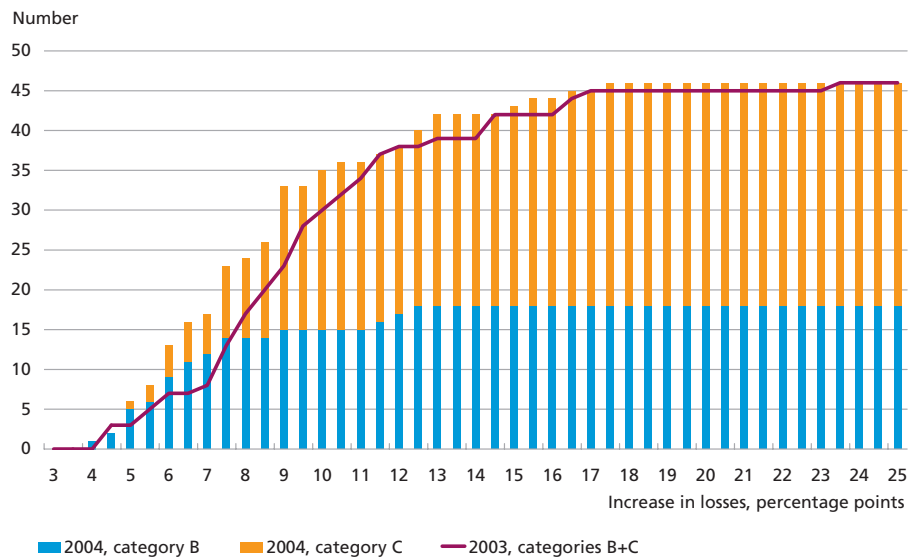
Chart 14 illustrates the same situation, the only difference being that the institutions are included with their total assets. This gives an idea of the size of the institutions with a solvency ratio below 8.

If losses go up by 5 percentage points, six banking institutions whose total assets exceed 10 per cent of the total assets of the Danish banking institutions are affected. The two Charts show that, compared with 2003, the banking institutions have become marginally more exposed to an increase in losses. However, contrary to the situation in 2003, banking institutions with small assets are now most at risk.

As far as the Nordic groups are concerned, losses must rise by 3 percentage points in 2004 before any groups fall below the solvency requirement. A year earlier, the corresponding figure was 2.5 percentage points. Thus the Nordic groups have overall become more robust. The most robust groups will not fall below the solvency requirement unless their losses rise by 4.5 percentage points.

NUMBER OF BANKING INSTITUTIONS IN CATEGORIES B AND C WITH A SOLVENCY RATIO BELOW 8 ON AN INCREASE IN LOSSES ON LOANS AND GUARANTEES, 2003-04

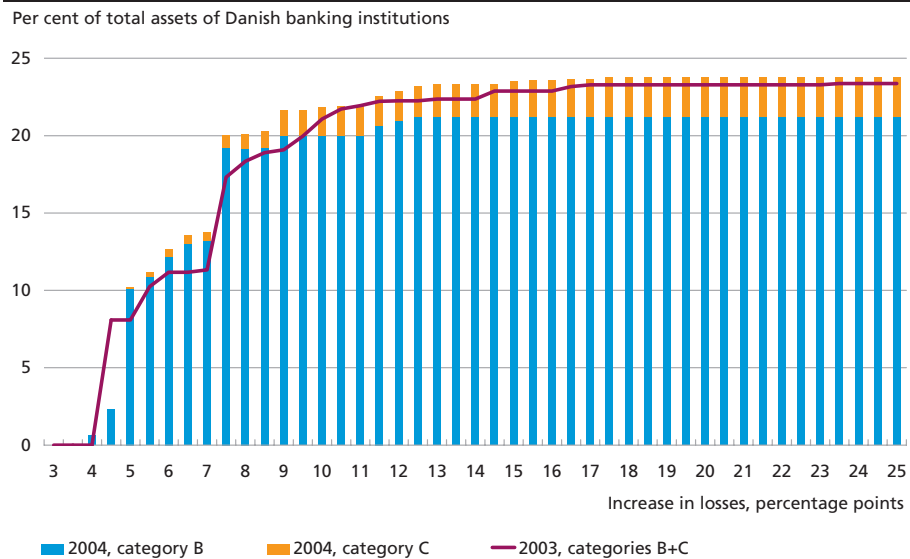
Chart 13



Source: Annual accounts and own calculations.

TOTAL ASSETS OF BANKING INSTITUTIONS IN CATEGORIES B AND C WITH A SOLVENCY RATIO BELOW 8 ON AN INCREASE IN LOSSES ON LOANS AND GUARANTEES, 2003-04

Chart 14



Note: Total assets for the institutions in categories B and C, Danske Bank and Nordea Danmark amounted to kr. 2,195 billion at end-2004 and kr. 2,026 billion at end-2003. The amount at end-2004 is equal to 100 per cent on the y axis. Adjustments have been made for an estimate of Danske Bank's activities abroad.

Source: Annual accounts and own calculations.

MORTGAGE-CREDIT INSTITUTES

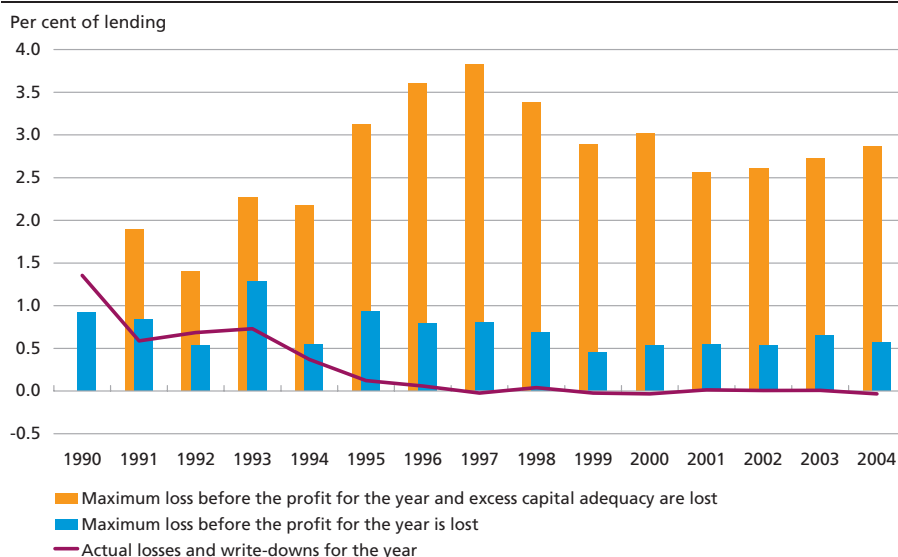
Mortgage-credit institutes play an important role in the Danish financial sector – partly by acting as key credit providers in connection with property financing and partly by serving as bond issuers. At end-2004, the mortgage-credit debt of households totalled kr. 1,141 billion, equivalent to approximately 70 per cent of household liabilities. The total outstanding volume of mortgage-credit bonds amounted to kr. 1,806 billion at end-2004, equivalent to just over 70 per cent of the Danish bond market.

The earnings of the mortgage-credit institutes are comprised mainly of regular commissions from borrowers, remortgaging fees and portfolio earnings. In 2004, the mortgage-credit institutes achieved profits before tax of slightly over kr. 9 billion, which is on a par with 2003. While 2003 saw a flurry of remortgaging activity, 2004 was characterised by conversion to deferred-amortisation loans and, towards the end of the year, by the introduction of adjustable-rate loans with an interest-rate cap. Gross new lending by mortgage-credit institutes totalled just under kr. 440 billion in 2004, while the high remortgaging activity in 2003, prompted by the low level of interest rates, led to the highest ever gross new lending at kr. 512 billion.

The proportion of adjustable-rate loan issues relative to traditional fixed-interest loans continues to increase. Variable-rate loans with an interest-rate cap, introduced in late 2004, have become popular, since loans worth more than kr. 60 billions have already been issued.

MORTGAGE-CREDIT INSTITUTES' BUFFER AGAINST LOSSES, 1990-2004

Chart 15



Note: Maximum losses are compiled including actual losses and write-downs. Capital base data for 1990 are not available.
 Source: The Danish Financial Supervisory Authority and annual accounts.

Mortgage-credit institutes' buffer against losses is illustrated in Chart 15. In 2004, the sector as a whole was able to withstand losses of 2.9 per cent. Actual losses and write-downs amounted to 0.0 per cent of the lending portfolio.

The banking institutions' sales of mortgage-credit products are in some cases linked to a guarantee vis-à-vis the mortgage-credit institute. The banking institution provides a guarantee for the "last-ranking" part of the mortgage-credit loan for a limited number of years against guarantee commission¹. In practice, under the guarantee system the intermediary banking institution assumes most of the credit risk associated with the mortgage-credit loan.

PENSION COMPANIES

Life-insurance companies and pension funds, jointly referred to as pension companies, form part of the Danish financial sector and may affect the banking institutions both directly, for instance through ownership, and indirectly, for example through the financial markets.

Higher global equity prices and declining interest rates in the euro area and Denmark meant that, in general, the pension companies achieved a higher return on investments in 2004, cf. Chart 16. Virtually all pension companies recorded a return equal to or higher than the maximum interest-rate guarantee given to policyholders of 4.5 per cent after tax. According to the annual reports published before contributions to this report were finalised,² few pension companies experienced problems with the yellow-light stress test scenario of the Danish Financial Supervisory Authority at the close of 2004.

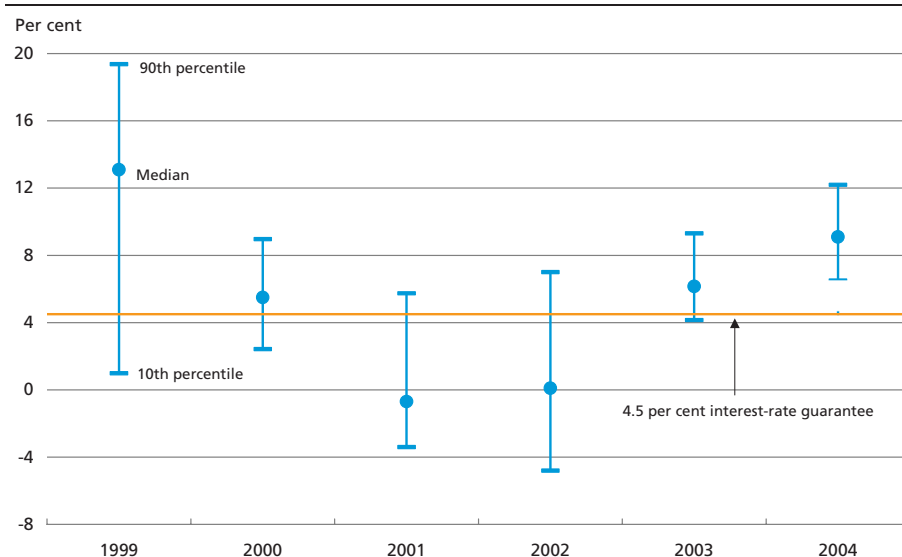
For the pension companies, declining interest rates in 2004 generated significant capital gains on their bond portfolios. However, lower interest rates are a double-edged sword for the pension companies. Firstly, because lower interest rates entail re-investing at a lower rate, which, in the longer term, serves to reduce the companies' current returns. Secondly, because the liabilities of the pension companies are typically more exposed to interest-rate changes than their assets, implying that an interest-rate decline may eventually make it more difficult for the pension compa-

¹ For owner-occupied housing mortgaged at 80 per cent of the property value, the banking institutions may e.g. guarantee the last-ranking 20 percentage points.

² The Danish Financial Supervisory Authority has developed two stress testing scenarios, the red and the yellow risk scenarios, which the pension companies are required to report to the Danish Financial Supervisory Authority. The red risk scenario assumes a change in interest rates of 0.7 percentage points in the direction entailing the highest losses; a fall in stock prices by 12 per cent; a decline in real estate prices by 8 per cent; and losses in connection with credit, counterparty and exchange-rate risks. The yellow risk scenario assumes a change in interest rates by 1.0 percentage point in the direction entailing the highest losses; a fall in stock prices by 30 per cent; a decline in property prices by 12 per cent; and losses in connection with credit, counterparty and exchange-rate risks.

RETURN AFTER TAX IN THE PENSION COMPANIES, 1999-2004

Chart 16



Note: A number of pension companies had not published their annual accounts for 2004 before contributions to this report were finalised. Therefore, the 2004 figures are estimates, based on a number of published annual accounts.

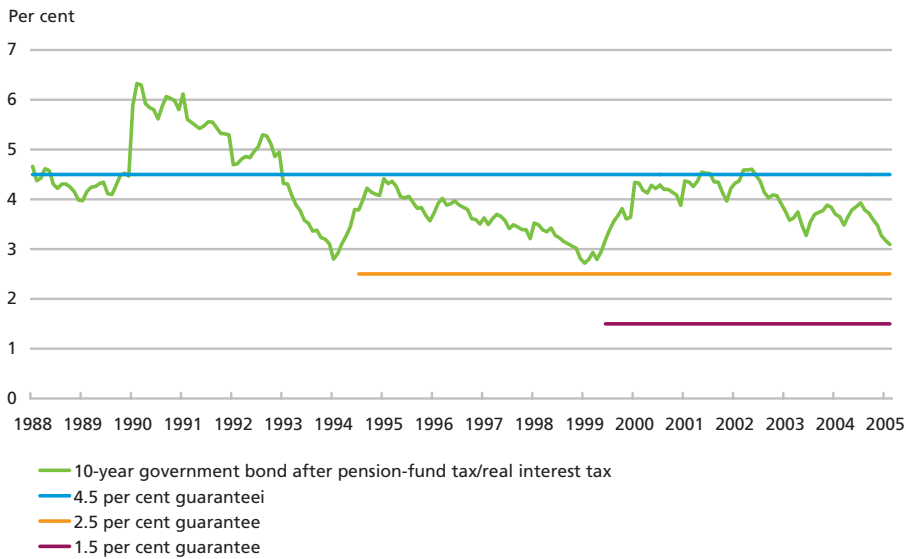
Source: The Danish Financial Supervisory Authority and annual accounts.

nies to fulfil their obligations. To several pension companies, the interest-rate risk of their liabilities is closely linked to nominal interest-rate guarantees previously given. From 1982 until mid-1994, the pension companies were thus free to guarantee the pension savers a minimum annual return after tax of 4.5 per cent over the life of the pension. In 1994, the Danish Financial Supervisory Authority lowered the rate to 2.5 per cent, followed by a further lowering, to 1.5 per cent, in 1999.

In step with the general decline in Danish interest rates, the 4.5 per cent guarantees, in particular, have become difficult to meet. Throughout most of the 1990s and until today, the yield on the 10-year government bond after tax has thus not been able to cover the 4.5 per cent guarantees, cf. Chart 17. Consequently, many pension companies have chosen to hedge their interest-rate risk either fully or partly through financial instruments.

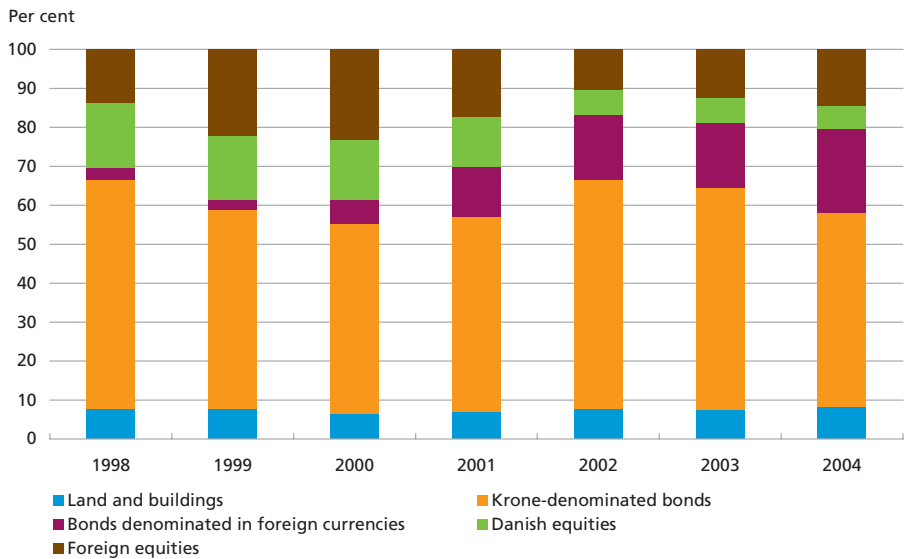
With bonds accounting for 72 per cent of the investment assets, the current low level of interest rates means that the pension companies must increasingly rely on the return on other investment assets to meet the interest-rate guarantees in the longer term. In 2004, the pension companies decided to increase their equity portfolios at the expense of bonds, cf. Chart 18. At the same time, the pension companies reduced their holdings of domestic assets, in the form of equities as well as bonds, to acquire foreign assets.

MAXIMUM GUARANTEED INTEREST RATES AND YIELD TO MATURITY OF A 10-YEAR GOVERNMENT BOND AFTER PENSION-FUND TAX / REAL INTEREST TAX, 1988-2005 Chart 17



Note: As from 2000, the Pension-Fund Tax Act replaced the Real Interest Tax Act. The maximum guaranteed interest rates are shown after deduction of expense and contingency loading, typically of 0.5 percentage points.
Source: The Danish Financial Supervisory Authority, the Danish Ministry of Taxation and Danmarks Nationalbank.

DEVELOPMENT IN THE PENSION COMPANIES' INVESTMENT ASSETS, 1998-2004 Chart 18



Note: A number of pension companies had not published their annual accounts for 2004 before contributions to this report were finalised. Therefore, the 2004 figures are estimates, based on a number of published annual accounts. Other investment assets are not included.
Source: Annual accounts and the Danish Financial Supervisory Authority.

The Corporate Sector and the Households

In 2004, the earnings capacity of the Danish corporate sector was generally unchanged compared to 2003. The decline in earnings experienced by the weakest companies in recent years seems to have stopped, and the strongest companies are still performing well.

This pattern is supported by the failure-rate model, in which the estimated failure rates for the weakest companies generally stagnated in 2004 after having risen for several years. On the basis of the development in estimated failure rates and the distribution of lending to the corporate sector, the banking institutions' losses are expected to remain low in the immediate future.

The finances of the Danish households have improved during the past year, e.g. because disposable real incomes have risen. The households' debt continues to increase at a higher rate than their income, but falling interest rates and more loans with shorter fixed-interest periods have more than neutralised the budget impact of the households' growing indebtedness. The debt composition of homeowners is still shifting in the direction of more adjustable-rate loans, which increases their interest-rate exposure.

THE SIGNIFICANCE OF THE CORPORATE SECTOR AND THE HOUSEHOLDS TO FINANCIAL STABILITY

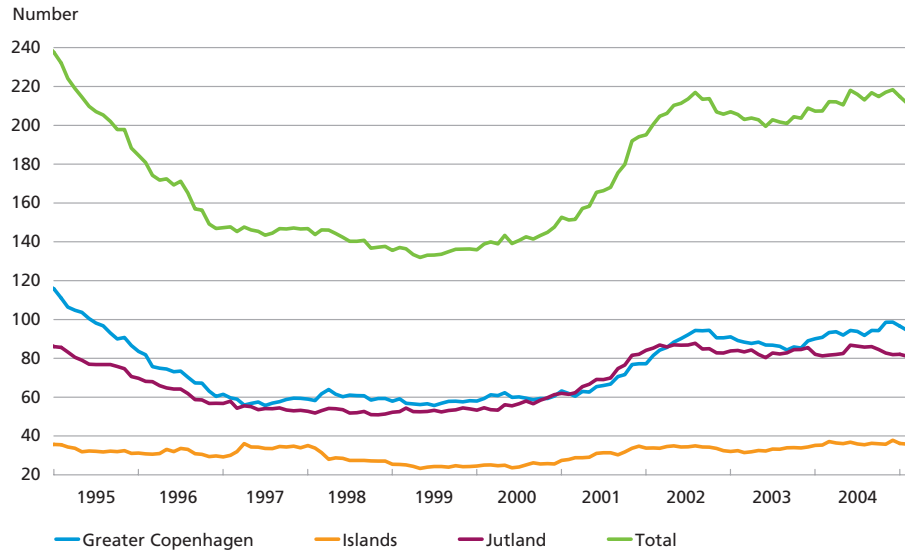
Extending credit to the corporate sector and the households is one of the primary functions of the banking institutions. In doing so, the banking institutions incur a credit risk. The finances of the corporate sector and the households and their robustness to adverse developments have an impact on the banking institutions' earnings and balance sheets and thus on financial stability.

CORPORATE SECTOR

Since mid-2003 the Danish economy has seen a cyclical upturn, primarily driven by domestic demand. The development in exports has been more dampened in recent years, reflecting low growth in a number of important export markets. Furthermore, the strengthening of the effective krone rate and a higher rate of wage increase than abroad have also had an adverse impact on competitiveness. The upturn has been most

NUMBER OF COMPULSORY LIQUIDATIONS IN THE CORPORATE SECTOR,
1995-2005

Chart 19



Note: The Chart shows monthly observations for the number of compulsory liquidations calculated as a 12-month moving average.

Source: Statistics Denmark.

pronounced in the building and service sectors, which mainly cater to the domestic market, while more subdued development has been seen in manufacturing, which is more export-oriented. Corporate investments in new technology have been at a high level for a number of years. The low level of interest rates and the prospects of sustained growth in the Danish and international economies, including higher growth in the euro area, provide the basis for continued growth in investments and underline the generally positive outlook for the Danish corporate sector.

This view is supported by the banking institutions' lower loan losses in 2004, cf. the chapter on the financial sector. In the short term, rising interest rates are deemed to constitute a risk to the corporate sector. The chapter on financial markets elaborates on market expectations of interest rates.

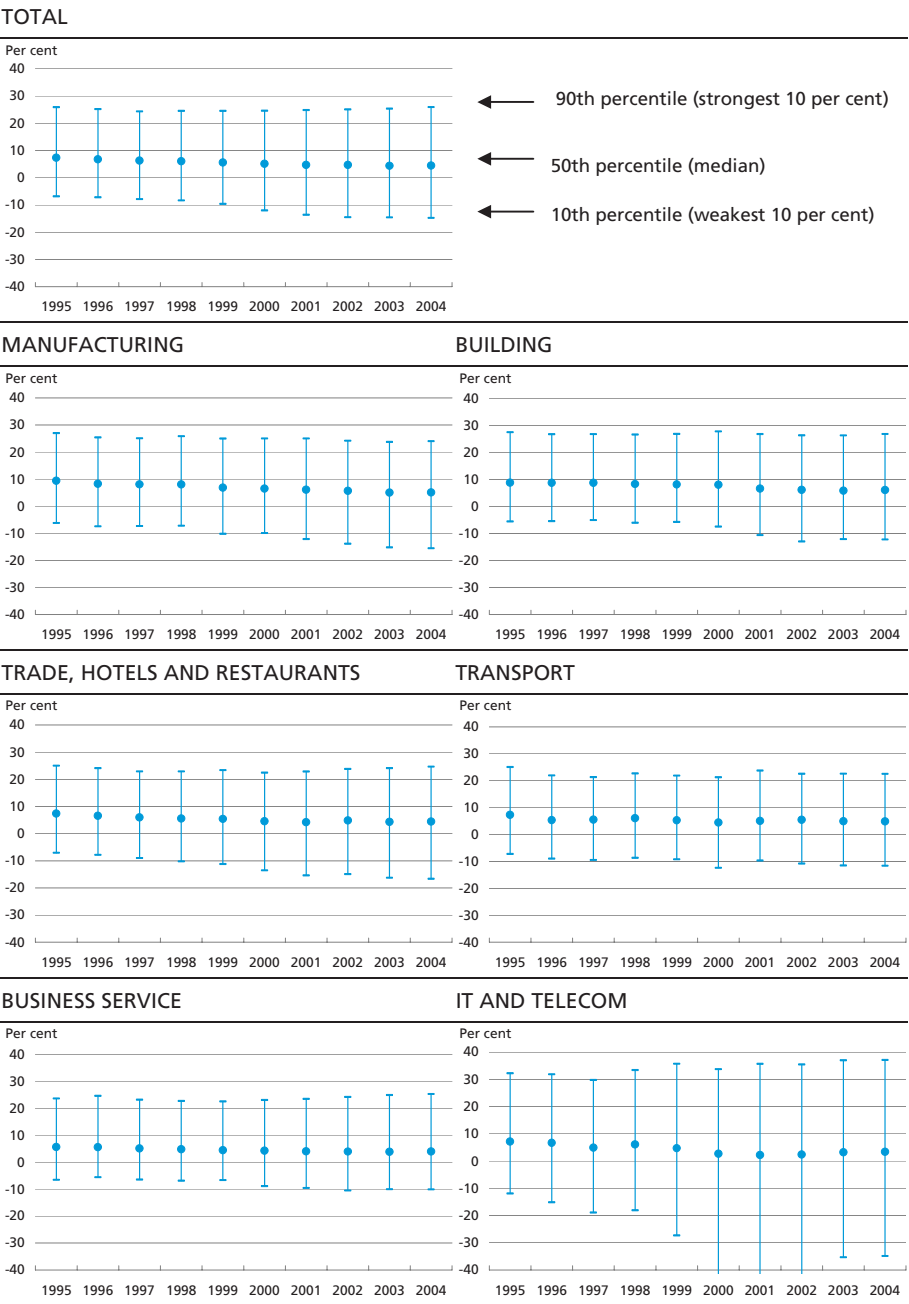
The incidence of compulsory liquidation in the Danish corporate sector has been stable in recent years. This development covers minor geographical variations, cf. Chart 19.

Development in the companies' key figures

Overall, the return on assets in Danish public and private limited liability companies remained almost unchanged in 2004 compared to 2003, but the spread between the companies has increased, cf. Chart 20. Among

RETURN ON ASSETS EXPRESSED AS THE 10TH, 50TH AND 90TH PERCENTILES, 1995-2004

Chart 20



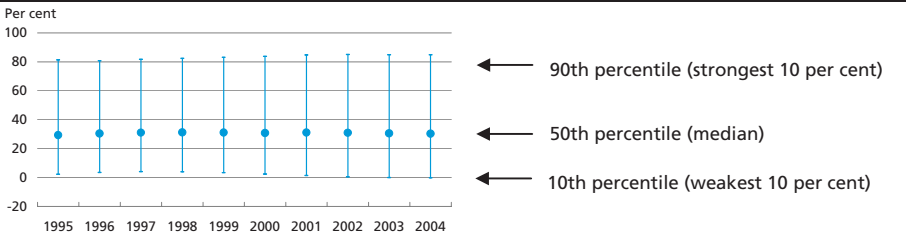
Note: The return on assets is defined as the primary operating result as a ratio of total assets. In the IT and telecom sector, the return on assets for the 10th percentile was around -50 per cent in 2000-02. Business service comprises real estate letting and administration, rental of cars, machinery and other equipment, legal services, consultant engineering services and auditing and other similar consulting and service.

Source: KOB and own calculations.

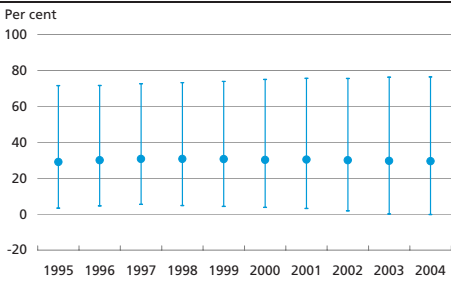
SOLVENCY RATIO EXPRESSED AS THE 10TH, 50TH AND 90TH PERCENTILES,
1995-2004

Chart 21

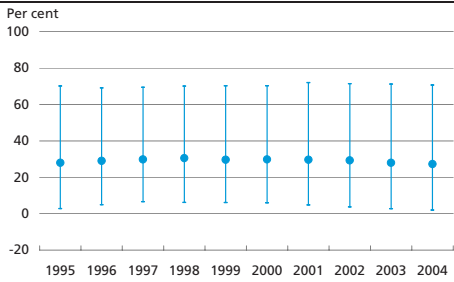
TOTAL



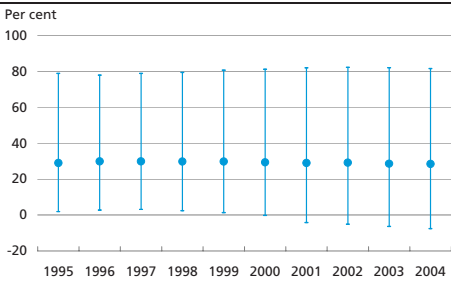
MANUFACTURING



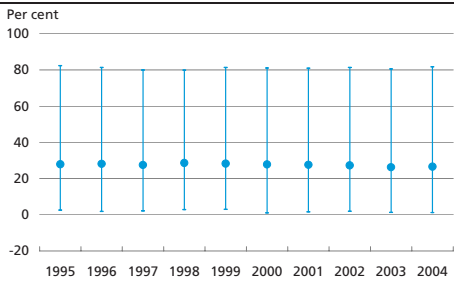
BUILDING



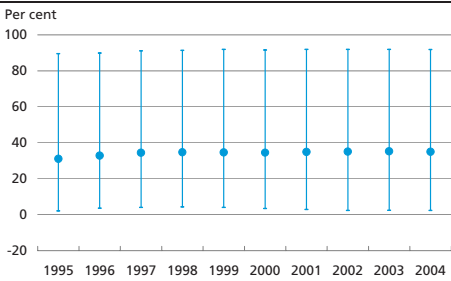
TRADE, HOTELS AND RESTAURANTS



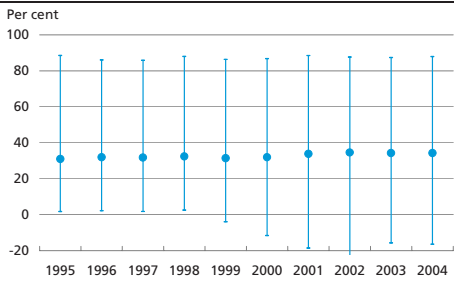
TRANSPORT



BUSINESS SERVICE



IT AND TELECOM



Note: The solvency ratio is defined as equity capital as a ratio of total liabilities. In the IT and telecom sector, the solvency ratio was -26 per cent in 2002. Business service comprises real estate letting and administration, rental of cars, machinery and other equipment, legal services, consultant engineering services and auditing and other similar consulting and service.

Source: KOB and own calculations.

the 10 per cent of companies with the highest return on assets, the return as a ratio of total assets has been increasing slightly since 2001. Expressed as the 90th percentile, these companies yielded a return on assets higher than or equal to 26 per cent in 2004. For the lowest 10 per cent, the return on assets has remained unchanged at less than or equal to -15 per cent since 2002.

The companies' ability to withstand losses, measured as the solvency ratio, remained virtually unchanged in 2004. The IT and telecom sector stands out as the only sector where the solvency ratio of the 10 per cent weakest companies improved between 2002 and 2004, albeit from the lowest starting point, cf. Chart 21.

DANISH AGRICULTURE

Box 5

While the development in most other sectors is reflected in data from KOB, this does not apply to the Danish agricultural sector since few farms are operated as public or private limited liability companies. Accounts from the Food and Resource Economics Institute for 2004 will not be available until the autumn of 2005.

In 2003, agriculture's average operating result fell to kr. 94,000 per full-time farm business. For pig farmers, 2003 was a poor year. The average return on assets fell further, to 3.6 per cent, which is very low compared to other sectors. The Danish Agricultural Advisory Service expects the 2004 figures to be even worse as a consequence of poor earnings across the board. In 2005 agricultural earnings are expected to rise considerably, primarily among dairy and pig farmers, although this prognosis is very uncertain since the financial consequences of the EU's agricultural reform are to a large extent unknown.

Structural adjustments within agriculture with a shift to fewer and larger farms – primarily cattle and pig farms – entail a sustained high level of investments in the agricultural sector. The high level of investments and the poor operating results in the last two years have increased the demand for external financing, and consequently the average solvency ratio in agriculture declined from 43 per cent in 2002 to 39 per cent in 2003. However, the solvency ratio of the agricultural sector remains relatively high compared to other sectors due to high land prices. Besides the level of interest rates and the earnings and production potential in the agricultural sector, the development in land prices is influenced to a great extent by framework conditions such as environmental requirements and various EU programmes.

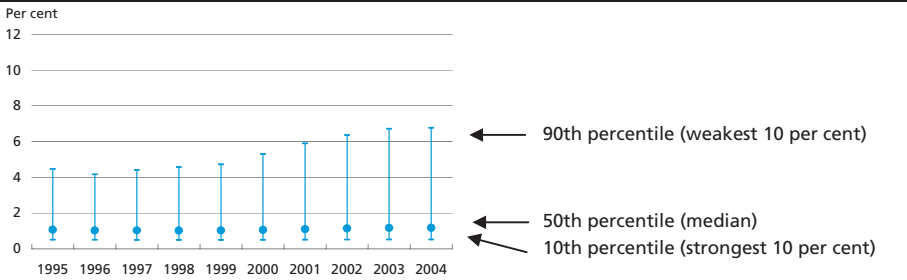
Earnings in 2003 and expected earnings in 2004 show that agriculture is experiencing difficulties in achieving sufficient income in relation to the work effort and an adequate return on the capital invested. The low earnings and growing indebtedness, as well as the uncertainty relating to the consequences of the EU's agricultural reform, make the agricultural sector vulnerable to any possible rising interest rates and falling land prices.

Agriculture is mainly financed via mortgage-credit institutes. Agriculture accounts for 29 per cent of total lending by mortgage-credit institutes to the corporate sector. In the banking sector, the ratio of lending to agriculture is highest among the smaller banks. Lending to agriculture thus constitutes more than 20 per cent of lending to the corporate sector for 64 per cent of the category C banks, but only 17 per cent of the category B banks.

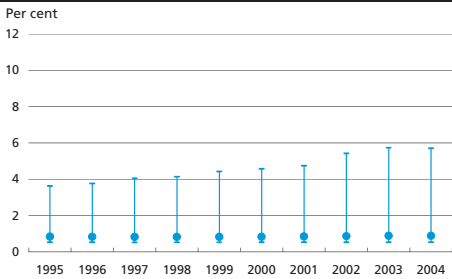
ESTIMATED FAILURE RATES EXPRESSED AS THE 10TH, 50TH AND 90TH PERCENTILES, 1995-2004

Chart 22

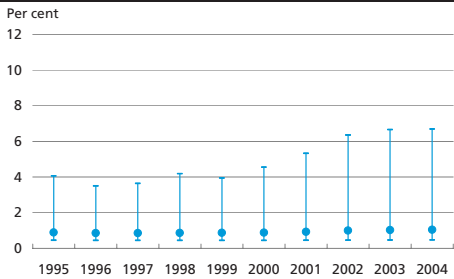
TOTAL



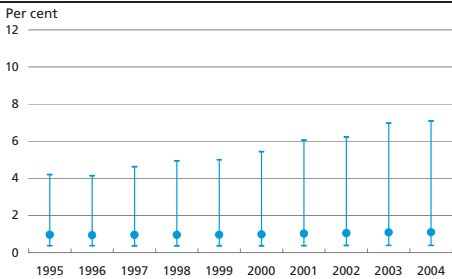
MANUFACTURING



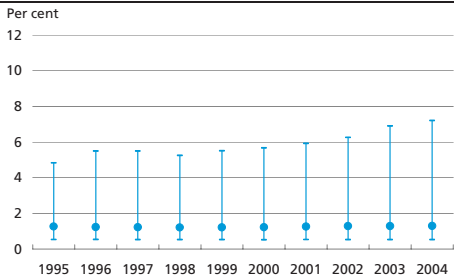
BUILDING



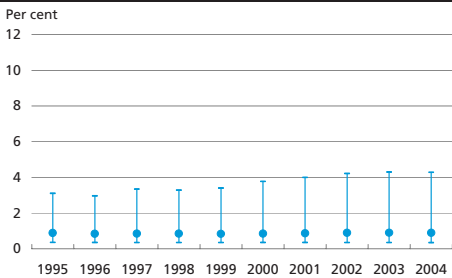
TRADE, HOTELS AND RESTAURANTS



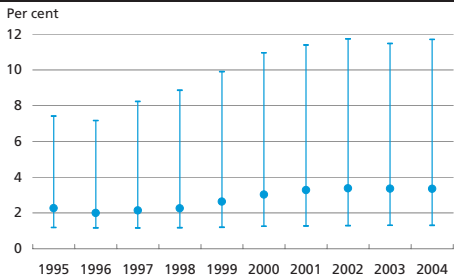
TRANSPORT



BUSINESS SERVICE



IT AND TELECOM



Source: KOB and own calculations.

The financial sector's exposure to the corporate sector

Annual growth in lending by banking institutions to the corporate sector was significantly higher throughout 2004 and into 2005 than in 2003. Growth in lending by mortgage-credit institutes to the corporate sector was stable in the same period. Corporate investments as a ratio of the gross domestic product at factor cost have been rising since mid-2003, which could explain the increase in lending by banking institutions to the corporate sector in 2004. This time lag between corporate investments and lending growth has also been seen in previous cyclical upturns. At end-February 2005, total lending by banking institutions to the corporate sector was kr. 320 billion, while the equivalent figure for mortgage-credit institutes was kr. 315 billion.

Estimated failure rates by sector

On the basis of Danmarks Nationalbank's failure-rate model, the general robustness of the Danish corporate sector is assessed to have been unchanged in 2004 compared to 2003. The rising tendency in the estimated failure rates of the weakest 10 per cent of the companies seen in recent years has been broken in several sectors, and the widening of the spread in estimated failure rates has also stopped. This is attributed to improved macroeconomic conditions, but the median estimated failure rate in 2004 remained at the same level as in recent years, cf. Chart 22. The failure-rate model is described in Box 6.

The interval between the 90th and 10th percentiles indicates the spread between respectively the weakest and strongest 10 per cent of the companies in each sector. This spread can be seen as an expression of the uncertainty associated with extending credit to each sector.

At sector level, the most robust sector is business service, comprising e.g. real estate administration, engineering services and auditing. The negative development in the IT and telecom sector seems to have been halted.

Expected losses by sector

The largest share of lending by banking institutions to the corporate sector comprises lending to the business service sector, cf. Chart 23, and this share rose from 2003 to 2004. This sector also has the lowest estimated failure rate. The banking institutions' losses by sector depend on the distribution of lending to corporate customers, as well as the robustness of the individual companies. Estimated failure rates for the individual companies within a sector are therefore used to calculate a sector-specific expected loss ratio for bank debt, cf. Box 7. The loss ratio is defined as the expected losses as a percentage of the sector's total

FAILURE-RATE MODEL¹

Box 6

Based on a company's accounts, Danmarks Nationalbank's failure-rate model can be used to estimate the probability of the company failing within the next few years. The estimated failure rate can be seen as a weighted index of key figures, etc. The failure-rate model does not include agriculture.

Compared to the sector-specific failure-rate model presented in *Financial stability 2004*, a number of improvements have been introduced, mainly of a technical nature. The model's estimation period has been extended to comprise the years 1995-2001, but it still does not cover an entire economic cycle, which may affect the level of the estimated failure rates. The technical estimation method has been fine-tuned. The model now takes into account that companies may close down for various reasons: financial difficulties, voluntary closure, acquisition, etc. In the literature, this type of model is known as a competing-risks model². In addition, the model's explanatory variables have been adjusted and extended slightly.

Variables

The model includes ten explanatory variables, i.e. four quantitative variables and six dummy variables. The sign in parenthesis indicates the influence on the estimated failure rate.

- Reduction of the capital base (+). The dummy variable is set at 1 if the company repeats the deficit for the year, whereby the company's equity capital falls below the required capital.
- Size (-). Logarithm of total assets.
- Solvency (-). Equity capital as a ratio of total assets.
- Auditors' comment (+). The dummy variable is set at 1 if the auditors' comment in the accounts is critical.
- Form of ownership (+). The dummy variable is set at 1 if the company is a private limited liability company.
- The company's return on assets adjusted for sector (-). The company's return on assets relative to the median return for the sector.
- Age (+). The dummy variable is set at 1 if the company is less than five years old.
- Debt ratio (+). Short-term debt as a ratio of total assets.
- Diversification (-). Dummy variables describing the number of sectors and/or sub-sectors in which the company operates.
- Municipality group (-). Dummy variables ranking the companies by municipality group with Greater Copenhagen as the reference group.

Continued

¹ For a more detailed review of the failure-rate model, see Lykke, Morten, Kenneth Juhl Pedersen and Heidi Mølgaard Vinter, *A Failure Rate Model for the Danish Corporate Sector*, Danmarks Nationalbank, working paper no. 16, 2004.

² For a more detailed review of the technical estimation method, see Dyrberg, Anne, *Firms in Financial Distress: An Exploratory Analysis*, Danmarks Nationalbank, working paper no. 17, 2004.

bank debt and thus indicates the risk of losses within the next few years on lending to the sector in question.

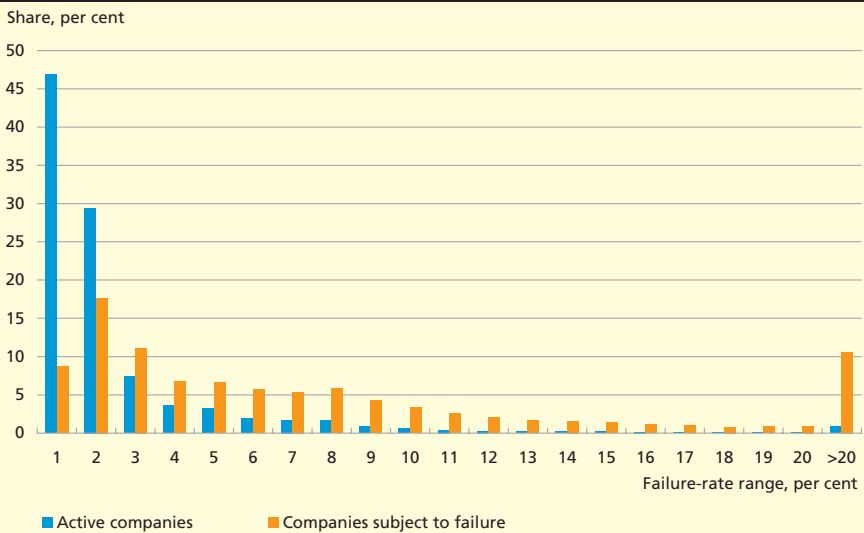
Data

The model was estimated on the basis of a KOB database comprising the annual accounts of Danish public and private limited liability companies. The estimation period 1995-2001 includes around 400,000 financial statements, of which approximately 8,900 relate to companies subject to failure. The latter are the latest accounts from active companies before they fail. The average period from the presentation of the last accounts as an active company to the time when the company fails is just under two years. A company is regarded as having failed in the following situations: Compulsorily liquidated, subject to compulsory liquidation, dissolved, compulsorily dissolved, subject to compulsory dissolution, compulsory composition confirmed, compulsory composition being negotiated. This broader definition provides a better link to the time when the payment problems arose.

Estimated failure rates

The distribution of estimated failure rates in the general model indicates when the probability of failure is relatively high or low, cf. the Chart below. 50 per cent of the active companies have an estimated failure rate below 1.0 per cent, while 50 per cent of the companies subject to failure have an estimated failure rate below 4.8 per cent.

DISTRIBUTION OF COMPANIES' ESTIMATED FAILURE RATES FOR THE COMING YEARS

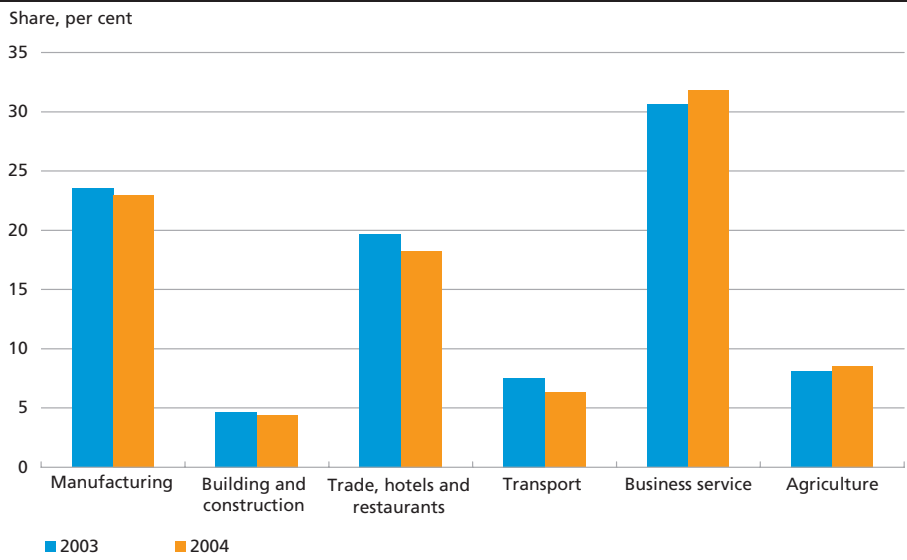


Note: The value "1" on the x axis indicates that the companies within this range have an estimated failure rate of above 0 and below or equal to 1 per cent. ">20" indicates all estimated failure rates above 20 per cent. The estimated failure rate for companies subject to failure is based on the latest accounts before failure.

Source: Own calculations.

BANKING INSTITUTIONS' CORPORATE LENDING BY SECTOR,
END-2003 AND END-2004

Chart 23



Note: Lending is calculated as lending by sector as a ratio of total corporate lending by banking institutions. The calculation is based on the institutions' reporting in full to the MFI balance-sheet statistics. IT and telecom, which is mainly comprised by the business service sector, cannot be shown as a separate sector. Business service also comprises real estate letting and administration, rental of cars, machinery and other equipment, legal services, consultant engineering services and auditing and other similar consulting and service.

Source: Danmarks Nationalbank.

CALCULATION OF EXPECTED LOSS RATIO FOR BANK DEBT

Box 7

The expected losses for each individual company are calculated as the probability that the company fails multiplied by the loss given failure. The bank debt is weighted to reflect the circumstance that, in most cases, the creditor recovers some of the debt. The calculation assumes that all short-term bank debt is lost, while only half of the long-term bank debt is lost.

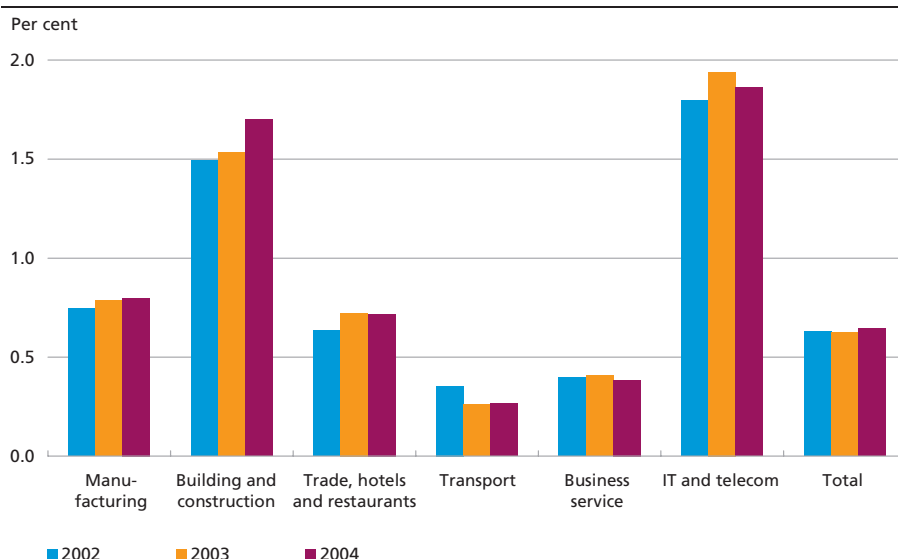
The expected loss ratio at sector level is then estimated by calculating the sum of the expected losses on the individual companies in the sector in question as a ratio of total bank debt in the sector, cf. the formula below.

Expected loss ratio in sector j=

$$\frac{\sum_{i=1}^n p_i \cdot (D_i^{short} + \frac{1}{2}D_i^{long})}{\sum_{i=1}^n D_i}$$

where D_i is bank debt, and p_i is the estimated failure rate for the company i .

Note: Only companies specifying bank debt are included in the calculation.

EXPECTED LOSS RATIO FOR BANK DEBT IN THE CORPORATE SECTOR, 2002-04 Chart 24

Note: Total comprises all public and private limited liability companies in the sectors listed, as well as companies with the sector code "unknown". Companies in this category are often young.

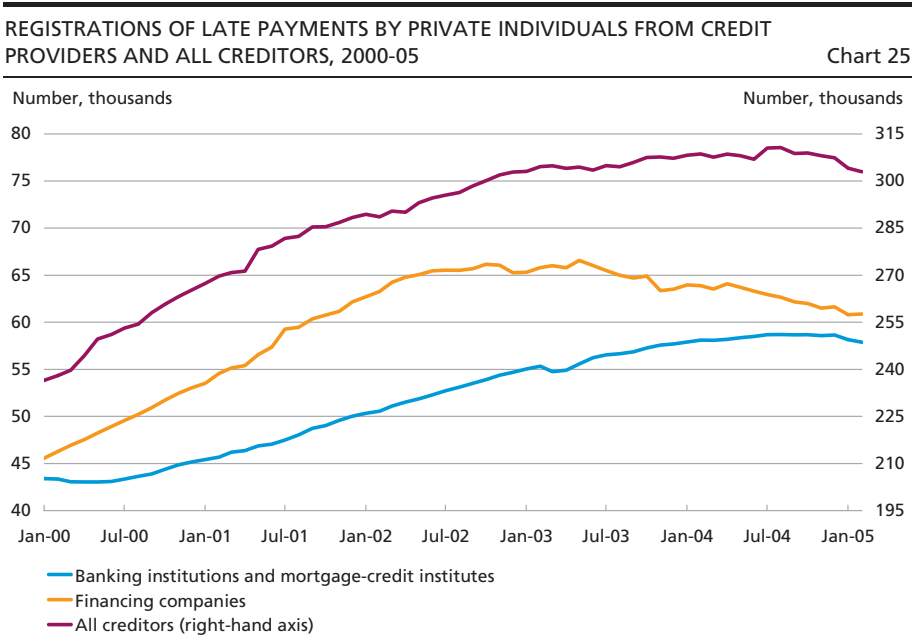
Source: KOB and own calculations.

Overall, the expected loss ratio on lending to the corporate sector was virtually constant in the period 2002-04, cf. Chart 24. The reason may be that the banking institutions have mainly increased credit extension to companies with low estimated failure rates. The expected loss ratio in the building and construction sector is relatively high and increased in 2004, but lending to this sector constitutes only a small percentage of the banking institutions' total lending. The lower expected loss ratio in the IT and telecom sector reflects, *inter alia*, the development in this sector's estimated failure rates in recent years. The increase in lending to the business service sector, in particular, has not resulted in a higher expected loss ratio.

HOUSEHOLDS

The finances of the Danish households have improved during the past year. Tax cuts and low inflation have contributed to a significant rise in the households' disposable real incomes. These factors, combined with increased employment and the very low level of interest rates, have contributed to strong growth in private consumption, and in early 2005 consumer confidence reached its highest level since 1998.

The substantial increase in the households' disposable real incomes is also reflected in the number of registrations of late payments with RKI.



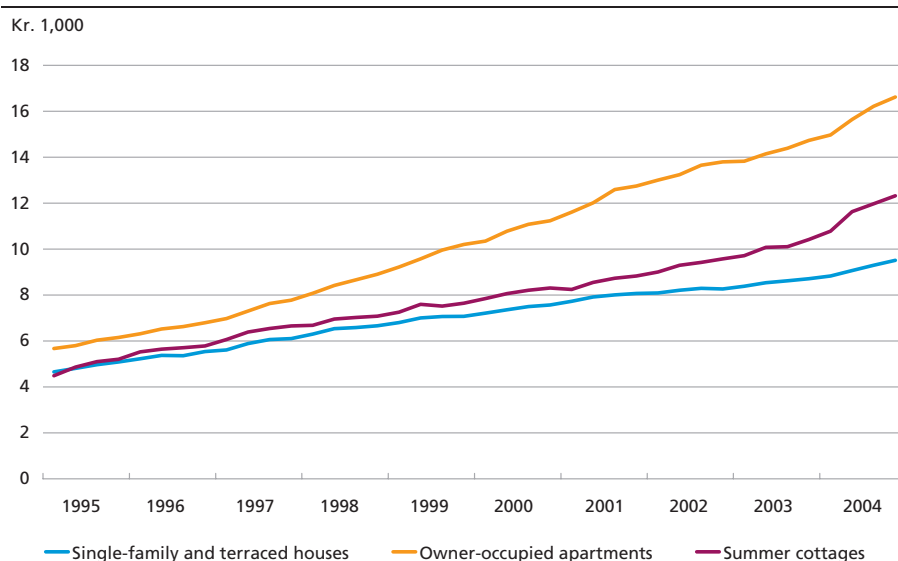
The number has been falling since mid-2004 after having risen almost constantly since 1999. For financing companies, this tendency has been registered for an even longer period of time, cf. Chart 25.

The number of enforced sales of owner-occupied homes fell throughout 2004 and early 2005. At national level, the prices of single-family houses and terraced houses rose by 9 per cent in 2004, which is the highest rate of increase since 1998, and the average price per square metre is approximately kr. 9,500, cf. Chart 26. However, there are considerable regional differences, with Copenhagen and Northern Zealand as the absolute "high jumpers". The sustained increase in housing prices should be viewed against the background of the low interest rates, the new loan types, the tax freeze and a low supply in the housing market. In the same period, the prices of summer cottages rose by 18 per cent, and on average a summer cottage now costs kr. 2,800 more per square metre than a single-family house. The prices of owner-occupied apartments rose by 13 per cent in 2004.

The development in housing prices has underpinned the improved finances of the households. As explained in the chapter on the interest-rate exposure of Danish homeowners, the free mortgageable value of Danish homes is considerable, and the average interest costs of Danish homeowners will increase by 1 per cent of their income before tax if the short-term interest rate increases by 1 percentage point.

PRICE PER SQUARE METRE FOR HOUSING IN DENMARK, 1995-2004

Chart 26



Source: Association of Danish Mortgage Banks.

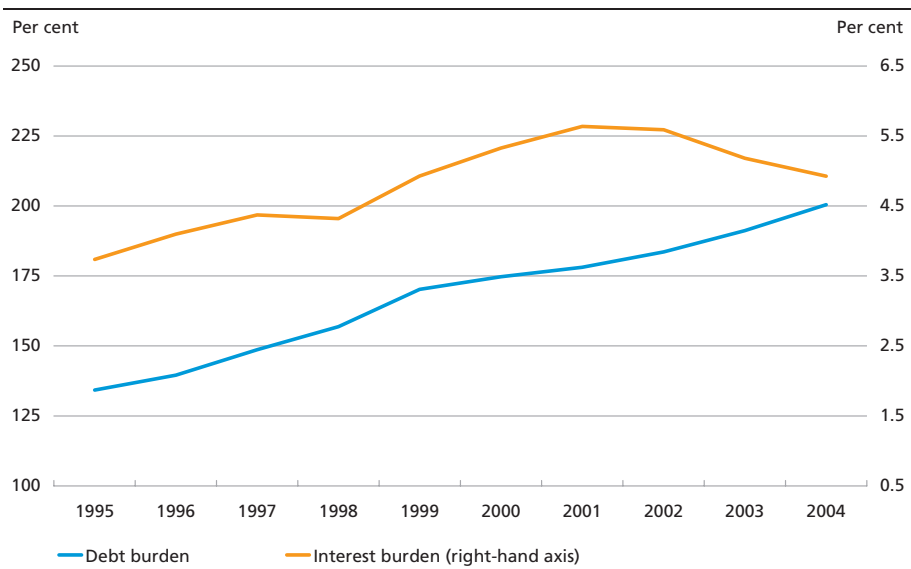
No major regional differences were seen in the development in unemployment and the number of enforced sales in Denmark in 2004. Greater Copenhagen had the lowest number of enforced sales and the lowest unemployment rate.

The financial sector's exposure to the households

In 2004, the total debt of the households continued to rise at a higher rate than their disposable income, which means that the debt burden of the households has increased, cf. Chart 27. Falling interest rates and more loans with shorter fixed-interest periods have, however, more than neutralised the budget impact of the growing indebtedness since interest costs as a ratio of income (the interest burden) fell in 2004 compared to 2003.

Growing indebtedness among Danish households is not a new phenomenon. This trend has been relatively constant for the last 10 years. Since 2001, total annual growth in lending by banking institutions and mortgage-credit institutes to the households has been stable at around 8-9 per cent, cf. Chart 28. During the past year, the households' behaviour has, however, changed, both in terms of loan types and choice of credit providers. Every single month throughout 2004, mortgage-credit institutes thus issued more adjustable-rate loans than traditional fixed-rate loans. This had not been seen previously. In addition, the banking institutions have acquired a larger share of this market from the mortgage-credit institutes. Lending by banking institutions to households in-

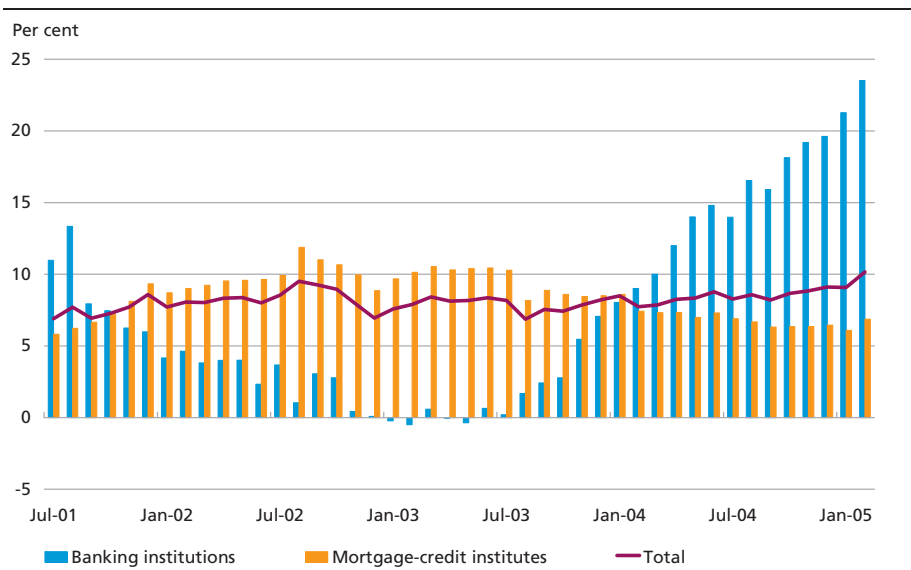
THE HOUSEHOLDS' DEBT AND INTEREST BURDENS, 1995-2004 Chart 27



Note: The debt burden is defined as the households' debt as a ratio of disposable income. The interest burden is defined as net interest expenditure after tax as a ratio of disposable income. Figures for disposable income and net interest expenditure for 2004 are preliminary estimates based on projections by the Ministry of Finance.

Source: Ministry of Finance and Danmarks Nationalbank.

ANNUAL GROWTH IN LENDING TO HOUSEHOLDS BY BANKING INSTITUTIONS AND MORTGAGE-CREDIT INSTITUTES, 2001-05 Chart 28



Source: Danmarks Nationalbank.

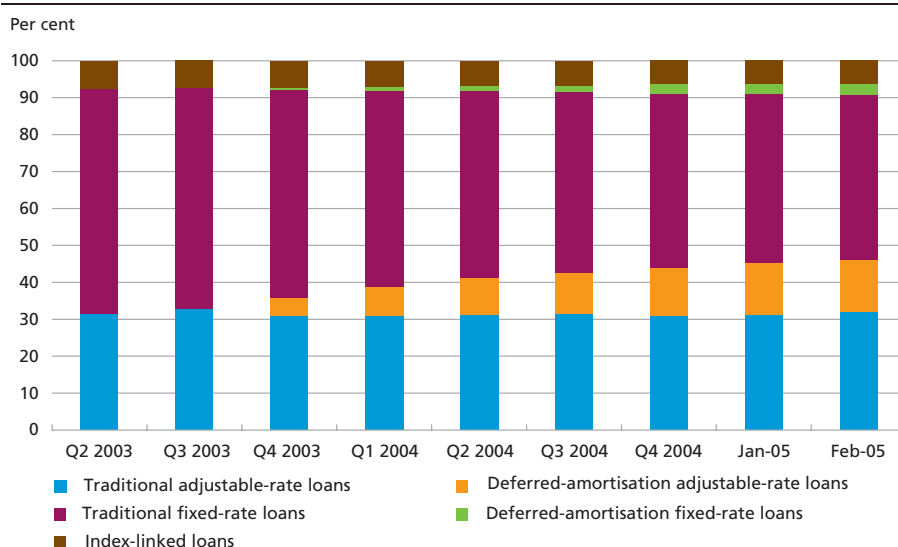
creased significantly during 2004, and in January 2005 the annual growth rate exceeded 20 per cent. This growth is mainly attributable to the introduction, in the 2nd half of 2003, of adjustable-rate bank mortgage loans to homeowners as an alternative to traditional capital-market financing via mortgage-credit institutes. However, mortgage-credit institutes still account for the largest share by far of total lending to the households, viz. 78 per cent. At end-February 2005 lending by mortgage-credit institutes to the households totalled kr. 1,158 billion, while lending by banking institutions amounted to kr. 329 billion.

In addition to a higher ratio of adjustable-rate loans, the introduction on 1 October 2003 of mortgage-credit loans with an option to defer amortisation has had a significant impact on the composition of lending by the mortgage-credit institutes, cf. Chart 29. Traditional fixed-rate mortgage-credit loans now account for less than half the total mortgage-credit volume, while fixed-rate and adjustable-rate mortgage-credit loans with the option to defer amortisation are gaining ground and constituted 17 per cent at end-February 2005.

Consequently, more households have become exposed to fluctuations in the short-term interest rate. This exposure is particularly evident for households that have also opted for deferred amortisation since these households have also made use of the buffer that the possibility of de-

THE MORTGAGE-CREDIT INSTITUTES' OUTSTANDING LENDING BY LOAN TYPE, 2003-05

Chart 29



Source: Danmarks Nationalbank.

ferring amortisation offers¹. In the autumn of 2004 the mortgage-credit institutes launched a new mortgage-credit product comprising adjustable-rate bond loans with a cap on the interest rate. This cap typically applies throughout the term of the loan, i.e. for up to 30 years, and protects the borrower against any increases in interest rates that exceed the cap. However, many households will experience a considerable rise in their costs before the cap is reached. Demand for these loans has been high from day one, and at end-March 2005 the total nominal volume amounted to more than kr. 60 billion.

¹ This is a buffer since a household that experiences higher housing costs as a result of rising interest rates or lower income owing to e.g. unemployment is able to temporarily neutralise part of this impact by switching to a deferred-amortisation loan.

Financial Markets

Equity prices have been on the rise in Denmark and abroad since the spring of 2003. The market assessment of the uncertainty of future equity prices (implied volatility) has returned to a relatively stable level following the market uncertainty during the period from 2001 to mid-2003. The equity prices of major Nordic financial groups (category A) have matched the rises recorded by European banks in 2004.

The European interest-rate market, as opposed to the stock market, has been characterised by great uncertainty as to future interest-rate developments. As a result, implied volatility has been rising since the summer of 2004.

European credit spreads continued to narrow in 2004, though the tendency was not as pronounced as in 2003.

THE SIGNIFICANCE OF FINANCIAL MARKETS TO FINANCIAL STABILITY

Banking institutions' earnings and balance sheets are affected by financial market developments. There is a direct impact through various channels – partly in the form of value adjustments of the banking institutions' bond and stock portfolios and partly through fee and commission income from financial market-related customer services, such as asset management, trading and advisory services in connection with public offerings. Financial markets also have an impact on the financial situation of the banking institutions' clients and financial counterparties.

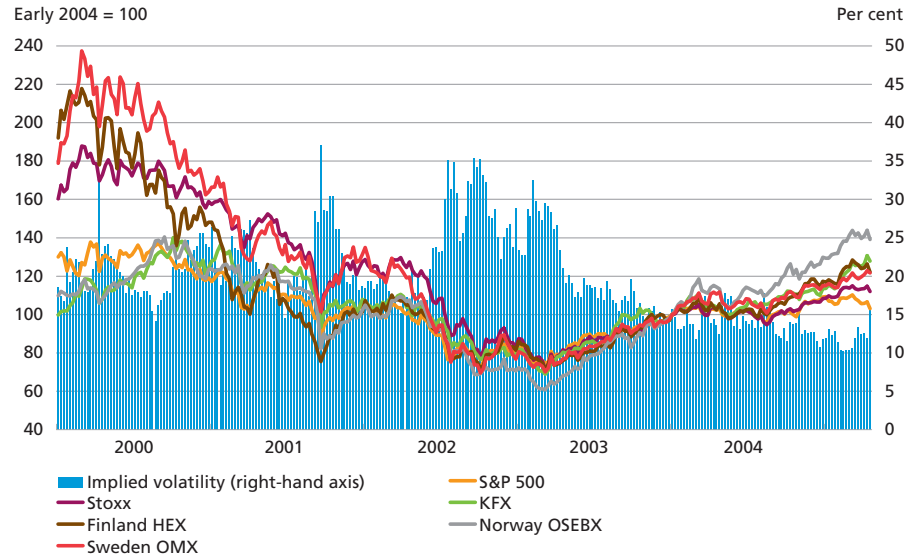
In addition, the general development in the financial markets affects the banks' costs of raising capital through bond or equity issues.

MARKET TRENDS

In general, equity prices have been on the rise in Denmark and abroad since early 2003, cf. Chart 30. This trend was, however, briefly reversed in the summer of 2004 in response, among other things, to disappointing economic indicators, especially in the USA. The high degree of co-variation between various equity indices in 2003 and the 1st half of 2004 was reduced in the 2nd half of 2004 when Norwegian equities, in particular, stood out with large price increases.

EQUITY INDICES IN THE NORDIC COUNTRIES, THE EURO AREA AND THE USA, AND IMPLIED VOLATILITY IN THE USA, 2000-05

Chart 30



Note: Implied volatility is calculated on the basis of put-option prices in the S&P 500 index and is shown as per cent p.a. The Nordic countries are exclusive of Iceland.

Source: EcoWin.

The market assessment of the uncertainty relating to future equity prices can be expressed by implied volatility, calculated on the basis of the price of equity options.

The implied volatility of the US S&P 500 index seems to have returned to a stable level after showing a slightly declining trend throughout 2004, cf. Chart 30. This indicates that the generally high uncertainty in 2001 and late 2002, as well as in early 2003, prompted by the terrorist attacks in the USA and the war in Iraq, no longer has any significant impact on the stock market.

The equity price developments of the major Nordic groups (category A) are illustrated in Chart 31. The equities of these groups have matched the general rise in international stock markets and the equity price development of banks in the euro area since early 2003.¹

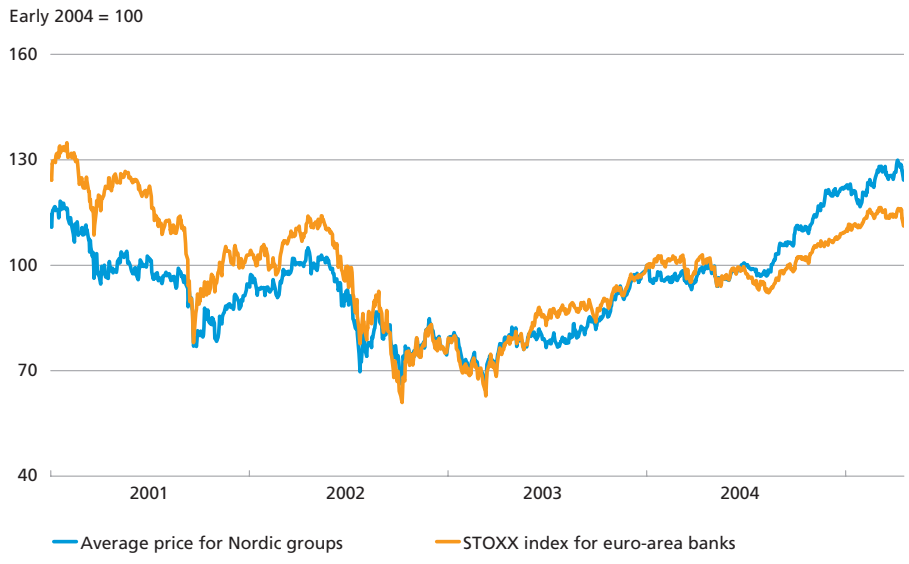
The equity prices of the Nordic groups outperformed the equity prices of banks in the euro area in the 2nd half of 2004. This is probably attributable to the more favourable economic conditions in the Nordic countries than in the euro area in general.

Yields on 10-year government bonds in Europe and the USA have declined by approximately 0.9 and 0.5 percentage points, respectively, since the summer of 2004, cf. Chart 32. Having moved in tandem in the

¹ For more information on stock prices and volatility, see the chapter on analysis of bank equity prices.

AVERAGE EQUITY PRICES FOR NORDIC GROUPS AND EQUITY INDICES FOR
EURO-AREA BANKS, 2000-05

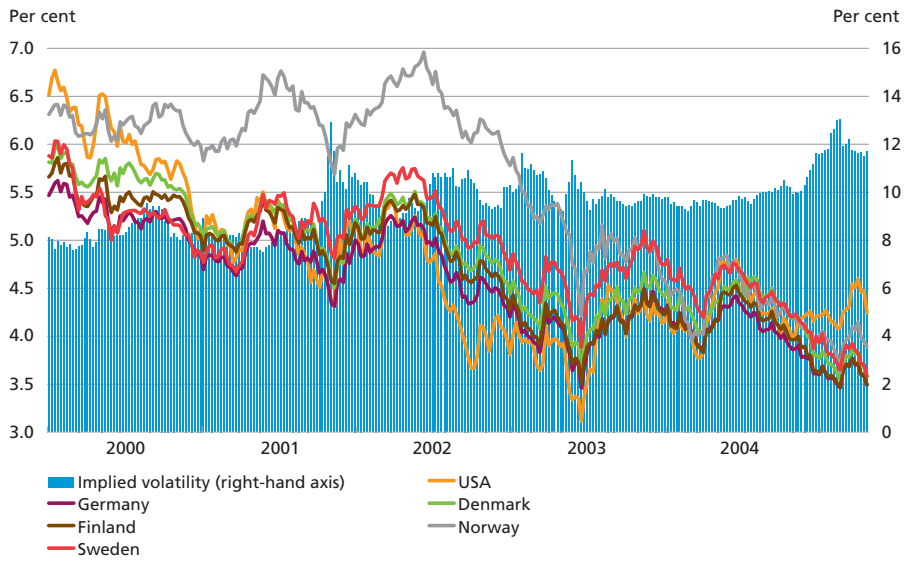
Chart 31



Note: STOXX is a value-weighted index.
Source: Bloomberg.

10-YEAR YIELDS IN THE NORDIC COUNTRIES, GERMANY AND THE USA,
AND IMPLIED VOLATILITY IN THE EURO AREA, 2000-05

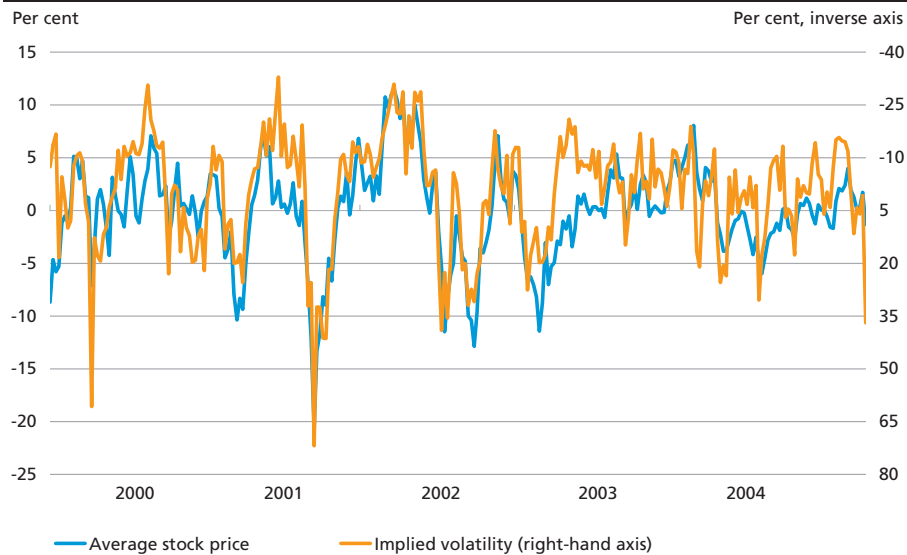
Chart 32



Note: Implied volatility is calculated on the basis of prices of a 20-year euro swaption, which, after 10 years, gives the holder the right, for a period of 10 years, to receive a 10-year fixed yield, while paying a variable rate of interest.
Source: EcoWin.

AVERAGE EQUITY PRICES IN THE NORDIC COUNTRIES, THE EURO AREA AND THE USA, AND IMPLIED VOLATILITY IN THE USA, DEVIATION FROM TREND, 2000-05

Chart 33



Note: Deviation from HP filtered series ($\lambda = 32,000$).

Source: EcoWin and own calculations.

1st half of 2004, European and US yields were decoupled in the 2nd half of 2004, since US yields started rising, while European yields continued to fall. The greater decline in European yields relative to US yields may be ascribed to uncertainty as to the strength of the economic upswing in Europe, as well as to prospects of continued monetary-policy tightenings in the USA.

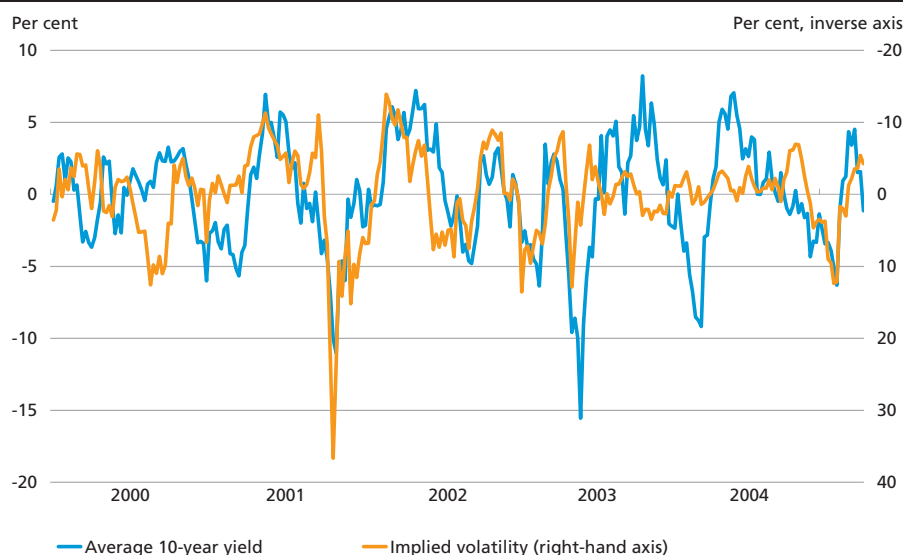
In the wake of the decoupling of European and US yields, uncertainty as to future interest-rate developments in Europe, measured in terms of implied volatility, increased sharply and was at a relatively high level at the beginning of 2005. In addition to the element of uncertainty, part of the rise in implied volatility may be explained by a strong demand for hedging the risk of higher interest rates, cf. Box 9. The implied volatility in Chart 32 has been calculated for options with a maturity of 10 years.

In the short term, equity prices and interest-rate developments match the development in implied volatility fairly closely. Higher implied volatility in stock markets typically translates into declining equity prices, while higher implied volatility in the bond market typically results in lower interest rates, cf. Charts 33 and 34. The Charts illustrate the development in equity prices and bond yields relative to their respective trends, compared with the corresponding development in implied volatility.

This correlation is especially pronounced for equities, the likely explanation being that investors are looking to protect themselves against

AVERAGE 10-YEAR YIELDS IN THE NORDIC COUNTRIES, GERMANY AND THE USA, AND IMPLIED VOLATILITY IN THE EURO AREA, DEVIATION FROM TREND, 2000-05

Chart 34



Note: Deviation from HP filtered series ($\lambda = 32,000$).

Source: EcoWin and own calculations.

equity price drops once prices have begun to fall. The correlation is less stable for interest rates towards the end of the period. However, the strong increase in implied volatility in the interest-rate markets in the euro area in the 2nd half of 2004 appears to reflect the usual pattern between interest rates and implied volatility.

This analysis may imply that, other things being equal, increased uncertainty as to economic developments translates into higher demand for the safer bond investments at the expense of stock investments.¹ This relationship is not surprising, since implied volatility, interest rates and stock prices all represent or reflect forward-looking asset prices, which are traded in integrated financial markets and thus must be expected to respond to the same underlying information.

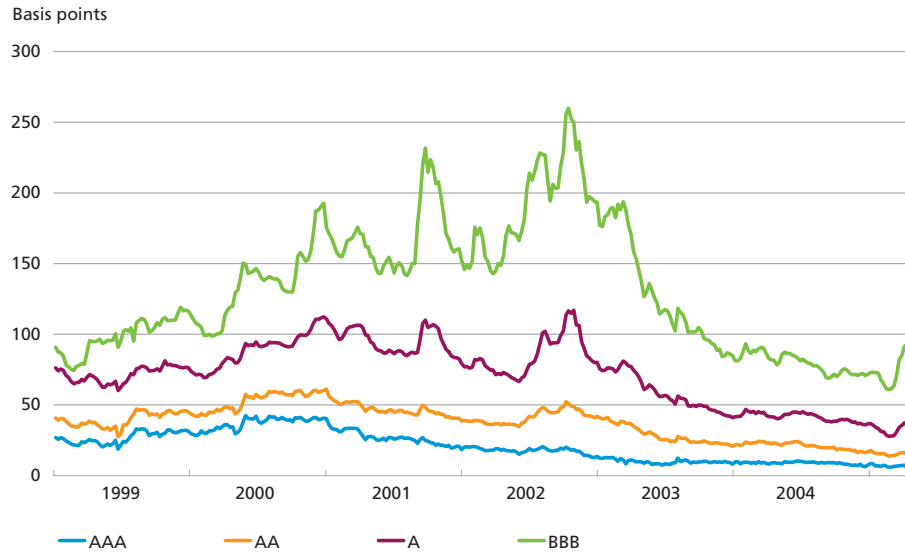
CREDIT SPREADS IN EUROPE

In general, credit spreads, i.e. the spread between corporate and mortgage-credit bond yields and the yield on a safe government bond, have narrowed significantly since 2003 and currently stand at a low level, cf.

¹ For more information on the relationship between stock prices and bond yields, see Hansen, Jakob Lage, Relations between Stock Prices and Bond Yields, Danmarks Nationalbank, *Monetary Review*, 1st Quarter 2005.

CREDIT SPREADS FOR EURO-AREA BONDS, 1999-2005

Chart 35



Note: Aggregate index of liquid euro-denominated bonds. The credit spread indicates the spread between corporate and mortgage-credit bond yields and safe government bond yields.

Source: J.P. Morgan and EcoWin.

Chart 35. The narrowing may be attributed, among other factors, to the low interest rates and the correspondingly lower earnings potential of high-rated government bonds. This has attracted investors to less safe investments in order to achieve a higher expected return. Moreover, the general supply of corporate bonds has decreased.

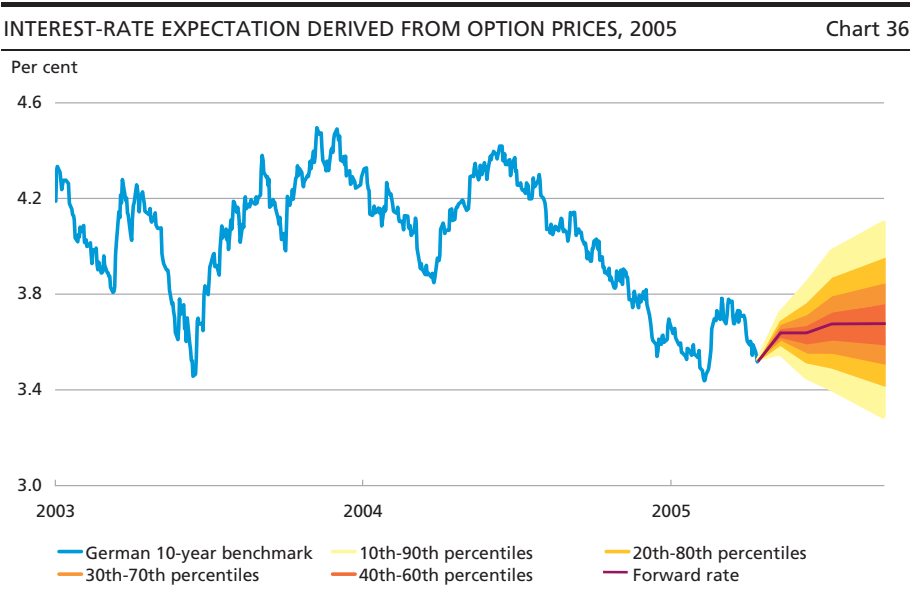
Credit spreads – especially for low-rated bonds – are also sensitive to general economic cycles. The widening of the spread until 2003 took place in a period with declining growth in the USA and the euro area.

INTEREST-RATE EXPECTATIONS DERIVED FROM MARKET PRICES

Prices of financial assets contain information on market participants' expectations as regards future market developments. For instance, based on yields on bonds with different maturities, it is, possible to calculate forward rates, reflecting expected future interest rates, among other things. The forward rate between, for instance, year 5 and year 10 reflects what the 5-year yield should be in five years in order for an investor to achieve the same return when choosing either a 10-year bond – the return on which is currently known – or a 5-year bond – the return on which is currently known – followed by yet another 5-year bond with the yield in question. In other words, the forward rate is a break-even rate. Other factors besides market expectations also affect prices, namely risk premiums and specific supply and demand factors.

INTEREST-RATE OPTIONS	Box 8
<p>An interest-rate option is a right, but not an obligation, to borrow or lend capital at a predetermined price (interest rate), the strike price. Interest-rate options may have different strike prices and investors may, for instance, hedge against the risk of an interest-rate increase or an interest-rate drop exceeding a certain level by buying or selling interest-rate options at specific strike prices. Thus the price of the actual interest-rate option reflects the market participants' assessment of the probability that the future market rate is above or below the interest rate calculated on the basis of the option strike price. Option prices are also affected by risk premiums, as well as specific supply and demand factors analogous to the description of forward rates.</p> <p>In other words, the prices of interest-rate options with different strike prices depend not only on the forward rate, but on the full probability distribution of future interest rates. The implied volatility of the probability distribution may be calculated on the basis of the price of a single option. This calculation does, however, presuppose firm assumptions about the probability distribution underlying the pricing of the option. The full implied probability distribution of future interest-rate trends may be assessed on the basis of the prices of interest-rate options with different strike prices. Thus, there is no need to make explicit advance assumptions about the distribution function of interest-rate developments that underlies option prices.</p>	

The full probability distribution of the future rate may be estimated on the basis of interest-rate option prices, cf. Box 8. Chart 36 provides an example of one such calculation based on option prices and interest-rate



Note: Risk-neutral probability distributions calculated on the basis of prices on 14 April 2005 for options on the German Bund interest-rate futures expiring in May, June, July and September 2005. The method is based on Andersen, Allan Bodskov and Tom Wagener, *Extracting risk neutral probability densities by fitting implied volatility smiles: Some methodological points and an application to the 3M Euribor futures option prices*, Danmarks Nationalbank, working paper no. 9, 2002.

Source: Bloomberg and own calculations.

ACTUAL AND IMPLIED VOLATILITY

Box 9

Market expectations derived from observed prices of financial products should be interpreted with caution. The left-hand side of the Chart below compares the implied volatility of Chart 32 in the European bond market with a measure of the actual historical volatility expressed as the moving 3-month standard deviation for the actual interest-rate development (the average of 10-year yields in the Nordic countries, the euro area and the USA). The two measures differ since implied volatility, in principle, reflects the expectation of future volatility at the maturity of the option – in this case in 10 years.

In 2002, the two measures tracked each other remarkably closely, indicating that market participants sometimes keep a close eye on actual historical volatility when determining option prices.

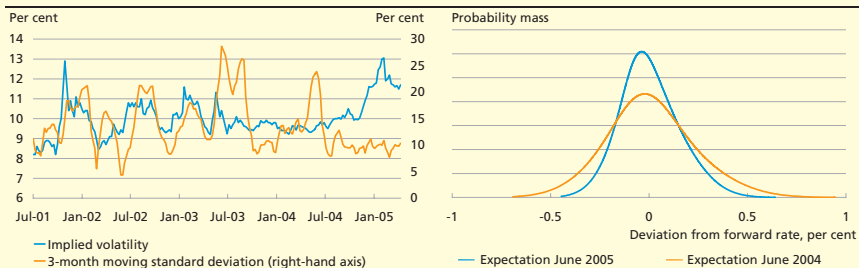
This pattern was broken in mid-2003 and again in early 2004 when the *actual* historical volatility increased without causing the implied volatility to rise as well. This may imply that option prices allow for short-term rises and falls in volatility, without this necessarily being an indication of a change in long-term volatility.

In early 2005, *implied* volatility increased, though this was not the case with actual historical volatility. This suggests that the price of options – and thus implied volatility – have increased in response to higher demand for options to hedge against the risk of losses in case of interest-rate rises and not exclusively as a result of higher uncertainty as to future interest-rate trends.

As regards the uncertainty as to future developments in the 10-year yield in the short term, the same increase is not seen – on the contrary, there is a fall. This is illustrated by the right-hand side of the Chart, showing the probability distribution two months ahead, calculated on the basis of option prices in April for the 10-year German government bonds maturing in June of 2004 and 2005, respectively. Both distributions are skewed to the right. Hence, in both 2004 and 2005, the probability that interest rates will be relatively higher than the forward rate is assessed to be higher than the probability that interest rates will be relatively lower than the forward rate, cf. also Chart 36, and the distribution of the expectation for 2005 is somewhat narrower than for the preceding year. This supports the view that the current increase in implied volatility in the long term may be explained by the impact of demand factors, see above.

Thus the individual volatility measures cannot stand alone – they supplement each other in assessments of financial market uncertainty.

VOLATILITY MEASURE



futures 1, 2, 3 and 5 months ahead on the yield of the German benchmark 10-year government bond. At the time of calculation, the forward rate was showing a slightly rising trend for the period until September. Gradually wider confidence bands indicate that the expectation becomes more uncertain, the longer into the future the forward-rate projection goes. Moreover, the distribution is not symmetrical around the forward rate, but skewed to the right. In other words, market participants find it more likely that interest rates will be relatively higher than the forward rate, than that interest rates will be lower than the forward rate. The width of the confidence bands may also be used to assess the size of the interest-rate scenarios used to analyse the interest-rate risk of banks and households, cf. the chapters on the financial sector and the interest-rate exposure of Danish homeowners.

As already mentioned, calculations of this nature should be interpreted with caution. Measures derived from option prices are not necessarily good indicators of actual future developments, cf. Box 9, which compares the implied volatility calculated on the basis of option prices with the actual historical volatility. This comparison indicates that the recent increase in implied volatility in the European bond market may be attributed not least to a stronger demand for options designed to protect investors from interest-rate risk.

Framework Conditions for the Financial System

In 2004, amendments to the framework for the financial system were driven mainly by developments within the EU. The players in the European financial markets are faced with requirements for considerable structural adjustments as a result of increasing internationalisation and consequential adjustment of the regulation of the European financial sector. The finalisation of the EU's Financial Services Action Plan, including the introduction of new accounting rules and new capital-adequacy rules, requires adjustment of routines, accounting systems, risk-management systems, reporting systems, etc. This will be a resource-consuming task for the financial sector as well as for the authorities. To ensure the credibility and stability of the financial system, it is essential that all parties make the necessary resources available.

FINANCIAL STABILITY AND FRAMEWORK CONDITIONS FOR THE FINANCIAL SYSTEM

The framework for the financial system is of key importance to financial stability. Organisational as well as technical and regulatory amendments may affect the ability of and incentive for the financial sector to maintain stable development in the short and long term. The framework for the financial sector is typically adjusted as a result of cooperation within the financial sector and/or on the basis of initiatives from the authorities. This chapter describes the amendments to the framework for the financial system that are deemed to have a significant impact on financial stability in Denmark.

THE EU's LEGISLATIVE PROCESS

Follow-up on the EU's Financial Services Action Plan

The EU's Financial Services Action Plan, FSAP, was launched at the meeting of the European Council in Lisbon in March 2000 in order to put into effect the EU's single market for financial services. With the FSAP, the necessary initiatives were combined into one plan with a tight implementation deadline¹. At end-2004, 39 of the 47 planned legislative initia-

¹ For a more detailed description of the FSAP and the Lamfalussy procedure, see Kurek, Dorte, The EU's Financial Services Action Plan, Danmarks Nationalbank, *Monetary Review*, 1st Quarter 2004.

tives had been completed. In the spring of 2004, the European Commission set up four expert groups¹ to assess the FSAP. It was concluded that there was no pressing need for new regulation, but that focus should rather be on effective implementation of the regulation now adopted.

The Lamfalussy procedure

The Lamfalussy procedure was originally introduced within the securities area to speed up the legislative process in the EU. To briefly outline the procedure, the European Parliament and the Council, level 1, jointly adopt the overall framework regulation, while more technical provisions are laid down in legal acts issued by the European Commission following consultation with a special committee of member state representatives, i.e. level 2. Level 3 comprises close cooperation between the member states' supervisory authorities, while level 4 is enforcement of the provisions by the European Commission.

It has now been decided to extend the Lamfalussy procedure to the EU's work on banking and insurance. Consequently, level 2 and 3 committees have been established in these areas.

The level 3 committees, which act as cooperation bodies for the European supervisory authorities², play important roles in relation to advising on implementation provisions (level 2 regulation) and as forums for co-ordination/alignment of supervisory practices between the member states. In an integrated single market with national supervisory powers, it is important to establish a well-functioning framework for cooperation and exchange of information between supervisory authorities.

With the implementation of the single financial market in the EU, more regulation and supervisory practices will be laid down by the EU. Consequently, Danish market participants and supervisory authorities must, individually and jointly, exert influence at EU level in order to put their stamp on the framework conditions. It takes considerable resources to monitor and influence the processes on an ongoing basis.

CREDIT INSTITUTIONS

Basel II

The proposal for a directive on new capital-adequacy rules for credit institutions and investment firms³, known as Basel II, is expected to be

¹ The four groups comprised experts within respectively banking, insurance, securities trading, and asset management.

² CEBS, the level 3 committee for the banking sector, comprises both supervisory authorities and central banks.

³ For a review of the proposed directive and a simple estimate of the impact on Danish banks, see Borup, Lisbeth and Dorte Kurek, Proposal for a Directive on New Capital-Adequacy Rules (Basel II), Danmarks Nationalbank, *Monetary Review*, 1st Quarter 2005.

finally adopted by the Council and the European Parliament in the 2nd half of 2005, with effect from the end of 2006. The credit institutions may apply the existing capital-adequacy rules (Basel I) until the end of 2007. However, credit institutions applying the most advanced methods for calculation of their minimum capital requirements may not apply the new rules until 2008.

Like the recommendations of the Basel Committee, the proposed EU directive is based on three pillars. The existing, uniform capital-adequacy rules will be replaced by more institution-specific rules, whereby the risks incurred by each individual credit institution are reflected more accurately. Pillar 1 is the minimum capital requirement to cover credit and market risk and, as a new element, operational risk. Under Pillar 2, the credit institutions must assess their own capital need, and the supervisory review process is strengthened. The supervisory authorities must supervise that the credit institutions' capital base is sufficient to cover their risks. In addition, credit institutions are encouraged to optimise internal risk management and control. Pillar 3 lays down a number of requirements for credit institutions as regards disclosure of more detailed information on risks, capital structure and capital adequacy, risk management, etc. The pillars are interdependent and supplement each other with a view to ensuring that the capital requirement is calculated to reflect the risks incurred by the credit institutions.

For Danish credit institutions, the new rules under Pillar 1 are generally expected to entail a reduction in the capital requirement, partly because Danish credit institutions have a relatively high volume of lending to households and small and medium-sized enterprises, for which the capital requirement is lowered. On the other hand, the new, more institution-specific capital-adequacy rules entail that the capital requirement more accurately reflects the risks incurred by each individual credit institution, and the institutions are encouraged to optimise their risk management. In addition, the introduction of Pillar 2 will, in itself, increase risk awareness of boards and managements of credit institutions, since each individual credit institution must assess its own capital need, i.e. assess whether its strategy, risk management, control and capital are adequate in relation to its risks. Pillar 2 also comprises a good supervisory tool for dialogue with the credit institutions concerning their capital need, and the supervisory authorities are given more powers to impose demands to prevent problems within the individual credit institution.

IAS and capital need

The EU regulation on the application of international accounting standards entered into force on 1 January 2005. Consequently, it is now

compulsory for listed enterprises, including listed credit institutions, to present their consolidated accounts in accordance with international accounting standards (IAS/IFRS) issued by the International Accounting Standards Board (IASB). In Denmark, the national accounting regulation for credit institutions have been adjusted to match the international accounting standards so that the Executive Order on Accounts is in all aspects in compliance with these standards

The international accounting standards must be approved by the EU before they enter into force. It has not been possible to reach agreement on one of the standards, IAS 39 on recognition and measurement of financial instruments, i.e. a large part of a credit institution's balance sheet. Particularly the option to include assets and liabilities at market value has been the subject of discussion. It is essential for Danish mortgage-credit institutes to have this option under IAS since considerable fluctuations that are not supported by economic realities might otherwise occur in the financial results and equity capital of the mortgage-credit institutions when they trade in their own bonds. The Danish Financial Supervisory Authority and Danmarks Nationalbank have pointed this out to the European Commission. It is expected that a recent proposal tabled by the IASB for a revision of the standard will take account of the problems experienced by the mortgage-credit sector.

The new accounting rules entail a transition from the prudent accounting principle to a neutrality principle on valuation of assets and liabilities by credit institutions. This will reduce the credit institutions' provisions and thus their buffer against future losses.

In a transitional phase between the implementation of the new accounting rules and the introduction of Basel II, Denmark has introduced a supplement to the existing solvency rules in that the individual credit institutions must determine their own capital need. The new solvency rules are inspired by Pillar 2 of the Basel Committee's revised recommendations for capital requirements.

For credit institutions, the capital need must, as a minimum, take into account the credit institution's business profile, risk concentration, large exposures, growth in lending, growth expectations, funding opportunities, dividend policy, control environment and sensitivity to cyclical fluctuations. In addition, the impact of the transition to new accounting rules must be considered. The credit institutions must report their capital need to the Danish Financial Supervisory Authority. If the latter deems the capital need calculated by the board and management to be insufficient, it may require the credit institution to raise the requirement. Under the Act, the institutions are not required to publish their capital need.

Branches of foreign banking institutions¹

In the summer of 2003, Nordea announced a decision to convert the banks in the Nordea Group into a European company based in Sweden and conducting business in the other Nordic countries via branches, instead of the existing subsidiary structure. This was made possible by the Regulation on the European Company, SE (*Societas Europaea*), which entered into force in October 2004. This regulation applies to companies in general and is not aimed particularly at financial businesses. After the introduction of the European company, it will be easier to reorganise a cross-border financial group from a subsidiary structure into a branch structure. When a group is reorganised in this way, the regulation and supervision of the bank's solvency takes place in its home country. Consequently, when Nordea is converted into a European company domiciled in Sweden, the Swedish authorities will be responsible for solvency supervision of the entire group, including the branches in Denmark and the other Nordic countries. The host countries are solely responsible for supervision of liquidity in the branches and compliance with national rules based on the so-called general good, e.g. rules on marketing, consumer protection, etc.

As a branch, Nordea will have the same impact on financial stability in Denmark as it currently has as an independent subsidiary bank under Danish supervision. Nordea will remain part of the Danish financial infrastructure, including payment systems and securities settlement systems, and any problems experienced may spread to the rest of the financial sector via these systems, in the same way as if the company were domiciled in Denmark.

The EU regulation does not generally grant the authorities of the host country insight into the risks associated with the activities of a branch. All supervisory reporting by the credit institution takes place to the supervisory authorities of its home country. In addition, branches do not present separate annual reports. Consequently, the Danish authorities will not have insight into Nordea's risks. This entails a need for more binding cooperation between the authorities in the Nordic countries than envisaged by the EU regulation.

Within the EU, this has been regarded as a specifically Nordic problem. With the development of the single market and focus on areas that might impede financial integration, the EU has, however, become more attentive to this "Nordea issue". A number of issues, including amendment of the Directive on Deposit-Guarantee Schemes, have thus been discussed under the auspices of the EU.

¹ For further information, see the chapter on branches of foreign credit institutions, *Financial stability 2004*.

Deposit-guarantee schemes

Deposit-guarantee schemes are of importance to depositors' confidence in the financial system, and thus to financial stability. It is important that the deposit-guarantee scheme is designed to meet its primary objectives, i.e. to support confidence in the financial system and safeguard the interests of small-scale depositors in the event of compulsory winding up.

The Directive on Deposit-Guarantee Schemes lays down minimum standards for such schemes in the EU. Since the directive operates with minimum harmonisation, the coverage, financing and organisational structure of the schemes differ materially. However, all deposit-guarantee schemes are based on the home-country principle, i.e. branches in other EU member states are comprised by the parent enterprise's deposit-guarantee scheme in its home country. This home country principle is important in that the supervision is aimed at protecting depositors. The home country principle thus ensures coherence between the supervision performed and the compensation to the depositors via the deposit-guarantee scheme in the event of compulsory winding up.

The Danish deposit-guarantee scheme is set up as a private independent institution providing coverage in the event of compulsory winding up or suspension of payments by a credit institution up to an amount of kr. 300,000, and full coverage for special deposits¹. The fundamental principles of the Danish deposit-guarantee scheme differ from Nordic practice in many ways. The other Nordic schemes are based on an insurance principle with ongoing cash payment of premiums without co-ownership of the fund's assets, i.e. previously paid premiums are not repayable. The Danish scheme, on the other hand, is based on a fund principle, whereby members have the right to a share in the assets of the fund. These differences matter when the home country, and thus the deposit-guarantee scheme, of a credit institution changes. In a broader perspective, it is inexpedient that differences in financing models between countries may be a decisive factor behind the choice of an institution's domicile and group structure.

In the European Commission, work is underway to revise the Directive on Deposit-Guarantee Schemes.

HEDGE ASSOCIATIONS

On 23 February 2005, the Danish government presented a bill to provide a basis for establishing hedge associations. Such associations will be the Danish equivalent of hedge funds, and like hedge funds they will not be

¹ Special deposits include e.g. capital pensions, child savings accounts, housing savings accounts, college savings accounts and client accounts.

subject to limitations to their gearing and short-selling options. According to the bill, consumer protection will mainly consist of requirements to publish investment strategies and risk profiles.

Today, individual investors are already able to gear investments and short-sell in the market. Hedge associations will make it possible to do so via an association. This allows the construction of more sophisticated hedging strategies and portfolio compositions.

International focus on the significance of hedge funds to the financial markets and financial stability has increased. No unambiguous conclusions can be drawn at present.

Danish hedge associations are not deemed to pose a risk to financial stability. The capital to be managed by Danish hedge associations is expected to comprise only a small share of the overall Danish financial market. Likewise, the impact of the banks' accounts with hedge associations (prime brokerage) is expected to be limited.¹

SECURITIES MARKETS

MiFID

The new EU Directive on Markets in Financial Instruments, MiFID², entered into force in April 2004 and was originally to have been transposed into national legislation in the member states within two years. Owing to the extensive and time-consuming work involved in preparing the implementation provisions, the deadline is expected to be postponed, presumably for a year.

The directive is applicable to regulated markets and enterprises conducting investment services and/or investment activities on a professional basis. The objectives of the directive are to create a uniform, high level of consumer protection and to facilitate and streamline trade in securities across national borders, e.g. by laying down rules for granting the so-called European passport³.

MiFID is a much-needed replacement for the existing Investment Service Directive from 1993 and is a key element of the efforts to promote well-functioning and integrated trade in financial instruments in the European capital markets.

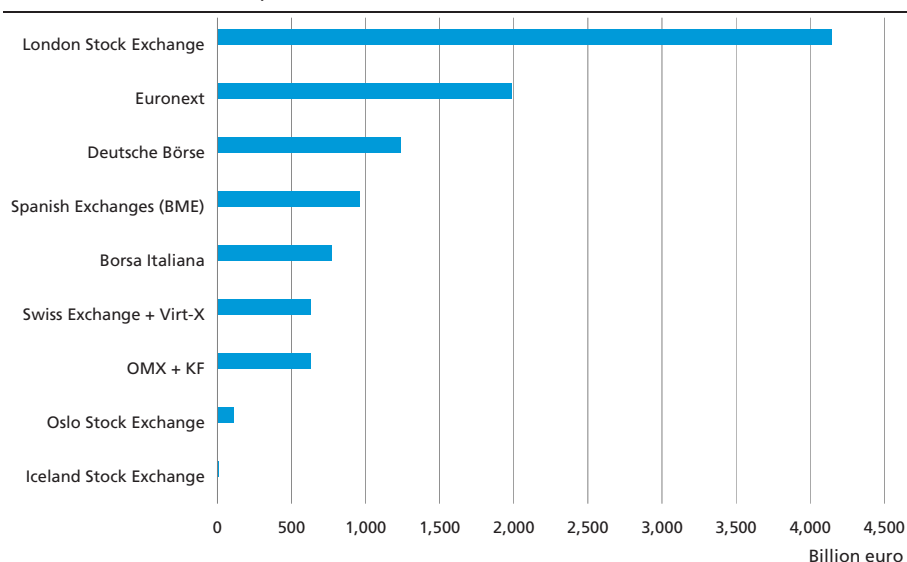
¹ For a more detailed description of the potential significance of hedge funds to financial stability, including the Danish hedge associations' potential impact on stability within the Danish financial system, see Thuesen, Jesper Ulriksen, *Hedge Funds in Denmark and Internationally*, Danmarks Nationalbank, *Monetary Review*, 1st Quarter 2005.

² Directive 2004/39/EC of the European Parliament and of the Council of 21 April 2004 on markets in financial instruments, amending Council Directives 85/611/EEC and 93/6/EEC and Directive 2000/12/EC of the European Parliament and the Commission repealing Council Directive 93/22/EEC.

³ The option to operate across national borders within the EU on the basis of approval in one member state.

TOTAL SHARE TURNOVER, 2004

Chart 37



Note: Here OMX comprises the stock exchanges in Stockholm and Helsinki. All amounts are single counted.

Source: Federation of European Stock Exchanges.

A large part of the actual content of MiFID will not be known until the implementing provisions have been finalised. This applies not least to the rules on market transparency, which is one of the areas where it has proved most difficult to reach agreement. Different types of securities require different market structures, including varying types and degrees of market transparency, if they are to be traded effectively¹. It is essential to the development of the European capital markets that the implementation provisions offer solutions that take account of the flexibility requirements in the market structures of the various markets, as well as the uniformity required when granting a European passport.

Acquisition of the Copenhagen Stock Exchange A/S by OMX AB

In a joint press release issued on 1 December 2004, Swedish OMX AB (OMX) and the Copenhagen Stock Exchange A/S (CSE) announced that an agreement had been signed regarding the consolidation of the two stock exchanges.

OMX already owned the stock exchanges in Stockholm, Helsinki, Tallinn, Riga and Vilnius. The consolidation of the two companies is aimed at creating an integrated securities market comprising Denmark, Sweden, Finland and the Baltic states in the course of 2005 and 2006. After

¹ For a more detailed description of the impact of capital market transparency and the approach to transparency in MiFID, see Thuesen, Jesper Ulriksen, Transparency in Capital Markets, Danmarks Nationalbank, *Monetary Review*, 4th Quarter 2004.

the consolidation, CSE will still be domiciled in Denmark and subject to Danish regulation and supervision.

The consolidation of the Nordic and Baltic marketplaces should be viewed against the background of the development in European stock exchange business. As Chart 37 shows, the combined OMX-CSE will still not be among the largest stock exchanges in Europe.

Consolidation among stock exchanges may have an impact on the efficiency of capital markets. Stock-exchange business is by nature characterised by economies of scale and scope. The marginal costs of conducting transactions are small, and liquidity in terms of depth and turnover is self-reinforcing and makes a marketplace more attractive.

However, the impact on financial stability depends on whether the consolidated stock exchanges are able to develop different markets and submarkets where trading systems and rules match the various types of financial instruments.

Implementation of the Market Abuse Directive and the Prospectus Directive

On 16 December 2004, the Folketing (Parliament) passed a number of amendments to the Securities Trading Act with a view to transposing the Market Abuse Directive and the Prospectus Directive into Danish legislation. Some of the amendments entered into force on 1 January 2005, while the remaining amendments will take effect on 1 July 2005.

The objective of the Market Abuse Directive is to introduce common EU rules to prevent insider trading and market manipulation. The objective of the Prospectus Directive is to ensure uniform rules for prospectuses so that investors are protected via a high level of information and so that the prospectuses can be granted the so-called European passport.

Under the Prospectus Directive, each member state must have one central, competent administrative authority responsible for obligations under the directive, including the power to approve prospectuses. In Denmark, approval of prospectuses for securities to be listed is currently delegated to the respective markets. Under the Prospectus Directive such delegation of authority must cease, but may, however, continue for a transitional period until the end of 2011. The amendment to the Danish legislation does not include a date for delegation to cease.

CLEARING AND SETTLEMENT

Assessment of VP Securities Services A/S

In 2004, Danmarks Nationalbank and the Danish Financial Supervisory Authority performed a joint assessment of VP Securities Services A/S (VP)

in relation to international recommendations for securities settlement systems. The recommendations were prepared by BIS and the International Organization of Securities Commissions, IOSCO.¹

The recommendations are aimed at enhancing safety and effectiveness in settlement of securities transactions. The recommendations have been consolidated into 19 standards concerning e.g. the legal basis for the systems, risk-management procedures, access requirements and the effectiveness of the systems.

The overall conclusion to the assessment was that VP complies with the recommendations in that all standards are met.² In connection with the assessment of VP, the risks on settlement of securities transactions in VP were analysed. The highlights of this analysis are presented in the chapter on assessment of settlement risks in VP Securities Services.

ESCB-CESR standards

The recommendations from BIS and IOSCO are aimed at securities settlement systems worldwide. In the ESCB and the Committee of European Securities Regulators, CESR, (the level 3 committee in the securities area) work to adapt the standards to the European securities markets has been underway for some years. In October 2004 this resulted in a report containing standards for securities settlement systems and major custodian banks in the EU.³ In a number of areas, the report envisages a tightening of the BIS and IOSCO standards.

ESCB and CESR are currently preparing guidelines for assessment on the basis of the new standards. In this connection a number of issues have been selected for further analysis. These include criteria for identification of the custodian banks to be comprised by the standards, as well as the systemic risks potentially associated with large custodian banks. The standards will not enter into force until the assessment guidelines have been prepared. The next assessment of VP by the Danish Financial Supervisory Authority and Danmarks Nationalbank will be based on the new standards.

The European Commission's initiatives on clearing and settlement

Recent years have seen increased focus on the need for more effective clearing and settlement of cross-border securities transactions within the

¹ See BIS, *Recommendations for securities settlement systems*, 2001. BIS and IOSCO have also prepared guidelines for assessment of compliance with the recommendations, cf. BIS, *Assessment methodology for "Recommendations for securities settlement systems"*, 2002.

² The report from the Danish Financial Supervisory Authority and Danmarks Nationalbank, *Review of VP Securities Services in relation to Recommendation for Securities Settlement Systems*, will be published at Danmarks Nationalbank's website, www.nationalbanken.dk, under Tasks, Payment systems, Oversight.

³ ESCB and CESR, *Standards for securities clearing and settlements in the European Union*, 2004.

EU. Today, settlement of such transactions involves considerable costs and larger risks than domestic transactions owing to a combination of technical market barriers, tax-related barriers and legal barriers (known as the Giovannini barriers)¹.

In April 2004, the European Commission published a communication on a number of initiatives within the area of clearing and settlement.² Among other things, the Commission announced that it would begin to prepare a framework directive for clearing and settlement in the EU. One of the objectives of the Directive is to ensure mutual recognition of securities settlement systems in the EU on the basis of common rules for supervision, and to provide a greater choice of systems for cross-border transactions.

The Commission also stated that it would set up a special expert group, CESAME, to monitor the efforts to dismantle the Giovannini barriers. In addition, the Commission intends to set up another two expert groups to consider the legal and tax-related issues in relation to clearing and settlement of cross-border transactions in the EU.

¹ In two reports from 2001 and 2003, the Giovannini Group, which advises the European Commission on financial market issues, has looked into the problems relating to clearing and settlement of cross-border securities transactions within the EU. In the first report, the Group identified 15 barriers to an effective market for clearing and settlement within the EU.

² European Commission, *Clearing and Settlement in the European Union – The way forward*, COM/2004/ 0312 final.

Issues related to
financial stability

The Interest-Rate Exposure of Danish Homeowners

Greater indebtedness and increasing use of adjustable-rate loans generally make Danish households more vulnerable to rising interest rates.

The analysis below shows that the interest burden of the average homeowner declines with rising income, which means that low-income homeowners are more vulnerable to adverse economic developments. On the other hand, homeowners in the high-income brackets have a higher ratio of adjustable-rate loans. The average change in interest expenses as a ratio of income following an increase in interest rates is almost the same for all income brackets. On average, the interest expenses of Danish homeowners increase by 1 per cent of gross income if the short-term interest rate goes up by 1 percentage point. However, there is considerable dispersion, and many homeowners have interest-rate exposure of more than 2 per cent.

The loan-to-value ratio for the individual homeowner depends on the geographical development in housing prices, as well as age and income. First-time buyers and low-income homeowners thus have the highest average loan-to-value ratios. Homeowners in Greater Copenhagen and Northern Zealand have the lowest loan-to-value ratios, but the highest debt-to-income ratios.

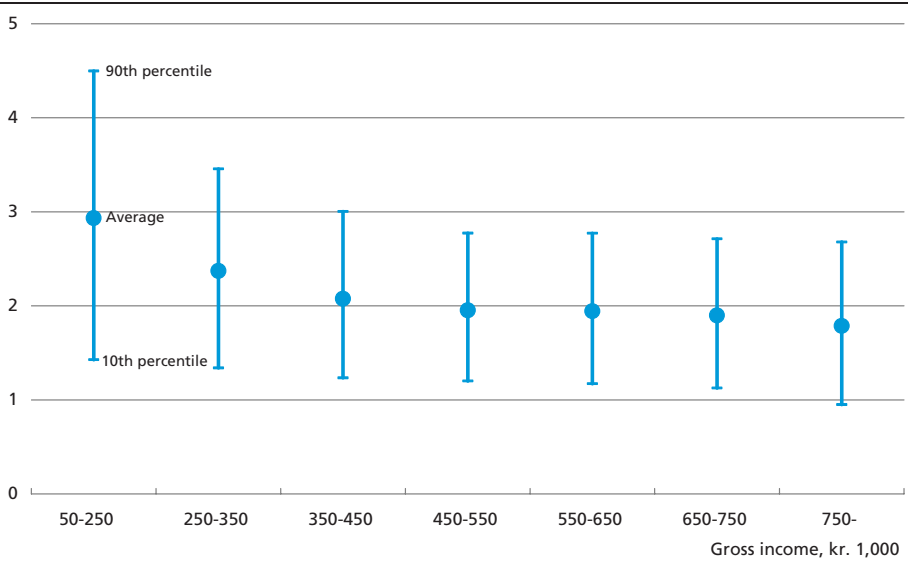
Data

The analysis is based on a database¹ comprising a range of anonymised data about a group of Danish homeowners – choice of loan type, income, geographical location, etc. The database is described in more detail in Box 10, which also compares the data with Statistics Denmark's data for all Danish homeowners. The homeowners in the database are assessed to be a representative sample of Danish homeowners, but it should be emphasised that the analysis and conclusions are based on lending to homeowners by a single mortgage-credit institute. Moreover, only the homeowners' mortgage debt to mortgage-credit institutes is considered, not any other debt.

¹ The database was provided by the courtesy of Nykredit and does not contain data relating to Totalkredit.

MORTGAGE DEBT AS A RATIO OF GROSS INCOME BY INCOME BRACKETS,
END-FEBRUARY 2005

Chart 38



Source: Nykredit and own calculations.

Debt burden

The homeowners' average mortgage debt is 2.1 times the gross household income. The debt ratio varies somewhat across and within income brackets. The average mortgage debt is 2.9 times the annual household income for homeowners in the lowest income bracket, and 10 per cent in this group have mortgage debt that is at least 4.5 times the annual household income, cf. Chart 38.

In Greater Copenhagen, Northern Zealand and Eastern Jutland, including Århus, homeowners have higher mortgage debt as a ratio of income than in the rest of Jutland and Zealand as well as Funen and Bornholm. This is to a large extent attributable to the geographical bias in the development in housing prices, with large increases particularly in Greater Copenhagen, Northern Zealand and Eastern Jutland, including Århus. The average housing debt of homeowners in the municipalities of Copenhagen and Frederiksberg is 2.8 times the annual household income, cf. Table 5.

As expected, a breakdown of mortgage debt by age shows that young homeowners, who are often first-time buyers, have the highest mortgage debt.

Loan-to-value ratio

The loan-to-value ratio is defined as the outstanding housing debt as a percentage of the estimated market value of the home. The loan-to-value

MORTGAGE DEBT AS A RATIO OF GROSS INCOME BY GEOGRAPHICAL LOCATION, END-FEBRUARY 2005

Table 5

Geographical location	Average	10th percentile	25th percentile	50th percentile	75th percentile	90th percentile
Copenhagen and Frederiksberg ...	2.8	1.4	2.0	2.5	3.2	3.9
Northern Zealand and suburbs of Copenhagen	2.4	1.5	1.9	2.3	2.8	3.3
Bornholm	1.6	0.9	1.2	1.5	1.9	2.3
Rest of Zealand and surrounding islands	2.1	1.2	1.6	2.0	2.5	3.0
Funen and surrounding islands	2.0	1.1	1.5	1.9	2.4	3.0
Southern Jutland	1.9	1.1	1.4	1.8	2.2	2.8
Central and Western Jutland	2.0	1.1	1.4	1.9	2.3	2.9
Eastern Jutland, incl. Århus	2.2	1.3	1.6	2.0	2.5	3.2
Northern Jutland	2.0	1.1	1.4	1.8	2.3	2.9
Total	2.1	1.2	1.6	2.0	2.5	3.1

Source: Nykredit and own calculations.

ratio gives an indication of the indebtedness of the individual homeowner, as well as the lender's buffer in the event that the borrower does not service the loan and the mortgage is redeemed. A mortgage-credit loan to finance the purchase of a permanent residence must not exceed 80 per cent of its market value. Consequently, the loan-to-value ratio cannot exceed 80 per cent when the mortgage-credit loan is raised, but this may be the case if the market value of the home subsequently declines. Owing to the substantial rise in market values in the Danish housing market in recent years, this has been a purely academic problem. However, certain marginal areas have seen a decline in housing prices within this period.

As Table 6 shows, the average loan-to-value ratio is generally higher for low than for high income brackets. One reason might be that high-income homeowners are able to make larger down payments and/or

LOAN-TO-VALUE RATIO BY GROSS INCOME BRACKETS, END-FEBRUARY 2005

Table 6

Household income, kr. 1,000	Per cent		
	Average	25th percentile	75th percentile
0-250 (200)	63.0	56.4	71.5
250-350 (298)	65.6	59.9	73.2
350-450 (404)	66.5	61.4	73.7
450-550 (499)	66.8	61.8	73.8
550-650 (595)	66.4	61.1	73.9
650-750 (694)	65.4	60.1	73.2
750- (973)	64.4	58.6	72.7

Note: The loan-to-value ratio is calculated for the outstanding cash debt as a percentage of the property value as estimated by Nykredit. Normally, no income details are required for mortgage-credit loans of less than 60 per cent of the property value, which adds a selection bias to the loan-to-value ratios, cf. Box 10. Figures in parenthesis indicate the average household income within each interval (gross).

Source: Nykredit and own calculations.

LOAN-TO-VALUE RATIO BY GEOGRAPHICAL LOCATION, END-FEBRUARY 2005 Table 7

Geographical location	Per cent		
	Average	25th percentile	75th percentile
Copenhagen and Frederiksberg	60.9	53.5	70.6
Northern Zealand and suburbs of Copenhagen	64.3	58.2	72.5
Bornholm	68.8	62.3	76.9
Rest of Zealand and surrounding islands	65.8	59.8	73.9
Funen and surrounding islands	65.6	60.4	72.6
Southern Jutland	66.2	61.6	73.2
Central and Western Jutland	68.2	63.6	75.2
Eastern Jutland, incl. Århus	65.8	60.4	73.1
Northern Jutland	66.2	61.6	73.5

Note: The loan-to-value ratio is calculated for the outstanding debt as a percentage of the real-estate value as estimated by Nykredit. Normally, no income details are required for mortgage-credit loans of less than 60 per cent of the real-estate value, which adds a selection bias to the loan-to-value ratios, cf. Box 10.

Source: Nykredit and own calculations.

choose a shorter redemption profile for the loan than homeowners in the lower income brackets. This is the obvious conclusion, but a more likely explanation is that the largest increases in housing prices have been seen in areas with a relatively greater number of high-income homeowners. Table 7 supports this argument since it shows that homeowners in Copenhagen and Northern Zealand – precisely the areas with the most substantial price rises – have the lowest loan-to-value ratios.

No clear link is seen between the loan-to-value ratio and the choice of mortgage-credit loan type. However, homeowners with a high loan-to-value ratio are more likely to opt for deferred amortisation.

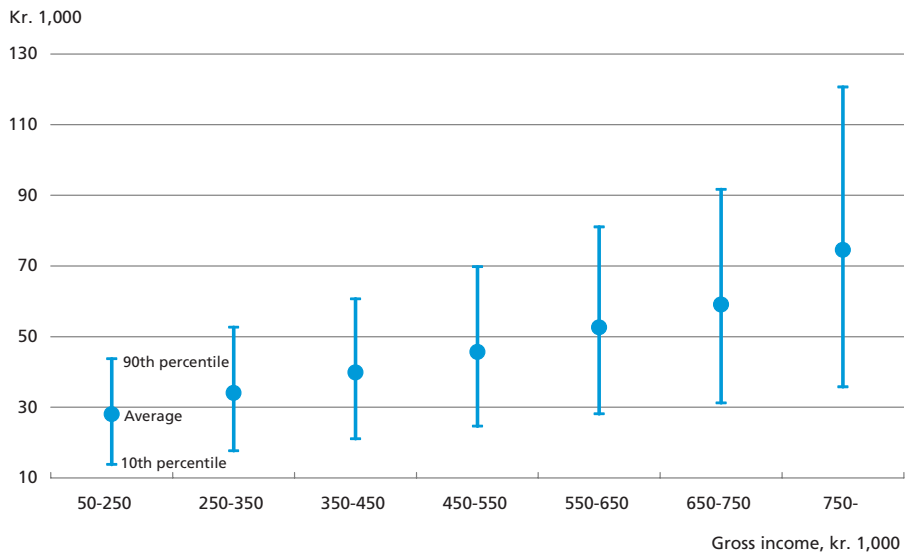
Not surprisingly, the loan-to-value ratio is highest among the youngest homeowners and generally falls as people get older. Geographically, the largest dispersion in the loan-to-value ratio is seen in Northern Zealand and the suburbs of Copenhagen, cf. Table 7.

Interest expenses and burden

As Chart 39 illustrates, the average annual interest expenses before tax for mortgage-credit loans rise with income. The interest-expense percentiles also show that the variation is greater in the higher income brackets.

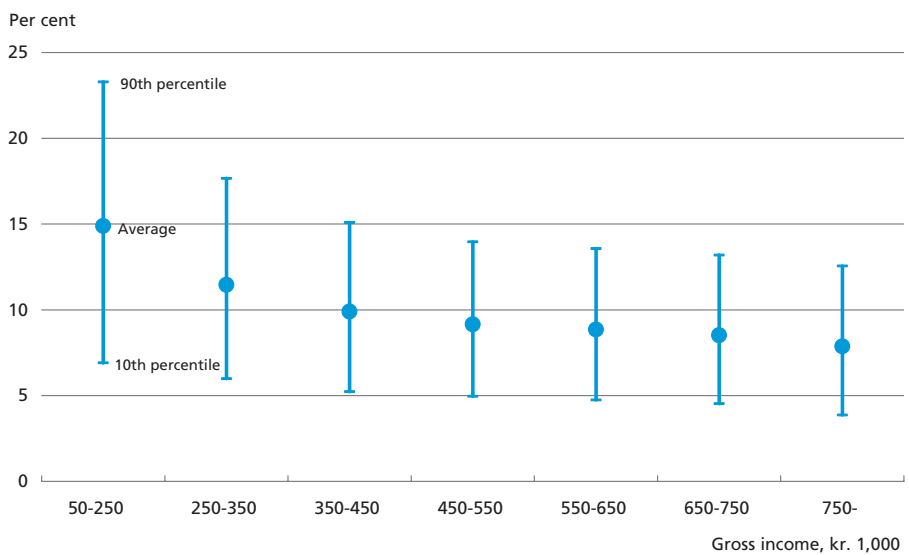
The interest burdens of the individual households, defined as annual interest expenses as a ratio of gross income, are shown in Chart 40. Households with annual income of less than kr. 250,000 spend a larger proportion of their income on interest than the other income brackets. The Chart also shows a clear link between average interest burden and household income. The interest burden falls with rising income, and consequently homeowners in the lower income brackets are more vulnerable if their incomes decline, e.g. as a result of unemployment.

DANISH HOMEOWNERS' INTEREST EXPENSES BEFORE TAX, END-FEBRUARY 2005 Chart 39



Note: The interest expenses relate to mortgage-credit loans in mortgage-credit institutes only and do not include interest expenses for other debt, etc.
Source: Nykredit and own calculations.

DANISH HOMEOWNERS' INTEREST EXPENSES AS A RATIO OF GROSS INCOME, END-FEBRUARY 2005 Chart 40



Note: The interest expenses relate to mortgage-credit loans in mortgage-credit institutes only and do not include interest expenses for other debt, etc.
Source: Nykredit and own calculations.

DANISH HOMEOWNERS' INTEREST EXPENSES AS A RATIO OF MORTGAGE
DEBT, END-FEBRUARY 2005

Table 8

Household income, kr. 1,000	Per cent					
	Average	10th per- centile	25th per- centile	50th per- centile	75th per- centile	90th per- centile
0-250 (200)	5.2	3.1	4.1	5.6	6.1	6.6
250-350 (298)	4.9	3.1	3.6	5.5	5.6	6.6
350-450 (404)	4.9	3.0	3.5	5.5	5.6	6.6
450-550 (499)	4.8	3.0	3.4	5.2	5.6	6.3
550-650 (595)	4.6	3.0	3.3	4.6	5.6	5.9
650-750 (694)	4.6	3.0	3.2	4.6	5.6	5.8
750- (973)	4.5	3.0	3.2	4.5	5.6	5.7

Note: Figures in parenthesis indicate the average household income within each interval (gross).
Source: Nykredit and own calculations.

The percentile distribution of interest expenses as a ratio of debt is virtually the same for all income brackets, cf. Table 8. This is a direct consequence of the market-based Danish mortgage-credit system where only the amount that can be borrowed varies with income, not the rate of interest. If a borrower is approved for a mortgage-credit loan, the interest rate is the same irrespective of other credit circumstances.

The differences in average interest expenses as a ratio of debt are purely attributable to the loan structure, i.e. whether the homeowner has opted for long-term fixed-interest-rate or adjustable-rate loans based on the short-term interest rate. In other words, the reason why the average is lower for the high income bracket is that this group has a larger percentage of adjustable-rate loans than the other income brackets, cf. Chart 41.

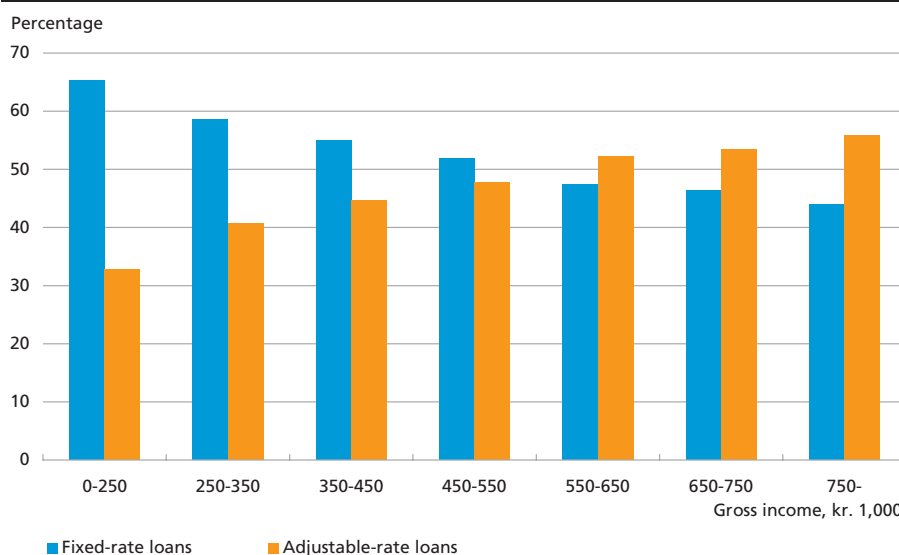
On average, a change in the short-term interest rate will therefore have a greater impact on the interest expenses of the higher income brackets. In addition, adjustable-rate loans tend to be more popular among young borrowers and among homeowners in Greater Copenhagen and in Central and Western Jutland.

Table 9 shows the average change in interest expenses for Danish homeowners if the short-term interest rate goes up by 1 percentage point. In this context, the short-term interest rate is defined as the rate of interest on an adjustable-rate loan, irrespective of the fixed-interest period. Table 9 shows that the change in interest expenses increases with income. In a financial stability perspective, this is positive since homeowners in the low-income brackets have a higher income burden from the outset, cf. Chart 40.

This means that in spite of the differences from one income bracket to another, the interest-rate exposure is virtually the same for all income

LOAN TYPES BY GROSS INCOME, END-FEBRUARY 2005

Chart 41



Note: Cash loans have been omitted, since they generally constitute less than 1 per cent.

Source: Nykredit and own calculations.

brackets. On average, homeowners' interest burden will increase by approximately 1 percentage point if the short-term interest rate goes up by 1 percentage point. In other words, the adjustable-rate debt matches the gross income on average, but there are large dispersions within and between the different income brackets, as well as geographically, and many homeowners have an interest-rate exposure in excess of 2 per cent.

AVERAGE CHANGE IN ANNUAL INTEREST EXPENSES ON AN INCREASE IN THE SHORT-TERM INTEREST RATE BY 1 PERCENTAGE POINT, END-FEBRUARY 2005

Table 9

Household income, kr. 1,000	Change in interest expenses, kr.	Change in interest expenses, per cent	Change in interest expenses as a ratio of debt, percentage points	Change in interest expenses as a ratio of income, percentage points
0-250 (200)	2,025	7	0.3	1.1
250-350 (298)	3,086	9	0.4	1.0
350-450 (404)	3,901	10	0.4	1.0
450-550 (499)	4,757	10	0.5	1.0
550-650 (595)	6,109	12	0.5	1.0
650-750 (694)	7,273	12	0.5	1.0
750- (973)	9,605	13	0.5	1.0

Note: Figures in parenthesis indicate the average household income within each interval (gross). In this context, the short-term interest rate is defined as the rate of interest on an adjustable-rate loan, irrespective of fixed-interest period.

Source: Nykredit and own calculations.

Danmarks Nationalbank has been granted access to information in Nykredit's customer database (exclusive of Totalkredit), which has made it possible to analyse the interest-rate exposure of Danish homeowners. The database contains anonymised details about borrowers' choice of mortgage-credit loan type, incomes, geographical location, etc. The database includes information up to and including February 2005.

The database contains information falling within the following three categories: customer information, mortgage-credit information and real-estate information. Only observations containing income details have been included in the analysis. Where the loan-to-value ratio is below 60 per cent, income details are not normally required. Consequently, the data have a selection bias. However, the data selection means that the homeowners omitted are generally better off than those included.

On the basis of data, a database containing the incomes, debts and interest expenses of the individual households is generated. Some households have more than one mortgage-credit loan, and therefore the number of observations is reduced to just over 63,000 households in the fully reduced data set used in the analysis.

The geographical distribution of homeowners in the database broadly matches the overall geographical distribution of homeowners in Denmark, cf. the Table below.

DISTRIBUTION OF HOMEOWNERS IN THE DATABASE AND IN DENMARK

Per cent	Database	Denmark
Copenhagen and Frederiksberg	3.5	4.6
Northern Zealand and suburbs of		
Copenhagen	19.7	17.6
Bornholm	0.7	1.1
Rest of Zealand and surrounding islands	16.1	16.9
Funen and surrounding islands	10.7	9.6
Southern Jutland	12.9	9.6
Central and Western Jutland	11.4	13.1
Eastern Jutland, incl. Århus	15.8	17.1
Northern Jutland	9.3	10.3
Total	100.0	100.0

Note: Distribution of Nykredit customers based on the reduced data set. Distribution of homeowners in Denmark as at 1 January 2004.

Source: Nykredit and Statistics Denmark.

On the other hand, the distribution of incomes among the homeowners in the database is more even than in Denmark in general. This may be partly attributable to the fact that the overall income distribution includes non-homeowners. In 2003, the average household income of Danish homeowners was kr. 453,000, while the average household income among the homeowners in the database is kr. 496,000.

Continued

CONTINUED		Box 10
<p>The concentration of homeowners in the range 30-50 years is greater in the database's reduced data set than among Danish homeowners overall, cf. the Table below. Part of the explanation is that the reduced data set includes only mortgage-credit loans with income details, which means that old loans are often omitted.</p>		
AGE DISTRIBUTION OF HOMEOWNERS IN THE DATABASE AND IN DENMARK		
Per cent	Database	Denmark
Younger than 30 years	10.1	10.3
30-40 years	24.2	20.7
40-50 years	28.9	22.4
50-60 years	25.7	23.4
60-70 years	8.7	11.8
70-80 years	1.8	8.0
Older than 80 years	0.5	3.4
<p>Note: Age distribution of homeowners in Denmark as at 1 January 2004. Source: Nykredit and Statistics Denmark.</p>		

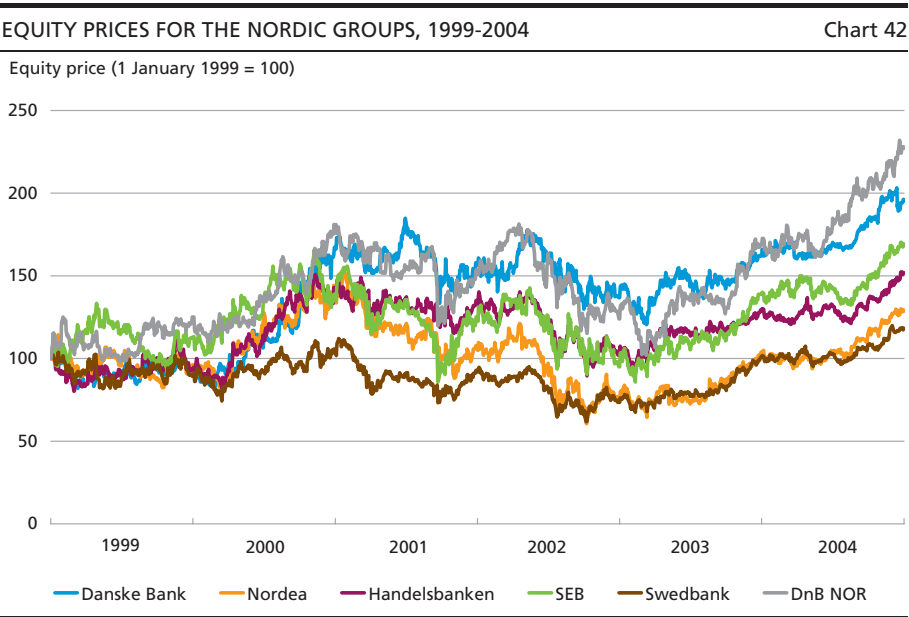
Analysis of Bank Equity Prices

The equity prices of the Nordic financial groups, category A, have been rising in recent years, while equity-price volatility has been declining. This can be interpreted as market expectations of a diminished risk of solvency problems for the groups. Historical data show, however, that market-based risk measures (e.g. distance to insolvency) can change significantly in a short space of time.

The equity prices of the Nordic groups exhibit relatively high mutual correlation, which may be due to exposure to common factors. Thus shocks affecting one group would probably affect other groups as well.

EQUITY-PRICE DEVELOPMENT

The positive equity-price development in the Nordic groups, category A, since early 2003, cf. Chart 42 and the chapter on the financial markets, may reflect market expectations of higher returns and lower risks facing the groups. The overall earnings of the groups actually rose to a very high level in 2004, cf. the chapter on the financial sector.



Source: Bloomberg.

In this chapter, equity-price data are used to estimate two equity market-based risk measures for banks (distance to insolvency and economic capital) and to analyse the comovement between the banks' equity prices and possible exposure to common factors.

DISTANCE TO INSOLVENCY – NEW VERSION

Financial Stability 2004 introduced "distance to insolvency" – a market-based risk measure specifically tailored to banks, which are subject to statutory capital-adequacy requirements. Distance to insolvency is compiled on the basis of accounting and equity-price data in an option price model, cf. Box 11. The distance to insolvency illustrates the market's assessment of the probability that the bank will be able to comply with the statutory capital-adequacy requirement. The distance to insolvency measures the changes (in number of standard deviations) in the market value of the assets that can be accommodated within the bank's buffer.

In order to better utilise information in the equity market on investor expectations of the future, the distance-to-insolvency model has been modified in several respects relative to *Financial Stability 2004* as follows:

- Accounting data are interpolated between the quarterly accounting dates to compile weekly estimates of debt, capital requirements and the market value of assets.
- Equity-price volatility is measured using a more sensitive GARCH model¹, which better captures the changing nature of volatility. *Financial Stability 2004* used the 50-week standard deviation of changes in equity prices, which was a more backward-looking measure.

The result is weekly estimates of the distance to insolvency, cf. Chart 43. The distance to insolvency has increased significantly for the Nordic groups in category A since the autumn of 2002 as a result of higher equity prices, decreasing volatility and enhanced profits. The weekly distance-to-insolvency figures also show, however, that the market assessment of the banks' situation may change rapidly, as was the case in September 2001 and in the autumn of 2002.

Distance to insolvency may be seen as a value-at-risk measure, with a distance to insolvency of 3 corresponding to a market assessment of a mere 0.13 per cent probability that losses will exceed the buffer.

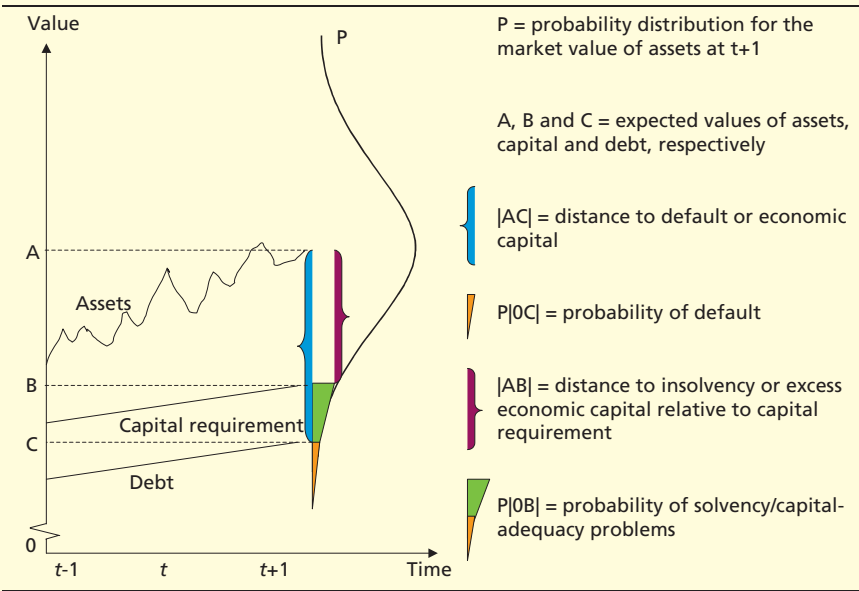
¹ In the GARCH (generalised autoregressive conditional heteroscedasticity) model, the equity price is estimated as an autoregressive process (i.e. a function of its own former values) together with a conditional variance for the stochastic error term (the conditional heteroscedasticity). Output is an econometric estimate of equity-price volatility.

Distance to insolvency was defined in *Financial Stability 2004* as "the number of standard deviations on the assets' market value which the bank's buffer can absorb". The current market value and volatility of the assets are not known, but are estimated on the basis of accounting and equity-price data in an option price model in which the share capital is seen as a call option on the company's assets less liabilities.

The resulting estimates of the market value and volatility of a company's assets may be compared with a critical value that would cause problems for the company, cf. the Chart. A frequently used risk measure for non-financial companies is distance-to-default, which measures the difference between the estimated market value of the assets and the interest-bearing liabilities (the critical value), scaled by the standard deviation of the assets' market value (in the Chart the relationship between $|AC|$ and the standard deviation). The distance to default may (with an assumed probability distribution of the fluctuations of the assets' market value) be expressed as an estimated probability of default ($P[0C]$ in the Chart).

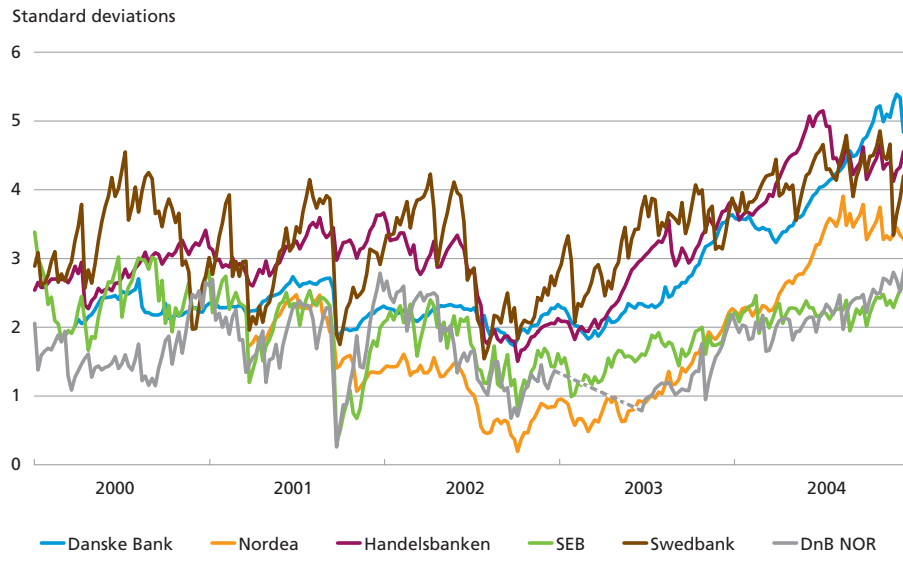
Unlike non-financial companies, banks are under an obligation to meet statutory capital requirements, which are therefore included with the liabilities in the critical value for distance to insolvency ($|AB|$ in the Chart). The distance to insolvency or the market's assessment of the excess capital relative to the capital requirement may (subject to the same reservation) also be expressed as an estimated probability of solvency or capital-adequacy problems ($P[0B]$ in the Chart).

DIFFERENCE BETWEEN DISTANCE TO INSOLVENCY AND DISTANCE TO DEFAULT



DISTANCE TO INSOLVENCY FOR THE NORDIC GROUPS, 2000-04

Chart 43

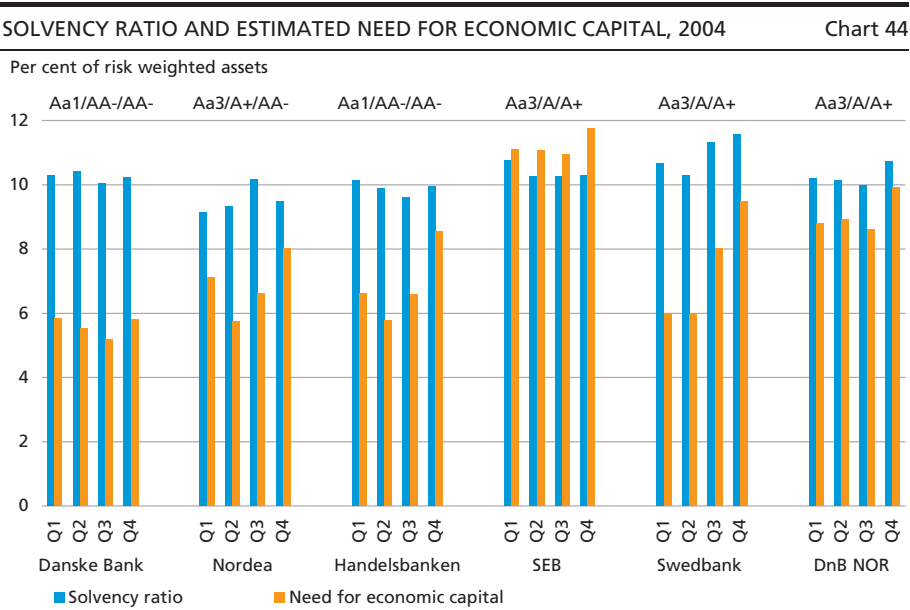


EQUITY-MARKET ASSESSMENT OF ECONOMIC CAPITAL

The distance-to-insolvency model can be used to estimate the equity market's assessment of the individual bank's need for economic capital. It should be underlined that the measurement of economic capital in itself is subject to considerable uncertainty. What is calculated here is the capital that a bank needs to be able – with a probability of 99.9 per cent – to absorb fluctuations in the market's assessment of the value of the assets within the capital. This corresponds to a distance to default of about three standard deviations (assuming that changes to the market value of assets follow a normal distribution).

These estimates of the equity market's assessment of the Nordic groups' need for economic capital can be expressed as a ratio of the risk-weighted assets and compared with the actual solvency ratios of the banks, cf. Chart 44.

For several of the banks, the estimated need for economic capital has been lower than the supervisory requirement of 8 per cent and lower than the groups' actual solvency ratios. The model calculations suggest that, in the market's assessment, several of the banks have scope to reduce their capital adequacy. However, this result reflects to a large degree the general equity-market development, and Charts 43 and 44 show that market-based risk measures can change sharply and quickly, and that they are sensitive to the assumptions made. This points to the need for caution against balancing too close to the capital requirement.



- the six Nordic financial groups in category A, with Kaupthing Bank (which has acquired FIH¹) as a possible addition,
- the six largest (by market capitalisation) banks in category B,
- the six largest euro-area banks,
- the five largest Nordic insurance companies,
- the broadest equity-market indices for Denmark, Sweden, Norway and the euro area (as indicators for common macro factors for each currency area).

Correlation analysis of equity-price changes

The correlation matrix for equity-price changes is shown in Table 10 in a colour-coded "heatmap", i.e. the higher the correlation between the changes in two companies' equity prices, the darker the colour. The correlations are shown for two time periods: 1999-2004 in the upper right-hand side (north-east) and 2003-04 in the lower left-hand side (south-west) of the matrix.

Among the Nordic groups, there is a particularly high correlation between the four Swedish groups. Danske Bank and Norwegian DnB NOR's correlations with the rest of the category are somewhat lower, but Danske Bank's correlations were higher in 2003-04 than in the period 1999-2004 as a whole. The last two years have also seen higher correlations than previously between the Nordic groups and the major euro-area banks. During both periods, Kaupthing had a very low correlation with the other Nordic groups.

The six banks in category B had low correlations both with one another and with other possible comparators. Whether this is attributable to technical factors (e.g. less liquid share prices) or whether these banks are not driven by the same factors as the Nordic groups, the correlation analysis provides no reason for changing the breakdown between categories A and B.

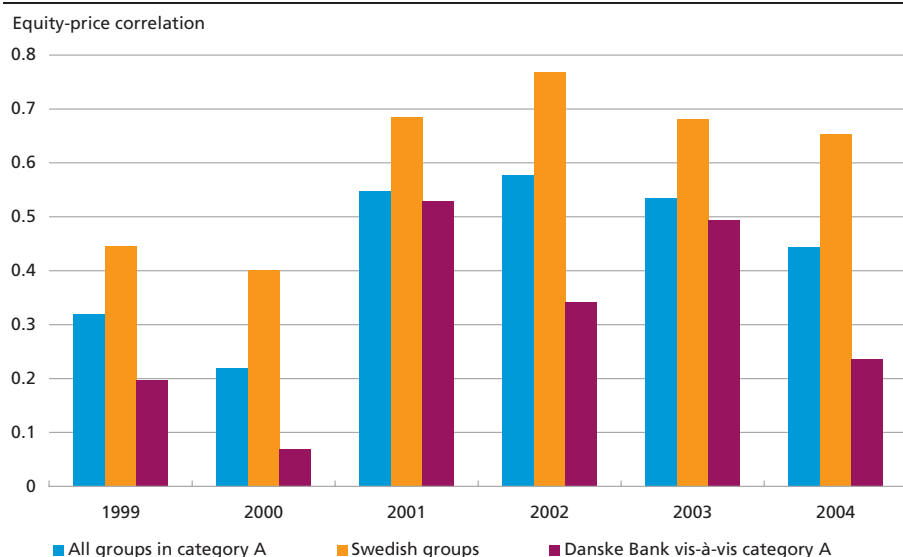
The major euro area banks exhibit more noticeable correlation with one another than the Nordic financial groups even though cross-border banking activities between their home countries have been less prevalent than between the Nordic countries. The high correlations may reflect exposures to other common factors, e.g. global financial-market factors, domestic economies with a common currency, interest rates (and increasingly) interest margins as well as credit risk on loans to large companies that are easier to trade and diversify.

¹ The acquisition is described in the box on structural development in the chapter on the financial sector.

CORRELATION MATRIX FOR WEEKLY EQUITY-PRICE FLUCTUATIONS FOR 1999-2004 AND FOR 2003-04																												Table 10	
Correlations for 1999-2004		Nordic groups					Danish banks					Euro-area banks					Nordic insurers					Equity markets							
2003-04		Danske	Nordea	Handelsb	Swedbank	SEB	DnB NOR	Kaupthing	Jyske	Sydbank	SparNord	RingLBK	Roskilde	Vestjysk	Santander	BNP	BBVA	ING	Deutsche	ABNAmro	Skandia	Codan	TopDan	AlmBrand	StoBrand	Copenhagen	Stockholm	Oslo	EuroStoxx
Nordic groups	Danske		0.33	0.31	0.27	0.33	0.30	0.16	0.21	0.25	0.07	0.10	0.02	0.06	0.30	0.36	0.35	0.38	0.33	0.30	0.19	0.15	0.22	0.15	0.35	0.56	0.29	0.34	0.39
	Nordea	0.52		0.59	0.57	0.57	0.30	0.14	0.12	0.03	0.13	0.10	0.10	0.00	0.39	0.37	0.39	0.43	0.37	0.35	0.34	0.08	0.13	0.14	0.30	0.38	0.45	0.28	0.44
	Handelsb	0.50	0.67		0.62	0.59	0.30	0.12	0.12	0.05	0.12	0.08	0.07	0.01	0.31	0.33	0.36	0.37	0.37	0.36	0.33	0.04	0.18	0.16	0.28	0.37	0.46	0.33	0.38
	Swedbank	0.44	0.66	0.73		0.66	0.40	0.15	0.15	0.06	0.15	0.09	0.15	-0.03	0.41	0.43	0.40	0.43	0.45	0.41	0.39	0.08	0.24	0.15	0.32	0.42	0.51	0.41	0.48
	SEB	0.43	0.62	0.68	0.73		0.40	0.16	0.10	0.10	0.16	0.12	0.09	0.01	0.46	0.53	0.49	0.53	0.56	0.45	0.44	0.08	0.19	0.17	0.38	0.47	0.59	0.53	0.62
	DnB NOR	0.27	0.41	0.31	0.41	0.39		0.21	0.12	0.09	0.03	0.09	0.06	0.01	0.31	0.36	0.35	0.40	0.29	0.27	0.22	0.07	0.15	0.12	0.39	0.31	0.35	0.61	0.42
	Kaupthing	-0.07	0.06	0.07	0.04	-0.03	-0.01		0.13	0.12	0.10	0.09	0.06	0.03	0.08	0.14	0.14	0.15	0.04	0.04	0.03	0.14	0.04	0.03	0.17	0.25	0.10	0.24	0.14
	Jyske	0.06	-0.03	-0.04	0.19	0.04	0.20	0.09		0.18	0.05	0.06	0.03	0.07	0.20	0.17	0.17	0.14	0.12	0.13	0.15	0.11	0.04	0.15	0.14	0.20	0.13	0.21	0.17
	Sydbank	0.17	0.01	0.09	0.14	0.11	0.22	0.14	0.34		0.21	0.11	0.13	0.19	0.14	0.12	0.13	0.13	0.13	0.11	0.04	0.15	0.12	0.14	0.20	0.13	0.27	0.12	0.16
	SparNord	0.12	0.03	0.05	0.10	0.07	0.04	0.04	0.09	0.34		0.16	0.29	0.25	0.02	0.09	0.03	-0.01	0.11	0.01	0.04	0.09	0.07	-0.06	0.09	0.06	0.06	0.06	0.05
	RingLBK	0.24	-0.02	0.12	0.09	0.04	0.05	0.02	0.09	0.22	0.25		0.24	0.21	0.03	0.02	0.08	0.10	0.15	0.07	0.05	0.19	0.13	0.16	0.09	0.24	0.13	0.15	0.11
Roskilde	0.09	0.19	0.19	0.28	0.22	0.09	0.01	-0.05	0.23	0.51	0.30	0.25		0.08	0.05	0.09	0.07	0.05	0.02	0.07	0.01	0.00	0.08	0.08	0.08	0.09	0.07	0.09	
Danish banks	Vestjysk	0.15	-0.06	0.01	0.06	-0.02	0.12	0.01	0.21	0.36	0.39	0.31	0.29		0.03	-0.01	0.00	0.00	-0.03	-0.02	-0.01	0.05	0.05	-0.02	0.05	0.12	-0.01	0.04	0.00
Euro-area banks	Santander	0.45	0.55	0.53	0.55	0.58	0.31	0.06	0.15	0.24	0.01	-0.07	0.08	0.05		0.58	0.83	0.66	0.56	0.60	0.47	0.18	0.20	0.19	0.35	0.49	0.53	0.46	0.69
	BNP	0.43	0.44	0.49	0.51	0.63	0.34	0.10	0.10	0.19	0.03	0.09	0.12	0.02	0.69		0.65	0.66	0.59	0.60	0.47	0.17	0.22	0.16	0.34	0.47	0.50	0.50	0.68
	BBVA	0.44	0.57	0.60	0.56	0.58	0.31	0.11	0.06	0.20	0.06	-0.07	0.09	0.04	0.89	0.72		0.70	0.62	0.63	0.50	0.22	0.26	0.19	0.41	0.53	0.57	0.51	0.76
	ING	0.44	0.48	0.51	0.48	0.57	0.40	0.03	0.06	0.20	0.01	0.10	0.08	0.02	0.69	0.77	0.72		0.65	0.75	0.50	0.15	0.22	0.19	0.43	0.52	0.54	0.54	0.77
	Deutsche	0.48	0.43	0.47	0.54	0.65	0.27	-0.08	0.10	0.10	0.05	0.01	0.12	-0.06	0.59	0.62	0.53	0.60		0.59	0.44	0.13	0.10	0.13	0.36	0.48	0.61	0.53	0.76
	Euro-area banks	ABNAmro	0.39	0.42	0.58	0.46	0.63	0.26	0.04	0.04	0.13	-0.05	0.06	0.06	0.03	0.63	0.68	0.65	0.76	0.59		0.47	0.10	0.19	0.20	0.32	0.43	0.52	0.48
Nordic insurers	Skandia	0.27	0.46	0.36	0.45	0.42	0.31	0.13	0.21	0.20	0.13	0.04	0.14	0.03	0.46	0.48	0.47	0.59	0.50	0.34		0.07	0.16	0.10	0.28	0.48	0.70	0.44	0.66
	Codan	0.12	0.05	0.13	0.09	-0.02	-0.06	0.07	0.03	0.14	-0.09	0.07	-0.05	-0.02	0.22	0.08	0.19	0.16	0.12	0.07	0.12	0.21	0.34	0.18	0.30	0.18	0.15	0.20	
	TopDan	0.16	0.27	0.20	0.05	0.04	0.20	-0.08	0.03	0.13	0.01	0.01	0.03	0.08	0.21	0.14	0.25	0.31	-0.06	0.25	0.16	0.23	0.09	0.26	0.33	0.15	0.16	0.18	
	AlmBrand	0.21	0.24	0.29	0.21	0.25	-0.12	0.00	0.09	0.20	-0.02	0.17	0.02	-0.04	0.22	0.14	0.25	0.38	0.24	0.12	0.20	0.04	0.15	0.29	0.18	0.19	0.19	0.20	
	StoBrand	0.35	0.35	0.39	0.35	0.27	0.40	0.13	0.13	0.21	0.13	0.05	0.10	0.09	0.45	0.45	0.53	0.49	0.37	0.39	0.53	0.16	0.25	0.16	0.42	0.35	0.54	0.41	
Markets	Copenhagen	0.51	0.38	0.41	0.38	0.31	0.23	0.16	0.20	0.21	0.04	0.16	0.06	0.18	0.53	0.42	0.48	0.52	0.48	0.41	0.46	0.36	0.21	0.37	0.46		0.61	0.56	0.64
	Stockholm	0.44	0.63	0.66	0.67	0.73	0.37	0.04	0.13	0.23	0.11	0.09	0.19	0.00	0.65	0.65	0.64	0.72	0.76	0.60	0.71	0.18	0.13	0.37	0.49	0.63	0.63	0.84	
	Oslo	0.32	0.35	0.46	0.44	0.47	0.62	0.15	0.14	0.20	0.04	0.16	0.05	0.10	0.47	0.52	0.54	0.60	0.42	0.48	0.36	0.11	0.23	0.14	0.57	0.50	0.57	0.80	
	EuroStoxx	0.49	0.59	0.62	0.60	0.70	0.41	0.13	0.14	0.22	0.03	0.05	0.15	0.03	0.77	0.81	0.80	0.86	0.77	0.77	0.61	0.21	0.19	0.27	0.55	0.60	0.86	0.64	
Correlation coefficients: less than 0.4 0.4 - 0.5 0.5 - 0.6 more than 0.6																													

AVERAGE CORRELATIONS BETWEEN EQUITY-PRICE CHANGES, 1999-2004

Chart 45



Note: Average correlations between weekly equity-price changes for all groups in category A, between the Swedish groups, and for Danske Bank vis-à-vis the other groups in category A.

Source: Bloomberg and own calculations.

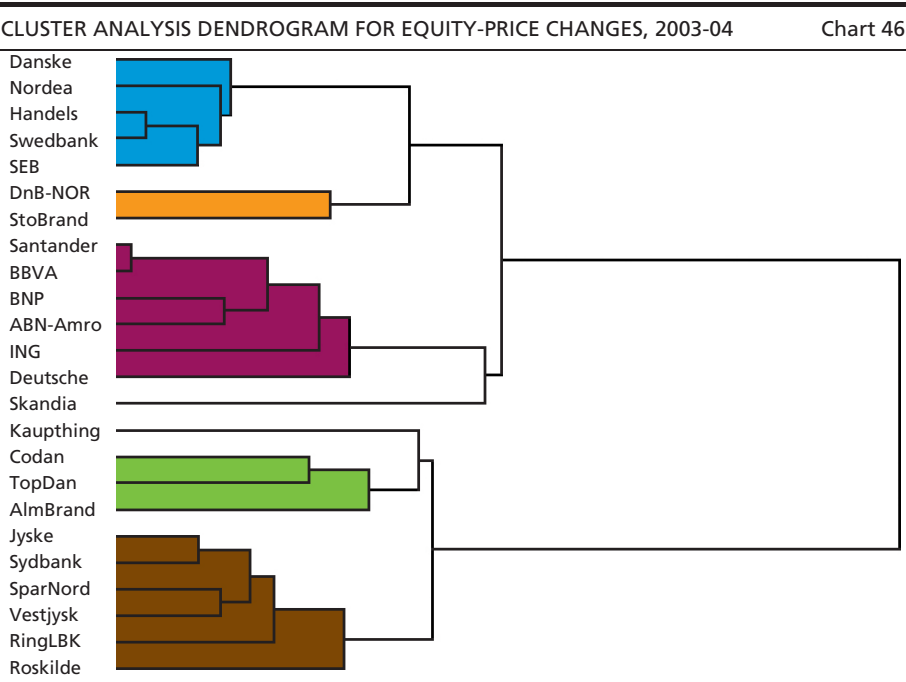
Among the Nordic insurance companies, Skandia, which has ventured into *bancassurance*, has the most noticeable correlations with others. There are no indications to suggest that the Danish insurance companies are particularly exposed to any common factors that might be driving the banks in categories A and B.

The correlations with the broad equity-market indices¹ may be interpreted as macroeconomic sensitivity and are generally seen as high – and highest for the euro area banks and a few of the Swedish banks.

The comovement of equity prices may change over time, reflecting whether exposure to common factors has increased or decreased. The correlations between the Nordic groups are of particular interest to financial stability in Denmark. Chart 45 shows the average correlations for each year between 1999 and 2004 for weekly equity-price changes between all groups in category A, between the Swedish groups in category A, and between Danske Bank and each of the other groups in category A.

The high correlation between the Swedish groups has been evident for each of the last four years, while Danske Bank's correlation with the rest of the groups in category A has varied from year to year. The analyses below focus on data covering the period 2003-04.

¹ Broad equity-market indices reduce the weight of each share in the index, but do not fully eliminate it. The correlation coefficients of major Danish and Norwegian companies with the Copenhagen and Oslo equity markets in particular should therefore be interpreted with caution.



Note: Cluster analysis based on squared Euclidean distance between untransformed weekly percentage changes in equity prices measured in euro.

Cluster analysis of equity-price changes

Cluster analysis, described in Box 12, attempts to determine the natural grouping of data for equity-price changes by, without any predetermined structure, "letting data do the talking". Chart 46 shows the clustering process as a dendrogram, in which the horizontal axis represents the distance between the groups at each clustering point.

The cluster analysis based on equity-price changes results in the following (mathematically) natural groupings:

- the Danish and Swedish groups in category A (shown in blue),
- the Norwegian institutions (DnB NOR and Store Brand) (yellow),
- the major internationally active banks in the euro area (red),
- the Danish insurance companies (green),
- the major Danish banks in category B (brown),
- the two remaining companies (Kaupthing and Skandia) remain independent clusters.

Had the optimum number of groups been smaller, the next cluster would have been between the Norwegian institutions and the natural grouping of Danish and Swedish groups in category A. Kaupthing, on the other hand, does not seem to belong in the natural grouping of

Cluster analysis attempts to identify quantitatively a natural grouping of data. The agglomerative hierarchical cluster process applied here (there are other types of cluster analysis) starts by considering the 25 financial companies as 25 separate groups, each containing one company. The difference² between the weekly equity-price changes of each group is calculated and the closest pair are clustered into one new group. This process is repeated until all companies are clustered together into one group comprising 25 companies. The clustering process and the Euclidian distance for each clustering step can be illustrated graphically in a dendrogram, cf. Chart 46. The largest number of groups that are statistically significant³ can be seen as natural groupings.

A *minimum spanning tree* is an open-chain graph in which N variables (in this case banks) are linked to N-1 (i.e. the minimum number of) relations. The connections are selected from a ranked list of all bivariate correlations. The process selects the connections with the highest correlations but deselects those connections that would "close" the chain by connecting variables that are already linked indirectly. For a given correlation matrix (of N specified variables for a given time period), the resulting minimum spanning tree thus provides a unique network of the most relevant correlation connections for each variable.

¹ For a more in-depth description, see Hawkesby, Marsh and Stevens, *Comovements in the prices of securities issued by large complex financial institutions*, Bank of England, working paper no. 256, 2005.

² Intuitively, the difference can be seen as a decreasing function of the correlation coefficient. Formally, it is the Euclidian distance between two points. In the cluster analysis, the points (each group) are defined by vectors with N variables (in this case; each weekly equity-price fluctuation) between which the Euclidian distance is measured in an N-dimensional space.

³ T test for the statistical significance of fusion values at a level of 5 per cent.

category A groups, in line with Kaupthing's low correlation with these groups in Table 10.

The cluster analysis results shown in Chart 46 will to some extent reflect correlations with common factors, i.e. the high correlations with equity-market indices in Table 10. Adjusted for the portion of equity-price fluctuations that can be explained by the broad equity-market indices¹, the cluster analysis shows a slightly different result, i.e. that the gap between the Nordic groups and most of the euro area banks narrows, while the separation between the groups in category A and the banks in category B remains.

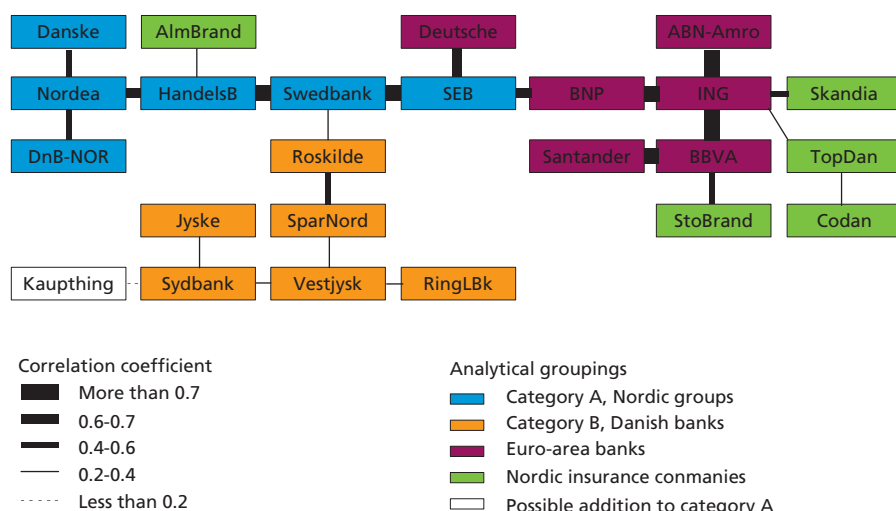
Minimum spanning trees

The "heatmap" correlation matrix in Table 10 emphasised equity-price correlations above certain absolute threshold values. A minimum spanning distils the correlation matrix of equity-price changes into one unique connected network with the lowest possible number of connections with the highest possible correlation coefficients. The method is

¹ By using the residuals from a regression of equity-price changes as a function of changes in the broad equity-market indices.

MINIMUM SPANNING TREE OF EQUITY-PRICE FLUCTUATIONS, 2003-04

Chart 47



described in more detail in Box 12, and the results are illustrated in Chart 47. The analytical categories of the banks are colour-coded and the line thickness indicates the strength of bivariate equity-price correlations.

Several interesting observations can be drawn from the minimum spanning tree of equity-price correlations:

- the groups in category A, the banks in category B and most of the euro area banks have the closest correlation connections within their own categories (although the absolute correlations among the banks in category B are lower),
- the banks in category B are connected to the rest of the network through groups in category A,
- most Nordic insurance companies are connected to the network through euro area banks rather than through categories A or B,
- the absolutely weakest correlation connection in the network is to Kaupthing bank. The weakest correlation connections in the network after that are to the Danish insurance companies and the banks in category B.

Analysis of the banks' equity prices using the analytical tools described in this chapter – correlation analysis, cluster analysis and the minimum spanning tree – may, in combination with analysis of accounting figures and other data, help to test on an ongoing basis the relevance for *Financial Stability* of the analytical groupings used. The analysis confirms the relevance of the grouping into categories A and B, and at present

there seem to be no compelling grounds for extending these categories – either geographically (e.g. to include other internationally active banks operating in Denmark) or sectorally (e.g. to include insurance companies).

Several of the Nordic groups in category A seem to have a high exposure to common factors. Thus shocks causing problems for one of the Nordic groups (however unlikely this may be) would probably weaken other groups in the same category as well.

Assessment of Settlement Risks in VP Securities Services

In connection with the settlement of securities transactions, participants may incur various types of risk.¹ A number of elements in VP Securities Services (VP) contribute to reducing the risks. These include simultaneous exchange of securities and cash, which eliminates the principal risk. Likewise, VP's rules and procedures are designed to ensure that transactions are settled on the designated day, so that the participants' liquidity risk is reduced.

Participants in the VP System usually incur a replacement risk on securities transactions that have been concluded but not settled. This is the case when participants choose to settle transactions in VP's normal settlement process, whereby settlement typically takes place three days after the conclusion of the transactions. However, an analysis based on data for a single settlement day shows that the replacement risk may only entail relatively small losses for the participants.

RISKS RELATED TO SETTLEMENT OF SECURITIES TRANSACTIONS

Settlement of securities transactions involves a number of risks that can be grouped under the headings of credit risk, liquidity risk, legal risk and operational risk. The definition of the various types of risk is basically the same as for other types of financial business. Box 13 further explains the implications of the risks related to settlement of securities transactions.

Problems experienced by one participant as a consequence of these risks may potentially spread to other participants and affect the entire financial system. This risk is amplified since securities transactions often involve the exchange of large amounts.

¹ In 2004, Danmarks Nationalbank and the Danish Financial Supervisory Authority performed a joint assessment of VP Securities Services A/S (VP) in relation to international recommendations, cf. the chapter on framework conditions for the financial system. In the course of this work, the risks on settlement of securities transactions in VP were analysed. This chapter outlines the main results of the analysis

Risks related to settlement of securities transactions can be grouped under the headings of credit risk, liquidity risk, legal risk and operational risk.¹

Credit risk on settlement of securities transactions comprises a principal risk, a replacement risk and other credit risks. The principal risk occurs if the buyer and seller do not execute their legs of the transaction simultaneously. The party executing its leg first incurs a credit risk on the counterparty equivalent to the agreed value of the principal. The principal risk increases with the time lapse between the parties' planned deliveries.

The *replacement risk* is the risk of suffering a loss because the counterparty fails in the period from the conclusion to the settlement of a securities transaction, so that the transaction cannot be executed. A buyer thus loses an unrealised gain if the market price of the securities has gone up in the meantime. Correspondingly, the seller suffers a loss if the price has gone down. The replacement risk increases with the time lapse from the conclusion to the settlement of the transaction, and with fluctuations in market prices.

Other credit risks related to settlement of securities transactions include the participants' credit risk on the settlement bank. Credit risks may also arise between direct and indirect participants in cash settlement. A securities settlement system may also incur a credit risk on participants if it lends securities or extends other credits in order to facilitate settlement.

Liquidity risk is the risk of incurring a loss because liquidity or securities are not received at the expected time. This loss may occur if the liquidity or securities have been disposed of in advance. In that case the seller of securities may have to borrow liquidity or sell assets at short notice, which often involves certain costs. Correspondingly, the buyer of securities may have to borrow equivalent securities in the market to meet any resale obligations for settlement on the same day.

Legal risk is the risk of suffering a loss as a result of an unexpected interpretation of the basis of agreement or the legislation on which settlement of securities transactions is based. A special type of legal risk pertains to uncertainty as to the ownership of securities deposited with a custodian bank that fails. This type of risk is often referred to as the custody risk.

Operational risk is the risk of loss resulting from inadequate internal processes, system failure, or external events. In modern securities settlement systems, operational risk mainly relates to IT systems. Like legal risk, operational risk amplifies credit and liquidity risks. For instance, operational errors may delay the settlement of securities transactions, which may in turn cause liquidity problems.

¹ See BIS, *Recommendations for securities settlement systems*, 2001.

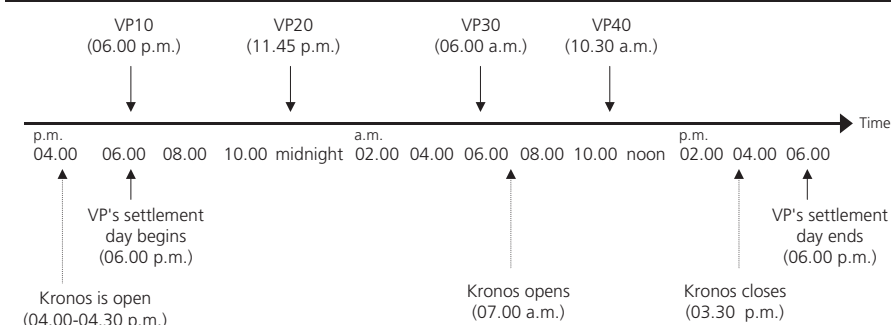
SETTLEMENT OF SECURITIES TRANSACTIONS IN VP¹

Participants in the settlement of securities transactions in VP (the VP Settlement System) mainly comprise banking institutions in Denmark. The banking institutions perform a number of tasks in relation to the VP

¹ Danmarks Nationalbank, *Payment Systems in Denmark*, 2005 (published in the summer of 2005), includes a more detailed description of the settlement process in VP.

VP's SETTLEMENT BLOCKS FOR SECURITIES TRANSACTIONS IN KRONER

Chart 48



Note: Kronos is Danmarks Nationalbank's real-time gross settlement system for settlement of payments between account holders. Kronos is open for krone-denominated payments from 7.00 a.m. to 3.30 p.m. Between 4.00 and 4.30 p.m., Kronos is open for transfer of funds from current accounts to settlement accounts for settlement during the night.

System. In their capacity as account controllers, they handle administration of VP's securities accounts and may report transactions to VP on behalf of themselves or others. The banking institutions also make liquidity available for cash settlement, which takes place via accounts at Danmarks Nationalbank. Some banking institutions do not participate directly in cash settlement, but choose to provide liquidity for settlement via a direct participant.

The VP System is a multilateral net settlement system, which means that at fixed times during the day, VP calculates and settles the individual participants' total net positions in securities and cash. Settlement mainly takes place in a number of settlement blocks between 6.00 p.m. (when VP's settlement day begins) and 10.30 a.m. on the following day. An overview of VP's settlement blocks for securities transactions in Danish kroner is provided in Chart 48.¹

Prior to the commencement of VP's settlement day, the banking institutions provide liquidity for settlement during the night. They can do this by transferring an amount from their current account with Danmarks Nationalbank to a VP settlement account, after which Danmarks Nationalbank informs VP of the amount. In addition, the banking institutions may provide liquidity for settlement under the automatic collateralisation agreement, cf. Box 14.

Before running a settlement block, VP checks that the buyer and seller have sufficient liquidity/securities to cover the transactions concluded. If

¹ In addition to the settlement blocks illustrated in Chart 48, VP runs a block for securities transactions in euro (VP50) at 1.35 p.m. and a number of settlement blocks for periodic payments in kroner and euro. A new settlement block in kroner (VP60) will also be introduced soon. It is expected to be placed at noon. In this connection, the settlement times for a few of the other blocks will be adjusted slightly.

THE AUTOMATIC COLLATERALISATION AGREEMENT	Box 14
<p>Automatic collateralisation enables banking institutions to obtain intraday credit from Danmarks Nationalbank for settlement of securities transactions in VP¹. Under the automatic collateralisation agreement, the banking institutions pledge securities deposited in one or several securities accounts with VP, typically their trading accounts, as collateral. In some ways, automatic collateralisation is a more flexible borrowing arrangement than traditional pledging of collateral for loans granted by Danmarks Nationalbank. Under the automatic collateralisation agreement it is thus possible to pledge securities as collateral for credit in the settlement block in which they are received, rather than in subsequent settlement blocks only as for traditional pledging of collateral. This means that fewer securities are tied as collateral for settlement of securities transactions compared to traditional pledging arrangements.</p>	

¹ Automatic collateralisation may also be used for settlement of payments in the Danish retail payment system (the Sumclearing), the VP Settlement System for periodic payments and the CLS settlement system for currency trades. See Danmarks Nationalbank, *Payment Systems in Denmark*, 2005 (published in the summer of 2005) for a more detailed description of the automatic collateralisation agreement.

that is the case, settlement takes place by exchanging securities in securities accounts with VP for cash in accounts (settlement accounts or automatic collateralisation accounts) with Danmarks Nationalbank. Positions in securities and cash are exchanged simultaneously, i.e. Delivery versus Payment (DvP). A securities transaction has been finally settled when the settlement block has been completed.

VP also offers settlement of securities transactions as real-time transactions outside the fixed settlement blocks. In real-time transactions, securities in securities accounts with VP and money in current accounts with Danmarks Nationalbank are exchanged immediately and simultaneously. In practice, relatively few VP transactions are settled in real time.

MANAGEMENT OF SETTLEMENT RISKS IN VP

A number of elements in the VP Settlement System contribute to reducing the risks involved. This section contains an assessment of the relevance of the various types of settlement risk in VP.

Credit risk

The principal risk is the exposure incurred by one party to a securities transaction vis-à-vis the other party if money is provided before the securities are received or vice versa, cf. Box 14. In the VP System, this risk is eliminated in that positions in securities and money are exchanged simultaneously. As described, both multilateral net settlement and real-time settlement in VP take place according to the DvP principle.

Another type of credit risk is replacement risk, i.e. the risk of suffering a loss because a securities transaction must be cancelled due to the failure of the counterparty. In the VP System this risk can be eliminated by settling the transaction in real time. In the multilateral net settlement, where the major part of the transactions are settled three days after the contract date, both parties incur a replacement risk, however. Below, the significance of this risk is assessed on the basis of data for a specific day.

Other potential credit risks on settlement of securities transactions are of minimum relevance to VP. Any credit risk on the settlement bank is eliminated by effecting payment via accounts with Danmarks Nationalbank. VP does not itself incur any credit risk since it does not engage in securities lending or otherwise extend credit to participants. A banking institution that participates indirectly in cash settlement may, however, incur a credit risk on a direct participant in the form of a cash account balance.¹

Liquidity risk

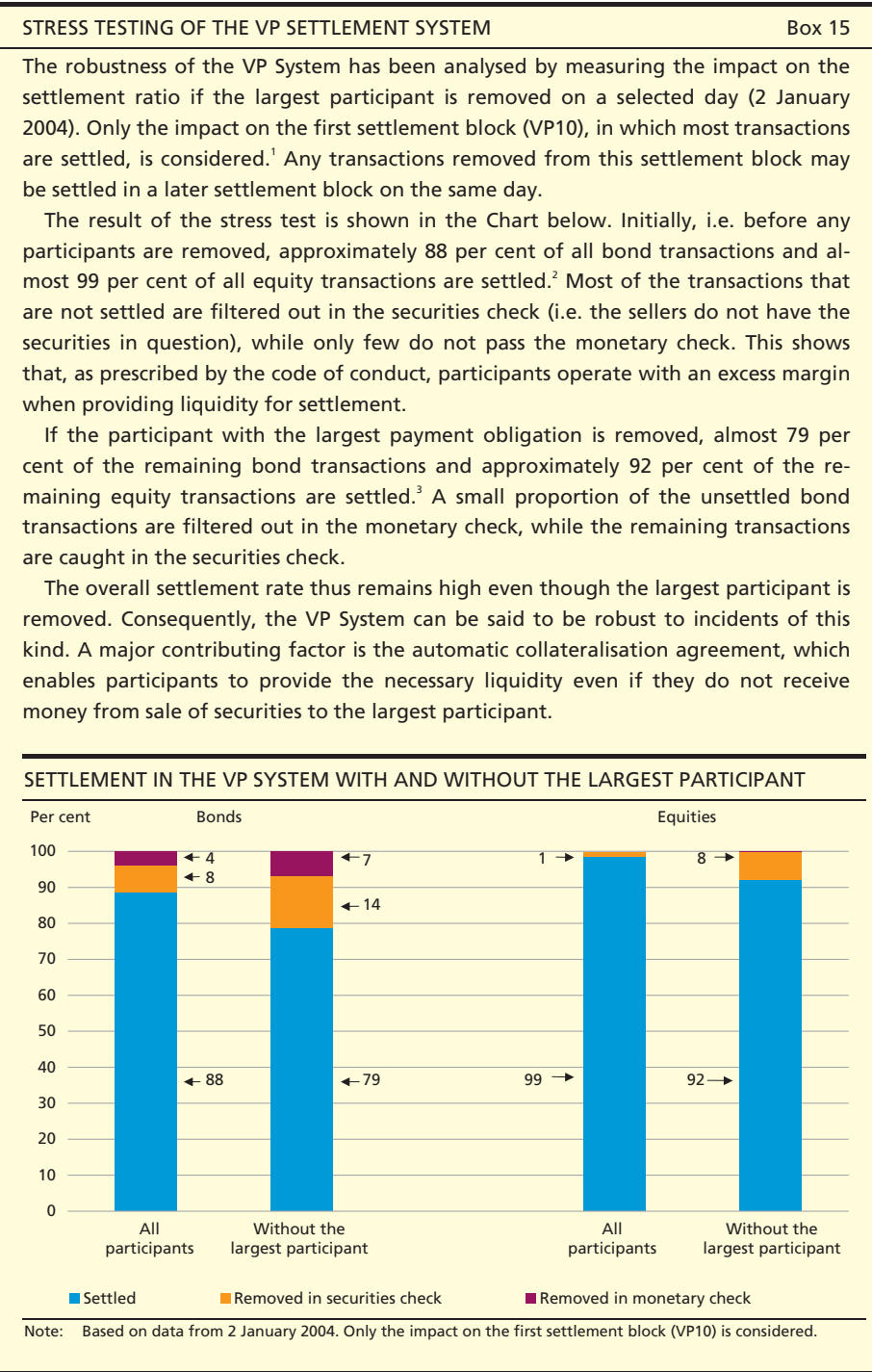
Liquidity risk is the risk of incurring a loss because the securities transaction is not settled at the expected time. A loss may occur if the buyer or seller has already disposed of the securities or cash that is not received, which must then be procured elsewhere.

In the VP Settlement System, liquidity risk is reduced via rules and procedures aimed at ensuring that transactions are settled on the agreed day. For instance, the last settlement block (VP40) is placed within the opening hours of Danmarks Nationalbank's payments system, Kronos, cf. Chart 48. This enables participants to provide extra liquidity for the transactions not settled during the night. Furthermore, unsettled transactions remaining after the last block can be settled as real-time transactions.

Another example is the agreed code of conduct for settlement in VP, encouraging participants to conclude the transactions as early as possible in the settlement run, preferably in the first settlement block. Among other things, the code of conduct requires that participants operate with an excess margin when calculating their liquidity requirements. A participant that does not adhere to this requirement and fails to cover its net positions in cash or securities will be fined.

A third example is VP's procedure for handling transactions that fail the check for adequate cover. If a participant in a settlement block has

¹ A direct participant providing liquidity for settlement on behalf of an indirect participant may lay down a maximum drawing right for the indirect participant. In this way the direct participant can limit its credit risk on the indirect participant.



insufficient securities or cash, VP is entitled to remove transactions from the block until there is adequate cover for the remaining transactions. Transactions are removed in accordance with specific criteria designed to optimise the remaining settlement. When a transaction has been removed from one settlement block, it is automatically rescheduled for the next block.

According to international standards, the robustness of a settlement system can be assessed by its ability to settle transactions in the event that the participant with the largest payment obligation is unable to settle.¹ Box 15 outlines the results of such a stress test of the VP System on a specific day. The results show that the VP System can withstand an incident of this nature since most of the transactions can still be settled even if the largest participant is removed. This is, to a great extent, attributable to the automatic collateralisation agreement, which helps to ensure that participants can still provide the necessary liquidity even though no money is received from the largest participant.

Operational risk

Operational risk is the risk of loss resulting from system failure, external events, etc. The settlement process in VP is carefully coordinated with a number of other key systems, and even brief system failures that delay settlement in VP may have major consequences. It is therefore important for VP to prevent system failures that have an impact on settlement.

VP has introduced a number of measures to minimise operational risk. These include internal controls, procedures for reporting and follow-up in connection with system failures, and back-up facilities at a second site. VP's track record shows a high degree of operational stability (uptime) and only few system failures.²

THE SIGNIFICANCE OF THE REPLACEMENT RISK TO THE VP SYSTEM

The replacement risk may result in a reduced profit to the buyer or a loss to the seller, cf. Box 13. In relation to financial stability it is primarily relevant to assess the possible loss to the seller.

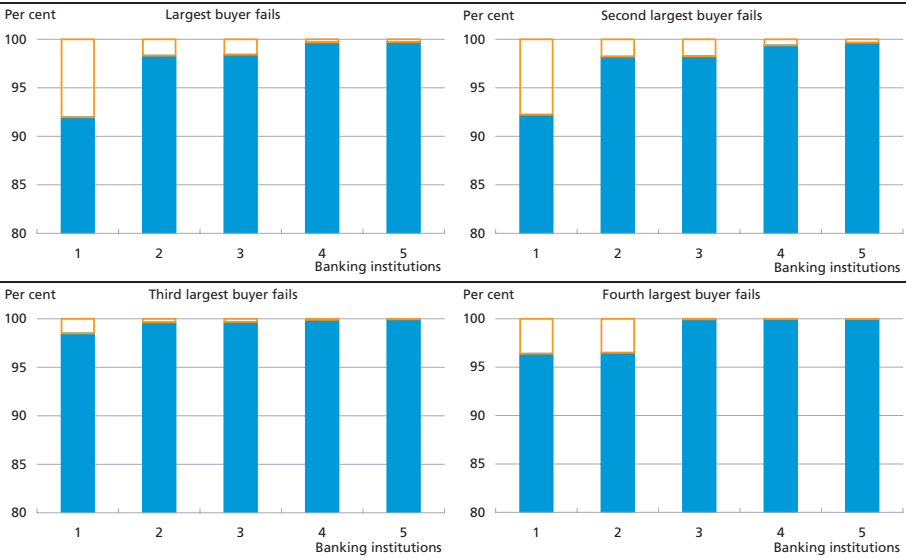
The impact of the replacement risk in VP is analysed on the basis of data for the participants' bilateral transactions on a selected settlement day. It is assumed that a participant fails immediately prior to the start of VP's settlement day and that a given fall in market prices is seen. For

¹ See e.g. Recommendation 9 of BIS, *Recommendations for securities settlement systems*, 2001.

² For an elaboration of the measures taken by VP to limit operational risk, see the Danish Financial Supervisory Authority and Danmarks Nationalbank, *Review of VP Securities Services in relation to Recommendation for Securities Settlement Systems*, 2004. The report can be found at Danmarks Nationalbank's website, www.nationalbanken.dk.

BANKING INSTITUTIONS' REMAINING CAPITAL BUFFER IF A PARTICIPANT IN THE VP SYSTEM FAILS

Chart 49



Note: Based on data from 2 January 2004. In each case, the Chart shows only the five banking institutions suffering the greatest losses as a percentage of their capital buffers.

each of the other participants, the ratio of the loss on the cancelled sales to the participant's capital buffer is then calculated¹.

The analysis is based on a number of extreme conditions. Firstly, the data relates to 2 January 2004, when VP experienced the largest securities settlement volume on any date in 2004². The replacement risk normally increases with the transaction volume.

Secondly, the participant that fails is assumed to be the largest participant. In addition, the analysis includes the potential failure of the second, third and fourth largest participants, which may have a greater impact on individual participants than the failure of the largest participant.

Thirdly, the fall in market prices is assumed to correspond to the largest decline, in percentages, over a period of three days seen since 1990. As mentioned, three days is the duration of the replacement risk for most securities transactions settled in VP. In the KFX index, the largest drop in stock prices in this period was by 13.1 per cent (April 2000), while the largest fall in bond prices, measured by the benchmark 30-year mortgage-credit bond, was 4.9 per cent (August 1994).

¹ The capital buffer is measured as the part of the base capital that exceeds the statutory solvency requirement of 8 per cent of risk-weighted assets, calculated at end-2004.
² The large volume is primarily attributable to the annual refinancing of adjustable-rate mortgage-credit loans with 2 January as the value date.

Even in this extreme scenario, participants suffer only modest losses. Chart 49 shows the reduction of the capital buffer for the banking institutions bearing the greatest losses. When the participant purchasing the greatest volume of securities fails, the banking institution suffering the greatest loss as a result of the replacement risk loses only approximately 8 per cent of its capital buffer. No other banking institution loses more than 2 per cent of its capital buffer. Likewise, the failures of the second, third or fourth largest buyers only entail small losses to the individual banking institutions.

CONCLUSION

Overall, the risks on settlement of securities transactions in VP are assessed to be relatively limited. This is due to a number of risk-reducing elements in the VP settlement procedure. Examples include the Delivery versus Payment principle, the automatic collateralisation agreement and the code of conduct for settlement via VP.

Participants in the VP System incur a replacement risk when they opt for settlement of securities transactions via VP's multilateral net settlements. However, calculations show that, even in extreme scenarios, losses stemming from this risk will not threaten the solvency of the participants.

The potentially most significant type of risk in relation to the VP System is operational risk. VP system failures and similar incidents that delay settlement will affect many participants and may have a serious impact on the financial system. Consequently, it is important for VP to maintain a high degree of operational security.

Glossary of Financial Terms

Additional capital. *Subordinate loan capital* in credit institutions, offered as part of the *base capital*, that meets certain requirements (no default sanctions for the creditor, an option to defer interest payments and to write down the principal), as well as revaluation reserves.

Adjustable-rate loan. See *variable interest rate*.

Amortised cost. A principle for valuation of lending by banking institutions. On determination of the value of the loan, the original cost price is calculated less redemptions and any *write-downs* and with the addition/deduction of the accrued transaction costs, fees and commission to be received during the term of the loan. See also *fair value*.

Bancassurance. Describes the distribution of both banking and insurance products within the same financial company or group.

Base capital. Financial companies' capital required for compliance with the statutory *capital requirement*. The base capital comprises *core capital* and *additional capital*, and the latter may not exceed half of the base capital. The base capital is adjusted for e.g. capital investments in other financial companies.

Basel II. Description of the *Basel Committee's* forthcoming standards for new capital-adequacy rules, entering into force at end-2006.

Basel Committee on Banking Supervision, whose secretariat is at *BIS*, was set up in 1975 with the purpose of promoting cooperation between national banking supervision authorities and strengthening the stability of the international financial system.

BIS. The Bank for International Settlements serves as banker to the central banks.

Callable bond. A bond which can be prematurely redeemed by the debtor on terms agreed in advance. Danish mortgage-credit bonds are callable bonds.

Capital adequacy. See *solvency ratio*.

Capital need. A credit institution must assess its *capital need*, i.e. *capital adequacy* in relation to its risks. See also *solvency requirement*.

Capital requirement. See *solvency requirement*.

Category 1, 2, 3 or 4 banking institution. The Danish Financial Supervisory Authority's categorisation of Danish banking institutions based on their volume of *working capital*. Banking institutions in category 1 have *working capital* of kr. 25 billion and above; category 2 from kr. 3 billion to kr. 25 billion; category 3 from kr. 250 million to kr. 3 billion; and category 4 less than kr. 250 million.

Category A, B or C. Danmarks Nationalbank's categorisation of Nordic financial groups and Danish banking institutions. Category A comprises 6 Nordic financial groups including Danske Bank and Nordea. Category B comprises 18 selected major Danish banking institutions, i.e. selected banking institutions in the Danish Financial Supervisory Authority's

categories 1 and 2 that are not included in category A. Category C comprises 28 selected small Danish banking institutions and is part of the Danish Financial Supervisory Authority's category 3.

CEBS. The Committee of European Banking Supervisors. CEBS is a level-3 committee for the banking sector, comprising both central banks and supervisory authorities. See the *Lamfalussy procedure*.

CEIOPS. The Committee of European Insurance and Occupational Pension Supervisors. CEIOPS is a level-3 committee for the insurance sector, comprising supervisory authorities. See the *Lamfalussy procedure*.

CESR. The Committee of European Securities Regulators. CESR is a level-3 committee for the securities sector, comprising supervisory authorities. See the *Lamfalussy procedure*.

CIBOR. The Copenhagen Inter-Bank Offered Rate is a reference interest rate for *liquidity* offered on an uncollateralised basis in the *inter-bank market* to banking institutions with a high *credit standing*.

Clearing. Compilation of each participant's purchases and sales of securities, resulting in the net position of each participant. See also *settlement* and *VP*.

CLS. Continuous Linked Settlement is an international currency-settlement system.

Conglomerate (financial). A group comprising both an insurance company and a credit institution or investment company, and in which the financial activities account for a significant share of the balance sheet.

Core capital. In credit institutions, this comprises paid-up share, cooperative or guarantee capital, additional paid-in capital and reserves, adjusted for e.g. own shares and deficit for the year. Furthermore, *hybrid core capital* may be included.

Cost ratio. A banking institution's *ordinary costs*, excluding losses and provisions, as a ratio of its *ordinary profit*.

Credit derivative. A term used for a number of *financial derivatives* that can be used for trading in *credit risk*.

Credit risk. The risk of suffering a loss should the counterparty default on its payment obligations.

Credit spread. The difference between the yield on a lower rated bond and a higher rated bond.

Credit standing. Assessment of a debtor's willingness and ability to honour its commitments. See also *rating*.

Depositor Guarantee Fund. The Guarantee Fund for Depositors and Investors is a private, independent institution established by act of parliament. It grants compensation to depositors and investors in Danish banking institutions, mortgage-credit institutes and investment companies for losses in connection with suspension of payments or compulsory liquidation. Under certain conditions, branches of foreign credit institutions and investment companies may also be included in the Danish depositor guarantee scheme.

Derivative. See *Financial derivative*.

Distance to default. The risk measure "distance to default" illustrates the probability that the estimated market value of a company's assets becomes lower than the value of its debt (i.e. *insolvency*). The distance is measured by the number of *standard deviations* for the estimated market value of the company's assets. See also *distance to insolvency*.

Distance to insolvency. The risk measure distance to insolvency shows the probability that a banking institution keeps within the statutory *solvency requirement*, i.e. that a decrease in the assets' estimated market value does not cause the banking institution to fall below the statutory *solvency requirement*. The distance is measured by the number of *standard deviations* for the estimated market value of the assets. See also *distance to default*.

Economic capital. The credit institution's assessment of the adequate capital base for the risk profile chosen. The calculation takes account of unexpected losses in relation to various risk types, e.g. *market risk*, *credit risk* and *operational risk*. See also *solvency requirement*.

Equity capital. The owners' share of the company's capital, including share capital, accumulated profits, etc.

ESCB. The European System of Central Banks consists of the European Central Bank (ECB) and the central banks of all EU member states.

Estimated failure rate is in this publication for companies estimated in a failure-rate model based on key accounting ratios, etc. The estimated failure rate indicates the probability that a company is compulsorily liquidated within the next few years.

European passport. The option to operate across borders within the EU on the basis of approval in one member state.

Exchange-rate risk. The risk of losses due to exchange-rate fluctuations. See also *market risk*.

Fair value. An estimate of the proceeds from transfer of an asset to a buyer on market terms. The fair value of a liability is an estimate of the set-off value of the liability on market terms. See also *amortised cost*.

Fee and commission income includes brokerage and custody commission, guarantee commission, fees for use of payment systems and remortgaging fees, as well as ordinary loan fees.

Financial derivative. An instrument whose value is derived from the price of an underlying asset such as a security, a product or a currency. *Options* and *swaps* are examples of financial derivatives.

Floor risk. The risk arising from the fact that the deposit rate cannot be negative. This situation may arise when the market interest rate is so low that if it declines further the deposit rate cannot be lowered correspondingly, whereby the *interest margin* narrows.

Forward rate. An implicit short-term interest rate at a future point in time. It is derived on the basis of bonds with different, long maturities. The forward rate reflects expectations of the future interest rate, including, inter alia, a risk premium to take account of the uncertainty of the future interest rate.

FSAP. The EU's Financial Services Action Plan. FSAP was initiated in 2000 to put into effect the EU's single market for financial services.

Gearing (financial). Debt (loan capital) as a ratio of equity.

Going concern. A description of a company that is expected to continue its activities. Used e.g. as a basis for valuation of assets and liabilities.

Guaranteed benefits. Payment obligations guaranteed to the policyholders in a pension company. See also *guaranteed interest-rate* and life-insurance provisions.

Guaranteed interest rate, also called technical interest rate. The lowest return on the savings guaranteed to the policyholders in a pension company. The guaranteed interest rate is used to calculate the relationship between paid-in premiums and the *guaranteed benefits* to policyholders in a pension company under the insurance contract. The interest rate is based on a number of assumptions regarding risk of disability, mortality, and interest rates and costs.

Hedge association. The Danish equivalent of a hedge fund. Unlike e.g. investment associations, hedge associations will not be subject to limitations to their *gearing* and *short-selling* options.

Hybrid core capital. Capital that may, under certain conditions, be included in the banking institutions' *core capital*. Hybrid core capital has characteristics resembling a debt instrument, but is subject to stricter rules. For instance, the maturity must not be fixed, and interest on debt lapses if the banking institution has no free reserves. Hybrid core capital must not exceed 15 per cent of the *core capital*.

IAS/IFRS. The international accounting standards prepared by the independent International Accounting Standards Board (IASB) to make accounts comparable across countries.

Implied volatility. The theoretically derived volatility in the Black and Scholes option-price model for an underlying financial asset, calculated on the basis of the observed option prices. See also *standard deviation*.

Insolvency. A company's situation if the value of its equity is negative.

Insurance provisions. The total provisions made by a pension company for settlement of commitments relating to the insurance policies issued by the company. Insurance provisions are divided into various categories, of which the most important in pension companies is life-insurance provisions.

Inter-bank market. In Denmark, the market for krone-denominated loan agreements and interest-rate derivatives with a maturity of up to a year transacted between banking institutions and mortgage-credit institutes. Often referred to as the money market.

Interest margin. The difference between the rate of interest for lending and deposits.

Interest-rate guarantee. See *guaranteed interest rate*.

Interest-rate risk. The risk that interest-rate fluctuations generate losses. The key ratio "interest-rate risk" is an expression of the part of the *core capital* after deductions that is lost on a parallel shift of the *yield curve* by 1 percentage point.

Internal interest rate. See *yield to maturity*.

IOSCO. The International Organization of Securities COMmissions, established in 1983, is an international forum for securities supervisors.

Issue. The issue of e.g. securities on a stock exchange.

KFX. Equity index consisting of the 20 most traded and liquid Danish equities listed on the Copenhagen Stock Exchange. The composition of the index is revised twice a year.

Lamfalussy procedure. A procedure determining the framework conditions for a new, faster legislative process within the EU, respecting the competences of the various EU institutions. The Lamfalussy procedure consists of 4 levels: at level 1, the European Parliament and the Council jointly adopt the framework regulation. More technical provisions are laid down in legislative acts issued by the European Commission following consultation of a special committee of member state representatives, i.e. level 2. Level 3 comprises close cooperation between the member states' supervisory authorities, etc., while level 4 is enforcement of the provisions by the European Commission.

Liable capital. A term previously used for *base capital* in credit institutions.

Liquidity. A measure of negotiability. Liquid securities are often characterised by a large circulating volume, high turnover and a narrow spread between bid and ask prices. See also *liquidity premium*.

Liquidity premium. The premium which the buyer is willing to pay for a more liquid asset.

Liquidity risk. The risk that the required financing is not available at a given price (interest rate) as the commitments fall due (e.g. if refinancing of securities or a loan is required).

Market risk. The risk that fluctuations in market prices (interest or exchange rates or equity prices) will result in losses. See also *Value-at-Risk*.

Median. The numerical value dividing data into two equal sets, one half being below and the other above the median. Corresponds to the 50th *percentile*.

OMX AB. A Swedish company that owns, *inter alia*, the stock exchanges in Stockholm, Helsinki, Tallinn, Riga and Vilnius. In December 2004, an agreement was concluded to combine OMX AB and the Copenhagen Stock Exchange A/S.

Operational risk. The risk of losses due to IT system failure, legal risk, human errors, fraud, etc.

Option. A *financial derivative* granting the owner (buyer) the right, but not the obligation, to buy or sell an underlying asset (e.g. a product, a security, a currency or another derivative) at an agreed price (the strike price) at/before an agreed future point in time. The seller of an option is obliged to fulfil the owner's right. An option can also be an inherent element of securities in the form of the right of premature redemption.

Ordinary costs of banking institutions include personnel and administrative costs, depreciation and amortisation, and losses and provisions.

Ordinary profits of banking institutions include e.g. net interest income, net fee and commission income, value adjustments, and the result of capital investments in associated and affiliated companies.

Percentile. The numerical value representing the share of the observations below that value. For example, the 10th percentile for the *return on assets* is the point below which exactly 10 per cent of the companies with the lowest returns on assets lie.

Portfolio. A holding of assets.

Prime broker. An investment bank that services hedge funds in connection with their activities in the financial markets. Prime brokers offer the following services, among others: trading transactions, *clearing* and *settlement*, securities lending, help to set up hedge funds. See *hedge associations*.

Profitability. See *return on equity*.

Provisions for loans. See *write-downs*.

Rating. An assessment of *credit standing* given by rating agencies such as Fitch, Moody's and Standard & Poor's. Rating is used e.g. in connection with the issue of securities and takes the probability of default and the size of the loss into account.

Red and yellow lights. The Danish Financial Supervisory Authority's risk scenarios for pension companies aimed to illustrate whether the company's chosen relationship between investment risk, capital base and commitments is appropriate. Each risk scenario is used to test the pension companies' ability to sustain losses due to changes in interest rates, falling equity and real estate prices, etc.

Return on assets. Describes a non-financial company's ability to achieve a return on invested capital. It is calculated as the company's profit before interest (primary operating result) as a ratio of its assets.

Return on equity. A measure of a company's ability to achieve a return on the owners' investment. Calculated as the company's profit as a ratio of its *equity capital*.

Risk-weighted items. The risk-weighted assets and off-balance-sheet items, i.e. items subject to *credit risk* and *market risk*. Under *Basel II*, the risk-weighted items will also include *operational risk*. See also *solvency requirement*.

S&P 500. US abbreviation of Standard & Poor's 500 equity Index. It consists of the 500 most traded US equities and is e.g. used as an underlying index for equity futures and equity *options*.

Settlement. Completion of trade by final settlement of agreed commitments. See also *clearing* and *VP*.

Short-selling. Sale of securities or currency not yet possessed in the expectation that the position can subsequently be hedged by purchasing at a lower price. See also *hedge association*.

Solvency. Indicators for a company's ability to sustain losses. More specifically the part of its assets that can be lost before the losses affect its loan capital. Calculated as the ratio of equity capital to assets.

Solvency ratio. A key indicator for credit institutions, defined as *base capital* as a ratio of *risk-weighted items*. See also *solvency requirement*.

Solvency requirement. The statutory solvency requirement imposed on financial companies. In a credit institution, the *base capital* must constitute at least 8 per cent of its *risk-weighted items*. In a pension company, the solvency requirement is calculated on the basis of life-insurance provisions with a number of minor additions. See also *solvency ratio*.

Standard deviation. The average distance from the observations to e.g. the average in the data material. See also *implied volatility*.

Subordinate loan capital. Debt that is subordinate to other liabilities in the event of the borrower's compulsory liquidation. Subordinate loan capital meeting certain requirements can be included in the credit institutions' *additional capital*. See also *base capital*.

Swap. A *financial derivative* that is an agreement between two parties to exchange payments over a fixed period. Currency swaps are used to restructure payment flows between various currencies. Interest-rate swaps are typically used to restructure payment flows between fixed and *variable interest rates*. Credit default swaps are used to exchange credit risk between two borrowers. The overall value of a swap is usually zero when the agreement is made, but may subsequently become positive or negative, depending on market developments in interest and exchange rates.

Swaption. An option on a *swap*. The buyer of a swaption has the right, but not the obligation, to conclude a swap on agreed conditions.

Systemic (financial) risk. The risk that an event may trigger financial losses and/or lack of confidence in a significant part of the financial system and thus potentially threaten financial stability. Events leading to systemic risk may occur suddenly and unexpectedly, or the risk builds over time in case of insufficient regulation, etc.

Technical interest rate. See *guaranteed interest rate*.

Term structure of interest rates. The relationship between securities' yields and maturities. A rising term structure, i.e. where yields on short-term securities are lower than yields on long-term securities, is considered normal. A falling term structure is described as inverse.

Value-at-Risk (VaR). A model for measuring *market risk* based on *volatility* and correlations in historical market developments. For a given *portfolio* and within a fixed time horizon, the model calculates the maximum loss that may arise with a given probability (often 95 per cent).

VaR. See *Value-at-Risk*.

Variable interest rate. An interest rate that varies during the maturity of the loan, e.g. because it is agreed that it tracks another interest rate.

Volatility. A parameter indicating the size of the fluctuations in an asset's price, e.g. the fluctuations in a share price. See also *implied volatility*.

VP. An abbreviation of Værdipapircentralen A/S (VP Securities Services). VP and the Copenhagen Stock Exchange are the two key market institutions in the Danish securities market. VP's most important tasks are electronic issue of securities, registration of ownership and rights concerning electronic securities, and *clearing* and *settlement* of securities transactions. All stock-exchange-listed securities and a number of unlisted securities are held electronically at VP.

Working capital. Comprises deposits, issued bonds, *subordinate loan capital* and *equity capital*. See also *category 1, 2, 3 or 4 banking institution*.

Write-down on loans. Under the new accounting rules, banking institutions' provisions are to be referred to as write-downs in future. For loans on which a loss is expected (i.e. there is an objective indication of a deterioration in value), the banking institutions must write down the loan to the present value of the expected future payments, including realisation of collateral.

Yellow light for pension companies. See *red and yellow lights*.

Yield curve. See *term structure of interest rates*.

Yield to maturity or internal interest rate. The fixed discount rate at which the present value of a cash flow equals the investment.