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Nationalbank

Financial stability

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The small picture on the cover shows a section of the Århus City Hall Tower, chosen as the motif for the first coin in a series of 7-10 thematic coins that are issued over a number of years.

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Explanation of symbols:

- Magnitude nil
- 0 Less than one half of unit employed
- Category not applicable
- ... Numbers not available

Details may not add due to rounding.

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Introduction

Danmarks Nationalbank publishes an annual report on financial stability in Denmark. The purpose is to assess whether the financial system is so robust that any problems in the financial sector do not spread and impede the functioning of the financial markets as efficient providers of capital for companies and households. The approach is to consider the general risks to the financial system, and not the situation of the individual financial institutions. That is the task of the Danish Financial Supervisory Authority. The two-part report first analyses the development in financial stability, with emphasis on the banking institutions. The second part of the report considers four current topics.

The Danish banking institutions have shown resilience to the slowdown in the economy and the increased uncertainty in the financial markets, with falling stock prices and interest rates in 2001 and 2002. The banking institutions' overall earnings are still sound. Losses and provisions have even declined, although the spread between the institutions has widened. Those with the highest growth in lending in recent years have also suffered the greatest losses.

Some banking institutions have reduced costs, while most institutions still face rising costs.

Capital adequacy has generally increased slightly in 2002, which is in harmony with the greater uncertainty concerning the economic development.

Overall, the banking institutions thus appear to be slightly more resilient to losses than one year before. The uncertainty is instead associated with the duration of the economic slowdown.

Danmarks Nationalbank has estimated a model to calculate the probability of corporate failures within the next years. The results of the model indicate that the probability of corporate failure has increased slightly in all sectors. IT and telecom is still the most vulnerable sector. The spread in the probability of corporate failure has widened in all sectors in the last few years, which has led to greater uncertainty in relation to credit expansion to the corporate sector.

The households have increased their indebtedness, but in view of the low level of interest rates, the interest burden has not increased equivalently. Many homeowners have used mortgage-credit loans to repay bank debt since the banks' lending rates are generally higher than interest rates for mortgage credit.

Developments in the financial markets in 2002 had especially negative consequences for the pension sector. There were massive capital losses on stocks, and the capital gains on the bond portfolios are not sufficient to cover the need for further provisions for pension commitments. Overall, however, the pension companies have been able to increase their reserves, since new accounting regulations have made it possible to book some of the provisions as reserves.

A secure and efficient infrastructure for settlement of payments is a prerequisite to financial stability. It is important to have sufficient liquidity when it is required so as to prevent any problems experienced by one or several participants from spreading to others. A crisis scenario has been simulated whereby the access to procure liquidity is reduced drastically. The outcome shows that currently the sector as a whole has ample liquidity at its disposal. There is also generally sufficient liquidity at the institutional level.

Real-Economic Development

THE INTERNATIONAL ECONOMY

Development in the international economy has been weak in recent years, with considerable fluctuations in the financial markets. The international stock markets have declined significantly, accompanied by reduced yields in both the money and bond markets. In the euro area, which has seen very moderate growth rates in the last 1½ years, the problems are especially pronounced in the three large member states, Germany, France and Italy. The US economy achieved relatively sound growth in 2002, but with a very large current-account deficit, reflecting an increasing savings deficit in the public sector.

The expected onset of a renewed international upswing has been deferred several times in the past year, and neither consumers nor companies have any strong confidence in the future course of the economy. It is a widespread perception, however, that the US economy will start to recover in the 2nd half of 2003. This was expressed most recently in the OECD's economic outlook from April. However, the imbalances described, especially the growing government deficit, may contribute to dampening growth. The prospects for the European economy, and in particular Germany, are more pessimistic. For Germany, the consensus growth estimate for the current year has now been adjusted downwards to below 1 per cent. Some of Denmark's other trading partners, e.g. Sweden and the UK, also saw receding growth in the 2nd half of 2002. The overall development in the Danish export markets does not point to any expansion of exports in the immediate future.

THE DANISH ECONOMY

Economic activity in Denmark slowed down during 2002. According to the latest national accounts, GDP rose significantly in the 1st half of 2002, but then declined in the 3rd quarter, followed by a moderate increase in the 4th quarter. For 2002 as a whole, growth was slightly higher than in 2001. According to the most recent official forecasts growth of around 1½ per cent is expected in 2003, cf. Table 1. This is slightly below the expectations at the turn of the year, and thus confirms the dampening.

OFFICIAL FORECASTS FOR THE DANISH ECONOMY, 2003 AND 2004

Table 1

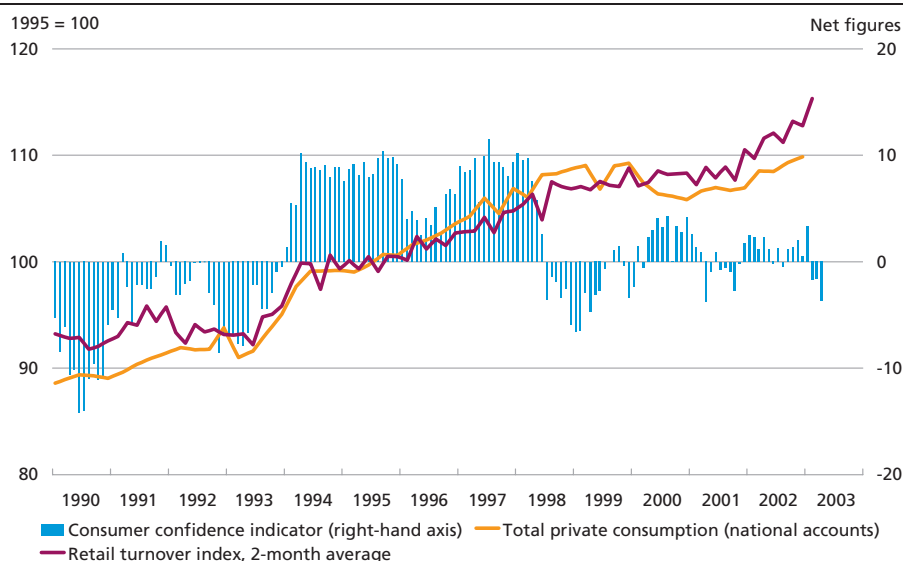
	Danish Economic Council	The Gov- ernment	Economic Council of the Labour Movement	EU	OECD
	Nov. 2002	Dec. 2002	Feb. 2003	Apr. 2003	Apr. 2003
	Percentage change vis-à-vis the previous year				
2003					
GDP	1.9	1.8	1.3	1.5	1.6
Private consumption	2.7	2.2	2.3	1.8	1.9
Business investments	0.8	2.7	-0.1	1.6	0.8
Exports	3.6	3.8	1.6	2.0	3.1
Hourly wages	4.0	3.9	3.7	3.8	3.9
Employment	0.3	0.1	-0.5	-0.3	0.0
2004					
GDP	1.9	2.1	2.0	2.2	2.6
Private consumption	1.9	2.4	2.4	2.3	2.2
Business investments	2.2	3.8	0.4	3.8	3.5
Exports	4.2	5.8	3.8	4.7	7.5
Hourly wages	3.8	3.7	3.7	3.9	4.2
Employment	0.2	0.5	0.1	0.4	0.5

Growth in the Danish economy in 2002 was driven especially by private consumption, which accelerated during 2002 after a few sluggish years, cf. Chart 1. In the 4th quarter of 2002 private consumption was thus almost 3 per cent above the level for the same quarter of 2001. For 2003 and 2004 the estimates for total private consumption are around 2-2½ per cent. The latest figures for new passenger car registrations and consumer confidence are both weak, while retail turnover is increasing very strongly. Sound growth in real disposable incomes and the low level of interest rates are expected to sustain growth in consumption, while a relatively high wealth ratio and a low consumption ratio ensure a sound starting point.

In 2002 business investments were at by and large the same level as in 2001. Investments in plant and equipment are at a high level after several years of strong increases. Many of the investments relate to IT equipment and other technological equipment, which have a shorter economic life than other capital stock. The higher investment level is thus offset by substantial write-offs and may therefore be of a more permanent nature. This also reduces the probability of an actual setback in investments. Construction investments are at a more moderate level, without any signs of a perceptible upswing. The latest estimates of total business investments point to only moderate growth in 2003, and are thus in line with the weak business confidence indicators.

PRIVATE CONSUMPTION AND CONSUMER CONFIDENCE, 1990-2003

Chart 1



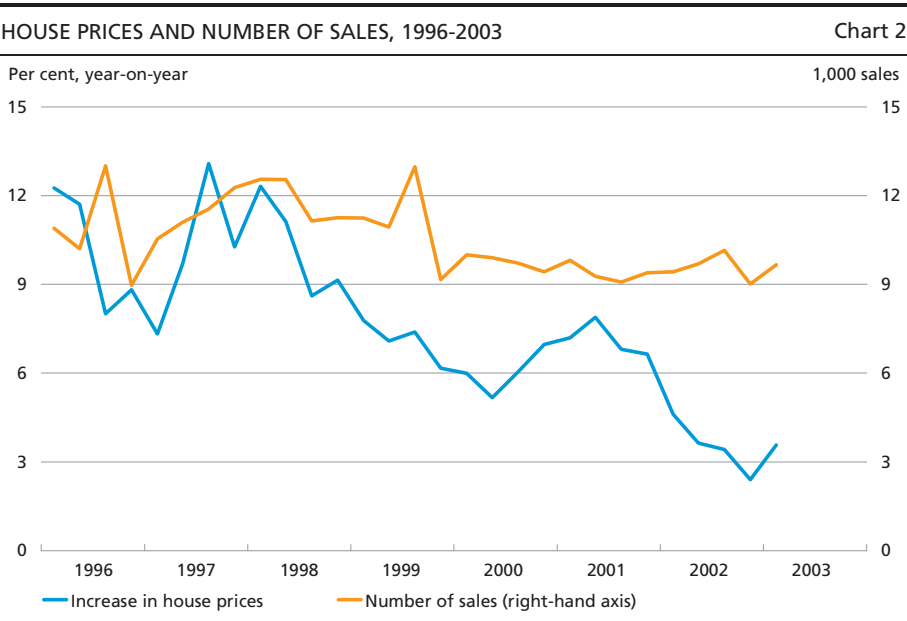
Note: Seasonally adjusted data.

Source: Statistics Denmark.

Stable growth in residential construction does not offset the decline in business construction, so that overall construction activity has developed weakly in recent years. Residential construction will be supported by the government's package of housing measures from 2002 to promote e.g. the construction of private rental properties and the renovation of public housing.

The significant increases in house prices in recent years appear to have ceased, while the number of house sales has remained flat since 1999, cf. Chart 2. The increase in house prices is hardly expected to exceed the general development in prices in the near future, but on the other hand there is no apparent immediate risk of a pronounced downturn in the housing market, nor of the major fluctuations in house prices seen in previous decades. This reflects that the imbalances in the Danish economy are considerably less pronounced than was previously the case.

To some extent Danish exports have defied the subdued growth in the international markets and won market shares in recent years. The favourable reaction to the international development to a large extent reflects the structure of Danish exports, including a relatively low proportion of investment goods, which are traditionally very cyclically sensitive. In addition, the market for some of the dominating export products, e.g. wind turbines and pharmaceutical products, has not been significantly affected by the recession.



Note: Seasonally adjusted data.
Source: The Association of Danish Mortgage Banks.

Despite the slowdown, the Danish economy has so far steered safely through the weaker international economy. Falling employment in 2002 and a moderate increase in unemployment have eased the pressure on the Danish labour market, which is, however, still tight in international terms. For a number of years wage increases have exceeded those abroad. Together with a stronger effective krone rate this weakens competitiveness. Competition in the national and international product markets limits the extent to which the business enterprises can pass on increased wage costs as higher prices, so that business earnings may come under pressure.

The imbalances in the Danish economy are generally moderate. In 2002 sound surpluses were achieved on both the government budget balance and the current account of the balance of payments. The private sector has gradually eliminated its financial savings deficit, i.e. gross investments less gross savings, from 2 per cent of GDP in 1998 to a surplus of more than 1 per cent of GDP in 2002. This is primarily the result of higher savings and a decline in housing construction.

Financial stability analysis

The Financial Sector

The financial sector is affected by the slowdown in the international economy, the course of the financial markets and uncertainty concerning the future.

The Nordic groups realised an overall decrease in earnings. For most of them, the level of losses and provisions has increased, but the average is unchanged. In a European perspective, especially compared to the German banking sector, the Nordic groups appear to be robust.

The Danish banking institutions' earnings continue to be sound, and losses and provisions have even decreased. So far, the banking institutions have shown resilience to the effects of the slowdown and the downturn on the financial markets, but there is a tendency for increased dispersion of earnings. A number of Danish banking institutions have enhanced their capital adequacy, which is in harmony with the greater uncertainty regarding the course of the economy.

The sensitivity of the banking institutions' profits one year ahead has remained by and large unchanged over the past year. At the same time, the increased capital adequacy has enhanced the banking institutions' overall resilience to losses on loans and guarantees. The uncertainty is instead associated with the duration of the economic slowdown.

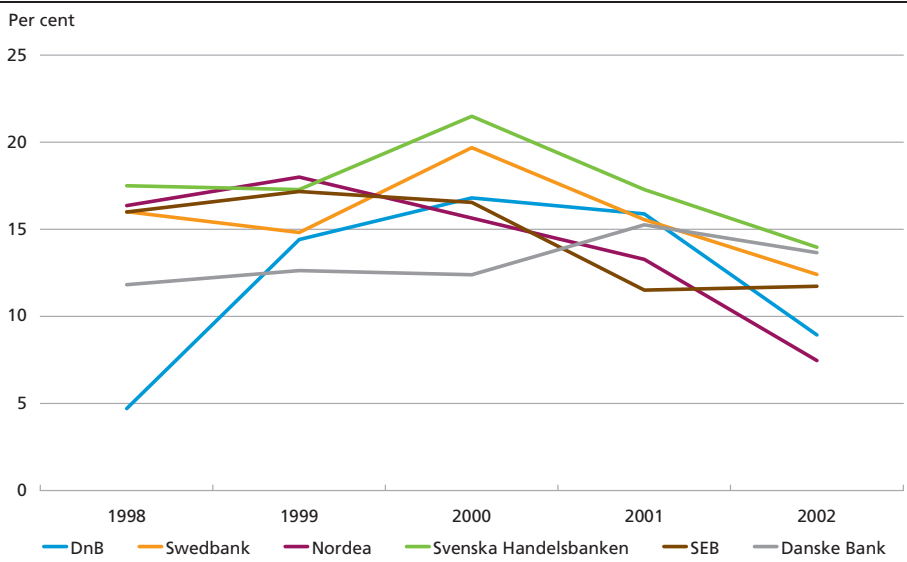
The development of the financial markets in 2002 has negatively affected the pension sector. However, new accounting principles enabled the pension companies to increase their reserves.

FINANCIAL GROUPS

The largest financial groups in Denmark are all major market participants within the fields of banking, mortgage credit and insurance. At the same time, a large proportion of the groups' operations are in the whole of the Nordic financial market. The development of the largest financial groups in the Nordic region thus puts that of the largest Danish groups and the Danish banking sector into perspective¹.

¹ The groups analysed are Danske Bank, Den norske Bank (DnB), Föreningssparbanken (Swedbank), Nordea, Skandinaviska Enskilda Banken (SEB) and Svenska Handelsbanken.

RETURN ON EQUITY AFTER TAX FOR THE LARGEST NORDIC FINANCIAL GROUPS, 1998-2002 Chart 3



Note: The data set comprises the six Nordic groups analysed plus the companies which were previously independent of, but are now included in, the present groups. Return on equity is calculated as profit after tax as a ratio of equity capital end-of-period.
Source: Annual accounts.

Trends in the groups' financial statements

For most of the Nordic financial groups profits before tax were lower in 2002 than in 2001, and returns on equity mainly decreased, cf. Chart 3. However, the groups succeeded in increasing their net interest income, even though both interest income and expenditure fell. Business expanded in terms of the volume of deposits and lending, with mortgage-credit lending accounting for particularly strong growth.

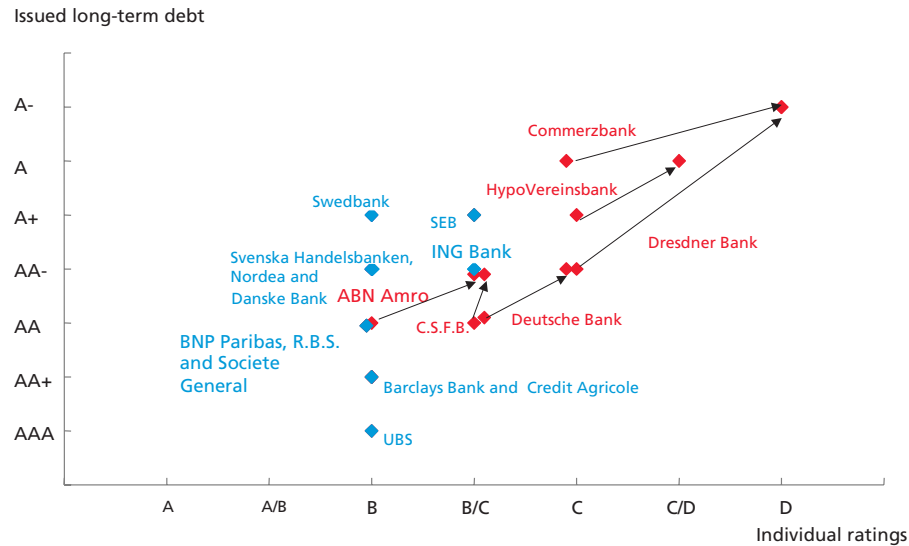
The downturn on the stock markets is reflected in lower net income from fees in connection with investment banking activities, and in a lower return on portfolios of securities and shares in 2002 compared to 2001 for most of the groups. To counter receding revenue several groups have downscaled their investment banking activities and laid off a considerable number of employees in the units concerned.

Nonetheless, investment banking activities do not play a major role for most of the Nordic groups. This may explain why the Nordic groups are doing well in an international perspective.

Most of the groups saw an expansion of losses and provisions on lending as a ratio of total loans and guarantees, but the ratio is on average unchanged at 0.14 per cent. A few groups improved their capital adequacy, which appears to accord with the increased uncer-

RATINGS OF SELECTED NORDIC GROUPS AND EUROPEAN BANKING INSTITUTIONS, BEGINNING OF MARCH 2002 AND BEGINNING OF MARCH 2003

Chart 4



Note: The Fitch rating agency applies a general scale of letters from AAA to -A for their long-term ratings, where AAA is the highest rating. The rating of individual banking institutions goes from A to D. The individual rating is an assessment of the banking institution's financial strength without considering any third-party support, whereas the long-term rating may be higher due to implicit or explicit guarantees from e.g. public authorities. C.S.F.B. stands for Credit Suisse First Boston, while R.B.S. stands for Royal Bank of Scotland.

Source: Fitch.

tainty concerning the development of the economy. Core capital accounts for 7.3 per cent of risk-weighted assets, which is the same ratio as in 2001.

The Nordic groups are affected by the problems faced by the pension sector via the groups' life-insurance activities, and via their own company pension funds. Life-insurance companies have been subject to pressure from the low level of interest rates and stock-market trends, and some groups had to grant liable loans to insurance and pension companies. Several groups have company pension schemes which could potentially generate losses. One group has stated that it has had to contribute capital to a company pension scheme.

Credit standing in a European perspective

With a view to assessing the credit standing of the Nordic groups Chart 4 presents the individual ratings at the beginning of March 2002 and March 2003 respectively for selected European financial groups, and the ratings of their long-term debt issues. The highest ratings are found to the "south-west" of the chart, and the arrows show the institutions that have been downgraded since March 2002.

FINANCIAL STATEMENTS OF THE BANKING INSTITUTIONS, 1999-2002

Box 1

The Danish banking institutions' profits totalled kr. 20.2 billion in 2002, which represented a small increase on 2001. The banking institutions' profits have stagnated in recent years, reflecting lower growth in the business volume than in the period 1996-2000 that saw very high growth rates for lending.

On the revenue side, the banking institutions' interest income remained unchanged in overall terms. Fee and commission income declined further against 2001 in view of the substantial market fluctuations in the second half of 2001, which particularly undermined the banking institutions' earnings basis via investment banking activities and asset management. The banking institutions' revenue from value adjustment of own portfolios decreased equivalently. However, the importance of value adjustments is relatively modest in relation to interest and fee income.

Operating expenses remain unchanged, but especially the largest banking institutions' cost adjustments relative to earnings contribute to maintaining the result for the sector as a whole. Losses and provisions were reduced in 2002, and the continuing subdued economic development has thus not yet impacted on the overall result, although the underlying variations between individual banking institutions and categories have increased.

THE BANKING INSTITUTIONS' FINANCIAL RESULTS, 1999-2002

Kr. billion	1999	2000	2001	2002
<i>Income</i>				
Net interest income	29.1	31.2	34.2	34.9
Net fee and commission income	11.5	14.0	13.3	13.0
Value adjustment of securities, etc.	1.8	4.6	1.9	0.8
Value adjustment of capital investments	3.5	4.6	5.8	6.2
Other ordinary income	1.9	1.6	1.6	1.6
<i>Costs</i>				
Operating expenses, etc.	30.8	35.1	32.3	32.2
Losses and provisions on debtors	2.6	3.1	5.0	4.2
<i>Ordinary operating result</i>	14.3	17.8	19.4	20.2

Note.: Banking institutions in categories 1-3.

Source: The Danish Financial Supervisory Authority.

The banks selected for comparison are the largest European banks measured in terms of total assets. There are four German banks, three French banks, two Dutch banks, two Swiss banks and two British banks.

All Nordic groups have a high rating as a starting point, and no group was subject to downward adjustment during the period.

Especially when compared to the German banking sector, the Nordic groups appear robust. The German banks were downgraded primarily due to their generally low profitability in view of structural factors that

have been reinforced by the unfavourable economic climate, resulting in declining revenue and losses on bad loans.

Structural trends

The Nordic groups were subject to a number of structural adjustments in 2002, and the consolidation among regional and local Danish banking institutions continued.

In June 2002, Nordea announced the sale of Tryg Skade to Tryg i Danmark. In September, Nordea acquired 37 per cent of LG Petro Bank in Poland, bringing Nordea's total interest to 92 per cent. Nordea acquired Postgirot Bank in 2001, which was operated as a subsidiary until its merger with Nordea Bank Sweden in December 2002.

Danske Bank divested Danica Life, a subsidiary of Danica Pension, in October. Furthermore, Danske Securities ceased to be an independent entity on the transfer of its activities to Danske Markets, and Danske Securities' activities are discontinued in full or in part in a number of countries.

Svenska Handelsbanken merged with Midtbank in May 2001. As from January 2002, Midtbank became a branch of Handelsbanken. In May 2002, Handelsbanken announced its intention to establish a new regional bank in the UK.

In February 2002, Den norske Bank acquired a controlling influence in Nordlandsbanken through the acquisition of shares. In June 2002, Den norske Bank acquired Skandia's asset management activities as an element of the establishment of Den norske Bank's asset management.

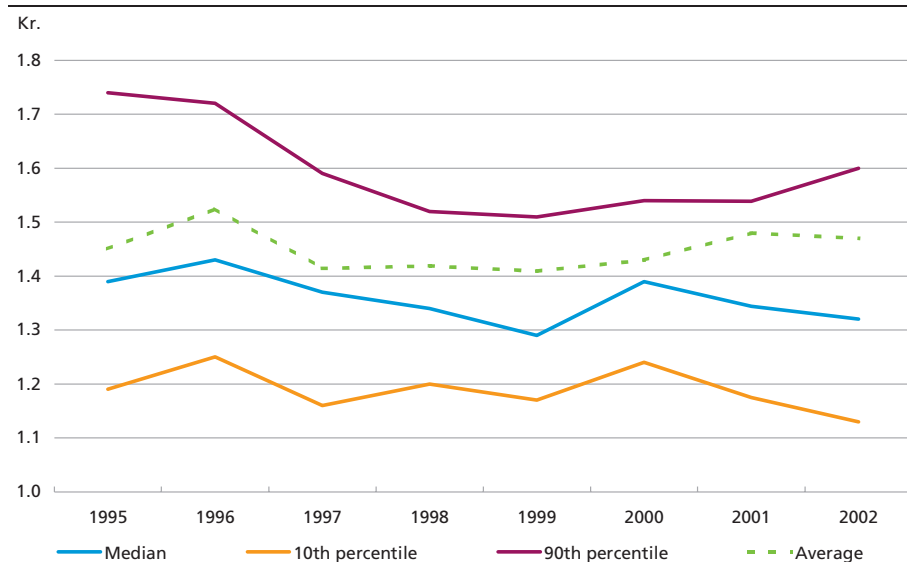
With effect from 1 January 2002, Vendsyssel Bank and Egnsbank Nord merged to become Nordjyske Bank. Egnsbank Nord is the continuing bank. In May, Sydbank merged with Egnsbank Fyn. Sydbank already owned more than 60 per cent of Egnsbank Fyn's share capital. Ringkjøbing Landbobank merged with Tarm Bank in August 2002, with Ringkjøbing Landbobank as the continuing company. Finally, Nordvestbank and Vestjysk Bank merged in March 2003 with effect from 1 January 2002, with Nordvestbank as the continuing company under the name of Vestjysk Bank.

THE DANISH BANKING INSTITUTIONS

There are 181 banking institutions in Denmark, of which the five largest account for 81 per cent of the banking institutions' total balance sheet. The Danish banking institutions thus constitute a heterogeneous group, so the average development may conceal considerable variations be-

THE BANKING INSTITUTIONS' OPERATING INCOME OVER OPERATING EXPENSES, 1995-2002

Chart 5



Note: Based on 48 selected banking institutions in categories 1-3. Operating income over operating expenses is defined as the financial result as a ratio of costs, including personnel and administration expenses, depreciation and losses and provisions.

Source: Annual accounts and the Danish Financial Supervisory Authority.

tween individual banking institutions. The differences are shown by e.g. the dispersion of some of the key ratios analysed¹.

Danish banking institutions' earnings and capital adequacy

On an aggregated level, the Danish banking institutions' profits for 2002 increased slightly over 2001, cf. Box 1.

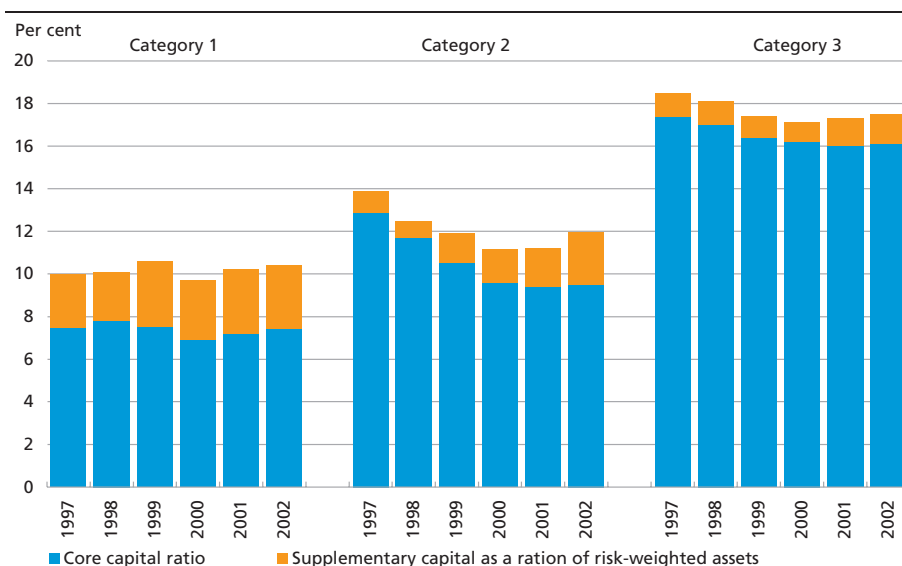
Average operating income over operating expenses fell slightly, and the dispersion among banking institutions is still increasing, cf. Chart 5. Few banking institutions were able to reduce costs, while most banking institutions continued to face rising costs. Operating income over operating expenses fell for more than half of the banking institutions.

The Danish banking institutions' overall capital adequacy decreased in the period 1997-2001, but increased a little in 2002, which is in harmony with the greater uncertainty concerning the economic development. The smallest banking institutions still have the highest capital adequacy, cf.

¹ The analyses primarily apply data for banking activities, including banking institutions that are part of financial groups. The development in earnings and capital adequacy is analysed for the groups as a whole for the banking institutions that are part of groups, while the other banking institutions are included in the analyses with data for actual banking activities. Analyses of the dispersion of various key indicators are based on the same population as the subsequent sensitivity analyses and stress tests comprising 48 selected banking institutions and groups.

THE BANKING INSTITUTIONS' SOLVENCY AND CORE CAPITAL RATIOS,
1997-2002

Chart 6



Note: The solvency ratio is the sum of the core capital ratio and the proportion of supplementary capital that can be included in the solvency compilation as a percentage of the risk-weighted assets.

Source: Annual accounts and the Danish Financial Supervisory Authority.

Chart 6. The smaller the banking institution, the lower the ratio of supplementary capital to the total capital base. Especially the medium-sized banking institutions increased the supplementary capital ratio. Supplementary capital is *ceteris paribus* associated with lower financing costs than equity capital, cf. the Capital Structure of Banking Institutions on p. 89. On the other hand, supplementary capital is typically subject to a fixed maturity, and the share of the supplementary capital that can be included in the solvency compilation decreases towards the end of the maturity period¹.

The banking institutions' operational risks

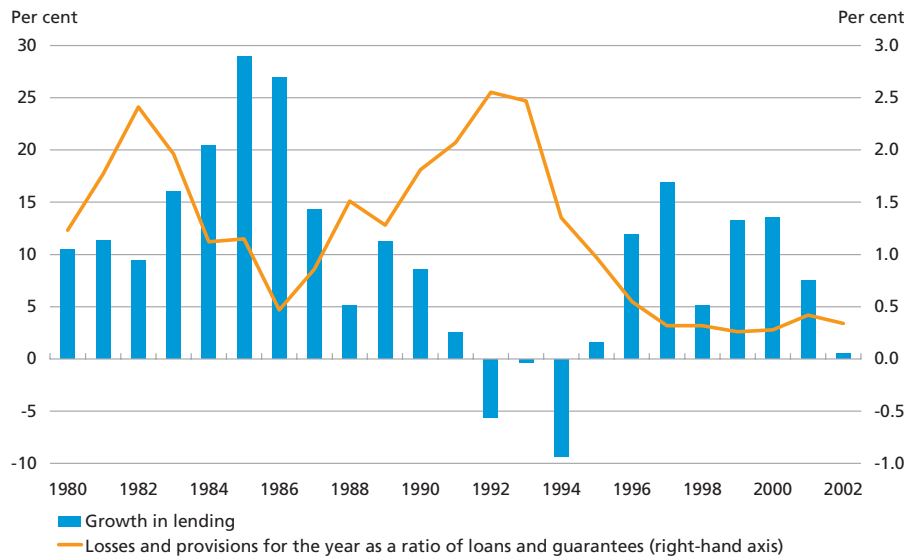
Losses and provisions normally lag behind the business cycle. When the economy is booming, lending increases, while losses and provisions are typically low. Credit quality deteriorates gradually in periods with high growth in lending, leading to increased losses and provisions in subsequent periods.

The development in the banking institutions' losses and provisions on loans and guarantees generally corresponds to the course of actual los-

¹ See Birgitte Bundgaard and Suzanne Hyldahl, Structure of the Banks' Capital – New Statutory Requirements and Opportunities, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 2002.

GROWTH IN LENDING AND LOSSES AND PROVISIONS AS A RATIO OF LOANS AND GUARANTEES, ALL BANKING INSTITUTIONS IN CATEGORIES 1-3, 1980-2002

Chart 7



Source: The Danish Financial Supervisory Authority.

losses realised, particularly losses on loans and guarantees to corporate entities.

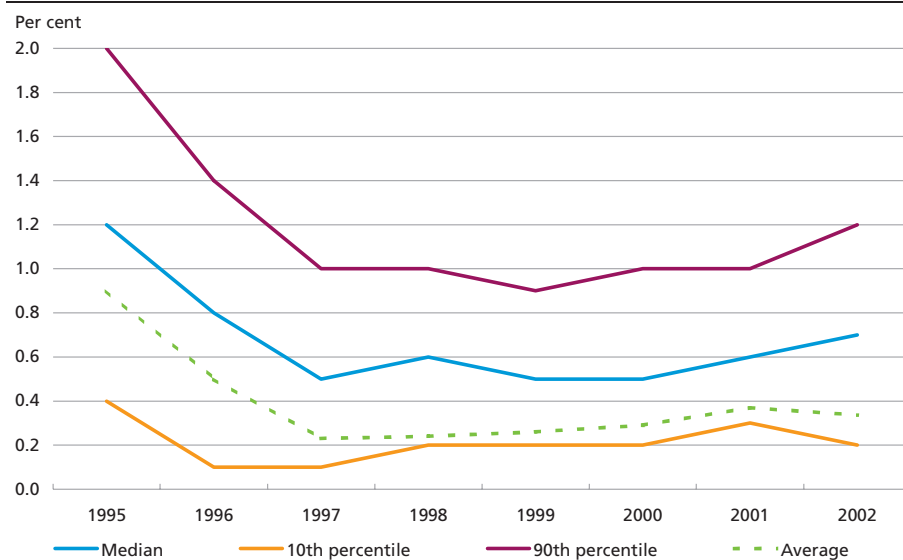
Since 1997, the banking institutions' losses and provisions have been at a very low level, even though they increased slightly in 2001. This reflects the favourable economic development in this period. Prior to 2002, some banking institutions stated that unless the economic climate improved, their losses and provisions would increase. At an aggregated level, however, the banking institutions reduced their losses and provisions in 2002, cf. Chart 7, to an average of 0.34 per cent of loans and guarantees.

The low level of total losses and provisions conceals a wider dispersion among the banking institutions. In 2002, there was an increase in the losses and provisions of the banking institutions already accounting for the largest losses and provisions, represented by the 90th percentile in Chart 8. The 10th percentile decreased.

The banking institutions with the highest growth in lending from 1996 to 2000 stand to lose most. A few banking institutions suffered considerable losses on single exposures at the end of 2001 and the beginning of 2002. These banking institutions' losses and provisions are considerably above the level of the 90th percentile. Among the banking institutions analysed the highest ratio of losses and provisions to loans and guarantees was 3.3 per cent in 2002, and 12 of the 48 banking institu-

THE BANKING INSTITUTIONS' LOSSES AND PROVISIONS AS A RATIO OF
LOANS AND GUARANTEES, 1995-2002

Chart 8



Note: Based on 48 selected banking institutions.

Source: Annual accounts and the Danish Financial Supervisory Authority.

tions analysed had losses and provisions accounting for more than 1 per cent of loans and guarantees.

According to the latest MFI statistics, there are still no indications of an increase in the banking institutions' loan losses at the beginning of 2003 compared to 2002.

Interest income

The widening of the average interest-rate margin for lending to the corporate sector shown in Chart 9 reflects that especially the largest banking institutions, including those with a relatively high corporate lending ratio, have increased their average interest-rate margin over the past year.

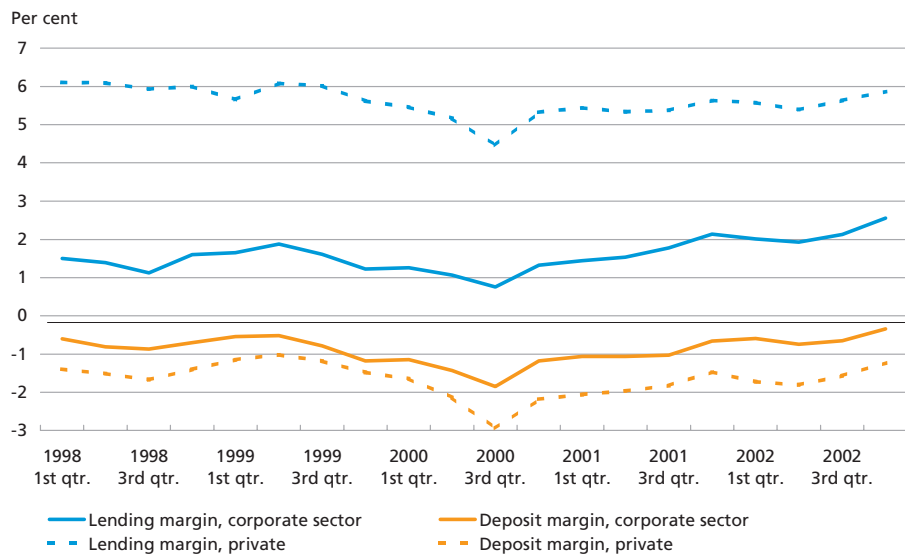
This is in harmony with the banking institutions' own indications that they will match price and risk on the individual exposures. At the same time, the corporate lending of especially the largest banking institutions declined, cf. Chart 10.

Many private customers redeemed bank loans by raising mortgage-credit loans, in view of the banking institutions' generally higher lending rates than mortgage-credit loan rates, even with the same maturity.

In a situation with sustained lower interest rates, *ceteris paribus* the banking institutions find it more difficult to maintain the current level of interest income.

THE BANKING INSTITUTIONS' AVERAGE DEPOSIT AND LENDING MARGINS,
BANKING INSTITUTIONS IN CATEGORIES 1 AND 2, 1998-Q4 2002

Chart 9

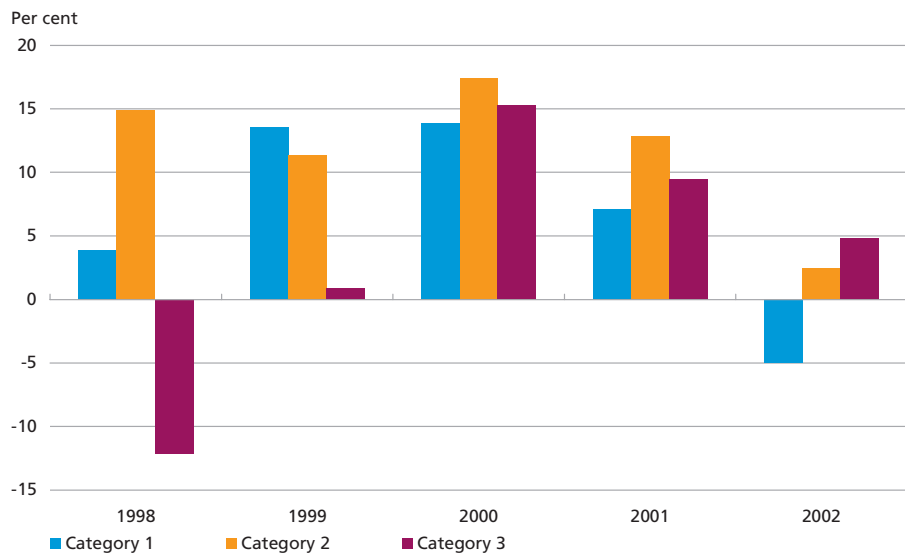


Note: The banking institutions' average lending margin is defined as the difference between the banking institutions' average lending rate and a base rate which in this case is a 3-month uncollateralised money-market interest rate. The deposit margin is equivalently defined as the banking institutions' average deposit rate less the base rate.

Source: Statistics Denmark and Danmarks Nationalbank.

GROWTH IN LENDING TO CORPORATE ENTITIES FOR CATEGORIES OF
BANKING INSTITUTIONS, 1998-2002

Chart 10

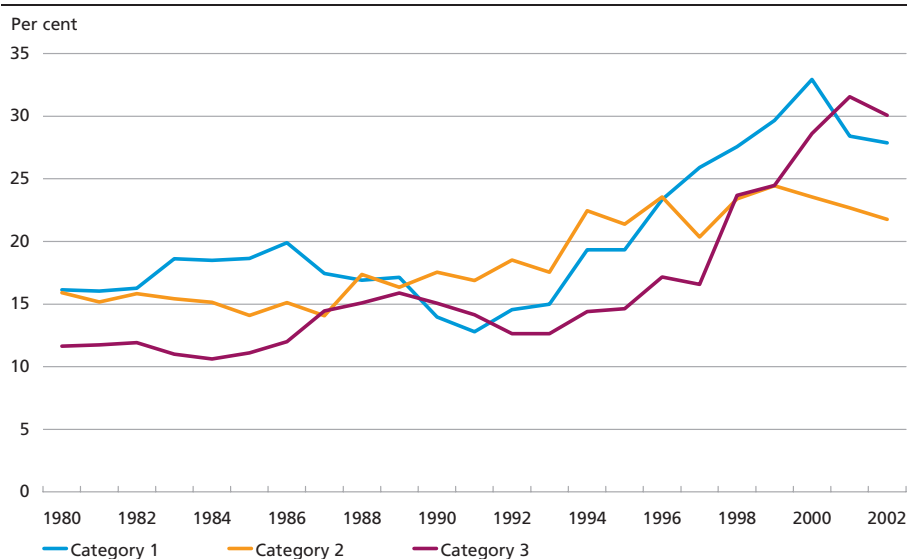


Note: Based on the banking institutions' categorisation of lending, etc. in various sectors.

Source: The Danish Financial Supervisory Authority.

THE BANKING INSTITUTIONS' NET FEE AND COMMISSION INCOME AS A RATIO OF TOTAL NET INTEREST AND FEE INCOME, ALL BANKING INSTITUTIONS IN CATEGORIES 1-3, 1980-2002

Chart 11



Source: The Danish Financial Supervisory Authority.

The most recent MFI balance-sheet statistics indicate that the banking institutions' lending largely remained unchanged at the beginning of 2003.

Fee and commission income

Fee and commission income have become increasingly important to the banking institutions. Fee and commission income rose from around 16 per cent of total interest and fee income in 1992 to around 27 per cent in 2002, cf. Chart 11.

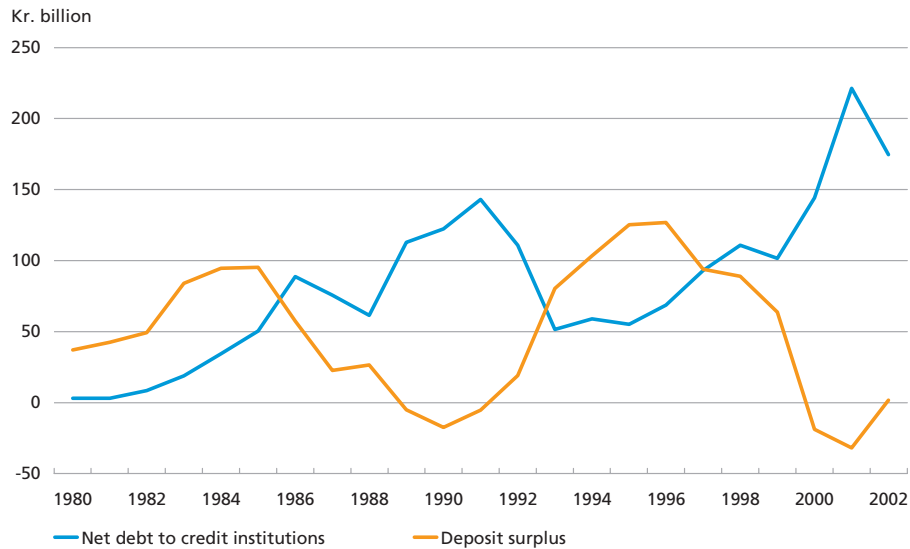
Fee and commission income comprises e.g. brokerage commission and commission on custody accounts, remortgaging and borrowing fees, fees for use of payment systems, and guarantee commission.

A few large banking institutions publish data on the composition of their fee and commission income. This data shows that brokerage commission and commission on custody accounts account for the largest share.

Especially the largest banking institutions are indirectly exposed to market fluctuations via brokerage commission and commission on custody accounts, whereas the smallest banking institutions appear to be more exposed to fluctuations in remortgaging and borrowing fees. As regards banking institutions in categories 1 and 2, higher fee and commission income from conversion of mortgage-credit loans has thus by no

THE BANKING INSTITUTIONS' DEPOSIT SURPLUS AND NET DEBT TO OTHER CREDIT INSTITUTIONS, ALL BANKING INSTITUTIONS IN CATEGORIES 1-3, 1980-2002

Chart 12



Note: The deposit surplus is defined as the banking institutions' deposits less lending. Net debt to other credit institutions' is defined as the banking institutions' debt to other credit institutions and central banks, less claims on other credit institutions and central banks.

Source: The Danish Financial Supervisory Authority.

means offset the decrease in fee and commission income as a result of the downturn in stock trading. However, an additional source of income for the banking institutions may be guarantees to mortgage-credit institutes in association with individual mortgage-credit loans.

The banking institutions' financial risks

The banking institutions' deposit surplus fell from 1996 to 2001, and 2001 was the second consecutive year with a deposit deficit, cf. Chart 12. This trend was reversed in 2002.

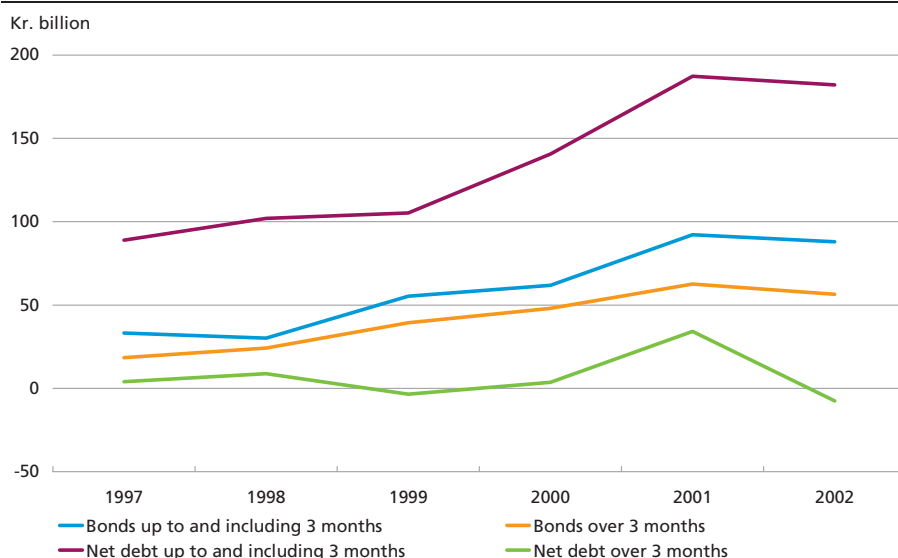
The proportion of the analysed banking institutions with a deposit deficit has fallen from 31 per cent to 23 per cent. Mainly the small banking institutions have turned a deposit deficit back into a deposit surplus.

Debt to other credit institutions may constitute a less stable source of financing than deposits. Deposits from other credit institutions are thus associated with a greater refinancing risk than ordinary customer deposits at longer maturities in real terms.

Besides demand deposits net debt to other credit institutions consists primarily of deposits with an agreed maturity of up to and including 3 months, cf. Chart 13. The banking institutions reduced their net debt to

THE BANKING INSTITUTIONS' NET DEBT TO OTHER CREDIT INSTITUTIONS AND ISSUED BONDS BY TIME TO MATURITY, 1997-2002

Chart 13



Note: In accordance with the Executive Order on Annual Accounts in the banking institutions' accounts the item issued bonds comprises Commercial Paper and certificates. Bonds issued as subordinate capital contributions are not included. Data until 2002 is based on all banking institutions in categories 1-3. Data for 2002 is estimated on the basis of selected annual accounts.

Source: Annual accounts and the Danish Financial Supervisory Authority.

other credit institutions in 2002, predominantly the proportion of the debt at the longest maturity.

THE SMALLEST BANKING INSTITUTIONS

Box 2

The banking institutions in category 4 have a working capital of less than kr. 250 million. In 2001, this category accounted for almost under half of the 181 banking institutions in Denmark, while the category's lending represented a mere 0.6 per cent of total lending.

Earnings

Operating income over operating expenses decreased strongly in the period 1995-2002, but has improved in recent years. In contrast, operating income over operating expenses decreased only moderately for the banking institutions in category 3.

The banking institutions in category 4 are very well-consolidated. In 2001, their average solvency ratio was 26.8, against 17.3 for banking institutions in category 3.

Growth in deposits and lending

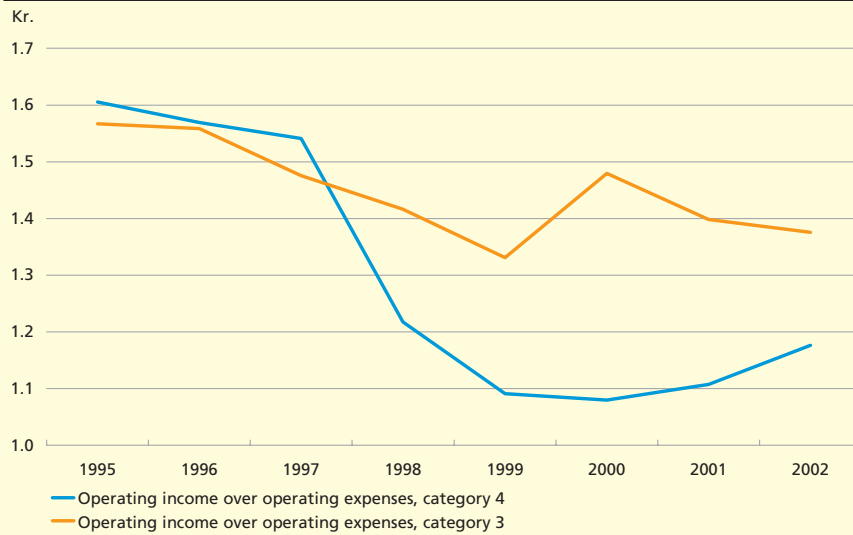
Total deposits for the banking institutions in category 4 decreased slightly in the period 1995-2002. In the same period, lending showed an average annual growth rate of 4.8 per cent. The deposit surplus of the smallest banking institutions is on the decrease.

Continued

CONTINUED

Box 2

OPERATING INCOME OVER OPERATING EXPENSES, 1995-2002



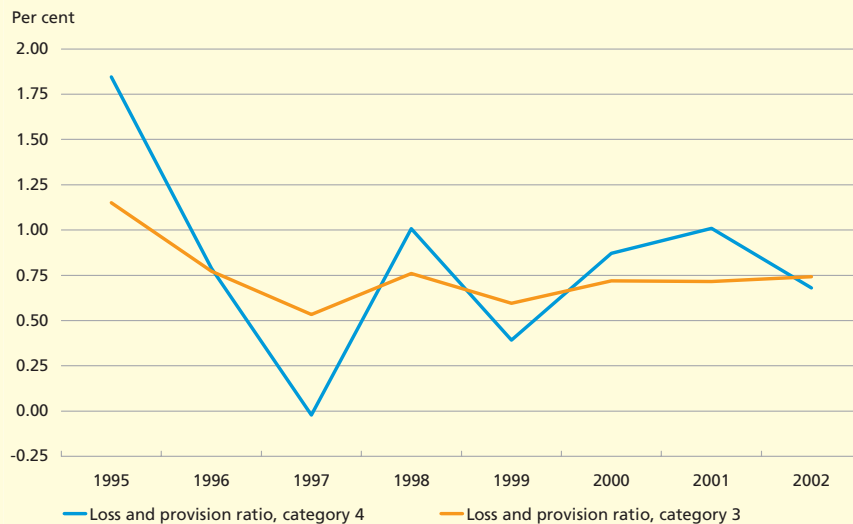
Note: Data for 2002 is estimates based on data for Q1-Q3 2002.

Source: The Danish Financial Supervisory Authority.

Losses and provisions

The loss and provision ratio in category 4 was at the level of category 3 in the period 1995-2002, although the banking institutions in category 4 saw stronger fluctuations.

LOSSES AND PROVISIONS AS A RATIO OF LOANS AND GUARANTEES, 1995-2002



Note: Data for 2002 is estimates based on data for Q1-Q3 2002.

Source: The Danish Financial Supervisory Authority.

Issue of bonds is a source of financing used especially by the largest banking institutions with an international rating. Depending on maturity, bonds constitute a stable source of financing. However, they may be associated with a greater refinancing risk than ordinary customer deposits. One reason is that bank bonds are primarily aimed at a professional segment, and that deposits up to a certain limit are subject to deposit guarantees.

SENSITIVITY ANALYSIS AND STRESS TESTING OF DANISH BANKING INSTITUTIONS

A number of sensitivity analyses and stress tests are performed to examine the banking institutions' resilience to various types of risk one year ahead. The extent to which the banking institutions' earnings and capital adequacy are sufficient to withstand the direct effects of a number of predetermined risk scenarios within a financial year is examined. On the other hand, the extent to which the banking institutions can withstand increased losses for prolonged periods is not examined.

SENSITIVITY ANALYSIS

Box 3

The sensitivity analysis is based on 48 banking institutions, i.e. 4 in category 1, 13 in category 2, and 31 banking institutions in category 3. In *Financial stability 2002* the analysis population consisted of 50 banking institutions, of which 9 have fallen out of the population due to mergers or restructuring as branches of foreign banking institutions, etc. 7 more banking institutions in category 3 are now included in the analysis.

The scenarios in the sensitivity analysis are based on the levels for individual banking institutions, and the consequences of changes are calculated in percentage points in relation to these levels, e.g. an increase by 2.25 percentage points in the individual banking institutions' losses as a ratio of loans and guarantees.

The basis for each scenario is the selected banking institutions' total ordinary operating result of kr. 18.8 billion in 2002.

The items included in the individual tests are calculated on the basis of their original value and the changes resulting from the risk scenarios. In each test the alternative result for the relevant risk scenario is calculated for each banking institution.

The sensitivity analyses take no account of indirect effects including possible diminished credit quality due to increasing interest rates, indirect effects of falling stock prices on the banking institutions' losses and provisions due to reduced values of stocks provided as collateral for loans, or the significance of stock-price trends to the banking institutions' fee and commission income, etc.

For banking institutions housing a negative result in the individual tests a new solvency ratio is calculated by deducting the result from the capital, and fully deducting any losses on balance-sheet items (assets) from the risk-weighted assets.

Sensitivity analysis

Increased losses on loans and guarantees are found to be the most significant risk for the banking institutions in view of the uncertain economic outlook and developments in the financial markets. This may be combined with diminishing interest income as a consequence of declining growth in lending and a continued low level of interest rates. There is also the risk that fee and commission income will continue to decline, as well as the direct effects of further stock price drops.

The basis for the analysis is the banking institutions' profits and capital adequacy in 2002, which in overall terms was a little better than in 2001.

SENSITIVITY TEST OF THE BANKING INSTITUTIONS' ORDINARY
OPERATING RESULT, 2001 AND 2002

Table 2

Scenarios	Overall ordinary operating result before tax, kr. billion		Number of banking institutions with a negative ordinary operating result before tax					
			Category 1		Category 2		Category 3	
	2002	2001	2002	2001	2002	2001	2002	2001
Basis, ordinary operating result	18.8	18.2	0	0	1	0	1	0
<i>Credit risks</i>								
1 An increase in losses by 1 percentage point	7.3	7.0	0	0	6	3	3	3
2 An increase in losses by 2.25 percentage points	-7.1	-7.0	4	4	12	12	27	27
3 An increase in losses by 1 percentage point for private customers and 2.25 percentage points for corporate customers	-3.3	-3.7	4	4	11	12	15	17
<i>Other operational risks</i>								
4 A decrease in the average lending rate by 1 percentage point	10.7	10.2	0	0	3	2	1	2
5 A decrease in net fee and commission income by 25 per cent	15.9	15.3	0	0	1	1	1	0
6 An increase in interest rates by 1 percentage point	16.2	14.7	0	0	2	2	1	3
7 An increase in interest rates by 3 percentage points	10.9	7.7	1	0	7	8	12	11
8 A decrease in stock prices by 30 per cent	16.7	15.7	0	0	1	2	2	3
<i>Combinations</i>								
9 Tests 5 and 8 simultaneously	13.8	12.8	0	0	2	2	2	3
10 Tests 3 and 8 simultaneously	-5.4	-6.2	4	4	12	12	18	27
11 Tests 3, 5, and 8 simultaneously	-8.3	-9.1	4	4	12	12	26	29

Note: The loss from a possible increase in interest rates is calculated on the basis of the key performance indicators for interest-rate risk of the Danish Financial Supervisory Authority. The interest-rate increase is calculated on the basis of a parallel shift in the yield curve. Loans and guarantees to the public sector are not included on an increase in losses.

Source: Annual accounts and own calculations.

The underlying spread between the individual banking institutions' profits has increased. In addition, two banking institutions realised deficits in 2002, of which one is in category 2 and one in category 3. In 2001, all banking institutions in the analysis reported surpluses.

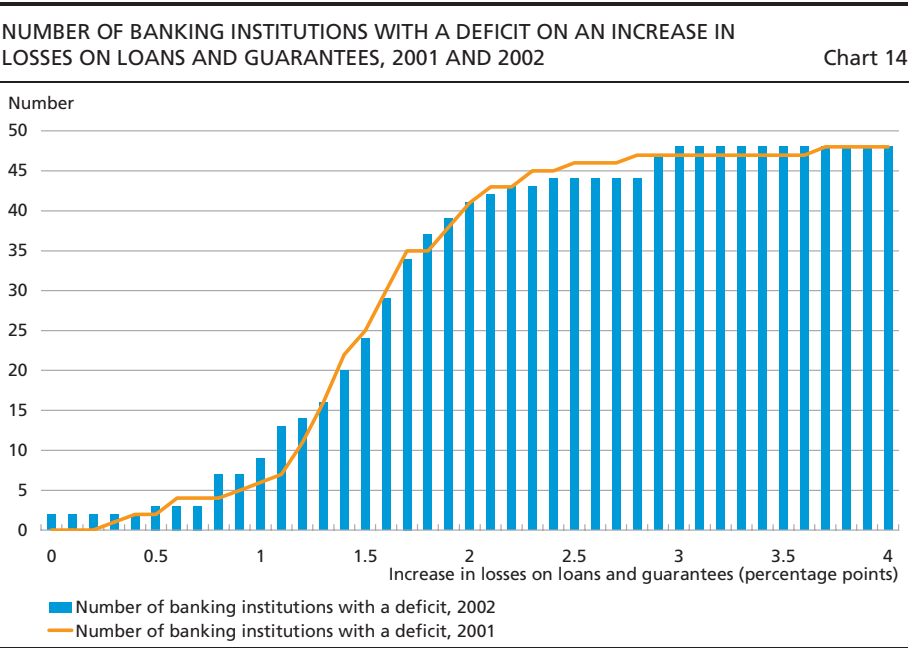
The banking institutions' earnings generally show by and large unchanged resilience to the risk scenarios set up at the end of 2002 compared to 2001, cf. Table 2. In test 2, which is the most strict scenario, most of the institutions analysed would show a deficit. In 2002, one of the small banking institutions would fall below the statutory capital requirement in the scenarios where the losses are increased by at least 1 percentage point. Other banking institutions are within the statutory solvency requirement in all tests.

Stress tests

The stress tests show the level of losses on loans and guarantees that the banking institutions can withstand at the current level of earnings and capital adequacy.

As regards the banking institutions' earnings, the resilience is almost unchanged from 2001, cf. Chart 14. As in 2001, the level of losses on loans and guarantees must increase by 1.5 percentage points before half of the banking institutions realise a deficit.

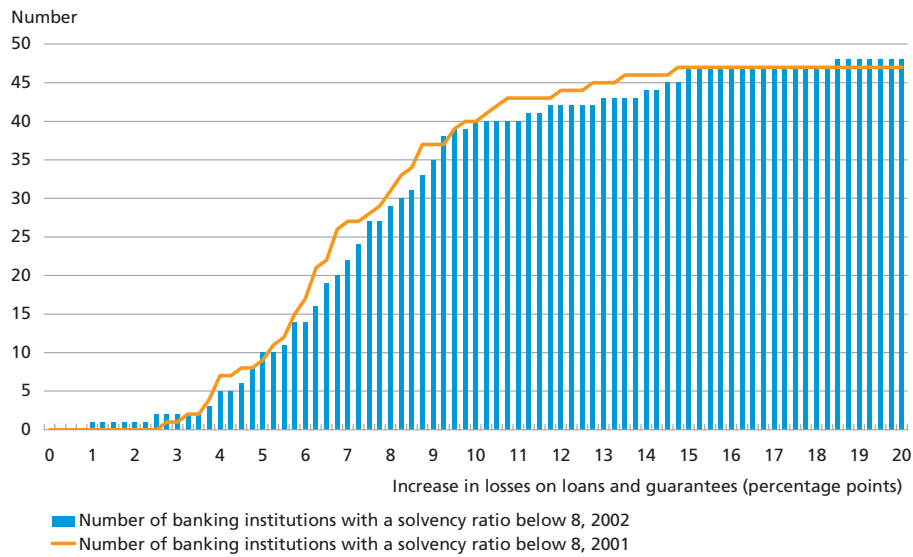
Taking both annual earnings and the current capital in excess of the statutory requirement into account the banking institutions' overall re-



Source: Annual accounts and own calculations.

NUMBER OF BANKING INSTITUTIONS WITH A SOLVENCY RATIO BELOW 8 ON AN INCREASE IN LOSSES ON LOANS AND GUARANTEES, 2001 AND 2002

Chart 15



Source: Annual accounts and own calculations.

silience to losses has strengthened a little, cf. Chart 15. Compared to 2001 most of the banking institutions were able to withstand a large increase in losses on loans and guarantees in 2002, while observing the statutory solvency requirement.

As in 2001, primarily banking institutions in category 2 are among the least robust. However, there is no straightforward correlation between the size of the banking institutions and their resilience to losses.

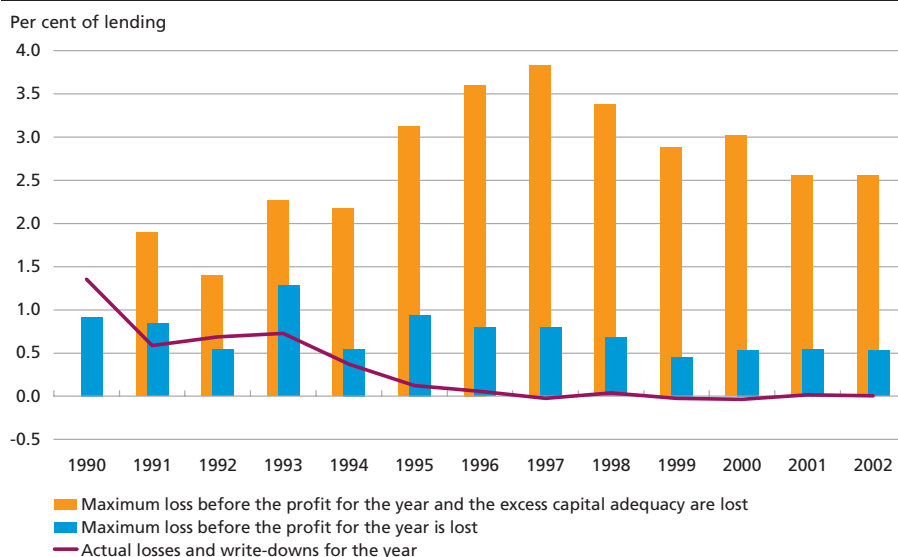
THE MORTGAGE-CREDIT INSTITUTES

In Denmark, the mortgage-credit institutes play an important role in the financial sector as the largest credit provider in connection with financing of real property, and as bond issuers with issue volumes totalling kr. 1,584 billion at end-2002, corresponding to more than 60 per cent of the Danish bond market.

The balance sheets of the mortgage-credit institutes in particular comprise liabilities in the form of issued bonds, and assets in the form of mortgage loans. The statutory framework for the mortgage-credit sector contributes to limiting liquidity, market and credit risks. A rough outline of the balance principle in the Mortgage Credit Act is thus that future disbursements to holders of mortgage-credit bonds must correspond to future receipts on mortgage loans.

MORTGAGE-CREDIT INSTITUTES' BUFFER AGAINST LOSSES, 1990-2002

Chart 16



Note: Maximum losses are compiled including actual losses and write-downs. Data for 1990 not available.

Source: Annual accounts and the Danish Financial Supervisory Authority.

Operating profits

The mortgage-credit institutes' total profit after tax was kr. 5 billion in 2002, which was unchanged from 2001.

Net interest income, which is the most significant source of income for mortgage-credit institutes, rose by 4.6 per cent in 2002.

Claims losses and write-downs

Chart 16 shows the mortgage-credit institutes' buffer against future losses. In 2002, the sector as a whole was able to withstand losses of more than 2.4 per cent of the loan portfolio, while remaining within the statutory solvency requirement of 8 per cent. Actual losses and write-downs accounted for 0.01 per cent of the loan portfolio. For comparison, the actual ratio of losses and write-downs was 1.36 in 1990.

Since 1997, the capital in excess of the statutory requirement has been reduced. The background is a general adjustment of capital in relation to actual losses, so that the development does not reflect a negative trend for the financial result.

Mortgage-credit institutes and financial stability

Since the beginning of the 1990s the structure of the mortgage-credit sector has changed from independent mortgage societies to limited li-

ability companies, in many cases owned by banking institutions or by several banking institutions jointly.

The banking institutions' ownership of mortgage-credit institutes is the result of e.g. economies of scale, since it enables the banking institutions to use their existing network of branches for the distribution of mortgage-credit products.

Mutual guarantee systems are often used for this purpose. The bank that intermediates the mortgage-credit loan guarantees the last-ranking element of the mortgage-credit loan for a limited number of years¹. In return, the mortgage-credit institute pays the intermediary bank a guarantee commission. The bank is thus more exposed to falling real property prices.

In practice, under the guarantee system the intermediary bank assumes most of the credit risk associated with mortgage-credit loans, against payment of a fee. On the other hand, the banking institution's capital burden is thereby proportionate to the size of the guarantee, and thus does not reflect that the guarantee covers the last-ranking element of the loan.

The guarantee system e.g. supports the high rating of mortgage-credit bonds.

THE PENSION COMPANIES

As from 1 January 2002, life-insurance companies and pension funds, hereafter called pension companies², could present accounts based on market values, and this became mandatory as from 1 January 2003. A number of pension companies presented their 2002 annual accounts according to the new rules, while others presented their annual accounts on the basis of the previous accounting rules. This circumstance diminishes opportunities for comparison between companies. Accounts presented on the basis of market values are described in Pension Companies on p. 67. Furthermore, the pension companies are subject to relaxed requirements regarding the publication of annual accounts, and not all companies had published annual accounts at the time of going to press. The review of the development in the pension companies thus only includes approximately 75 per cent of all pension companies measured in terms of life-insurance provisions. The Folketing (Parliament) is currently hearing a bill³ to e.g. harmonise the deadlines for publication

¹ For an owner-occupied home financed by mortgage credit for 80 per cent of the property value, the banking institution may e.g. guarantee the last-ranking 20 percentage points of the loan.

² Accounting items for pension companies are described using the terms applying to life-insurance companies.

³ Bill to amend the Financial Business Act.

of the annual accounts of financial corporations, including tighter publication deadlines for pension companies.

Premiums were increased in 2002 over 2001, but insurance claims and operating expenses rose even more.

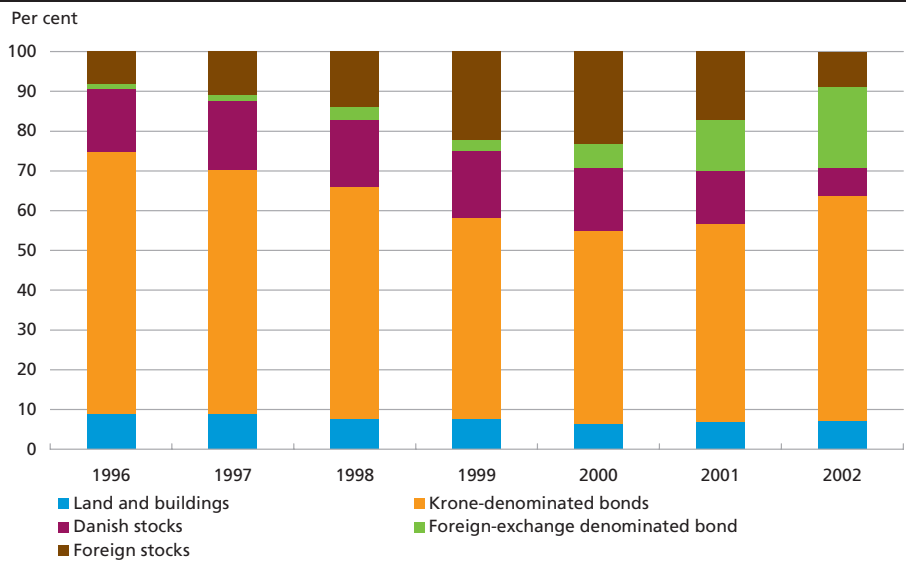
The continuing downturn on the stock markets in 2002, combined with the falling level of interest rates towards the end of the year, had a negative impact on the pension companies. The loss on stocks was in the area of 25 to 35 per cent. This contributed directly to reducing the value of the shares as a proportion of total investment assets, cf. Chart 17. To a certain extent, the pension companies have hedged the risk of further stock price drops by purchasing financial derivatives and selling shares, thereby matching the investment risks to commitments and capital strength.

Bond portfolios were increased as shares were divested. The falling level of interest rates has helped to secure capital gains on the pension companies' bond portfolios, and positive returns on property investments. However, the capital gains on the bond portfolios were not sufficient to cover the need for further provisions, since the liabilities to be covered are generally more sensitive than bonds to interest-rate fluctuations. Many companies hedged the risk of falling interest rates by purchasing financial derivatives. This has covered the pension companies' losses due to market developments. As Chart 17 shows, the pension companies have significantly increased their holdings of bonds denominated in foreign exchange in recent years.

The pension companies' overall resilience to e.g. losses relating to insurance or market risks may be covered by three different capital buffers: 1) Capital base exceeding the statutory requirement; 2) Collective bonus potential, which is the undistributed reserves of the policyholders; and 3) Bonus potential related to benefits on premium-free policies, which can now be included as a reserve under the new accounting rules. The three capital buffers measured as a ratio of life-insurance provisions give an overall indication of the pension companies' economic resilience, cf. Chart 18. Developments in 2002 weakened the collective bonus potential especially, but also the excess capital base. The bonus potential related to benefits on premium-free policies brings the total capital buffer to a higher level than in 2001. This reserve would no doubt have been even larger if all pension companies had applied the new accounting rules based on market values at end-2002. The overall development in 2002 conceals diverging trends for the individual pension companies.

DEVELOPMENT IN THE PENSION COMPANIES' INVESTMENT ASSET STRUCTURE, 1996-2002

Chart 17

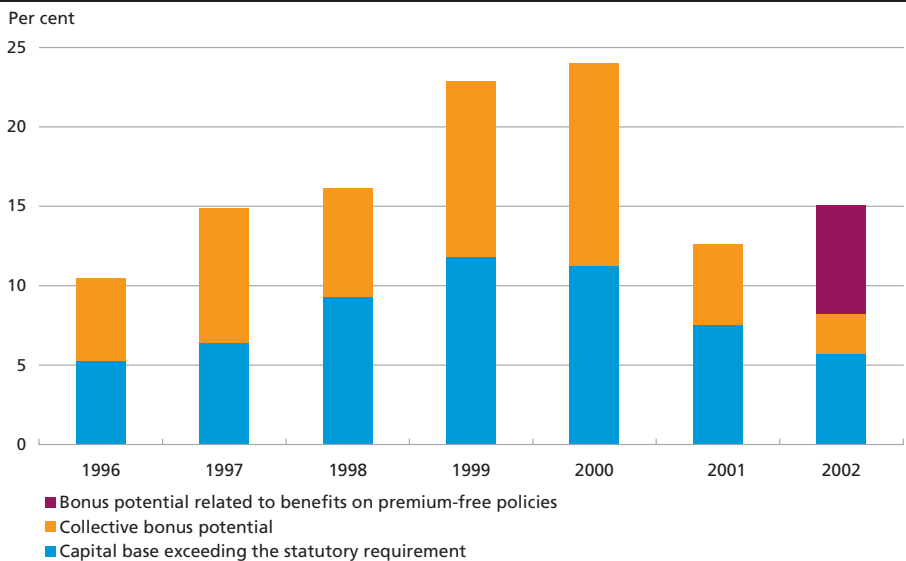


Note: Data for 2002 is estimates based on a number of published annual accounts. Other investment assets are not included.

Source: Annual accounts and the Danish Financial Supervisory Authority.

THE PENSION COMPANIES' FINANCIAL BUFFERS AS A RATIO OF LIFE-INSURANCE PROVISIONS, 1996-2002

Chart 18



Note: Data for 2002 is estimates based on a number of published annual accounts.

Source: Annual accounts and the Danish Financial Supervisory Authority.

The Corporate Sector and the Households

On overall terms, the Danish corporate sector showed stable development in 2002, even though economic growth was still subdued. However, the overall picture conceals differences between and within sectors.

Danmarks Nationalbank has estimated a model of the probability that companies will fail. The results of the model indicate that the failure rate has increased slightly.

In view of the low level of interest rates the households augmented their debt burden, even though there was no increase in the interest burden. The households' indebtedness has increased in line with the expansion of housing wealth. The households are well-consolidated, but the greater indebtedness makes them more vulnerable to declining incomes, rising interest rates and falling house prices.

CORPORATE SECTOR

Corporate profits were almost unchanged in 2002 over 2001. However, the weakest companies in all sectors experienced a tightening. One result is that in August 2002 the number of compulsory liquidations had reached the highest level for seven years, cf. Chart 19.

The banking institutions' lending and losses on corporate exposures

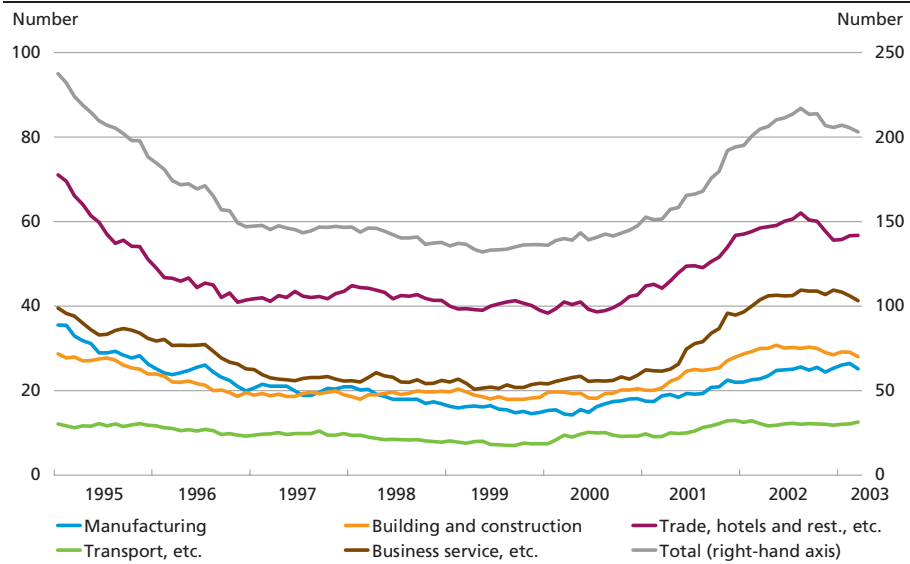
The banking institutions' domestic lending to the corporate sector increased by 1.1 per cent in 2002. At an aggregate level, the banks in category 1 reduced their corporate lending, while the banks in category 2 increased their credit expansion. The breakdown in Chart 20 shows that business service, etc., trade, hotels and restaurants, as well as manufacturing, are the three most important sectors for the banking institutions in terms of lending.

The banking institutions' total losses as a ratio of loans and guarantees decreased marginally from 2001 to 2002. This applied to all sectors apart from manufacturing and building and construction, for which the loss ratio increased, cf. Chart 21.

For manufacturing, as well as trade, hotels and restaurants, which are both sectors accounting for a large share of the banking institutions' total lending, the loss ratio in 2002 exceeded the average.

INCIDENCE OF COMPULSORY LIQUIDATION IN THE CORPORATE SECTOR, 1995-2003

Chart 19



Note: The Chart shows monthly observations for the number of compulsory liquidations calculated as a 12-month moving average. The IT and telecom sector cannot be shown as a separate sector. The sectoral breakdown in the Chart is not identical to that in the analyses later in the chapter, which are based on data supplied by the Danish Business Information Bureau.

Source: Statistics Denmark.

SECTOR BREAKDOWN OF THE BANKING INSTITUTIONS' LENDING TO THE CORPORATE SECTOR, 2000-02, YEAR-END

Chart 20

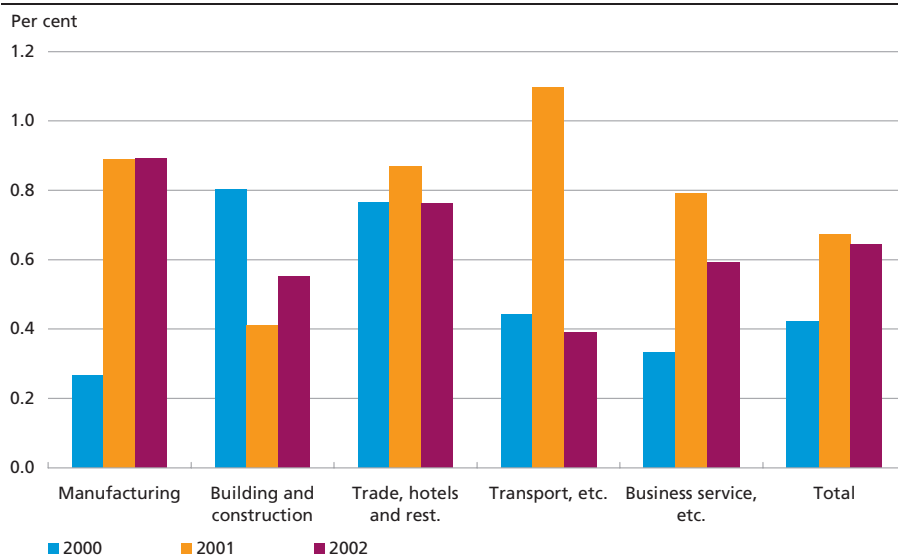


Note: Lending is calculated as lending by sector as a ratio of total lending to non-financial corporations. The statistics are based on the institutions' that report fully to the MFI balance-sheet statistics. The IT and telecom sector cannot be shown as a separate sector.

Source: Danmarks Nationalbank.

SECTOR BREAKDOWN OF THE BANKING INSTITUTIONS' LOSS RATIO,
2000-02

Chart 21



Note: The Chart shows the banking institutions' losses in a number of sectors as a ratio of loans and guarantees to the individual sector. The development in provisions is not taken into account. The "Total" item covers total losses on corporate exposures. The IT and telecom sector cannot be shown as a separate sector.

Source: The Danish Financial Supervisory Authority.

Development in the companies' key figures

The average return on assets in 2002 was at the level of 2001. The average return on assets increased in the IT and telecom sectors, as well as in trade, hotels and restaurants. The improvement in the IT and telecom sector can be explained by the large number of companies with a sound business basis and increasing earnings, despite the sector's problems relating to the IT bubble. In addition, the very weakest companies no longer exist.

NEW FINANCIAL STATEMENTS ACT

Box 4

A new Financial Statements Act entered into force on 1 January 2002. The conceptual framework of annual accounts is now focused on balance sheet rather than results. The prudential principle has been abandoned in favour of a more topical view of the company's value. In the annual accounts the balance sheet must therefore include more assets, which are to be calculated at fair value instead of acquisition cost. This development accords with international accounting standards.

The amendments to the Financial Statements Act relate primarily to the company's balance sheet, while the profit and loss account is affected by the ongoing value adjustments to the balance-sheet items, cf. the Table.

Continued

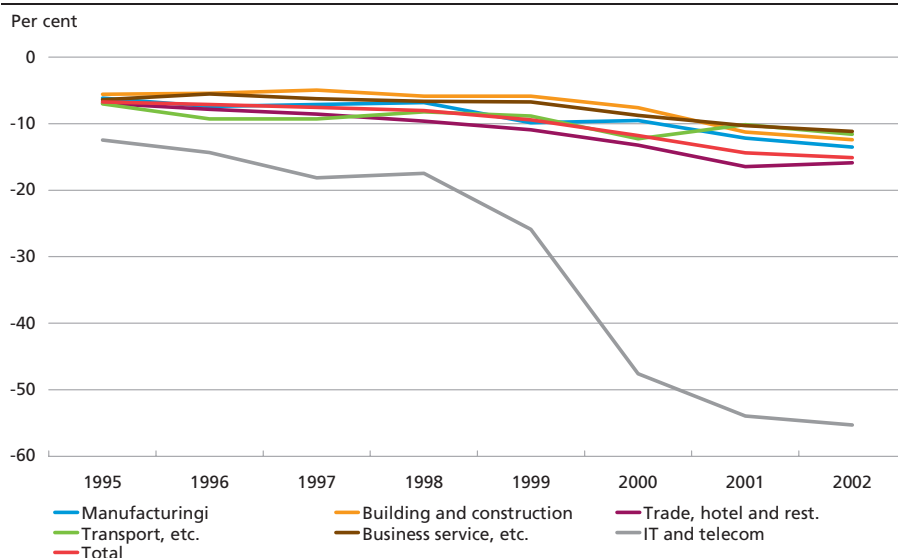
CONTINUED		Box 4
SELECTED ACCOUNTING ITEMS SUBJECT TO NEW ACCOUNTING PRACTICE UNDER THE AMENDED FINANCIAL STATEMENTS ACT		
Item	Previous Financial Statements Act	New Financial Statements Act
Development projects	Carried as expenditure to the profit and loss account	Entered to the balance sheet, subject to ongoing write-off to the profit and loss account
Goodwill	Written off immediately to equity capital	Entered to the balance sheet, subject to ongoing write-off to the profit and loss account
Financial assets	Acquisition cost	Fair value or amortised cost
Investments in subsidiaries and associated companies	Acquisition cost	Equity method
Inventories	Direct production costs	Direct and indirect production costs
Revenue recognition of contracts	Invoicing method	Production method
Deferred tax	No or partial recognition	Full recognition
Note: The table describes the main principles. There may be exceptions within the individual items.		
<p>Intangible assets, including goodwill, must be entered to the company's balance sheet subject to annual systematic amortisation over the expected economic life of the asset. Goodwill previously written off immediately against equity capital must now be included in the balance sheet and written off over the expected useful life of the asset. In future, leased assets are entered to the balance sheet and treated as acquired assets. All other things being equal, the balance sheet will be expanded, and this will affect the calculation of key financial ratios.</p> <p>Certain financial items previously entered at acquisition cost must now be stated at fair value or amortised cost. This may lead to greater fluctuation than before in the value of the financial items.</p>		

For the 10 per cent of the companies in each sector with the weakest earnings the trend for the past year is almost flat, cf. Chart 22.

The companies' average solvency has deteriorated slightly from 2001. For most sectors, the solvency ratio for the 10 per cent least solvent companies is between 0 and 4 per cent in 2002, cf. Chart 23. In the IT and telecom sector, and in trade, hotels and restaurants, the solvency of more than one out of 10 companies is still negative.

RETURN ON ASSETS FOR THE 10 PER CENT LEAST PROFITABLE COMPANIES IN VARIOUS SECTORS, 1995-2002

Chart 22

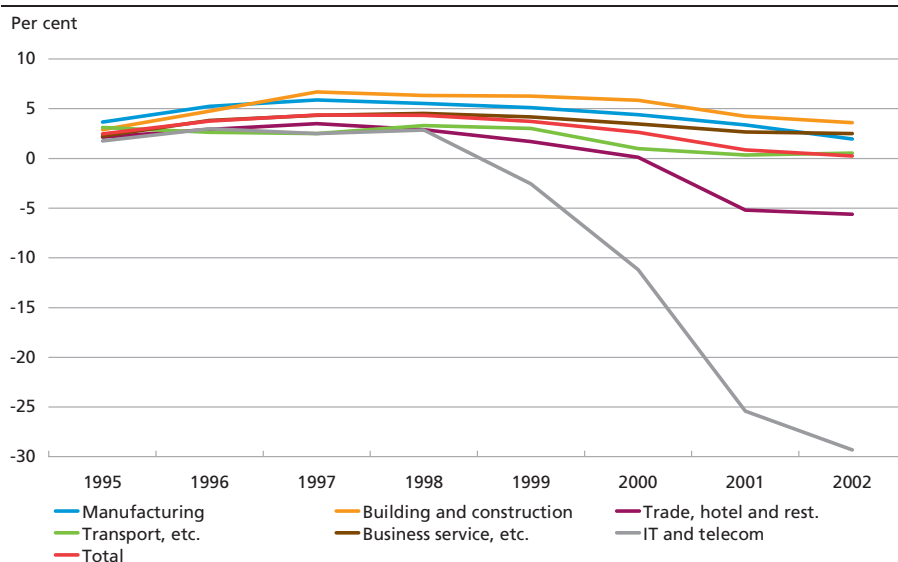


Note: The return on assets is defined as the primary operating result as a ratio of total assets. The primary operating result is the profit from the company's principal activity. The Chart shows the 10th percentile. 2002 comprises accounts presented in 2002, and accounts presented in the 3rd or 4th quarters of 2001 for the companies that have not yet registered their accounts for 2002.

Source: The Danish Business Information Bureau.

SOLVENCY OF THE 10 PER CENT LEAST SOLVENT COMPANIES IN VARIOUS SECTORS, 1995-2002

Chart 23



Note: Solvency is defined as equity capital as a ratio of total liabilities. 2002 comprises accounts presented in 2002, and accounts presented in the 3rd or 4th quarter of 2001 for the companies that have not yet registered their accounts for 2002.

Source: The Danish Business Information Bureau.

Data

The analyses of the corporate sector are based on a database of the Danish Business Information Bureau containing accounts data for Danish public and private limited liability companies. Some adjustments were made to the database, whereby the level in the Charts is not in full accordance with equivalent Charts in previous publications.

Non-financial holding companies are excluded. A holding company is characterised by partial or full ownership of other companies. As a general rule holding companies have no other activities. In addition, a number of large international groups have placed their holding companies in Denmark. Non-financial holding companies were previously included under business service, etc., so that only this sector is affected by the adjustment. For 2002, almost 3,000 non-financial holding companies are excluded.

Companies with total assets of less than kr. 50,000 are excluded, i.e. approximately 1,300 companies were excluded in 2002. These companies are registered as active, but have no activities.

Registration of accounts presented in 2002. The Danish Business Information Bureau collects annual accounts as they are registered at the Danish Commerce and Companies Agency. Not all annual accounts for 2002 are available for the analyses in *Financial stability 2003*. Against this background, observations for 2002 consist of accounts finalised in 2002 which are registered in the database, as well as accounts published in the 3rd and 4th quarters of 2001 for the companies that have not yet registered their accounts for 2002. The figures for 2002 are thus partial approximations and should be interpreted with caution.

¹ See also Box 4 in *Financial stability 2002*, Danmarks Nationalbank.

Model for quantification of probable failure rates by sector¹

Danmarks Nationalbank has developed an account-based model for Danish public and private limited liability companies in order to quantify a company's probable failure rate within the next few years². A banking institution's credit risk associated with lending to a company can be expressed as the probability of that company defaulting on its financial obligations, whereby the bank incurs a loss. However, this probability cannot be calculated on the basis of the available data due to insufficient information on failure to repay debt. Therefore company failures are used instead.

The calculations are based on key financial ratios to illustrate the company's earnings, solvency and liquidity, as well as information on the company's age, size, etc. Aggregation of the failure rates of the individ-

¹ The work is based on e.g. Kenneth Juhl Pedersen, *Regnskabsbaseret konkursmodel for danske virksomheder – teori og empiri* (Accounts-Based Model for Failure Rates of Danish Companies – Theory and Empirical Evidence – in Danish), 2002, thesis for a master's degree in Economics, University of Copenhagen.

² The model assumes a failure rate to include the following events: The company is subject to compulsory liquidation or is being liquidated, the company has been dissolved/dissolved by the courts, or is subject to compulsory dissolution by the courts, the company is subject to a compulsory deed of arrangement with creditors or is subject to a compulsory scheme of arrangement with creditors.

MODEL FOR QUANTIFICATION OF FAILURE RATES

Box 6

Danmarks Nationalbank has estimated a model to calculate individual failure rates on the basis of the companies' annual accounts. The individual failure rates are aggregated to sector level, to enable comparison across sectors.

Data

The model is estimated on the basis of annual accounts for the period 1995-99, corresponding to approximately 290,000 accounts, of which around 8,600 incidences of failure. The model can estimate failure rates for accounts presented after 1999. The failure rate is related to the failure incidence, whereby the failure can be interpreted as a measure of whether, on the basis of the published accounts, the company will fail within the next few years¹.

Variables

The model includes 9 explanatory variables, i.e. 4 quantitative variables and 5 dummy variables. The variables are listed below according to their explanatory power in the model. The sign in parenthesis indicates the influence on the failure rate:

- *Reduction of the capital base (+)* is measured in terms of a dummy variable. The 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 (-)* is measured as total assets
- *Solvency (-)* is measured as equity capital as a ratio of total assets
- *Auditors' comment (+)* is measured as a dummy variable which is set at 1 if the auditors' comment in the accounts is critical
- *Form of ownership:* a distinction is drawn between private and public limited liability companies. According to the model, all other things being equal the failure rate is greater for a private company than for a public limited liability company
- *The company's return on assets adjusted for sector (-)* is measured as the difference between the company's return on assets and the median return for the sector
- *Age (-)* is measured as the number of years in which the company has been active
- *Reduced liquidity (+)* is measured in terms of short-term debt as a ratio of the primary operating result
- *Goodwill (-)* is measured in terms of the company's registration of goodwill among its assets.

Evaluation

The model can be evaluated by examining the companies' status a few years later in terms of the estimated failure rate. The model can thus classify 4 out of 5 accounts correctly, i.e. as active or failed.

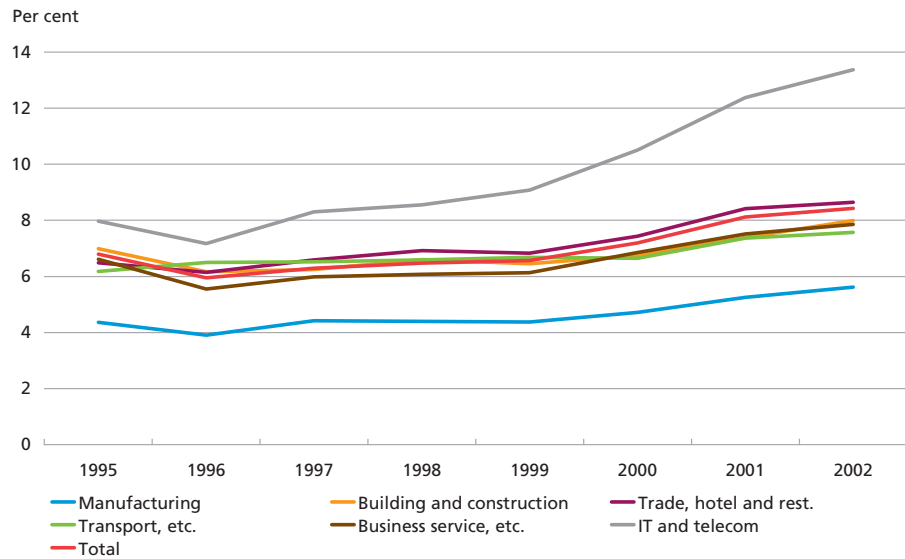
The model is also estimated over different periods, which has no significant effect on the results.

¹ For a failed company, there is a certain time lag from the publication of accounts to the registration of failure. After almost 21 months half of the failed companies have received a public notification. It is thus difficult to specify the timing of failure.

ual companies within each sector indicates the overall failure rate for the sector. The model is described in further detail in Box 6.

FAILURE RATES OF THE WEAKEST COMPANIES IN VARIOUS SECTORS,
1995-2002

Chart 24

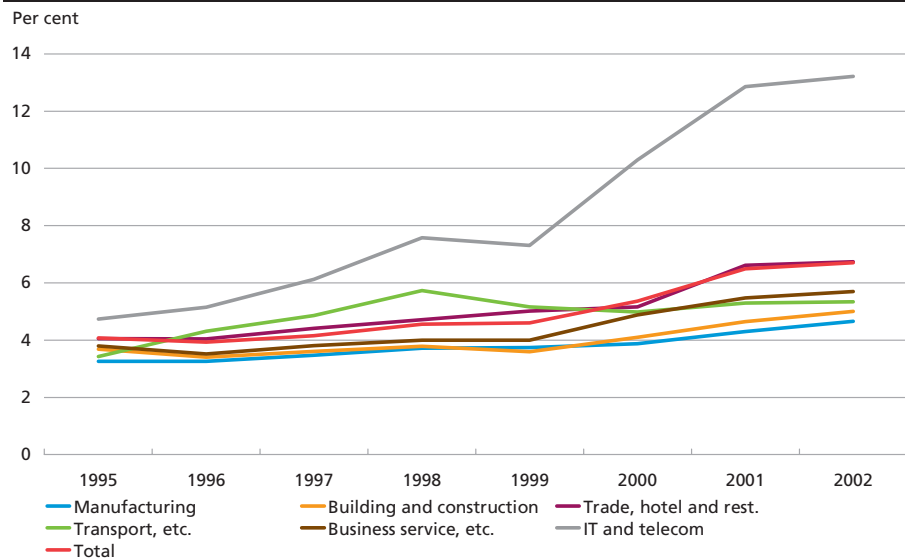


Note: The Chart shows the 90th percentile. 2002 comprises accounts presented in 2002, and accounts presented in the 3rd or 4th quarters of 2001 for the companies that have not yet registered their accounts for 2002.

Source: Own calculations.

DISPERSION OF FAILURE RATES, 1995-2002

Chart 25

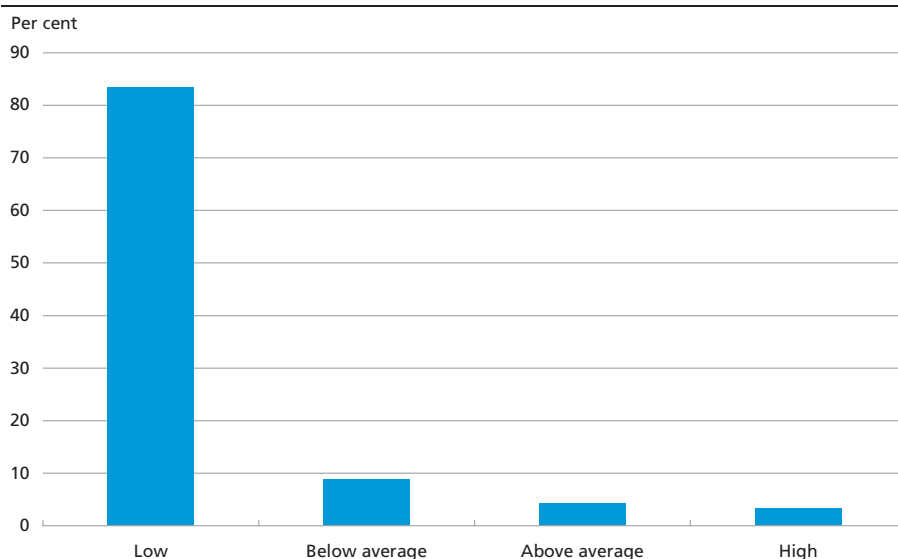


Note: The dispersion is measured in terms of the standard deviation. 2002 comprises accounts presented in 2002, and accounts presented in the 3rd or 4th quarters of 2001 for the companies that have not yet registered their accounts for 2002.

Source: Own calculations.

SHARE OF BANK DEBT IN 2002 BROKEN DOWN BY FAILURE RATE

Chart 26



Note: The observations include the companies holding bank debt, according to their annual accounts. The "Low" category corresponds to the 25 per cent of companies with the lowest failure rate. The "Below average" group corresponds to the companies with the second-lowest failure rate (i.e. within the range of 25 to 50 per cent) and so on. 2002 comprises accounts presented in 2002, and accounts presented in the 3rd or 4th quarters of 2001 for the companies that have not yet registered their accounts for 2002.

Source: The Danish Business Information Bureau and own calculations.

Results from the model

Chart 24 shows the probable failure rate by sector for the 10 per cent of companies that are most exposed to failure.

According to the model, the IT and telecom sector accounts for the highest, and manufacturing for the lowest, probable failure rates viewed over the entire period. This is in line with previous analyses in Financial stability. Of the three sectors accounting for the largest share of the banking institutions' lending, trade, hotels and restaurants account for the highest failure rate.

The dispersion of failure rates has risen for all sectors in the last few years, cf. Chart 25. The increased dispersion indicates greater uncertainty concerning lending to the corporate sector.

The lowest dispersion and smallest failure rate are found in manufacturing. Against this background, manufacturing is the sector deemed to be least exposed in overall terms, according to the available accounts. On the other hand, manufacturing showed the highest loss ratio in 2002. Like manufacturing, building and construction has a low dispersion, but a somewhat higher failure rate.

It is examined whether the model's probable failure rate at sector level and the loss ratio for the banks vary together. If the co-variation is high,

the development in the failure rate can be used as an indicator of the banks' future losses. The analysis shows that for all sectors there is a robustly positive co-variation between the failure rate and the banks' loss ratio one to two years ahead.

The banks' debt is concentrated in the companies with the lowest failure rates, cf. Chart 26. An analysis of the concentration of bank debt by sector gives a similar result.

AGRICULTURE

Lending by banking institutions and mortgage-credit institutes to the agricultural sector accounts for 7.5 per cent of total domestic lending, of which the mortgage-credit institutes' share exceeded 80 per cent in 2002. Total lending to the agricultural sector rose by 7 per cent from 2001 to 2002. The small institutions account for the relatively largest share of the banking institutions' lending to the agricultural sector.

Agriculture's earnings and capital

The agricultural sector's operating result fluctuates strongly, and has been strongly influenced by pork prices in recent years, cf. Chart 27.

The operating result of pig producers has shown strong fluctuation, while the operating result of plant growers and dairy cattle producers has been relatively stable, although at a low level. According to the estimate of the Danish Agricultural Advisory Centre, the agricultural sector's operating result decreases in both 2002 and 2003, primarily due to lower pork prices.

The agricultural sector's net interest expenditure increased considerably in the period 1997-2001, despite the falling level of interest rates in recent years. The increase is attributable to the agricultural sector's growing debt. In the same period, the debt-to-assets ratio fell slightly to just over 50 per cent as a consequence of the continued increases in prices for farmland.

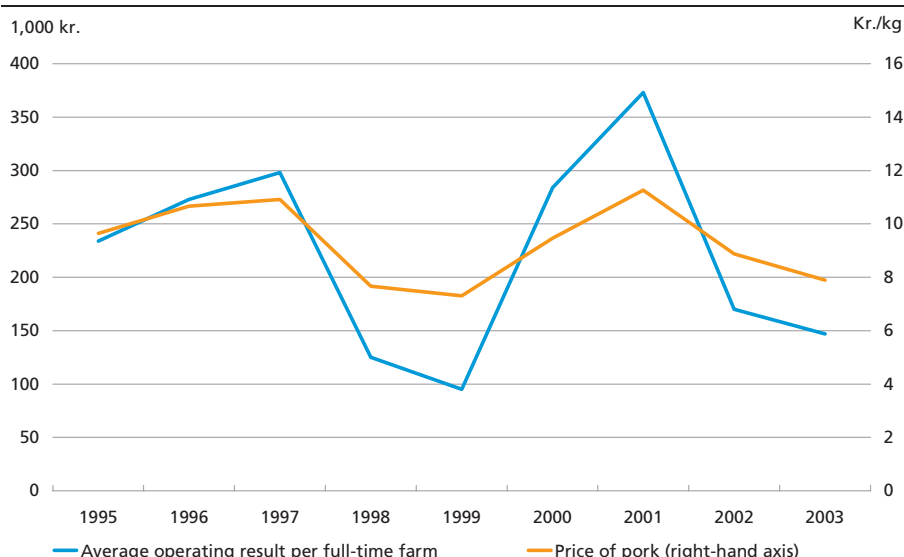
Expectations that earnings will decrease in 2003, together with a slightly rising trend for the number of compulsory liquidations, indicate that the situation of the weakest members of the sector is worsening.

The price of farmland

The agricultural sector's earnings and production conditions, as well as other conditions, influence demand for and the price of land. The price of farmland is determined by such factors as the return on cultivating the land, the environment-related requirements of land used for live-stock production, including pig production, and various EU subsidy

OPERATING RESULTS OF FULL-TIME FARMS AND PORK PRICES, 1995-2003

Chart 27



Note: The operating results of full-time farms do not include mixed farms. The operating results for 2002 and 2003 are prognoses from the Danish Agricultural Advisory Centre. The price of pork for 2003 is the average quoted sales price in week 13 stated on Danish Crown's website.

Source: Statistics Denmark, Danish Crown and the Danish Agricultural Advisory Centre.

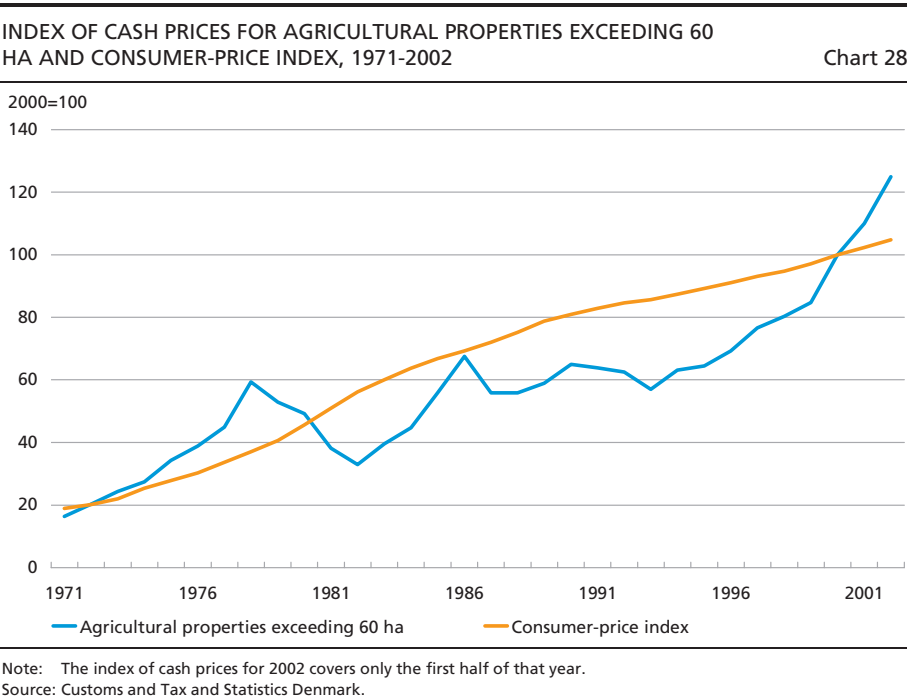
schemes, including subsidy per hectare. Other conditions specific to the agricultural sector include the location of the agricultural property, and the fact that land is a scarce resource. Finally, more general factors influence property prices overall, such as the general development in prices and wages, the level of interest rates, and inflation expectations.

Chart 28 shows the development since 1971 in the index of cash prices for agricultural properties exceeding 60 hectares, compared to the consumer-price index. Since there are no separate statistics for traded farmland, the index of cash prices for the largest agricultural properties is chosen as an estimate for the price of farmland. The housing element thus constitutes only a small proportion of the index.

When Denmark joined the EU at the beginning of the 1970s, land prices rose at a faster rate than inflation. The agricultural crisis around 1980 entailed a significant correction, whereby product prices were more than halved. Since 1994, land prices have again increased considerably, and in 2002 the price of the largest agricultural properties is kr. 100,000 per hectare¹.

A price of kr. 100,000 per hectare makes great demands of the agricultural sector's earnings. Expectations of weak development in earnings,

¹ Customs and Tax, Property Sales, 1st half of 2002.



together with pressure on the agricultural sector's other framework conditions, may lead to downward pressure on farmland prices. All other things being equal, receding earnings and declining land prices may reinforce the tendency within the agricultural sector towards larger and more profitable farms, particularly in pig production where it seems the greatest economies of scale can be obtained.

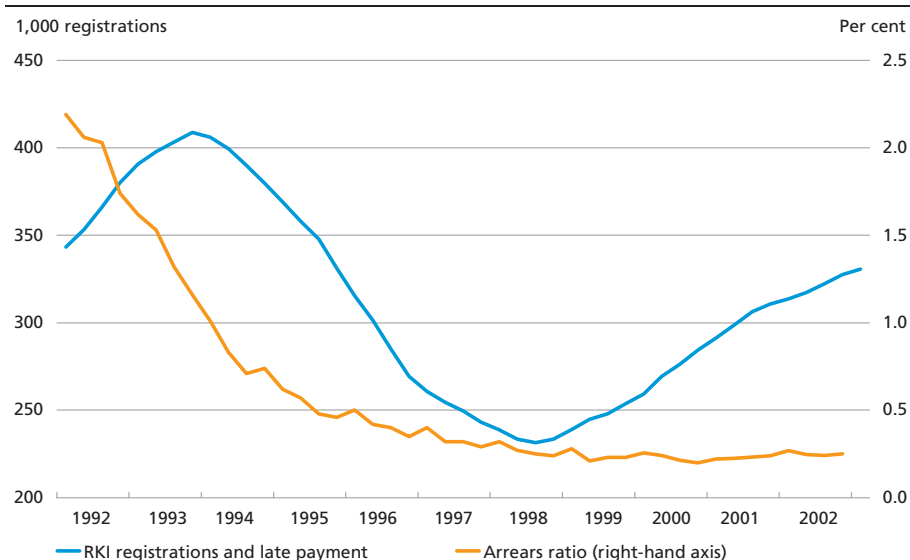
HOUSEHOLDS

Several indicators show that the households' ability to fulfil their payments is still robust. Recent years have seen firm increases in real disposable gross incomes. Unemployment is still low, even though it has increased a little.

The reports of late payment incidents to RKI may give an early warning of the households' future ability to meet payments. The RKI data indicates that, in overall terms, the households' financial situation has tightened a little. A more direct warning concerning homeowners' ability to meet payments can be obtained by considering the development in the arrears ratio of mortgage-credit loans, since repayment of housing loans must be assumed to be homeowners' highest-ranking debt commitment. The arrears ratio is at a very low level historically, and was

REGISTRATION OF LATE PAYMENT INCIDENCE AND ARREARS RATIO,
1992-2003

Chart 29



Note: A mortgage payment is regarded as late if the due date is exceeded by more than 3½ months. The arrears ratio is calculated on a quarterly basis as the late payments in the period divided by the period's total payments. The mortgage payment and arrears ratio relate to the settlement period in the quarter prior to the date of compilation, i.e. the arrears ratio for the 4th quarter of 2002 relates to late payments in the 3rd quarter of 2002. The arrears ratio is calculated up to and including the 4th quarter of 2002. The RKI registrations are calculated up to and including the 1st quarter of 2003. RKI states that approximately 92 per cent of the registrations relate to private individuals, and the remaining 8 per cent to companies. The average number of registrations per person is approximately 2. Each person can thus be registered by several creditors.

Source: RKI Kredit Information and the Association of Danish Mortgage Banks.

almost unchanged throughout 2002, cf. Chart 29. One explanation for the increase in RKI registrations may be that non-homeowners' ability to meet payments has tightened a little.

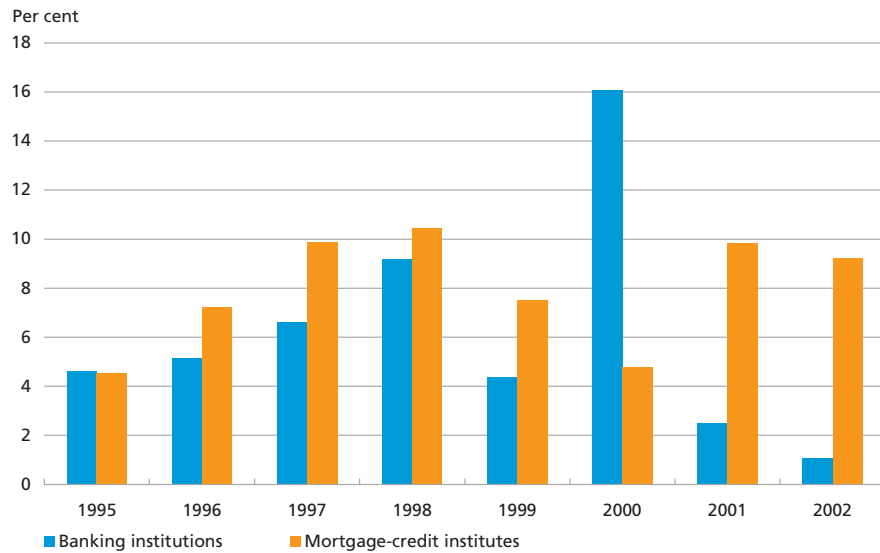
The number of enforced property sales is still very low, although the number of enforced sales of one-family houses increased by 35 per cent in the period from 2000 to 2002, while the number of enforced sales of owner-occupied flats decreased by 15 per cent in that period.

The increase in house prices has diminished over the past year after several years of substantial growth. The most recent drop in interest rates has thus not fully impacted house prices. This may be explained by the weaker economic development and a dampening labour market.

So far it has not been possible to repay mortgage-credit loans for owner-occupied homes at a slower rate than an annuity loan is repaid. The government has proposed a bill which e.g. permits repayment-free loans for up to 10 years. Theoretically, this should not affect house prices, since changing a loan's repayment profile does not affect the real cost of owning a home. Repayments constitute savings and are not a housing cost. However, even if the new type of loan gains ground, it is

GROWTH IN LENDING BY BANKING INSTITUTIONS AND MORTGAGE-CREDIT INSTITUTES, 1995-2002

Chart 30



Note: Up to and including 2000 households comprises private individuals and the self-employed. As from 2001, households solely comprise private individuals.

Source: Danmarks Nationalbank.

uncertain whether it will stimulate house prices, which traditionally are fixed on the basis of the net instalments on the home, including repayments. If this is the case, the new type of loan will mainly be to the advantage of existing homeowners.

Borrowing by households

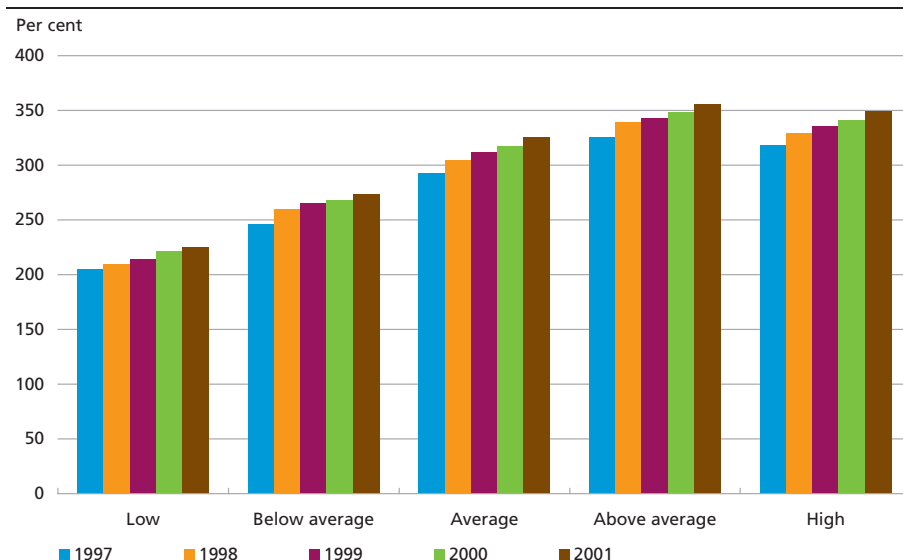
The banking institutions' lending to households accounts for approximately 1/3 of the banking institutions' total lending, while approximately 2/3 of the mortgage-credit institutes' total lending is extended to the households.

The banking institutions' lending to the households increased only moderately in 2002, while the lending of mortgage-credit institutes increased considerably, cf. Chart 30. Of the households' debt 18 per cent is extended by the banking institutions, and 82 per cent by the mortgage-credit institutes. Recent years' development in house prices has enabled homeowners to mortgage the equity in their homes. In conjunction with falling interest rates many homeowners have used this opportunity, e.g. to repay bank debt. Since the 2nd half of 2001 the growth in mortgage-credit lending has exceeded increases in house prices¹. Given a constant

¹ The house price is the average cash price per square metre for one-family and row houses nationwide, cf. www.realkreditraadet.dk.

THE DEBT BURDEN OF THE 10 PER CENT MOST DEBT-BURDENED
HOUSEHOLDS BY INCOME BRACKET, 1997-2001

Chart 31



Note: A household is defined as a family of one or more persons resident at the same address in mutual relationships. The analysis includes singles, couples and shared households with and without children below the age of 18. The households are divided into 5 categories by family income before tax. The lowest income bracket comprises the households with the lowest 20 per cent of incomes. The category below average is the households with a family income between the 20th and 40th percentiles, etc.

Source: Statistics Denmark, family income statistics.

supply of homes in the short term this may indicate a higher loan-to-value ratio.

Debt burden and ability to meet payments

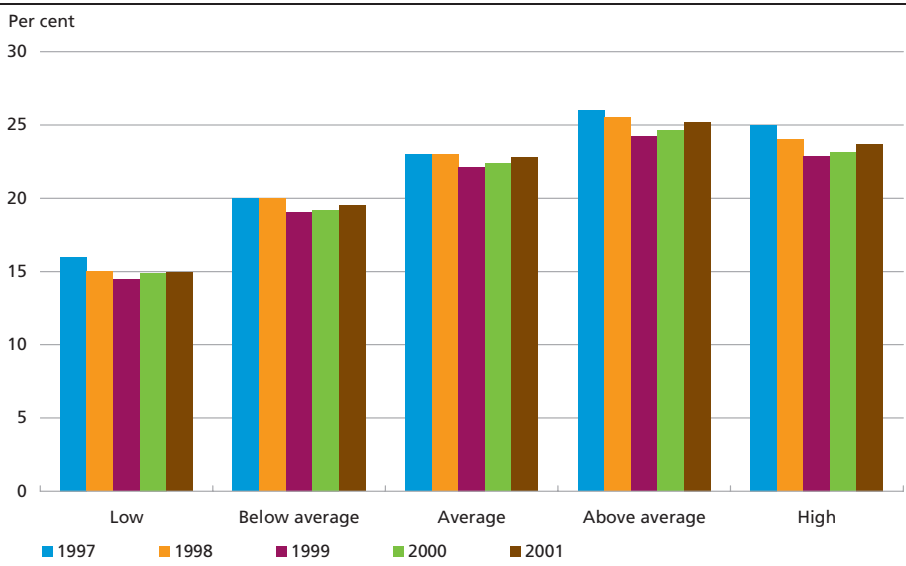
The households' debt has grown more than their gross disposable income¹ in the period 1997-2001, i.e. the households' debt burden has increased². In terms of the 10 per cent most indebted households in various income brackets, cf. Chart 31, all income brackets' debt burden has increased. The group of households with incomes above average are those most indebted. At the same time, this group has the largest proportion of 25-39 year-olds, of whom many must be assumed to be new entrants to the housing market. This may help to explain the high debt burden of this group. On average, non-homeowners have increased their debt burden more than homeowners, although from a relatively low level. All other things being equal, the higher debt burden makes the households more vulnerable to a decrease in income.

¹ The gross disposable income is defined as the households' income after tax, but before payment of interest expenditure.

² The debt burden is defined as total debt as a ratio of gross disposable income.

THE INTEREST BURDEN OF THE 10 PER CENT MOST INTEREST-BURDENED HOUSEHOLDS BY INCOME BRACKET, 1997-2001

Chart 32



Note: The households are divided into 5 categories by family income before tax. The lowest income bracket comprises the households with the lowest 20 per cent of incomes. The category below average is the households with a family income between the 20th and 40th percentiles, etc.

Source: Statistics Denmark, family income statistics.

An expression of the households' ability to repay their debt is the interest burden, cf. Chart 32, i.e. interest expenditure as a ratio of gross disposable income. In overall terms, the interest burden has been reduced during the period for the 10 per cent most interest-burdened households in each income bracket, despite growing indebtedness.

Financial Markets

The financial markets were subject to substantial movements during the past year. Stock prices and long-term yields fell significantly in the USA and Europe. However, the market development had only a minor direct impact on the banking institutions' earnings due to small stock portfolios, hedging and portfolio restructuring. The market impact on the banking institutions' earnings is more indirect via the business areas that depend on the financial markets such as asset management and investment banking.

No new companies were listed on the Copenhagen Stock Exchange in 2002. Stock exchanges in other countries also saw a significant decline in the number of initial public offerings.

MARKET TRENDS

During the past year the international financial markets were affected by unrest, with strong fluctuation in stock prices and long-term interest rates. The stock markets in the USA, the euro area and Denmark fell by approximately 20 per cent, 35 per cent and 25 per cent respectively from mid-April 2002 to mid-April 2003, cf. Chart 33.

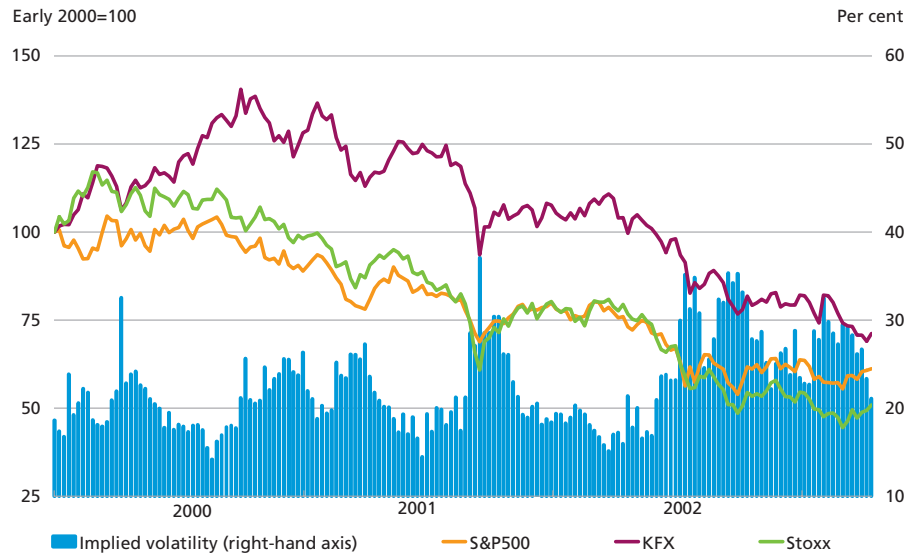
There was also considerable uncertainty among market participants regarding the future development in prices. This was e.g. reflected in a high level of implied volatility of US stocks. As implied volatility is calculated on the basis of option prices it reflects the cost to stock investors of hedging against fluctuating stock prices.

The falling stock prices should be viewed in the light of the deterioration in the outlook for economic growth in the industrialised countries. In the summer of 2002 this trend was reinforced by doubt among investors as to whether the companies' accounts give a adequate view of their earnings and risks. This doubt arose as a result of accounting scandals involving a few large US companies. Market uncertainty was also underpinned by geopolitical tensions such as a number of terrorist acts and the prospect of a military conflict in Iraq. On the outbreak of war in Iraq the stock markets reacted positively, however, as the coalition forces won ground. Moreover, the uncertainty of the future development in prices diminished, cf. the decrease in implied volatility.

The development in Danish stock prices is driven to a considerable degree by trends in the international markets. The stock markets in Den-

STOCK INDICES IN THE USA, THE EURO AREA AND DENMARK, AND
IMPLIED VOLATILITY IN THE USA, 2000-03

Chart 33



Note: S&P500 and KFX are respectively US and Danish stock indices, and Stoxx is a stock index for the euro area. Implied volatility is calculated on the basis of the price of a put option on S&P500.

Source: Bloomberg and Ecwin.

mark and the USA have thus shown very close co-variation for a number of years, cf. Chart 34. This also applies to the bond markets.

The high degree of co-variation between financial markets across borders means that e.g. Danish investors who spread their investments to financial markets abroad can only reduce their market risk to a limited extent.

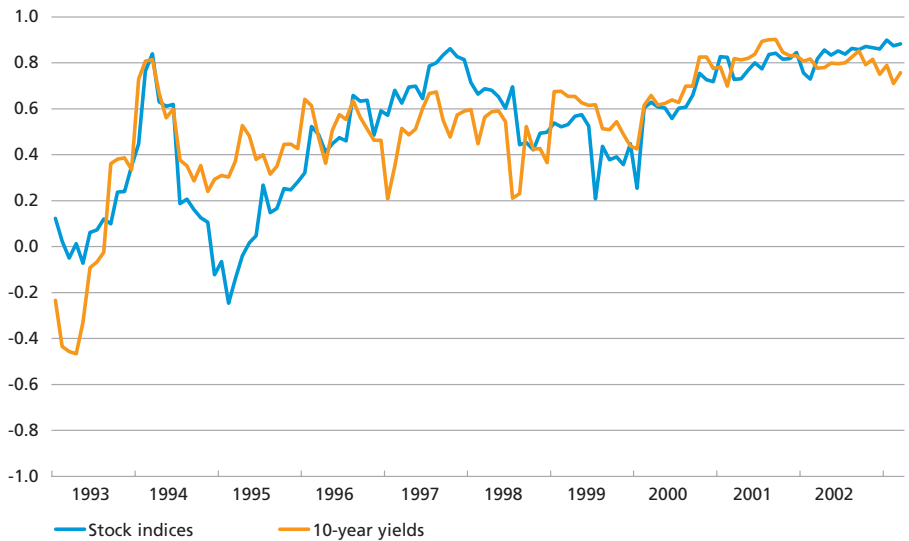
Recent years' stronger interest in investing abroad may be motivated by other circumstances such as credit and liquidity risk.

Concurrently with the decline in stock prices in the USA and Europe, long-term yields also continued to decrease, cf. Chart 35. In the USA the 10-year yield fell briefly to below 3.6 per cent in October 2002, and again in March 2003. This is the lowest level for 40 years. The implied volatility in the long-term interest rates was generally at a very high level, which among other factors reflects widespread uncertainty among market participants concerning the future course of interest rates.

The close positive co-variation between stock prices and long-term yields has been observable since the beginning of 2001, and since then has become even more apparent, cf. Chart 36. The co-variation is probably a result of the investors' portfolio shifts from stocks to bonds. As stated in the chapter on the financial sector, the Danish pension companies, for example, considerably reduced their stock portfolios in 2002.

CORRELATIONS BETWEEN FINANCIAL MARKETS IN DENMARK AND THE USA, 1993-2003

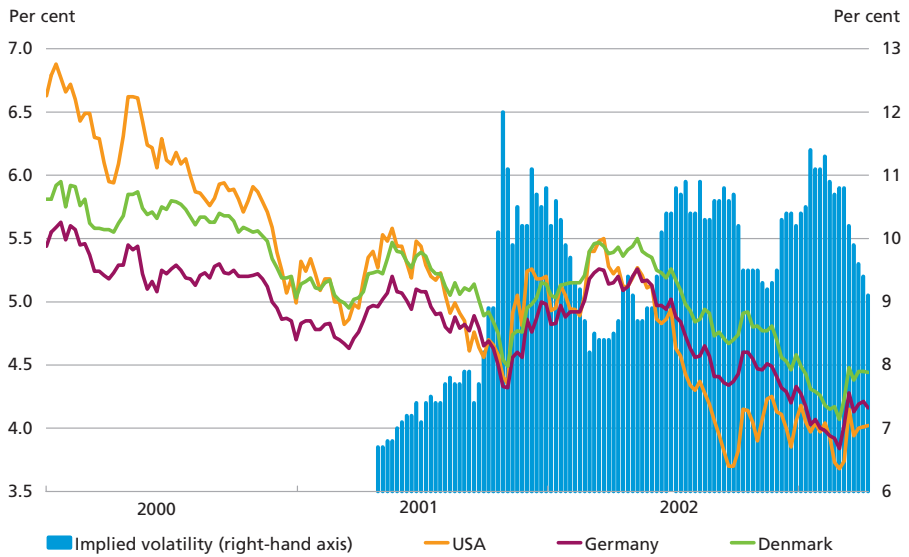
Chart 34



Note: Running correlations based on monthly changes in the preceding year. The stock indices are KFX for Denmark and S&P500 for the USA.
Source: Ecwin and own calculations.

10-Year Yields In The Usa, Germany And Denmark And Implied Volatility In The Euro Area, 2000-03

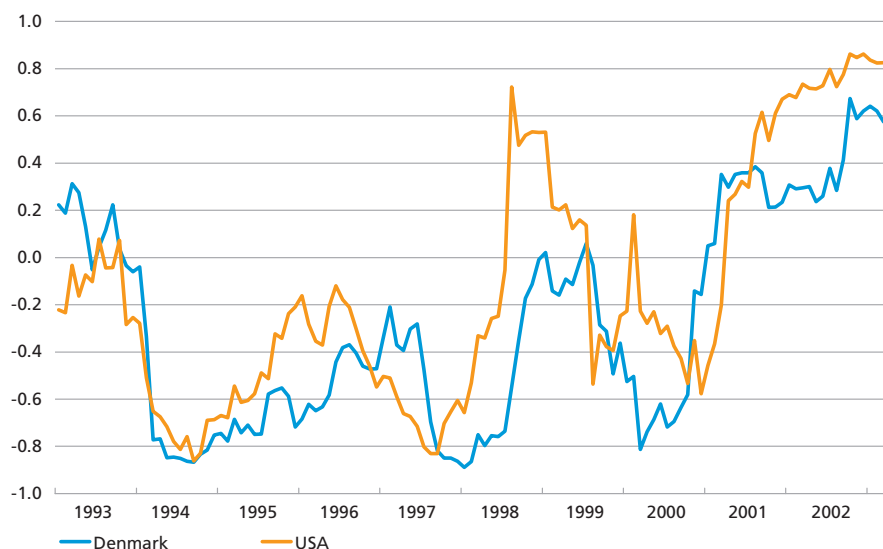
Chart 35



Note: Implied volatility for a 20-year euro swaption, where the fixed leg is a 10-year yield.
Source: Bloomberg.

CORRELATION BETWEEN STOCK PRICES AND 10-YEAR YIELDS, 1993-2003

Chart 36



Note: Running correlations based on monthly changes in the preceding year. The stock indices are KFX for Denmark and S&P500 for the USA.

Source: Ecowin and own calculations.

The low level of interest rates in the USA gave rise to a high volume of mortgage conversions among homeowners with callable, fixed-rate loans. In certain periods, investors' expectation that many homeowners would call their housing loans contributed to reinforcing the fluctuations in long-term yields. In Denmark strong fluctuations in long-term yields are also seen when the level of interest rates is low, due to such factors as loan restructuring in connection with conversion of mortgage-credit loans and the returns promised by pension companies¹. In April 2003, conversions of Danish mortgage-credit bonds amounted to kr. 116 billion, which is the highest amount ever.

ASSESSMENT OF STOCK PRICES

The international stock markets were characterised by strong price increases in the last half of the 1990s. Parallel to this, speculation mounted as to whether the stock prices had reached levels that deviated considerably from the economic fundamentals.

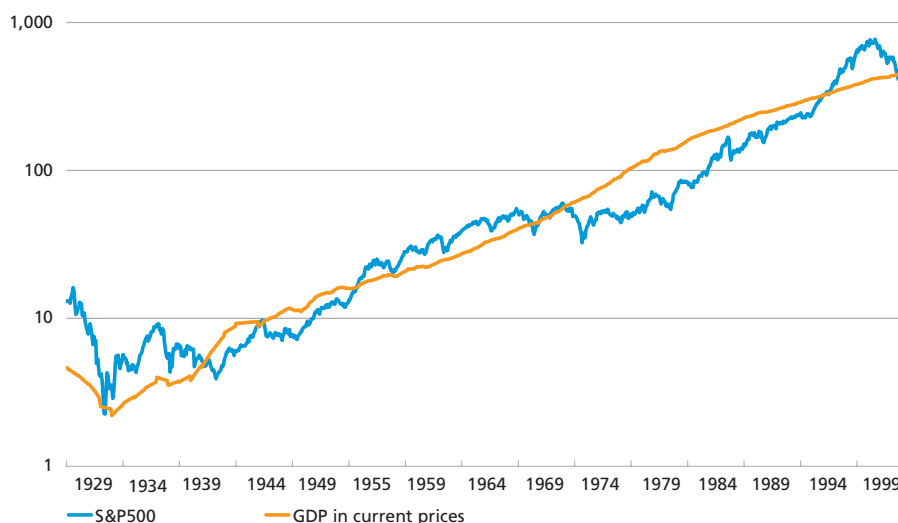
In the industrialised countries stock prices have generally tended to decline since 2000. In mid-April 2003 the benchmark stock indices in the USA and Europe had by and large fallen to half the highest level

¹ See Louise Mogensen, Market Dynamics at Low Interest Rates, Danmarks Nationalbank, *Monetary Review*, 1st Quarter 2002.

US STOCK INDEX AND GDP IN CURRENT PRICES, 1929-2003

Chart 37

Index, average 1929-2002 = 100



Note: Logarithmic scale.

Source: US Department of Commerce, Ecowin and own calculations.

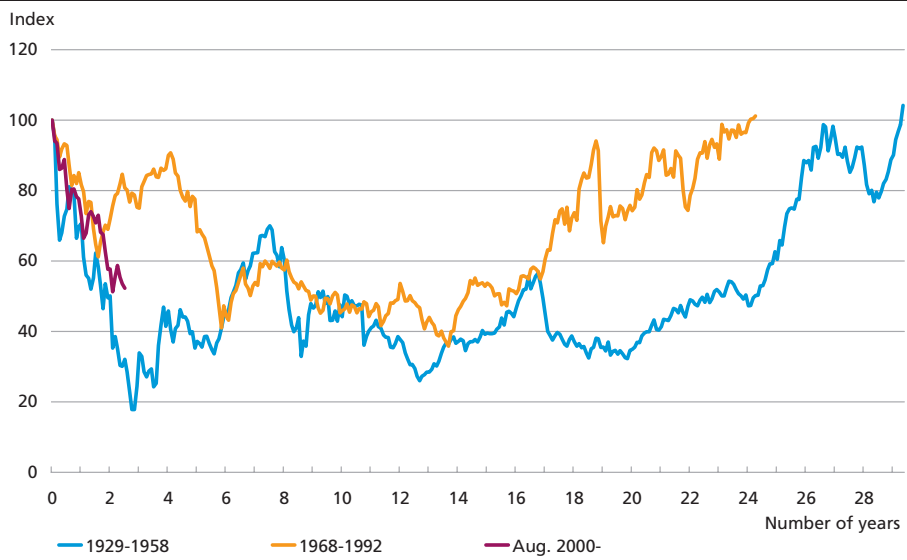
reached in 2000. Viewed over a longer period, by mid-April 2003 the US S&P500 index was close to its level had the index matched the general economic growth since 1929, cf. Chart 37.

Equivalently strong stock price drops have been observed previously, e.g. in the period after 1929. In the course of less than three years the S&P500 fell by more than 80 per cent in real terms, cf. Chart 38, and it took 30 years for stock prices to return to their initial level.

In theory, the movements in a company's stock price should in the long term reflect the movements in the expected value of the company's future cash flows. Various methods can be used to assess whether a company's stock price, or a stock index for a group of companies, is in accordance with the economic fundamentals.

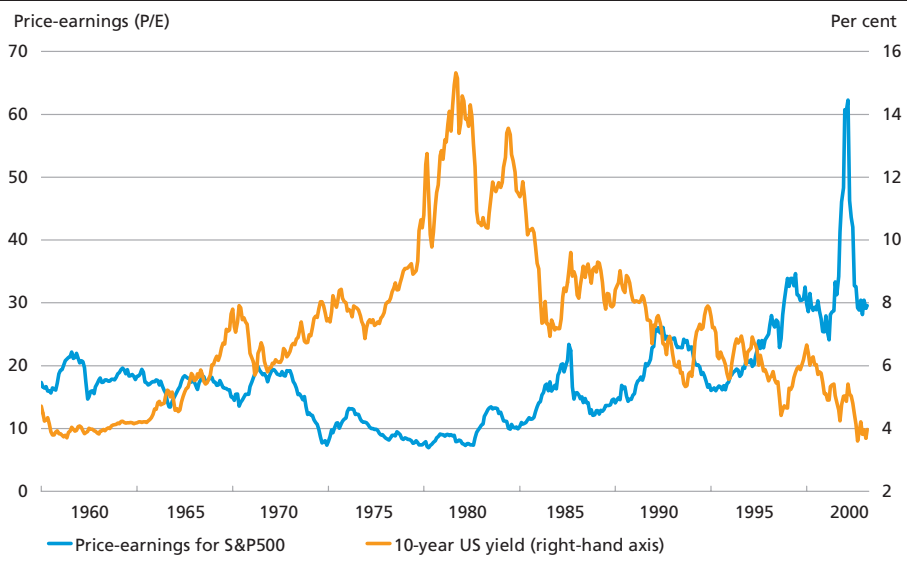
A key ratio often used to assess the stock price level is price-earnings (P/E), i.e. the stock price (P) as a ratio of the company's profit per share in the last financial period (E). The key ratio thus expresses the cost of purchasing a profit of one unit of currency in a company. In mid-April 2003 the P/E ratio for the US S&P500 was around 30, which is a good deal higher than the historical average, despite the decline in stock prices in recent years, cf. Chart 39. However, the underlying increasing P/E trend since the beginning of the 1980s has been affected by a falling interest-rate level. When interest rates decrease, the present value of the companies' future profits increases, which supports a higher stock price and thereby a higher P/E.

REAL PRICE DEVELOPMENT AFTER US STOCK INDEX PEAKS Chart 38



Note: The S&P500 stock index is adjusted for inflation and indexed so that the peak equals 100. Monthly observations.
Source: Global Financial Data.

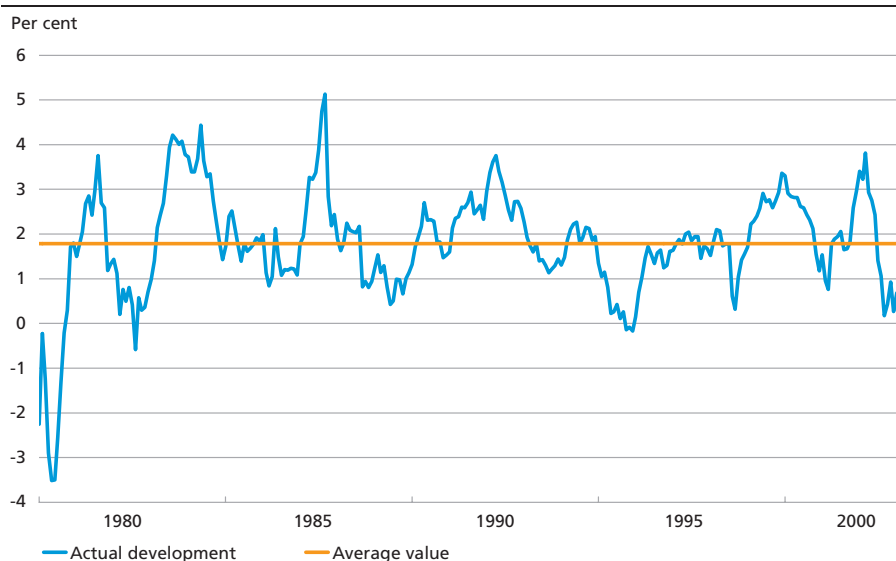
PRICE-EARNINGS FOR US STOCK INDEX AND 10-YEAR US YIELD, 1960-2003 Chart 39



Source: Bloomberg and Ecwin.

US 10-YEAR YIELD LESS E/P (FED MODEL), 1980-2003

Chart 40

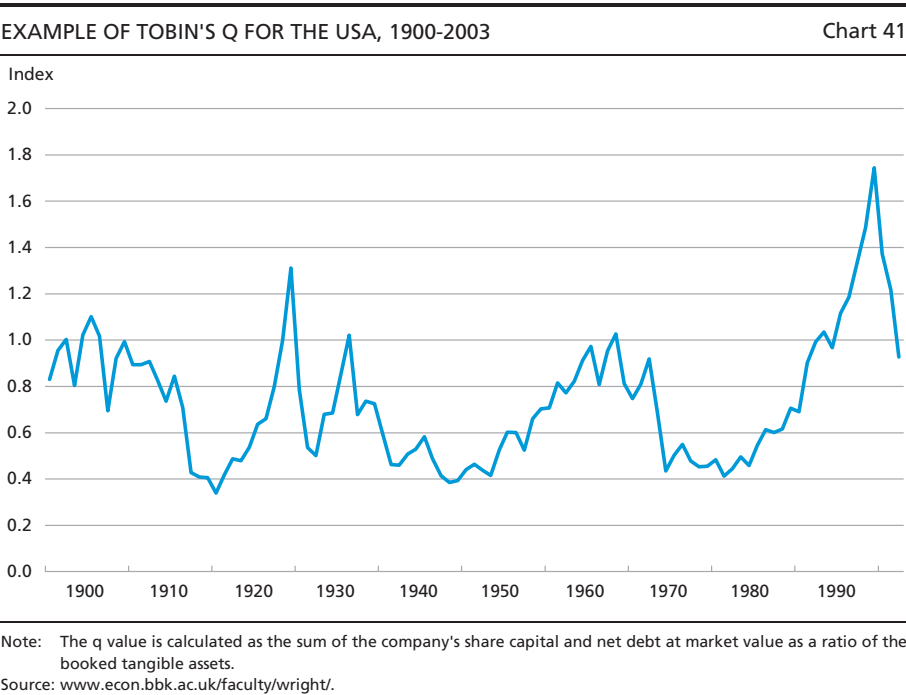


Note: E/P is the reciprocal price-earnings for the US stock index S&P500 multiplied by 100.
Source: Bloomberg and Ecowin.

The "Fed model" is a related method for assessment of stock prices. This method considers the correlation between the return on stocks and the return on bonds. The return on stocks is measured by reciprocal price-earnings (E/P), while the return on bonds is measured by the yield to maturity on a long-term bond¹. The rationale behind this method is that bonds and stocks can be regarded as alternative investment assets, whereby their respective returns should follow the same trend in the long term. The aforementioned argument that a lower level of interest rates supports higher stock prices and thereby a lower E/P also applies. According to this method, stocks are expensive compared to bonds if the level of interest rates is high in relation to E/P. The two measures are compared in Chart 40, which shows that at the end of March 2003 stocks did not seem expensive compared to bonds. In other words, the level of stock prices was supported by the low level of interest rates.

A third method for assessing stock prices is Tobin's q, which is the ratio of the market value of capital. A high value of Tobin's q indicates that the market value, and thereby the stock price, is overvalued, while a low value indicates that the stock price is undervalued. In practice, the calculation of Tobin's q presents a number of difficulties. Furthermore, the

¹ The model is based on Lander, J., Orphanides, A. and Douvogiannis, M. *Earnings forecasts and the predictability of stock returns: Evidence from trading the S&P*. Federal Reserve Board Working Paper, 1997 – 6. The model uses a measure of the companies' expected future earnings, rather than actual historical earnings which are used here.



method is not unequivocal, and may produce varying results. Chart 41 shows an example of Tobin's q for the USA, where it has maintained a high level in recent years.

These methods of assessing stock prices are based on various assumptions, and they also produce different results. The diversity emphasises that in practice determining whether a company's stock price is over- or undervalued is no trivial matter. However, a common characteristic of the various methods is that they illustrate how for long periods actual stock prices can deviate from fundamental values. In a forward-looking perspective, stock prices should therefore also be expected to show movement in some periods that deviates from the economic fundamentals.

MARKET IMPACTS ON THE FINANCIAL INSTITUTIONS

Trends in the financial markets have a direct impact on the banking institutions via their portfolios of bonds and stocks. The declining level of interest rates has led to capital gains on the sector's substantial bond holdings, while the lower stock prices have had a small direct impact on the banking institutions' earnings, since the sector had reduced its already relatively small portfolio of stocks, cf. Table 3. Value adjustment of

SECURITIES PORTFOLIOS OF FINANCIAL INSTITUTIONS

Table 3

Kr. billion	Banking institutions	Pension companies	Mortgage-credit institutes
Shares, total	94.2	236.8	10.1
Shares in foreign companies	24.8	151.2	0.7
Bonds, total	417.4	540.0	76.1
Mortgage-credit bonds	240.3	358.4	53.3 ¹
Foreign bonds	62.0	112.0	-0.7
Balance sheet	2,039.6	921.8	1,721.8

Note: The portfolios of the banks and mortgage-credit institutes are compiled as of end-2002, apart from the mortgage-credit institutes' bond portfolios that are compiled as of end-November 2002. The portfolios of pension companies are compiled as of end-2001. All securities are stated at market value.

Source: The Danish Financial Supervisory Authority and Danmarks Nationalbank.

¹ Only the portfolio of own mortgage-credit bonds.

the banking institutions' securities portfolios was positive in 2002 in overall terms. However, the value adjustment was lower than in 2001.

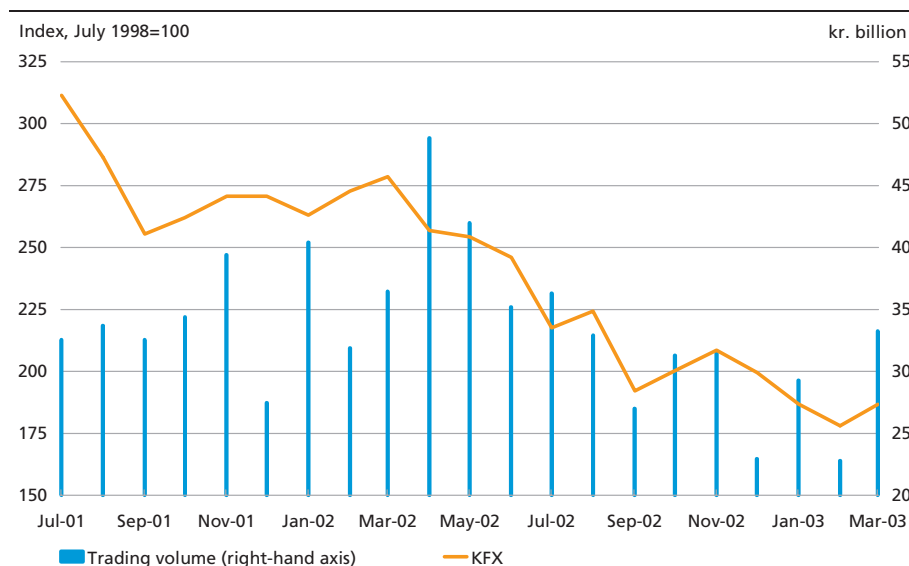
The market impact on the banking institutions' earnings is more indirect via the institutions' business areas that depend on the financial markets such as asset management and investment banking.

The negative course of the stock markets has reduced earnings from trading activities and led to lower fee income from stock-related management and consulting agreements. Trading of stocks on the Copenhagen Stock Exchange has been declining, cf. Chart 42.

The largest banking institutions, which are particularly active in the field of investment banking, have noted a reduction in this area. Issuing

TRADING VOLUME AND PRICE DEVELOPMENT ON THE COPENHAGEN STOCK EXCHANGE, 2001-03

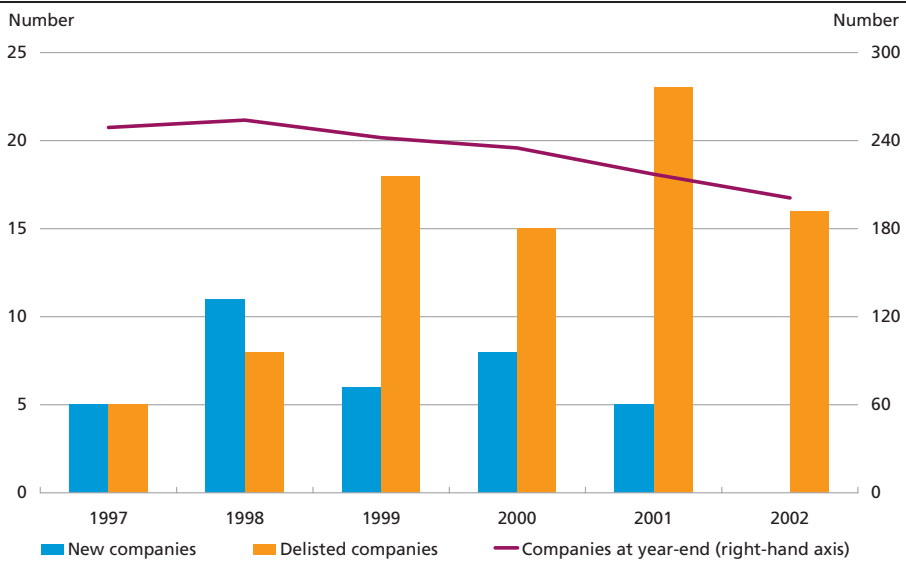
Chart 42



Source: The Copenhagen Stock Exchange.

NUMBER OF COMPANIES LISTED ON THE COPENHAGEN STOCK EXCHANGE, 1997-2002

Chart 43



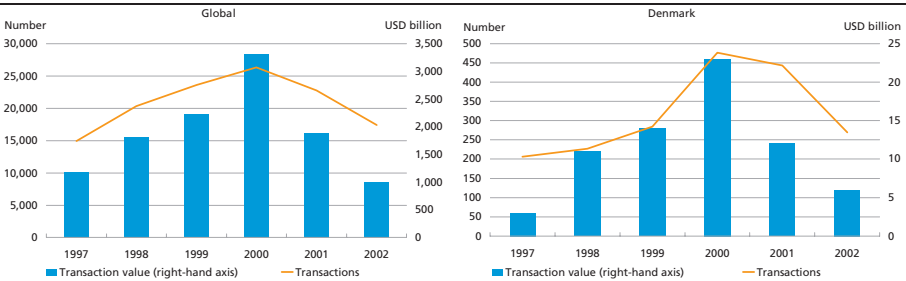
Note: Delisted companies are companies subject to merger or acquisition or liquidation proceedings, or purchase of all shares by one shareholder.
Source: The Copenhagen Stock Exchange.

activity was at a low level in 2002, and for the first time since 1981 there were no initial public offerings on the Copenhagen Stock Exchange, cf. Chart 43. In an international perspective the number of initial public offerings has also declined, and the level of share issues was lower in 2002 than in 2001.

Furthermore, both the number and value of mergers and acquisitions have declined significantly in recent years both globally and in Denmark, cf. Chart 44.

MERGERS AND ACQUISITIONS GLOBALLY AND IN DENMARK, 1997-2002

Chart 44



Note: The figures for the value of mergers and acquisitions cover only a part of the mergers and acquisitions – primarily deals involving major or stock-exchange-listed companies. The data comprises both domestic and cross-border transactions.
Source: Dealogic 2002.

Issues related to
financial stability

Pension Companies

In recent years the situation of life-insurance companies and pension funds has deteriorated in a number of countries. Falling stock prices and low interest rates have made it difficult for the companies to achieve yields that are sufficient to meet the guarantees given. This has drained reserves and increased pressure on the companies' capital. To ensure economic development and financial stability it is important that confidence in life-insurance companies and pension funds is maintained. The influence on financial stability is assessed to be of an indirect nature, e.g. via the financial markets, via group affiliations with banks, and via risk transfer related to the use of financial derivatives.

Danish life-insurance companies and pension funds, jointly referred to as pension companies, are subject to the same regulation under the Act on Insurance Companies. Nonetheless, there are a number of differences between the various types of pension schemes and pension companies, and consequently it is not generally possible to make clear comparisons between pension schemes and between pension companies.

Policyholders have a natural interest in the highest possible degree of transparency, so that they can assess whether the pension company manages and returns satisfactory interest on the pension savings efficiently compared to other pension companies. The pension companies can still do more to improve transparency.

PENSION SCHEMES AND PENSION COMPANIES

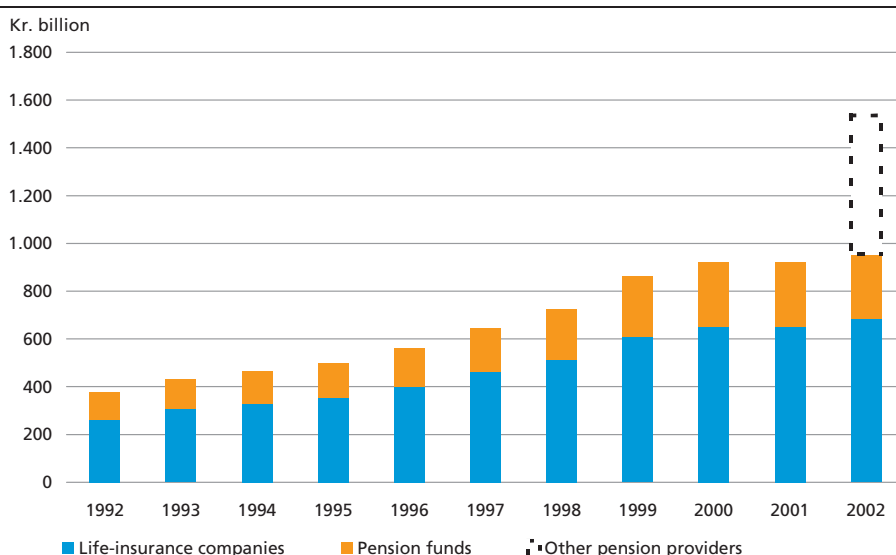
Life-insurance companies and pension funds, jointly referred to as pension companies¹, redistribute and reduce various types of risk for policyholders, and play an important role as managers of long-term savings. Due to the growth in the volume of pension savings, the pension companies exert more and more influence on the financial markets. Chart 45 shows that the pension companies' total balance sheet increased significantly during the 1990s. Pension savings total approx. kr. 1,500 billion², equivalent to 110 per cent of GDP.

¹ In connection with the discussion of accounting items the terminology applying to life-insurance companies is applied generically to the pension companies.

² Pension Market Council report, April 2002.

DEVELOPMENT IN THE TOTAL BALANCE SHEETS OF LIFE-INSURANCE COMPANIES AND PENSION FUNDS FROM 1992 TO 2002, AND TOTAL PENSION ASSETS

Chart 45



Note: Labour-market-related life-insurance companies are included in the Chart under life-insurance companies. Other pension providers include the Danish Labour Market Supplementary Pension Scheme (ATP), LD Pensions and company pension funds. Figures for 2002 are estimates based on a number of published annual accounts.

Source: Annual accounts and the Danish Financial Supervisory Authority.

Different types of pension company

In overall terms, there are three types of pension company: life-insurance companies, labour-market-related life-insurance companies, and pension funds. All pension companies are subject to the Act on Insurance Companies¹.

The pension schemes typically comprise a combination of savings and insurance products. The structure of an individual pension scheme depends on a number of different factors. Labour-market pension schemes are compulsory, while individual pension schemes are taken out on a voluntary basis. Most pension schemes, i.e. both labour-market and individual pension schemes, are based on a guaranteed interest rate, cf. Box 7. Among other things, this means that the pension company is subject to an obligation to pay a fixed minimum nominal yield throughout the lifetime of the scheme.

Traditional life-insurance companies are limited-liability companies offering both labour-market and individual pension schemes. Limited-liability companies established specifically for this purpose, known as labour-market-related life-insurance companies, may also write labour-

¹ Other pension providers, e.g. The Danish Labour Market Supplementary Pension Scheme (ATP) and LD Pensions, and company pension funds are subject to separate acts.

INTEREST-RATE TERMS IN PENSION COMPANIES

Box 7

When a pension scheme is established, the premium payable by the policyholder is agreed, and the relationship between the premiums paid and the pension and insurance benefits receivable by the policyholder via the pension scheme are calculated. This calculation is based on a number of assumptions of the risk of disability, mortality, and interest rates and costs. The maximum technical interest rate is used to calculate pension and insurance benefits to policyholders. The maximum technical interest rate is identical to the guaranteed rate of interest. The assumptions as to risk of disability, mortality, interest rates and costs must be based on conservative estimates, since the guarantees may be of long duration.

The use of conservative estimates on calculating pension and insurance benefits normally results in profits. These profits may derive from insurance elements, investment returns and costs. A proportion of this profit is distributed to policyholders as bonus.

The return accruing to the pension scheme each year is known as the deposit interest rate. The deposit interest rate is usually based on an average-return principle, which means that all policyholders in a pension company obtain the same deposit interest rate, irrespective of whether they have individual schemes or labour-market pension schemes, and that the deposit interest rate is determined on the basis of the pension company's bonus policy and the development in the investment yield over several years. The deposit interest rate is thus in principle independent of the investment return in the individual year. The average-return principle means that it is sought to smooth the yield over time, thereby supporting stable and predictable development in pension and insurance benefits. In addition, the smoothing of the yield means that redistribution takes place between groups of policyholders.

In connection with the presentation of pension companies' accounts the present value of the life-insurance provisions is calculated on the basis of a discount rate. The pension companies may also make present-value calculations based on a zero-coupon-yield structure estimated by the pension company.

market pension schemes. A labour-market-related life-insurance company is directly or indirectly owned by the policyholders' trade union or professional organisation, possibly jointly with the employers' organisations for the relevant industries, and is established as a result of a collective agreement. Labour-market-related life-insurance companies do not pay out dividend to their owners. Pension funds may, like life-insurance companies, establish both labour-market and individual pension schemes. Pension funds are associations or societies owned by their members who share the same educational background or are employed within the same sector.

The ownership structure of the various types of pension company determines who in actual terms must fulfil the guarantees given. If the realised result does not cover the guarantees, the reserves and equity capital may be drawn on. If a pension company finds itself in a situation

where the reserves have been exhausted, the equity capital must be used to fulfil the guarantees. If the equity capital is not sufficient to meet the guarantee commitments, the owners of a life-insurance company may have an interest in contributing further capital to the company, e.g. to maintain its reputation. It is less certain how the owners of a pension fund will react in this situation, since the members themselves have issued the guarantees via the collective agreements established with the relevant labour-market bodies.

Distribution of profits in the pension companies

The different ownership structures influence the distribution of profits in the pension companies. Most pension schemes are subject to a bonus entitlement. The calculation of the guaranteed pension and insurance benefits is based on prudent assumptions, so that normally a return is available for distribution between the owners and the policyholders.

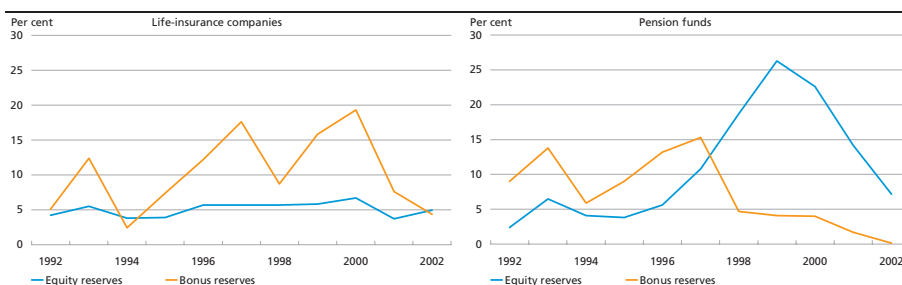
The contribution principle guides the distribution of the realised result between owners and policyholders and mutually among policyholders. The distribution is based on how much the owners and policyholders have contributed to achieving the result. The contribution principle is applied in the same way to the distribution of losses between owners and policyholders. As a consequence of the contribution principle, the return on the equity capital is not necessarily dependent on the result for the year and thereby calculated on a residual basis, as is the case in all other types of companies.

In life-insurance companies the owners and policyholders may have diverging interests regarding the distribution of profits. On the one hand, the owners may be interested in carrying the profit to equity capital, while on the other hand the policyholders may prefer distribution to policyholders. In this respect the members of pension funds are both policyholders and owners.

The pension companies must set up rules for the return on equity. A review of a number of these policies for equity returns shows that the return on equity in a pension company generally comprises two elements. Firstly, a return that is in line with the yield paid to policyholders, and secondly a risk premium that must be reasonable in relation to the risk associated with providing equity capital. The risk premium in pension funds is calculated mainly as a percentage premium on the yield or deposit rate payable to policyholders. In most life-insurance companies the risk premium is a percentage of a balance-sheet item, e.g. life-insurance provisions. The risk premium is thus not directly related to the current yield achieved by the life-insurance company. This difference in the calculation of the risk premium means that the return on equity in

EQUITY RESERVES AND BONUS RESERVES IN LIFE-INSURANCE COMPANIES AND PENSION FUNDS, 1992-2002

Chart 46



Note: Figures for 2002 are estimates based on a number of published annual accounts.

Source: Annual accounts and the Danish Financial Supervisory Authority.

life-insurance companies will be more stable than the return on equity in the pension funds.

The development in the two key indicators, bonus reserves¹ and equity reserves², may give an indication of the differences in how life-insurance companies and pension funds build up their buffer capital. Chart 46 illustrates that in the life-insurance companies the equity reserves show stable development, while the bonus reserves fluctuate considerably. This indicates that the life-insurance companies primarily use the bonus reserves as buffer capital. In the pension funds, the bonus reserves have been reduced to a low level in recent years, while the level of equity reserves has fluctuated. Pension funds primarily use the equity reserves as buffer capital.

PENSION COMPANIES' RISKS, FRAMEWORK AND TRANSPARENCY

In recent years there has been some focus on policyholders' influence on the structure of pension schemes, and opportunities to make individual choices. A number of pension companies have given policyholders more influence on the investment structure, but this is still the exception. For example, there is a high degree of interdependence between the individual policyholders in a compulsory labour-market pension scheme. This is not immediately compatible with full freedom of choice, since the options may have consequences for the other policyholders under the scheme.

It can be rather difficult to gain an overview of pension schemes. This is one reason that an Information Order has been issued. The order makes it compulsory for pension companies to provide policyholders

¹ The bonus reserves are the undistributed reserves as a ratio of life-insurance provisions.

² The equity reserves are the excess equity capital as a ratio of life-insurance provisions.

PENSION COMPANIES' RISKS

Box 8

The assets of a pension company primarily comprise properties, shares and bonds. These assets involve market and credit risks. Pension companies' investments covering commitments to policyholders are subject to investment rules which lay down quantitative limits to investments in the various types of assets. In addition, congruence rules have been laid down to set limits to the mismatch between the currency denominations of the assets and liabilities. In connection with the introduction of the flexible share ceiling in 2001 two risk scenarios were set up which are used to illustrate whether the relationship between the investment risk and capital provides adequate security that the pension companies at any time will be able to fulfil their commitments to policyholders, cf. Box 9.

The pension companies' risks in terms of liabilities partly comprise the risk that the insurance assumptions of disability and mortality do not accord with the actual disability rates and mortality among policyholders. For instance, extra provisions must be made for old-age pensions if the life expectancy of policyholders is longer than first assumed. To this should be added the interest-rate risk arising when the pension companies guarantee a fixed nominal interest rate to policyholders many years into the future. The long-term nature of these guarantees entails that the valuation of the life-insurance provisions will be sensitive to changes in the level of interest rates.

with adequate information on their rights and obligations. The Information Order relates to the individual pension agreement, but not to the general framework under which the pension companies must operate.

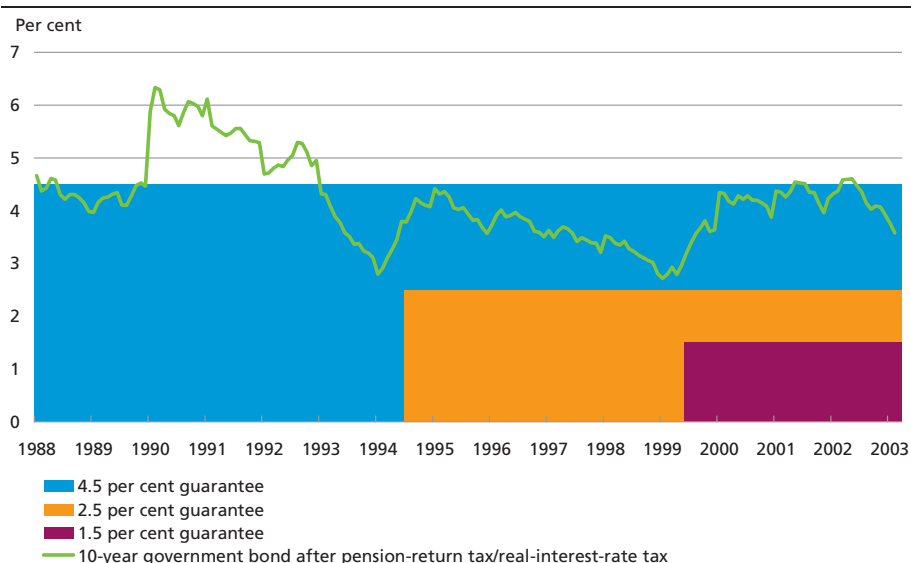
Guaranteed interest rate and interest-rate risk

In connection with the determination of the common tariff in 1982, the maximum guaranteed rate of interest after tax (the maximum technical interest rate), which the pension companies may apply to calculating pension and insurance benefits, was agreed at 4.5 per cent.¹ Until mid-1994 the pension companies applied a maximum technical interest rate of 4.5 per cent. It was then lowered by the Danish Financial Supervisory Authority to 2.5 per cent. In 1999 the maximum technical interest rate was reduced further to 1.5 per cent. The maximum technical interest rate applies throughout the lifetime of the pension scheme, so that the agreements established up to mid-1994 still yield a guaranteed rate of interest of 4.5 per cent. These are maximum guaranteed rates of interest, and the pension companies have been at liberty to create pension schemes based on lower guaranteed rates of interest, or without any guarantees at all. Chart 47 illustrates the development in the maximum technical interest rates compared to the average yield to maturity on a 10-year government bond after the tax on pension returns.

¹ See Charlotte Møller, *Tilsynet med risikostyring i livsforsikringsselskaber og pensionskasser*, (Supervision of risk management in life-insurance companies and pension funds – in Danish), *Finans/Invest* 8/01.

MAXIMUM TECHNICAL INTEREST RATE AND YIELD TO MATURITY ON A 10-YEAR GOVERNMENT BOND AFTER PENSION-RETURN TAX/REAL-INTEREST-RATE TAX, 1988-2003

Chart 47



Note: The Act on Taxation of Pension Returns replaced the Real-Interest-Tax Act as from 2000. The maximum basic returns are shown after deduction of expense and contingency loading, which is typically 0.5 percentage point.
Source: The Danish Financial Supervisory Authority, the Ministry of Taxation and Danmarks Nationalbank.

As the Chart shows, the yield to maturity on 10-year government bonds, which illustrates the risk-free yield, has not been sufficient to cover the pension companies' guarantees of 4.5 per cent during much of the period since 1988¹. The falling level of interest rates during this period has furthermore enhanced the need for further provisions for commitments. Together with the development in the stock markets in recent years this has made it necessary for the pension companies to draw on their reserves and equity capital.

The reduction of the maximum technical interest rate has entailed that many pension companies have pension schemes with different guaranteed rates of interest. Differences in the guaranteed rates of interest may lead to conflicts of interest between the different groups of policyholders. Those with low guaranteed interest rates may in principle engage in investments at a higher risk than policyholders with high guaranteed interest rates.² In a situation where market yields are relatively low, the high guarantees will stimulate investment in bonds rather than shares which are subject to a greater risk, in order to ensure that the guarantee obligations are still met.

¹ The actual yield to maturity after tax has been higher in the pension companies, e.g. due to the transitional deduction introduced in connection with the real-interest-rate tax.

² Under the contribution principle, systematic redistribution involving considerable amounts must not take place between insurance policies, cf. the Order on the contribution principle of 30 January 2003.

It is estimated that around 2/3 of the pension companies' commitments are based on the high maximum technical interest rate of 4.5 per cent. The volume in pension schemes based on guarantees of 4.5 per cent is still increasing as a result of the accrual of interest and current payments. The level of interest rates was considerably higher in the early 1980s than is the case today. The guaranteed rate of interest was far below the level of interest rates and thus probably functioned more as a basis for calculation to illustrate the development in policyholders' savings, and in connection with the pension companies' internal distribution. However, the development in the level of interest rates and in tax rules has made fulfilling the guarantees a greater challenge to the pension companies. So providing guarantees so far into the future is not unproblematic.

The increased focus on the risks to the pension companies, as well as the market development since 2000, have led the pension companies to launch a number of initiatives to hedge their risks. On the asset side, stock portfolios have been reduced in order to limit losses from further price drops and create greater symmetry between assets and liabilities. However, the pension companies' commitments are more sensitive to falling interest rates than bonds. Capital gains on the bonds therefore cannot cover the increased need for provisions for commitments. The interest-rate risk thus cannot be hedged solely by investing in bonds, due to the duration mismatch.

In recent years many pension companies have hedged all or part of the interest-rate risk via financial derivatives. Information on the use of financial derivatives varies greatly in the accounts presented, so that there is no clear picture of its scale. It would be natural to present clear and transparent information in financial statements on the scale of hedging via financial derivatives. Several pension companies also use financial derivatives to hedge other types of risk, e.g. the risk of falling stock prices and exchange-rate fluctuations.

Some pension companies have considered dividing their insurance portfolios into policy blocks based on the size of the guarantees provided. This would make it possible to draw up an investment policy for each policy block that matched the guarantees given.

Moreover, several pension companies have introduced conditional crediting of the interest, which may be revoked if *inter alia* the return on investment falls short of expectations. On the one hand, conditional crediting of interest can help to ensure appropriate distribution between generations. On the other hand, the use of conditional crediting makes it difficult for policyholders to comprehend what has actually been credited.

SIMPLIFIED BALANCE-SHEET SET-UP FOR PENSION COMPANIES

Table 4

ASSETS	LIABILITIES
Land and buildings	Equity capital
Bonds	Collective bonus potential
Shares	Life-insurance provisions
	Guaranteed benefits
	Bonus potential related to future premiums
	Bonus potential related to benefits on premium-free policies

The aforementioned initiatives will help the pension companies to fulfil the guarantee commitments. The risk in relation to the guarantees provided can hereby be minimised, but in general the pension companies have only limited opportunities to amend the terms of existing pension schemes.

For new pension schemes, however, there is greater scope for development, and several pension companies have already introduced new pension products such as pension schemes based on zero interest guarantees or unit-link schemes. Overall, the new schemes are deemed to give the pension companies greater room for manoeuvre.

Accounts at market value and key ratios

As from 1 January 2002 the pension companies could present their accounts on the basis of market values. Since 1 January 2003 this has been compulsory. During 2002 a number of pension companies took advantage of this opportunity, and the first annual accounts based on market values were published in the spring of 2003. The key items of the balance sheets of the pension companies are presented in simplified form in Table 4.

On the asset side the new rules entail that, in future, bonds must be stated at market value. Valuation of bonds at market value does not entail problems. Other types of assets, e.g. land and buildings and stocks, have already been stated at market value.

Similarly, the liabilities, including insurance provisions, must be measured at market value. An innovation is that life-insurance provisions are now split into three sub-items: guaranteed benefits, bonus potential related to future premiums, and bonus potential related to benefits on premium-free policies. Guaranteed benefits comprise the commitments to fulfil payments guaranteed to policyholders. The bonus potential related to future premiums relates to the future premiums, and the bonus potential related to benefits on premium-free policies relates to premiums which have already been paid up. In simplified terms, the relation between the three sub-items under life-insurance provisions can

be described as follows: if the discount rate is equal to the guaranteed rate of interest, the bonus potentials will equal zero, and the guaranteed benefits will equal the life-insurance provisions. If the discount rate is greater than the guaranteed rate of interest, there will be bonus potentials as a bonus potential related to future premiums and/or a bonus potential related to benefits on premium-free policies. The distribution between bonus potential related to future premiums and bonus potential related to benefits on premium-free policies depends on when the pension scheme was established, among other things.

The bonus potential related to benefits on premium-free policies is now included as an element in the pension companies' reserves and may be used to offset losses on assets, should the collective bonus potential be insufficient to cover the policyholders' share of any losses. The value of the guaranteed benefits will be affected by ongoing fluctuations in interest rates. If interest rates drop, the value of the guaranteed benefits will increase, and the bonus potential related to benefits on premium-free policies – and thereby the ability to withstand losses on assets – will decline, and vice versa if interest rates increase.

Collective bonus potential is the policyholders' collective undistributed reserves against fluctuations in the value of the assets and negative development in insurance risks and costs. If the collective bonus potential exceeds what is deemed necessary as a provision against unfavourable developments, distribution must take place to policyholders on an individual basis.

Pension companies' accounts at market value reflect a more true and fair picture of the economic risks faced by pension companies. Furthermore, the breakdown of the life-insurance provisions provides a clearer picture of the pension company's risk profile than previously. For instance, a pension scheme with a low guaranteed rate of interest will have a larger bonus potential related to benefits on premium-free policies than an equivalent pension scheme with a higher guaranteed rate of interest. The market value statement will disclose the difference between the risk profiles of the two pension schemes. Against this background, accounts based on market values are more transparent than the previously presented accounts. The introduction of the bonus potential related to benefits on premium-free policies has also meant that many pension companies have gained extra reserves against losses, created via the technical breakdown of life-insurance provisions, and thus not by increasing the capital base. The extra reserves will mean that a pension company will experience problems later rather than sooner, but the reserves do not remove the underlying risks. On the other hand, there is no doubt that accounts based on market values will show greater fluc-

tuations, which will increase the demands on reserves and capital in the pension companies.

As stated above, the return on equity is not necessarily residually determined, as is the case for all other types of company. If the return on equity is not at the level determined in the pension company's profit policy, owing to a shortfall in realised results, the required return on the equity capital may be booked to a "shadow account". The shadow account expresses the equity capital's claim on the future positive realised results that exceed the prescribed return stated in the pension company's profit policy. The shadow account is not stated in the pension companies' balance sheet, although the size of the amount expected to be allocated to the equity capital at a later date must be stated. Most pension companies operate with shadow accounts. The use of shadow accounts means that the return on equity over several years is not affected by low realised results in single years. The shadow account will thereby contribute to smoothing the effects of market fluctuations, irrespective of the chosen profit policy. On the other hand, the use of shadow accounts reduces the transparency of the pension companies' annual accounts, since the equity-capital requirements are not stated in the balance sheet.

In addition to the accounts, the pension companies publish a number of key ratios that are calculated on a standardised basis. The key ratios were introduced in 1995 and have helped to give policyholders a better insight into yields, costs and consolidation issues in the pension companies. In connection with the transition to market values, only minor adjustments were made to the key ratios, but a committee is currently working on an actual revision of the key-ratio system for pension companies, including setting up key ratios for the return on equity and accrued returns to policyholders. It is believed that new key ratios will increase transparency and the basis for comparisons between pension companies.

Risk scenarios

In 2001 the flexible share ceiling took effect. This means that the pension companies may place up to 70 per cent of the assets covering their commitments to policyholders in shares and non-gilt-edged assets. In connection with the introduction of the flexible share ceiling it was made clear that the pension companies must ensure that their investments do not jeopardise their commitments to policyholders at any time. When assessing the investment risks of pension companies in relation to capital and commitments to policyholders, two simple risk scenarios are applied, popularly known as the amber and red lights, cf. Box 9, which also includes a tentative calculation of the effect of the risk scenarios.

The use of risk scenarios has enhanced the Danish Financial Supervisory Authority's opportunities to monitor a pension company and intervene at an earlier stage, before any problems develop into an actual solvency crisis. There is no requirement for the pension companies to publish the effects of the red and amber risk scenarios. A few pension companies have, however, begun to publish this information on a regular basis, and it is believed that precisely this type of risk information can help to increase transparency and thereby give policyholders a better insight into the robustness of the pension companies.

CALCULATED RISK SCENARIOS	Box 9
<p>Risk scenarios</p> <p>Risk scenarios are aimed to illustrate whether there is an appropriate relationship between the pension companies' investment risks, capital and commitments. The risk scenarios are popularly known as traffic lights, one being amber, the other red.</p> <p>The amber scenario assumes a change in interest rates by 1 percentage point in the direction entailing the highest losses; a fall in share prices by 30 per cent; a fall in property prices by 12 per cent; and losses in connection with credit, counterparty and exchange-rate risks. The red scenario assumes a change in interest rates by 0.7 percentage point in the direction entailing the highest losses; a fall in share prices by 12 per cent; a fall in property prices by 8 per cent; and losses in connection with credit, counterparty and exchange-rate risks.</p> <p>It is sought to calculate the effects of the individual risk factors in the risk scenarios for the pension companies which have presented their accounts, in order to indicate how the robustness of the pension companies in general developed from 2001 to 2002. It should be noted that the calculation does not take account of the pension companies' hedging of risks via financial derivatives, since the extent of hedging is not stated on a uniform basis in the accounts. Most pension companies use financial derivatives to hedge risks. The assumptions entail that the risk scenarios will not generally affect the pension companies as severely as the calculation shows, provided that the market develops as assumed.</p> <p>Due to the assumptions, no clear and unambiguous conclusions can be drawn, but it is estimated that the calculations give an indication of development trends in capital and risks of the pension companies.</p> <p>According to the calculations, the pension companies overall were unable to handle the amber risk scenario at the end of 2001, since the overall risk in the amber scenario exceeded the total financial buffer. At end-2002 the calculations show that the pension companies were able to handle both the amber and the red risk scenario. A key reason for the pension companies appearing more robust at end-2002 is that they have acquired an extra buffer, i.e. bonus potential related to benefits on premium-free policies. The Table also illustrates that the pension companies' reduction of their share portfolios has significantly lowered the risk of losses as a result of falling share prices. In addition it can be seen that the collective bonus potential was virtually halved between 2001 and 2002, which affects the future potential for bonus.</p> <p style="text-align: right;"><i>Continued</i></p>	

CONTINUED

Box 9

**CALCULATED EFFECTS OF THE AMBER AND RED RISK SCENARIOS AND
THE OVERALL FINANCIAL BUFFER, END-2001 AND END-2002**

Kr. billion	2001		2002	
<i>Risk scenario</i>	Amber	Red	Amber	Red
Interest-rate risk – net	47	33	47	33
Fall in share prices	48	19	26	10
Fall in property prices	6	4	7	4
Credit and exchange-rate risks	3	3	3	3
Total risk	104	59	83	50
Adjusted capital base	49	49	44	44
Collective bonus potential	26	26	14	14
Bonus potential related to benefits on premium-free policies	0	0	41	41
Total financial buffer	75	75	99	99

Sources: Annual accounts.

calculation assumptions

The adjusted capital base is calculated as the capital base less the solvency-margin requirement after deduction of 3 per cent of life-insurance provisions. The distribution of losses between capital base, collective bonus potential and bonus potential related to benefits on premium-free policies is not taken into account.

The calculations of the effects on respectively the amber and red risk scenarios are based on the following assumptions:

- Hedging via financial instruments is not taken into account.
- Changes in the value of the tax asset, if present, are not taken into account.
- Calculation of interest-rate risk is based on life insurance provisions.
- The duration of the provisions is assumed to be 12.
- The duration of the entire bond portfolio is assumed to be 5, and convexity is not taken into account.
- The calculations operate only with falling interest rates.
- 50 per cent of the bond portfolio is assumed to entail credit risks.
- Counterparty risk is not taken into account.

The exchange-rate risk is assumed to be distributed at 75 per cent and 25 per cent of holdings in foreign currencies in EUR and USD respectively.

Cross-Border Groups

The financial sector is developing towards increasingly large units crossing traditional sector divides and national borders. This makes greater demands of the managements of the groups in question and of the authorities in the relevant countries, including cooperation between the authorities.

Legislation in this area, including EU legislation, determines the distribution of management responsibility within a group and within the authorities, depending on the corporate structure chosen. The distribution of responsibility is an important element of the regulation of a financial group, and thereby also of ensuring financial stability.

During the last 15 years, the financial sector in Denmark has been characterised by the formation of increasingly large groups via mergers and acquisitions. In the banking area, the five largest banking institutions now have a market share of 81 per cent, against 55 per cent in 1989. Moreover, the mergers have crossed the traditional sector divides, and today the large banking groups also own e.g. mortgage-credit institutes and insurance companies. There have also been a number of mergers and acquisitions across national borders. Particularly in the years up to and after the millennium rollover, focus has been on the creation of a pan-Nordic banking market.

The tendency towards larger units and cross-border activities within the financial sector is also seen in most other EU member states and in the Nordic region. The background to this development has been the deregulation of financial markets and the opportunity and right to engage in cross-border activities within the EU/EEA. There may be many reasons for this development, but overall it is an indication of enhanced competition between the various segments, which increasingly offer services to the same customers. Moreover, synergies can be achieved in connection with the development of various financial products.

Financial groups crossing sector divides and national borders require enhanced regulation and supervision. Regulation must allow the groups to conduct their business and achieve the potential economies of scale. On the other hand, the supervisory authorities need to have an overview of the groups, including the distribution of risks within them. This makes great demands of cooperation between authorities across national borders.

MERGERS AND ACQUISITIONS AMONG FINANCIAL ENTERPRISES IN THE EU
AND THE NORDIC REGION 1997-2002

Table 5

Number of transactions	1997	1998	1999	2000	2001	2002
<i>All.....</i>	56	102	80	153	181	166
<i>National</i>						
Involving at least one banking institution	13	43	34	58	54	41
Of which cross-sector.....	6	9	11	20	22	17
<i>Across national borders</i>						
Involving at least one banking institution	9	10	12	22	17	11
Of which cross-sector	7	5	4	13	10	9

Note: Transactions comprise mergers and acquisitions of capital interests. Mergers and acquisitions are included in the individual years on the basis of the time of announcement of the transaction. Mergers and acquisitions across sectors include transactions where one party already conducts activities across financial sectors.

Source: Zephyr, Bureau van Dijk.

The managements of cross-border groups also face more stringent requirements. The most appropriate course to take from a business point of view must also be in compliance with the legislation and the requirements of the authorities in the individual countries.

Mergers and acquisitions within the EU

Table 5 shows the number of mergers and acquisitions within the EU and the Nordic region during the last six years. The numbers are clearly rising.

The consolidation in the banking sector has typically been actual bank mergers, and has primarily taken place at national level. More than 70 per cent of the mergers and acquisitions in the 1990s that involved banking institutions within the EU took place from 1998 onwards.

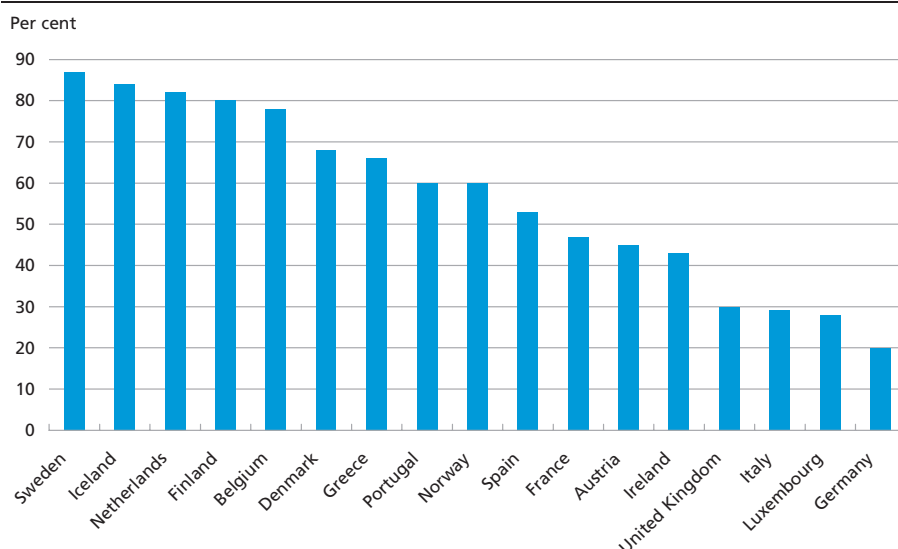
Mergers and acquisitions in the financial sector are often motivated by economies of scale and the economies of scope from integrating different business areas.

The potential economies of scale that can be achieved via mergers of banking institutions within the same country appear to some extent to have been exhausted. This particularly applies to the largest banking institutions, cf. the high concentration in a number of EU member states, cf. Chart 48.

Economies of scale across national borders e.g. include merging shared functions (such as capital and risk management) and development and operation of information technology and business concepts on a common platform (e.g. e-banking). There are naturally special challenges related to working across different languages, etc., but IT advances en-

THE FIVE LARGEST CREDIT INSTITUTIONS' SHARE OF THE TOTAL ASSETS,
2001

Chart 48



Note: The measure of the assets of the five largest credit institutions as a ratio of the total assets of credit institutions. The measure may differ from the same values compiled on the basis of banking institutions. In Denmark, credit institutions include banking institutions, as well as mortgage-credit institutes and other specialised credit institutions.

Source: ECB and national central banks.

tail that many of the banking institutions' systems can operate and be expanded flexibly across language barriers.

Mergers and acquisitions across national borders are also a way of diversifying risk, while the business case for setting up across national borders may be based on a need to follow customers that move abroad as industry and commerce are internationalised, as well as the desire for broad regional representation on the part of customers in third countries.

Finally, the merger activities across financial sectors indicate that the boundaries between the various financial services are becoming eroded.

Main principles behind the regulation of financial enterprises

Financial enterprises have traditionally been subject to supervision by the authorities and to extensive legislation. For insurance companies, this regulation aims to safeguard the policyholder's opportunity for a claim to be covered if an insurance event occurs. For banking institutions, the primary consideration is the depositors, who must be certain that the funds they have entrusted to the banking institutions are still at their disposal. Borrowers also have an interest in the continued operation of the banking institutions. If their loans are terminated prema-

turely owing to e.g. the compulsory liquidation of a banking institution, it can be difficult at short notice to find another source of financing without incurring considerable costs.

Regulation helps to ensure financial stability. Problems in one financial enterprise may rub off on other financial enterprises, and in the long term on the entire financial sector, which again may have a negative effect on the economy.

Regulation of financial enterprises is based on three pillars. Firstly, limits in the form of capital requirements have been set to the institutions' liabilities. Secondly, limitations have been set concerning the opportunity to take on risks on the asset side via placement rules. Finally, the supervisory authorities may impose sanctions on the institutions in the event of non-compliance with the rules, and in extreme cases they may in practice assume control of an institution.

The combination of capital requirements, placement rules and change of control to the supervisory authority in the event of violation of the statutory rules applies to banking institutions, investment companies and insurance companies alike. The activities of the individual sectors also have various special characteristics, and consequently regulation also differs in these respects. The banking institutions' primary task is to assume credit risks, that of the investment companies is to take on market risks, while the insurance companies' are to accept insurance risks. The capital requirements laid down for the individual types of institutions thus reflect the different types of risk.

When a financial enterprise forms part of a conglomerate, i.e. a group comprising both banking and insurance activities, it is important to ensure that the creation of the conglomerate does not lessen the effect of the rules governing the individual sectors and thereby the individual companies, or otherwise create new problems. A financial enterprise that is part of a financial conglomerate may, in addition to the ordinary risks in financial enterprises, also be exposed to risks resulting from the group affiliation, cf. Box 10.

Risks in relation to groups across national borders are fundamentally the same as for groups in the individual countries. The existence of cross-border activities will, however, *per se* increase the degree of complexity and require cooperation between authorities in different countries.

Regulation of financial groups and conglomerates within the EU

The framework for cross-border financial activities is chiefly laid down by EU regulation. The main objective is the single market for financial services, which is to ensure that foreign financial enterprises are not discriminated against in the national markets. Within the EU, as in na-

GROUP RISKS

Box 10

Multiple gearing: Risks relating to simultaneous use of the same capital to meet capital requirements in several companies within a group.

Intra-group transactions: The possibility of transferring funds between companies in a group, where prices and terms do not correspond to market conditions.

Lack of transparency: Risks resulting from the fact that complex group structures can impede assessment of the financial position of the group.

Contamination: Risk that problems in one entity within the group spread to other financial corporations subject to supervision within the same group.

Independence of the companies: Each financial corporation subject to supervision within a group may incur a risk that it would not otherwise have taken on, as a consequence of the parent/group's influence on company decisions.

tional legislation, the regulation of financial enterprises takes the individual financial company as its starting point. It is not possible for the same legal entity to conduct both banking and insurance activities. At EU level these enterprises are regulated separately by respectively the insurance¹ and banking² directives. In addition, banking groups are regulated by a directive on the supervision of credit institutions on a consolidated basis³, and insurance groups by the insurance group directive⁴.

The insurance group directive enables the supervisory authority to perform supplementary supervision of a company forming part of a group, e.g. across national borders. The supplementary supervision mainly comprises the calculation of an adjusted solvency situation, which is, *inter alia*, to prevent multiple gearing, cf. Box 10, as well as receiving information from the other companies in the group.

The directive on the supervision of credit institutions on a consolidated basis concerns supervision of groups comprising several credit institutions, including those transcending national borders. The competent supervisory authority is that of the parent company if the latter is a credit institution. This supervisory authority is responsible for the consolidated supervision and must, for the purposes of supervision, require full consolidation of the group. The following must be stated/calculated on a consolidated basis: solvency, adequacy of own funds to cover market risks, and control of large exposures. It must also be ensured that there are adequate internal control mechanisms for the production of any data and information which would be relevant for the purposes of supervision on a consolidated basis.

¹ Directives 92/49/EEC and 92/96/EEC.

² Directive 89/646/EEC.

³ Directive 92/30/EEC.

⁴ Directive 98/78/EEC.

As regards mixed groups, conglomerates, the conglomerates directive was adopted in 2002. It aims at ensuring uniform competition terms for different types of financial groups by imposing a number of obligations which transcend sector divides and national borders. It is not an actual consolidation directive in the same way as the credit institution directive, since the institution responsible for the consolidated supervision is not defined. Instead, the directive operates with a coordinator who is to coordinate supervisory activities between the authorities involved. The coordination primarily involves compiling information from the entire conglomerate. The directive aims to take into account the problems outlined in Box 10, since simultaneous use of the same capital in several entities of the conglomerate (multiple gearing) is not possible. In addition, the solvency position must be calculated at the level of the conglomerate, and intra-group transactions and risk concentration are regulated. To counteract lack of transparency in the conglomerate there are requirements of risk management, assessment of the fit and proper character of the management, and a requirement of close collaboration between the supervisory authorities. However, the directive does not require harmonisation of the actual supervisory provisions, or convergence of supervisory activities. It seeks solely to take account of the "extra" risks that may arise as a result of the formation of the conglomerate, and it is specified how the supervision should be coordinated. The starting point is thus still the individual company and the relevant competent authority.

The individual company subject to supervision

A licence to conduct financial activities is given to a legal entity that must independently comply with the supervisory provisions. This also applies to legal entities within a group or a conglomerate, i.e. subsidiaries. It is thus the management of each subsidiary within a group that is responsible for the operations it conducts. This responsibility cannot be transferred to the parent company. The granting of licences to and regulation of the individual financial enterprises within a group are based on the individual company being able to function independently of the group. The supplementary regulation of groups and conglomerates is thus intended to shield the individual company against "misuse" by the rest of the group/conglomerate. In this connection it is important that the management of each company is able to make independent decisions that are in the interest of that company. These issues are particularly relevant in relation to cross-border groups.

Financial groups are often managed on the basis of the financial structures across the legal entities in the group, e.g. with a view to benefiting

from economies of scale and joint operations. This practice may involve a number of special risks to the extent that the individual company does not have the required degree of independence. Several of the provisions in financial legislation that are to prevent or minimise the risk of "contamination" between the companies in a group or conglomerate are based on a "firewall" principle. This means that in the event of a crisis it must be possible to seal off the individual enterprise subject to supervision from the other entities in the group. A prerequisite is that even in a crisis the enterprise can still operate independently. The supervisory authorities must thus ensure that the core functions for operating this enterprise are present within a reasonable time horizon. For instance, today it may be impossible to operate a banking institution without well-functioning IT systems.

Branches

If a financial enterprise operates with a branch structure, regulation and supervision will take place in its home country. A branch structure is only possible within the same sector, i.e. a banking institution can conduct banking activities via a branch, but not insurance activities. Home-country supervision means that the supervision of a banking institution's activities, including supervision of its financial soundness and solvency position, is the responsibility of the authority in the country where the banking institution is licensed. There can thus be no conflict between the commercial and legal structures, and activities can be placed as deemed expedient. EU regulation is based on home-country supervision, and member states are obliged to acknowledge that a banking institution that is licensed in its home country can conduct activities in the host country.

Where a branch is as large as or larger than the home-country entity, or a branch in an individual host country is so large that it has systemic importance and could affect the financial stability of the host country, very close collaboration should be established between the authorities across national borders, irrespective of the home-country supervision.

The Capital Structure of Banking Institutions

Banking institutions can finance their assets in various ways. The costs of the various types of financing reflect, inter alia, the risk that depositors and investors incur. The largest banking institutions generally have a larger ratio of external financing than the smaller banking institutions. This may indicate that the largest banking institutions apply more sophisticated management tools in connection with capital allocation. New capital-adequacy rules contribute to greater consistency between the risks that banking institutions incur and the capital requirement.

Banking institutions differ from other companies in that they have the sole right to approach the general public to obtain deposits. Protection of depositors is an important reason for the public regulation of banking institutions, including capital adequacy requirements and the deposit guarantee scheme. So the risk incurred when making an ordinary deposit to a banking institution is moderate.

Banking institutions are subject to a requirement to hold a certain level of liable capital. Liable capital constitutes actual equity capital¹ (primarily share capital and reserves), but may also include external financing that has some of the characteristics of equity capital. This subordinate capital comprises external financing that in the event of compulsory liquidation² is not repaid until other debt has been settled. Consequently the distinction between equity capital and external financing is not as clear-cut for banking institutions as for other companies.

Banking institutions' financing costs

A banking institution's financing structure (capital structure) affects its financing costs, i.e. the size of the return required by the various types of capital contributors for placing funds with the banking institution. This required return depends on e.g. the maturity and the risk which the financing is deemed to involve.

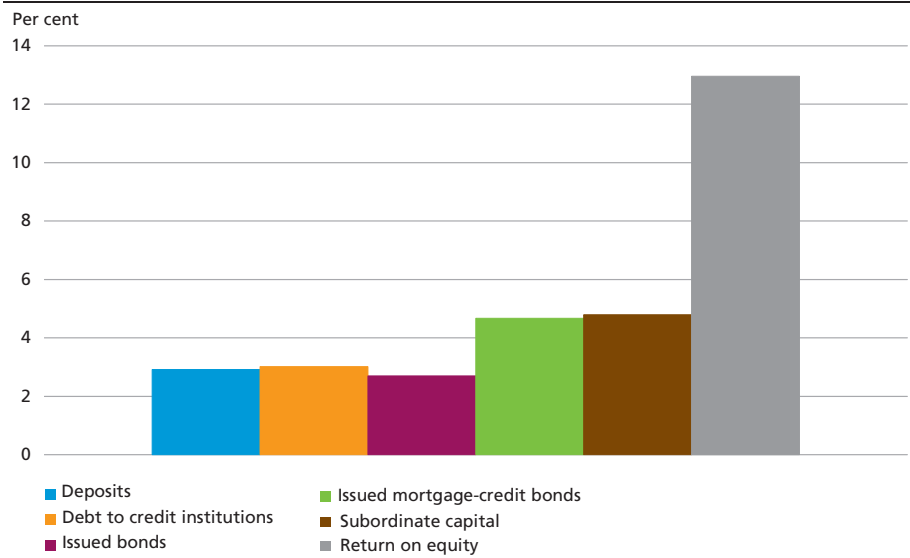
Chart 49 shows the average costs of the various types of financing for Danish banking institutions in 2002 and the return on equity.

¹ In this context equity capital is used synonymously with core capital, one of the capital elements included in the compilation of credit institutions' capital adequacy.

² See Birgitte Bundgaard and Suzanne Hyldeahl, Structure of the Banking institutions' Capital – New Statutory Requirements and Opportunities, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 2002.

AVERAGE COSTS OF VARIOUS TYPES OF FINANCING AND RETURN ON EQUITY IN 2002

Chart 49



Note: Financing costs are calculated as the interest expenditure for the year as a ratio of the average of holdings at the beginning and end of the year. The return on equity is calculated as the profit for the year after tax as a ratio of the average of equity capital at the beginning and end of the year. Debt to other credit institutions also includes debt to central banks and debt certificates that can be refinanced in central banks.

Source: Annual accounts.

There seems to be a degree of correlation between the risk incurred by capital contributors, i.e. maturity and debt ranking in the event of compulsory liquidation, and the return achieved.

The costs of deposits, debt to other credit institutions and issued bonds are relatively low. The small variations in the Chart are, *inter alia*, attributable to the calculation method, which does not take into account balance-sheet fluctuations during the year, and the low level of interest rates. Among the various types of financing, deposits involve the smallest risk. Deposits are to a large extent covered by the deposit guarantee, and deposits can be withdrawn without or at short notice. Debt to other credit institutions typically comprises short-term loans. Issued bonds are also primarily short-term loans based on negotiable securities. The calculated spread of interest rates between debt to other credit institutions and issued bonds may be related to the fact that issued bonds are negotiable, and that investors therefore pay a liquidity premium. However, it may also reflect that bonds are not issued at par, which the calculation does not take into account.

Mortgage-credit lending is subject to the balance principle, and the interest expenditure on issued mortgage-credit bonds therefore more or

less corresponds to the interest income from mortgage-credit lending on the asset side.

Subordinate capital is a sort of hybrid between external financing and equity capital, and the interest on this type of capital lies between the two. Subordinate capital typically has a longer maturity than other external financing, except for mortgage-credit bonds, and in the event of compulsory liquidation ranks after all other external financing. So ordinary deposits and other non-subordinate external financing must be fully covered before payment can be made to contributors of subordinate capital.

Equity capital gained a higher return than the other types of financing, one reason being that equity capital bears the operational risk. The returns required by shareholders will increase with the proportion of external financing, since a higher external financing ratio means that higher fixed interest costs is to be paid before any return on equity. The relatively high return apparent from Chart 49 should be interpreted with caution, since it only relates to a single year. Return on equity is residual and it will therefore fluctuate more than the costs of other financing sources.

Banking institutions' capital structure

The costs of the various types of financing affect how banking institutions are financed. The capital structures of three categories of banking institutions are shown in Table 6. The categories are described in Box 11.

The equity ratio is lowest for the largest banking institutions and highest for the smaller banking institutions. This may indicate that the largest banking institutions apply more sophisticated management tools in connection with capital allocation, and that the large banking institutions are subject to greater shareholder pressure. Most of the small and medium-sized banking institutions apply ownership ceilings and/or limitations on voting rights, which can reduce shareholder pressure. In addition, small banking institutions often have a strong local base, and their shareholders focus not only on a high return on their shares, but also on e.g. the banking institution's role in the local community.

The largest banking institutions have the lowest ratio of deposits to total liabilities, while they have the highest ratio of issued bonds among the three categories of banking institutions. Debt to other credit institutions is used relatively most by the medium-sized banking institutions, while deposits are by far the most important source of financing for the small banking institutions. The small banking institutions have deposit surpluses, while the medium-sized and large banking institutions have deposit deficits.

THE BANKING INSTITUTIONS' BALANCE-SHEET STRUCTURE IN
RELATIVE TERMS AT YEAR-END 2002

Table 6

	Groups with mortgage-credit and banking activities on their balance sheets		Medium-sized banking institutions		Small banking institutions	
	Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
Receivables from credit institutions and demand deposits	14		10		15	
Bank lending	28		58		63	
Mortgage-credit lending	24		0		0	
Bonds and shares	23		25		18	
Other assets	11		7		4	
Equity capital		3		7		13
Subordinate capital		2		2		2
Debt to other credit institutions		20		27		11
Deposits		26		54		70
Issued bonds		6		1		0
Issued mortgage-credit bonds		29		0		0
Other liabilities		14		9		4

Note: Some items are estimated. Rounded to whole numbers. Debt to other credit institutions also comprises debt to central banks and debt certificates that can be refinanced at central banks.

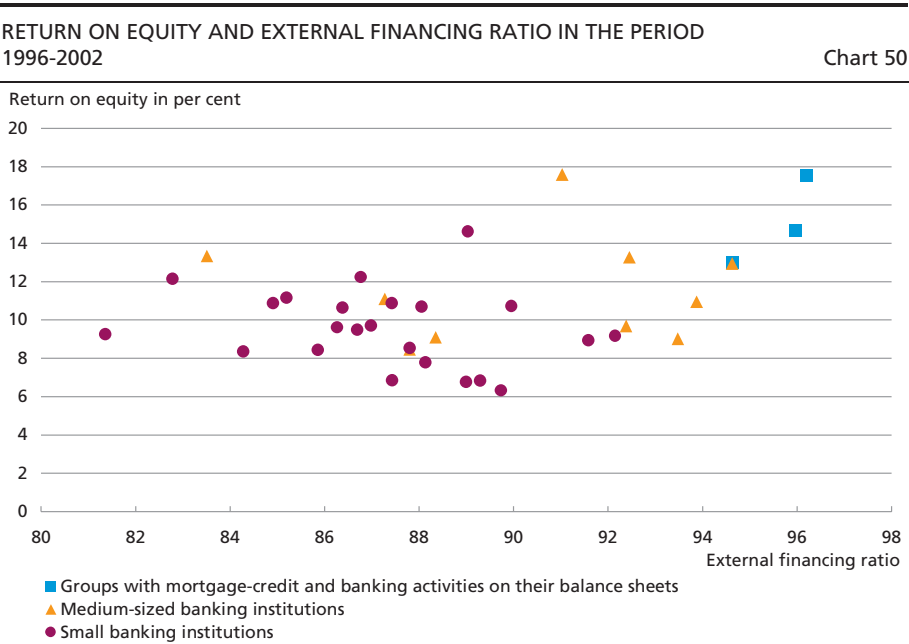
Sources: Annual accounts.

On the other hand, the financing structure also depends on the asset structure. This is, *inter alia*, a consequence of the statutory requirement that the liable capital must constitute at least 8 per cent of the risk-weighted assets (the assets in the table are not risk-weighted). The credit risk on the share of lending comprising mortgage-credit lending is small, so that requirements of economic capital are less stringent than for ordinary bank lending. The smallest banking institutions have the largest share of ordinary bank lending, and thereby the highest capital

BANKING INSTITUTIONS INCLUDED IN THE ANALYSIS

Box 11

The analysis operates with three categories of banking institutions: groups, comprising three Danish banking groups with both banking and mortgage-credit activities on their balance sheets; medium-sized banking institutions, comprising 10 large Danish banking institutions; and finally 23 smaller Danish banking institutions. This breakdown is not comparable to the breakdown in the chapter on the financial sector. It has been chosen as banking institutions with mortgage-credit activities have another balance-sheet structure than the other banking institutions. In addition, the size of a banking institution affects its balance-sheet structure. It should be noted that within each category there may be considerable differences between the individual banking institutions, and that the conclusions in the analysis are based on averages.



Note: The return on equity is calculated as the sum of the profits after tax for the individual years as a ratio of the sum of the average of equity capital at the beginning and end of each year.
Source: Annual accounts and BankScope.

requirement, all other things being equal, while the opposite is the case for the large groups that have a high ratio of mortgage-credit lending.

Chart 50 illustrates the relationship between the ratio of external financing to total liabilities and the return on equity, calculated as averages for the full period from 1996 to 2002 for the three categories of banking institutions.

For the large and medium-sized banking institutions the return on equity appears to increase with the ratio of external financing. This is not quite so pronounced in the case of the small banking institutions. Concerning the other types of financing, no equivalent correlation is seen, which reflects that equity investors run the risk of no return if the company is not in jeopardy.

Link between capital requirements and financial stability

If a banking institution is unable to meet its payment obligations, the whole banking sector may be affected. One banking institution may thus pose a risk to the entire financial system. The costs to an economy in the event of financial instability are very high, and this is why the authorities seek to ensure that the banking institutions have adequate capital.

When a banking institution grants a loan to a company, the company is in most cases monitored carefully by the banking institution, so that

the latter may intervene if the risk on the loan is assessed to be excessive. This external monitoring is weakened to a degree when the company to be financed is a banking institution. This is because a significant proportion of the financing is deposits. Deposits of up to kr. 300,000 are covered by a deposit guarantee, which limits the incentive to consider the robustness of the individual banking institution. It should, however, be noted that even if there were no deposit guarantee schemes this would not necessarily lead to external monitoring via depositors. Most depositors have limited knowledge of the banking institutions' business area, so it is difficult for them to assess the level of risk to which a banking institution is subject

Large banks are assessed by rating agencies, and capital structure is an important parameter of the assessment. All else being equal, large equity capital entails a high rating, and thereby low borrowing costs. However, as stated, high equity capital may entail high overall financing costs, since equity capital is the most expensive source of financing. Rating is the systematic external monitoring of the banks, and thus helps to compensate for the possible lack of external monitoring by depositors. The authorities contribute, *inter alia*, to financial stability via legislation to ensure that the banking institutions have certain minimum capital. If a banking institution's capital base falls below the statutory requirement, the banking institution will lose its licence to operate. The capital reserves exceeding the capital requirement thus enable the banking institution to withstand unexpected losses. The purpose of the statutory capital requirement is, *inter alia*, to provide a degree of security that the equity capital does not become negative in the event of compulsory liquidation and thereby that the banking institution can be liquidated without losses to creditors, including the deposit guarantee scheme.

Under the statutory capital requirement, a banking institution's liable capital (equity capital and supplementary capital) must at all times constitute at least 8 per cent of the risk-weighted assets. The equity capital must be at least half the liable capital. It is difficult to determine the right level of the capital requirement. If the capital requirement is too low, it will not provide an adequate buffer, but if it is too high, it will impede the role of the banking institutions as providers of capital from depositors to borrowers. The 8-per-cent requirement is an international compromise taking both these considerations into account. The banking institutions themselves also have an interest in holding sufficient capital for any unexpected losses not to put the banking institution in jeopardy. In addition, a certain level of excess capital coverage may have a positive signal value.

The importance of new capital-adequacy rules

Work is underway to introduce new capital-adequacy rules for banking institutions, known as the Basle II rules¹. While the existing capital-adequacy rules since the mid-1990s have allowed banking institutions to apply their own models for calculating market risks, this has not been the case for the banking institutions' primary risk, credit risk. The aim of the new rules is for the capital requirement to be determined on the basis of the banking institutions' own knowledge of the credit risk on exposures, or external rating agencies' credit ratings. The minimum capital requirement for banking institutions will still be 8 per cent of the risk-weighted assets. The new capital-adequacy rules include capital requirements to cover operational risks, i.e. technical or human errors.

The proposed new capital-adequacy rules include market discipline as an important element. The aim is for banking institutions to provide the financial markets with more detailed information on risks, capital structure and capital adequacy, risk management, etc.

To a higher degree than the existing set of rules, the proposed new rules take account of financial innovation, modern risk-management techniques, and internal control procedures. The new capital-adequacy rules are structured so as to give the banking institutions an incentive to expand and improve their risk management. On the other hand, the capital adequacy requirement may be relaxed to a certain degree. The rules can therefore mean that the share of the equity capital is reduced for the banks that apply sophisticated risk-management methods, i.e. primarily the large banks. The underlying philosophy is that the banking institution itself has the best overview of the risk profile, and that this overview must be applied when determining the capital adequacy. In relation to financial stability the new capital-adequacy rules will bring more consistency between the risk incurred by the banking institutions and the compilation of risk-weighted assets, and thus the capital requirement.

The introduction of the new rules is not expected to have any significant effect on the capital structure of the Danish banking institutions.

¹ For an in-depth description of the principles underlying the new capital-adequacy rules, reference is made to Suzanne Hyldahl, *New Capital-Adequacy Rules for Banking institutions*, Danmarks Nationalbank, *Monetary Review*, 1st Quarter 2001.

CLS and Payment System Stability

With the introduction of the Danish krone in CLS, settlement risk in foreign-exchange transactions in Danish kroner can be reduced. CLS will increase the number of pay-ins over the settlement day for the settlement members, thereby increasing focus on liquidity management. In 2002 the automatic collateralisation agreement was expanded to include additional settlement purposes, in view of CLS among other factors. This has created the basis for more flexible liquidity management. The resulting degree of interdependence between the settlements is not assessed to have implications for the stability of the settlement structure. The access to sufficient liquidity at the right times is a precondition for a stable settlement structure. Stress testing and sensitivity analysis of the settlement structure show that in a situation where the automatic collateralisation agreement is not applicable, there is still access to ample liquidity. In general, there is also ample liquidity available at the level of individual banking institutions.

THE SIGNIFICANCE OF CLS TO FINANCIAL STABILITY

CLS (Continuous Linked Settlement) is an international foreign-exchange settlement system that offers settlement of foreign-exchange transactions in seven key currencies¹. With the introduction of CLS on 9 September 2002 credit risk in foreign-exchange transactions can be eliminated. CLS thereby entails that a significant settlement risk can be reduced considerably. It has long been possible to settle interbank payments, retail payments and securities transactions without any credit risk, while settlement of foreign-exchange transactions has traditionally been associated with a credit risk of the same magnitude as the trade². Given a daily average turnover of approximately USD 1,200 billion in the

¹ US dollars, Canadian dollars, Australian dollars, euro, Japanese yen, pounds sterling and Swiss francs.
² Foreign-exchange transactions are traditionally settled via the usual international payment channels. A trade of e.g. kroner against dollars entails a transfer of kroner from one party to the other, as well as a transfer of dollars in the opposite direction. The two legs of the trade are settled separately and independently of each other. The credit risk arises because one party to the trade may default after having received the bought currency, but not yet delivered the sold currency. Typically, exposures are significant in foreign-exchange transactions. However, the probability of losses is very small and compared to the traditional credit risk assumed by banks, where exposures are smaller, but the probability of losses greater, credit risk in settlement of foreign-exchange transactions can be seen as asymmetrical.

foreign-exchange market¹, CLS can potentially imply a significant contribution to financial stability.

The use of CLS has increased gradually, and in March 2003 an average of almost 34,000 trades were settled for a value of more than USD 400 billion per day. If the credit risk on foreign-exchange transactions is to be reduced, the system must be widely used. Obviously, the inclusion of new currencies is an important parameter. Moreover, it is of great importance that the many participants in the foreign-exchange market that are not direct settlement members in CLS will be connected as indirect settlement members in the settlement system². CLS estimates the transaction volume for the potential third party settlement members to be around three times the maximum transaction volume settled by third party settlement members via CLS.

The Danish krone is expected to be introduced in CLS during 2003, as are the Norwegian krone, the Swedish krona and the Singapore dollar.

Foreign-exchange settlement in CLS

Foreign-exchange transactions are settled in CLS when both parties to a transaction report their trading instructions to CLS. The instructions are then matched by CLS, after which the two sides of the transaction are settled simultaneously via the settlement members' accounts with CLS. In this way the traditional credit risk between the parties is eliminated.

Since foreign-exchange settlement takes place in CLS, the operational risk is concentrated. It is therefore vital that CLS cannot sustain losses and that the settlement to a great extent can take place, even if a settlement member fails to honour its pay-in obligations. CLS settlement is therefore subject to strict risk management to ensure that pay-ins to CLS always take place before pay-outs to settlement members. Hereby CLS avoids credit risk on the settlement members. The principles, including risk management in CLS settlement, are described in Box 12.

To ensure that settlements are completed, CLS has made an agreement with certain settlement members to provide extra liquidity should a settlement member fail to honour its payment obligations. In each currency CLS has concluded an agreement with at least 2-3 liquidity providers that in an emergency will assume the defaulting settlement member's pay-in obligation in CLS. In exchange, they will receive the defaulting settlement member's pay-outs. The risk assumed by the liquidity provider in this connection is limited, since all settlement members always have a positive position in CLS taken as a whole, cf. Box 12.

¹ BIS: Triennial Central Bank Survey of Foreign Exchange and Derivation Market Activity 2001.

² Only shareholders may participate directly in settlement via CLS. Others may participate indirectly via a direct participant.

THE PRINCIPLES OF CLS SETTLEMENT

Box 12

Pay-ins to CLS

Each settlement member has a multi-currency account at CLS with sub-accounts for each currency. On the basis of the reported trades CLS calculates the settlement members' net positions in the various currencies. The settlement members pay in foreign-exchange amounts to CLS by transferring amounts to CLS' central-bank account via the national RTGS systems. Pay-ins to this account are automatically credited to the settlement members' (sub)account at CLS.

Settlement of trades

Foreign-exchange transactions are settled by moving the traded currency between the relevant settlement members' CLS accounts. Foreign-exchange transactions are settled on a Payment-versus-Payment basis whereby the two sides of the trade are entered to CLS' books simultaneously. The settlement of a trade is only completed if the following risk management tests are met:

- A settlement member's net balance across currencies must always be positive or zero
- A settlement member's short position limit in a given currency may not exceed CLS' limit for that currency
- The sum of a settlement member's short position limit may not exceed a limit stipulated by CLS which reflects a settlement member's credit standing.

Pay-outs from CLS

CLS pays out currency to the settlement members by transferring amounts from its own central-bank account via the national RTGS systems to the relevant participant's central-bank account. At the same time the pay-out is debited to the settlement member's (sub)account at CLS. Pay-outs are subject to compliance with the aforementioned risk management tests.

Since pay-in and pay-out of currency to/from CLS take place in the national RTGS systems¹, the settlement depends on all RTGS systems being open at the same time across time zones. Against this background it has been decided that CLS settlement must be completed between the hours of 7.00 a.m. and 12.00 noon CET, which is late in the evening in Japan and Australia and early in the morning in the USA and Canada. Concentrating foreign-exchange settlement in CLS within this relatively short time implies great demands of the settlement members' ability to procure liquidity. For this reason liquidity-saving measures were an important factor in the design of the CLS system. A key aspect is that the settlement members pay in funds to CLS on a net basis, in numerous small

¹ RTGS systems are Real-Time Gross Settlement Systems. Danmarks Nationalbank's RTGS system, Kronos, is described in further detail in Thomas Angelius and Astrid Henneberg Pedersen, Danmarks Nationalbank's New Payment System, Kronos, Danmarks Nationalbank, *Monetary Review*, 1st Quarter 2002.

CLS SETTLEMENT CYCLE, CET	Box 13
<ul style="list-style-type: none">• 00.00: Deadline for reporting trades for settlement on the next day. CLS calculates the settlement members' net positions and a preliminary schedule of when CLS must receive the pay-ins• 6.00 a.m.: Deadline for conclusion of In/Out Swaps• 6.30 a.m.: Deadline for reporting trades for settlement on the same day (In/Out Swaps). CLS provides a revised schedule of the settlement members' net pay-ins before the deadlines at 8.00 a.m., 9.00 a.m., 10.00 a.m., 11.00 a.m. and 12.00 noon• 7.00 a.m.: The settlement process starts. Trades are settled as soon as there are funds in the participants' CLS accounts. It follows from the risk conditions that a trade may be settled no matter which currency the settlement member has paid in. Pay-outs to the settlement members take place on an ongoing basis subject to compliance with the risk management tests• 8.00 a.m.: First pay-in in all currencies• 9.00 a.m.: Second pay-in in all currencies. The settlement (booking) of the trades is to be completed. The pay-in schedules are calculated so as to leave sufficient funds in the participants' CLS accounts after the second pay-in for all trades to be settled in compliance with the three risk management tests. Once all trades are settled, the settlement members will have long positions in some currencies and short positions in others. As the settlement members pay in the remaining amounts, CLS will gradually be able to pay out the long positions without compromising the risk management tests• 10.00 a.m.: Third pay-in in European and US currencies. Last pay-in in Japanese yen and Australian dollars. The pay-out of yen and Australian dollars is to be completed• 11.00 a.m.: Fourth pay-in in European and US currencies• 12.00 noon: Last pay-in in European and US currencies. All remaining pay-outs are to be completed	

portions. Furthermore, the settlement members may trade on their positions in CLS by concluding In/Out Swaps¹ with each other. The CLS settlement cycle and the fixed pay-in schedules are described in Box 13.

CLS in the settlement day

The introduction of the Danish krone in CLS implies the inclusion of yet another settlement cycle in the Danish settlement day². Besides the bilateral RTGS payments there will thus be four systems for settlement of payments in Denmark; the Sumclearing (the retail payment system),

¹ For example, if a settlement member has accepted inappropriately large negative dollar positions in the CLS settlement, two reciprocal transactions in dollars are concluded with another CLS settlement member. One of the transactions (buying dollars) is settled via CLS, which reduces the net position in dollars. The other transaction is settled outside CLS in the traditional manner. The use of In/Out Swaps thus reintroduces a (small) part of the credit risk associated with foreign-exchange transactions.

² The settlement day follows the monetary-policy day and runs from 4.00 p.m. on the day before the value date to 3.30 p.m. on the value date.

settlements in VP (VP Securities Services), FUTOP settlement¹ and CLS settlement.

Individual large-value payments (RTGS payments) are completed on an ongoing basis in Danmarks Nationalbank's RTGS system, Kronos, whenever it is convenient for the settlement members within the system's opening hours from 8.00 a.m. to 3.30 p.m.

The Sumclearing and VP settlement systems are net settlement systems for the settlement of retail payments and securities transactions, respectively. The principle of net settlement is that all payments to and from a settlement member are netted. Settlement members subject to a net pay-in obligation transfer funds to the settlement, which is then completed, and pay-outs are made to the settlement members subject to net receipt of funds in the settlement process. In both the Sumclearing and the VP settlement systems the netting process takes place several times within each settlement day. The Sumclearing normally takes place as 2-3 overnight settlements, and possibly an extra settlement before noon (Sum1, Sum2, Extra1 and Extra2 respectively). Settlement of securities transactions in VP takes place in four settlement blocks (VP10, 20, 30 and 40), of which three are run in the evening and overnight and one before noon. VP's settlement of periodical payments (VP35)² is also processed before noon. When the Danish krone is introduced in CLS, there will be five additional pay-in deadlines between 8.00 a.m. and 12.00 noon, cf. Box 13. Chart 51 shows the schedule for the various settlements and pay-ins during the settlement day.

Several consecutive settlements with the same purpose both enhances efficiency and reduces settlement risk. The three VP settlement blocks for securities transactions run during the evening and overnight are examples, since they improve efficiency of international trading settlement by ensuring smoother traffic through the link to the international settlement system Euroclear. At the same time, the division into a number of settlements with the same purpose reduces both settlement risk and systemic risk, since processing a whole day's transactions does not depend on the completion of one particular settlement.

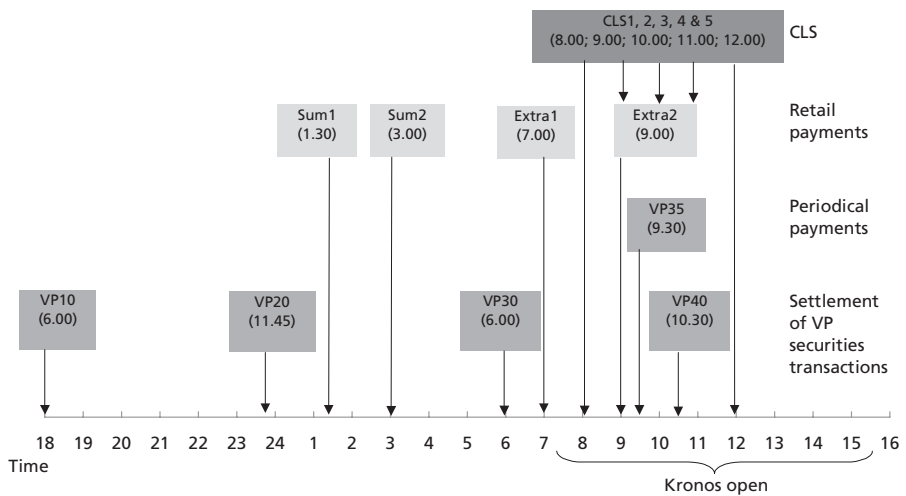
Stricter regime for the management of liquidity

The net amounts participants have to pay in every day for settlement purposes in Denmark are substantial. The current daily average settlement amounts to approximately kr. 17 billion, which is expected to increase to approximately kr. 23 billion when the Danish krone is introduced in CLS.

¹ The scale of FUTOP settlement is relatively limited, and is not included in the analysis in this chapter.
² Interest, repayments and dividend.

SETTLEMENTS OF DANISH KRONER DURING THE SETTLEMENT DAY

Chart 51



Note: Kronos' opening hours will begin at 7.00 a.m. when the Danish krone is introduced in CLS. There are other VP settlements such as VP05 (disbursement of yields on government bonds) and VP14 (subscription), but they are not included in the analysis.

The increased pay-in obligations and the more complicated settlement day will make greater demands of the settlement members' liquidity management. The participants pay in funds to the various settlements by transferring liquidity to special accounts at Danmarks Nationalbank. The settlement members can for this purpose use their current-account balances or the Scandinavian Cash Pool¹, or avail of collateralised intra-day overdrafts on their accounts at Danmarks Nationalbank. The collateral may be securities or certificates of deposit pledged to Danmarks Nationalbank or via the VP automatic collateralisation agreement system. The automatic collateralisation agreement is described in further detail in Box 14.

Fast and reliable mobilisation of the necessary liquidity is a prerequisite for a smooth settlement process. If a settlement member in e.g. the Sumclearing has not transferred sufficient funds to its settlement account, all of the settlement member's underlying retail transactions will be taken out of the system and postponed for later processing. The participant's insufficient liquidity thus also affects the other settlement members. As another example, if a CLS participant fails to pay in funds

¹ An automatic cross-border collateral system, Scandinavian Cash Pool (SCP), has been established to facilitate settlement members' access to liquidity primarily for CLS settlement. Under SCP, collateral provided to one Scandinavian central bank can be used at short notice as collateral for a loan raised at another Scandinavian central bank. SCP can be used to procure intra-day liquidity during Kronos' opening hours until 1.30 p.m. Loans raised under SCP are not included in this chapter's analyses.

THE AUTOMATIC COLLATERALISATION AGREEMENT

Box 14

The automatic collateralisation agreement may be used for intraday credit in Danmarks Nationalbank for settlement purposes. Settlement members requiring such loans provide collateral by pledging bonds registered at a special safekeeping account at VP to Danmarks Nationalbank. The amount pledged to Danmarks Nationalbank is for an amount equivalent to the loan. The automatic collateralisation agreement thus gives the settlement members the right to freely sell or mortgage securities in the safekeeping account for as long as there remain sufficient bonds to cover the pledge to Danmarks Nationalbank.

The automatic collateralisation agreement was originally developed for securities settlement and has the special characteristic that securities deals are to a certain degree self-collateralised since the value of the acquired assets may be used as collateral for the purchase in the very same settlement block. This ensures sufficient collateral at all times for settlement of deals via the automatic collateralisation agreement.

Since 18 November 2002 the settlement members have also been able to apply the automatic collateralisation agreement to loans for settlement of payments in the Sumclearing system and for periodical payments in VP. Once the Danish krone is introduced in CLS, the settlement members can also use the automatic collateralisation agreement as collateral for loans for settlement of foreign-exchange transactions via CLS

on time this may delay pay-out of the other currencies, to the detriment of the other participants. At worst, the RTGS systems in the Asian time zone may not be able to close on time.

CLS, the extended automatic collateralisation agreement and settlement risks

CLS settlement will require liquidity to be mobilised quickly, and for this reason among others the automatic collateralisation agreement, which previously applied solely to the settlement of securities transactions in VP, has been extended to include collateral for loans for CLS settlement, Sumclearing and periodical payments in VP. Viewed in isolation there is thus more liquidity available for each settlement. This reduces the settlement risk and allows for more flexible liquidity management.

The drawback of the extended automatic collateralisation agreement is that it creates potential interdependence between the settlement systems. If a settlement is not completed on schedule, collateral subject to the automatic collateralisation agreement may be tied to that settlement, and may not be available as expected for the subsequent settlements. The system has a number of inherent measures to offset the effect of these interdependences.

If the first two VP settlements for securities transactions are delayed, the automatic collateralisation agreement will initially not be available

for the Sumclearing. The payments of settlement members that for that reason have insufficient liquidity to complete the settlement will not be settled until the extra Sumclearing settlement at 9.00 a.m., cf. Chart 51. The settlement members may reduce this risk by making reservations for the Sumclearing under the automatic collateralisation agreement prior to the second settlement of securities transactions in VP.

If the Sumclearing is delayed, there is in principle a risk that the collateral in the pledged safekeeping account is unavailable when the participant is to raise liquidity for the CLS payments. This risk is eliminated by the system, as collateral reserved for the Sumclearing is released at a fixed time. In other words, the link between the two settlement systems can be broken and the provision of collateral for CLS settlement be given higher priority than provision of collateral for the Sumclearing.

Settlement members using the extended automatic collateralisation agreement may reserve parts of the value of their collateralised safekeeping accounts for various settlement purposes, thereby limiting the interdependence between the settlements. Furthermore, Danmarks Nationalbank may limit the participants' reservations, should it find that the settlement members' inappropriate use of reservations gives rise to unnecessary settlement risks. Box 15 describes the reservation system for the automatic collateralisation agreement and the participants' use of the agreement.

In view of the systemic measures to contain settlement risks described above, and of the settlement members' behaviour in the system so far, the extended automatic collateralisation agreement is found to contribute to a more secure and smoother settlement process.

APPLICATION OF THE EXTENDED AUTOMATIC COLLATERALISATION AGREEMENT	Box 15
<p>The Chart below shows the total reservations of the collateralised safekeeping accounts and the total drawings under the automatic collateralisation agreement for the Sumclearing and periodical payments. The sums of reservations and drawings, respectively, apply to the participants who exercised the extended automatic collateralisation agreement on the day in question. In principle, the participants may reserve 100 per cent of the value of the safekeeping account for each purpose, whereby the total reservations amount to 200 per cent (100 per cent for the Sumclearing and 100 per cent for periodical payments). The participants may not make special reservations for settlement of securities transactions in VP under the automatic collateralisation agreement. For these settlements the full value of the collateralised safekeeping account at the given time is applied.</p> <p><i>Continued</i></p>	

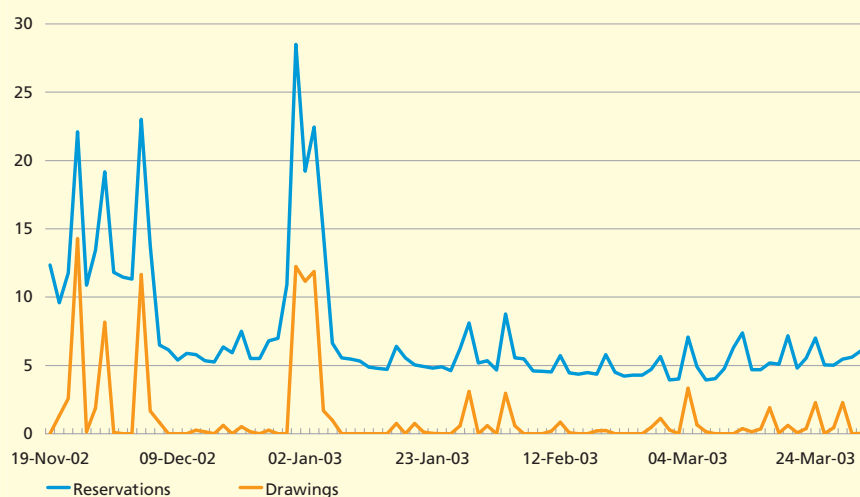
Source: Danmarks Nationalbank.

CONTINUED

Box 15

RESERVATIONS AND DRAWINGS ON THE EXTENDED AUTOMATIC COLLATERALISATION AGREEMENT

Per cent of the value of the collateralised safekeeping account



The spread between the two curves shows that the reservations of collateral normally exceed the actual collateral used. This "excess cover" is mainly found in the Sumclearing where the participants do not know the exact liquidity impact, so that a certain excess cover is appropriate. On the other hand, the participants can calculate exactly the liquidity impact of periodical payments, so their reservations for this purpose therefore generally correspond to the drawings

The sum of the reservations and sum of the drawings on the automatic collateralisation agreement account for a relatively small share of the value of the collateralised safekeeping accounts, i.e. barely 10 per cent on average in the period. With a view to the forthcoming introduction of the Danish krone in CLS this indicates that the automatic collateralisation agreement provides for ample collateral for CLS settlement. Moreover, the parallel patterns of the two curves in the Chart indicate active liquidity management by the participants.

Source: Danmarks Nationalbank.

STRESS TESTING OF THE DANISH SETTLEMENT STRUCTURE

Multiple sources of liquidity for settlement purposes will *ceteris paribus* enhance the stability of the settlement systems. The extension of the automatic collateralisation agreement creates a general alternative to traditional pledging of collateral. However, the stability will depend on the extent to which the participants apply the two types of collateralisation. In terms of stability it is important that the two types of collateralisation can supplement each other to a reasonable degree.

ASSUMPTIONS IN THE STRESS TESTS	Box 16
<p>The basic assumption is that the automatic collateralisation agreement is not available, and that the settlement members cannot withdraw securities from the collateralised safekeeping account or other safekeeping accounts. Another implication of the lack of access to the automatic collateralisation agreement for settlement of securities transactions in VP is that the self-collateralisation mechanism for securities trades cannot function. The assumption is therefore that the settlement of securities transactions in VP (total net settlements from VP10, 20 and 30) cannot be completed before noon the next day. Another assumption is that the other settlements, i.e. VP's settlement of periodical payments (VP35), the Sumclearing and CLS settlement will also be processed before noon.</p> <p>In the first stress test, which focuses on the banking sector's total overdraft access, the assumption is that all four settlements take place at the same time before noon. This assumption deprives the settlement members of the opportunity to use liquidity received in one settlement in other settlements.</p> <p>In the second stress test that focuses on the settlement members' sensitivity to changes in the overdraft access, the above assumption is eased, and the four settlements instead take place consecutively. Some settlement members will thus receive liquidity in the early settlements for use in subsequent settlements. The assumption is that CLS pay-ins are made first. This is followed by the extra settlement in the Sumclearing system at 9.00 a.m. The settlement of periodical payments in VP takes place at 9.30 a.m., and finally the net settlement of the postponed securities deals from the night before takes place at 10.30 a.m. in VP40.</p> <p>Both stress tests assume that Kronos opens at 7.00 a.m., but no interbank RTGS payments are submitted before all settlements have been completed.</p>	

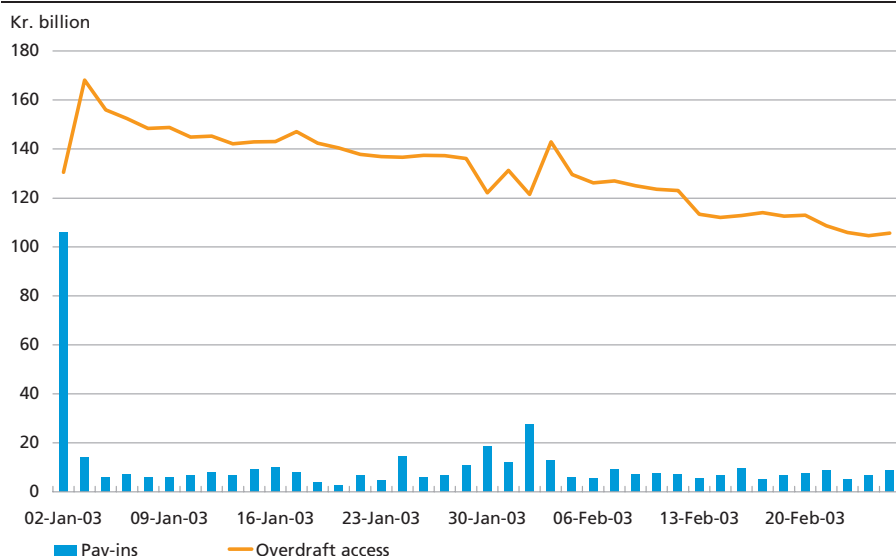
Stress testing of overall liquidity

The first stress test assumes an operational "worst case" crisis scenario whereby the automatic collateralisation agreement lapses and the settlement of overnight securities transactions in VP has to be postponed until the next morning. This eliminates one source of liquidity for the participants' settlement purposes. It is also assumed that there are delays in the Sumclearing, which must also be postponed until the next morning. The CLS pay-in schedule in five instalments from 8.00 a.m. to 12:00 noon continues to apply. The stress test thus examines whether it is possible to run these three settlements and the settlement of periodical payments before noon simultaneously in a situation where the settlement infrastructure is wholly dependent on the participants' access to current-account overdrafts¹. The assumptions for the stress tests are described in further detail in Box 16.

¹ The analysis considers participants holding accounts at Danmarks Nationalbank that are direct settlement members in either CLS, VP settlement and/or Sumclearing. There are 75 such settlement members all in all.

ACCESS TO CURRENT-ACCOUNT OVERDRAFT AND SIZE OF SETTLEMENT PAY-INS

Chart 52



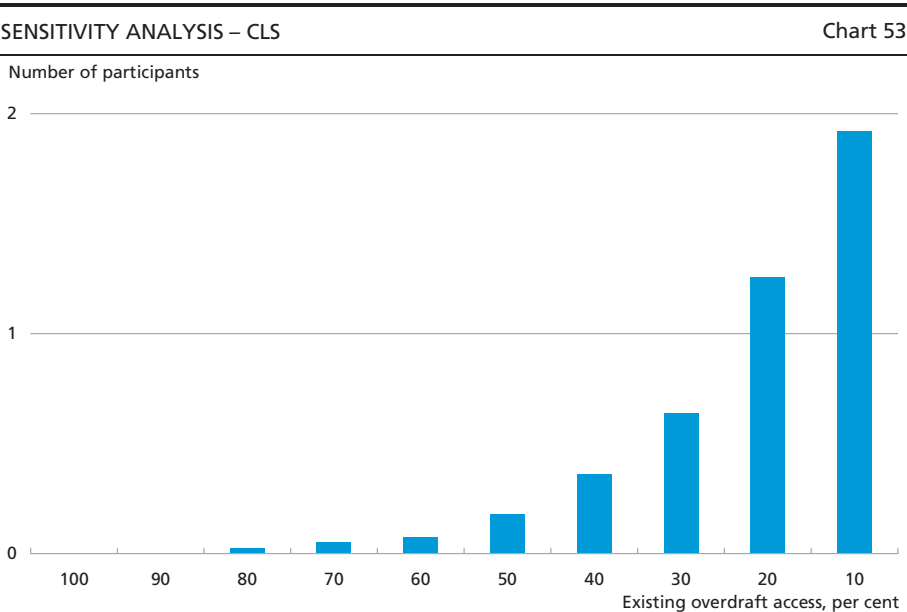
Note: Pay-ins to CLS are estimated on the basis of foreign-exchange transactions in January and February 2002.
Source: Danmarks Nationalbank and CLS.

The daily pay-ins for the four settlements in this period on average totalled almost kr. 23 billion, of which settlement of securities transactions in VP accounted for approximately 34 per cent, Sumclearing settlements for approximately 21 per cent, and periodical payments in VP for approximately 20 per cent, while the estimated liquidity impact from CLS accounted for approximately 25 per cent. The total net pay-ins were relatively stable, apart from 2 January, when they exceeded kr. 100 billion. However, on no day in this period would the participants' current-account overdraft access not have been sufficient to cover the current net pay-ins, as well as the estimated CLS pay-ins. The large pay-ins at the beginning of the period can be explained by the extraordinarily high number of transactions on 2 January, including periodical payments concerning mortgage-credit bonds.

Liquidity conditions at the level of individual banking institutions

Despite the ample liquidity at aggregate level it cannot be ruled out that certain individual participants may find it difficult to mobilise liquidity¹. This is examined more closely in the second stress test, which considers whether individual participants did not have sufficient over-

¹ Individual participants' inability to settle may generate systemic effects. Examination of systemic effects is beyond the scope of this analysis.



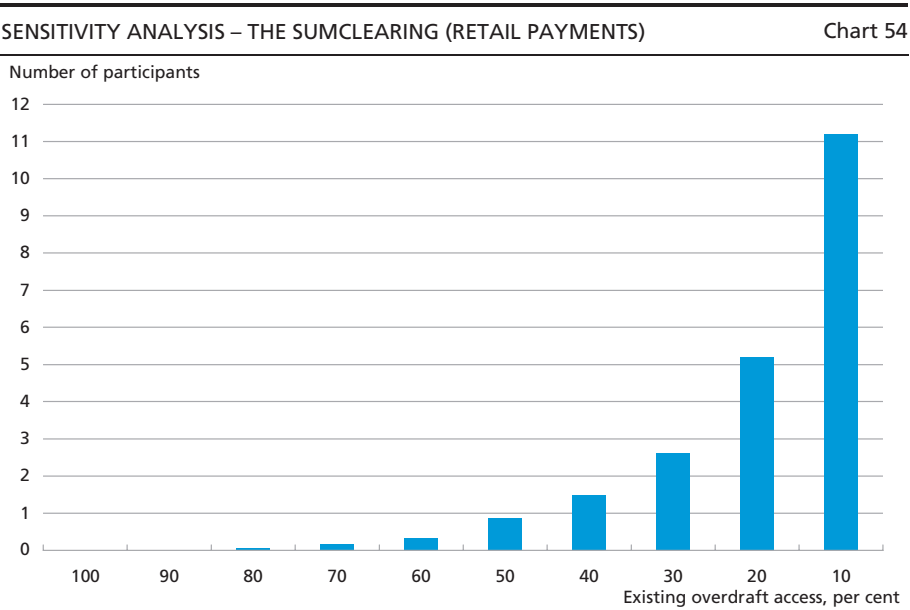
Note: The Chart shows the average daily number of participants unable to honour their obligations given a reduction of the individual participants' overdraft access. Net pay-ins to CLS are estimated on the basis of foreign-exchange settlements in January and February 2002.

Source: Danmarks Nationalbank and CLS.

draft access in the period. The sensitivity to a reduction of the overdraft access is also analysed.

The restrictive assumption in the above stress test of one simultaneous settlement before noon is eased, so that the postponed settlements are assumed to be consecutive in the following order: CLS settlement, the Sumclearing, periodical payments, and finally, the net result of the postponed settlement of securities transactions in VP. This takes into consideration that participants may be net recipients of liquidity in one settlement and net contributors of liquidity in another. Charts 53-56 show the daily average number of participants that are unable to honour their obligations in the period, assuming that the individual participants' overdraft access is reduced.

As regards the CLS settlement, based on estimated data the test shows that on no day in the period analysed will any of the participants be short of liquidity, cf. Chart 53 where there is no indication at 100 per cent. The sensitivity analysis shows that the overdraft access must be reduced to 80 per cent of the actual value before a participant becomes short of liquidity on one day. If the overdraft access is reduced to 20 per cent of the actual value, on average more than one participant per day will encounter problems.



Note: The Chart shows the daily average number of participants unable to honour their obligations given a reduction of the individual participants' overdraft access.

Source: Danmarks Nationalbank and CLS.

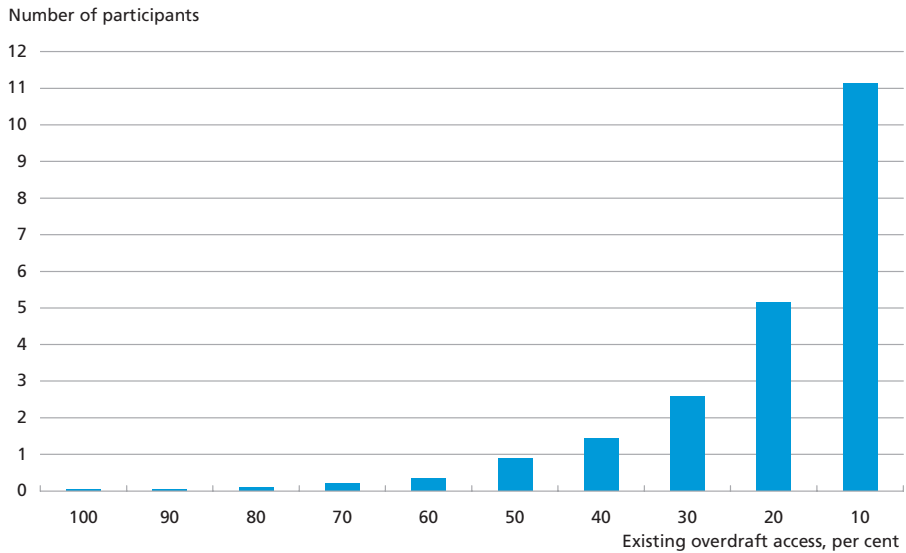
In the Sumclearing too, no participant has insufficient overdraft access on any day of the period, cf. Chart 54. The sensitivity analysis shows that if the overdraft access is reduced to 80 per cent of the actual value, two participants have insufficient overdraft access on one day in the period under consideration. If the overdraft access is reduced to 40 per cent of the actual value, on average more than one participant per day will encounter settlement problems.

If the settlement of periodical payments and then the VP settlement of securities transactions are also executed, cf. Charts 55 and 56, it is seen that a few participants have insufficient liquidity on one given day or another in the period under review (illustrated by the slight indication at 100 per cent). If the overdraft access falls to around 40 per cent, on average one participant per day will have insufficient liquidity.

The very few participants with insufficient overdraft access in the last two scenarios is related to the large settlements on 2 January and the assumption that no RTGS payments are processed. Had the participants in question received the payments which they actually received on 2 January, they would have been able to honour their obligations. In a crisis scenario such as that described here it is therefore important that the participants behave as normally as possible in the interbank market, and dispatch payments at the normal time.

SENSITIVITY ANALYSIS – PERIODICAL PAYMENTS

Chart 55

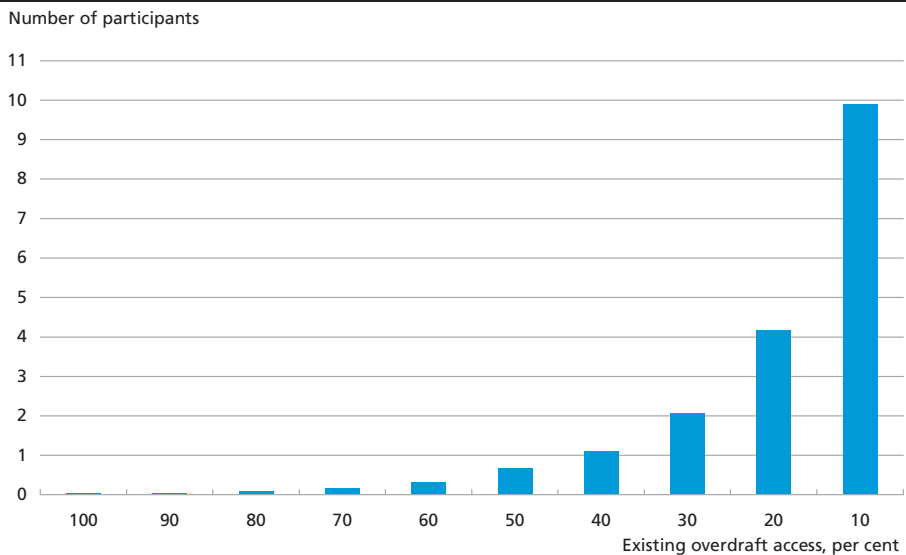


Note: The Chart shows the daily average number of participants unable to honour their obligations given a reduction of the individual participants' overdraft access.

Source: Danmarks Nationalbank and CLS.

SENSITIVITY ANALYSIS – SETTLEMENT OF SECURITIES TRANSACTIONS IN VP

Chart 56



Note: The Chart shows the daily average number of participants unable to honour their obligations given a reduction of the individual participants' overdraft access.

Source: Danmarks Nationalbank and CLS.

Conclusion

The first stress test shows that the banking sector as a whole still has ample liquidity available for settlement purposes, even if the access to liquidity is reduced considerably. The second stress test shows that in general there is ample liquidity available to the individual banking institutions, but that it cannot be ruled out that on days with extraordinarily high settlement amounts a few settlement members will be unable to settle all their obligations.

Ample liquidity is a prerequisite to a robust settlement structure. It is therefore important that the participants review their access to mobilise liquidity on an ongoing basis, including their dependence on different sources of liquidity.

Glossary of Financial Terms

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

BIS stands for Bank for International Settlements, which serves as banker to the central banks.

Bonus. Generic term covering the amounts allocated by pension companies to policyholders in addition to the originally guarantee (see *Guaranteed interest rate*).

Bonus potential related to benefits on premium-free policies is the commitment to allocate *Bonus* on premiums already paid into pension companies, and is a sub-item under *Life-insurance provisions*. Bonus potential related to benefits on premium-free policies may be used to cover losses on assets if the *Collective bonus potential* has been used.

Bonus potential related to future premiums is the commitment to allocate *Bonus* on premiums that are agreed, but not yet due, in pension companies, and is a sub-item under *Life-insurance provisions*.

Bonus reserves. A key indicator for pension companies expressing the undistributed reserves as a ratio of *Life-insurance provisions*. See also *Equity reserves*.

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/capital requirement. See *Solvency requirement* for credit institutions and *Solvency margin* for pension companies.

Capital base (pension companies). The capital that a pension company may use to cover its *Solvency margin*. The capital base comprises the pension company's equity capital less certain deductions, e.g. subsidiary insurance companies' solvency margin, and certain additional items.

Capital loss/gain on issue. The issuer's capital loss and gain on issue of securities at prices below and above *Par*.

Category 1, 2, 3 or 4, banking institution. Categorisation of Danish banking institutions based on volume of *Working capital*. Banking institutions in category 1 have a working capital of kr. 25 billion and above. Banking institutions in category 2 have a working capital from kr. 3 up to kr. 25 billion, banking institutions in category 3 have a working capital from kr. 250 million up to kr. 3 billion, and banking institutions in category 4 have a working capital of less than kr. 250 million.

CD see *Certificate of Deposit*.

Certificate of Deposit. A short-term negotiable certificate which is mainly traded between banking institutions. Abbreviated to CD.

Clearing. Compilation of each participants purchases and sales, resulting in the net position of each participant. See also *Settlement* and *VP*.

CLS is the abbreviation for Continuous Linked Settlement, which is an international currency-settlement system.

Collective bonus potential in pension companies is the undistributed reserves that can be used to allocate bonus in addition to the bonus amounts accrued to the *Life-insurance provisions*. May be used to cover losses on assets.

Commercial Paper. A short-term debt instrument (zero-coupon paper) with a maturity of up to one year. Abbreviated to CP.

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 comprises paid-up share or guarantee capital, premium on issue and general reserves, adjusted for e.g. own shares and current deficit for the year.

Correction account. An account to which the banking institutions' ongoing losses and *Provisions* are booked.

CP see *Commercial Paper*.

Credit risk. The risk of suffering a loss should the counterparty or debtor default on its payment obligations. See also *Market risk*.

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

Deposit Guarantee Fund. The guarantee fund for depositors and investors is a private, self-governing fund established by law. It grants compensation to depositors and investors in banking institutions, mortgage-credit institutes and investment companies for losses in connection with suspension of payments or compulsory liquidation.

Derivative. See *Financial derivative*.

Duration. The price sensitivity of an outstanding amount or *Portfolio* to (small) interest-rate fluctuations. The higher the duration, the greater the price sensitivity.

Economic capital is the estimated capital required to cover the anticipated maximum loss with a predetermined probability. The calculation takes account of unexpected losses in relation to various risk types, e.g. *Market* and *Credit risks* and *Operational risks*. Economic capital is thus the credit institution's own assessment of the necessary capital base. See also *Solvency requirement*.

Equity capital is the owners' share of the company's capital, including share capital and accumulated profits.

Equity reserves. A key indicator expressing the extent to which the adjusted equity capital (equity capital plus subordinate loan capital) exceeds the statutory minimum requirement measured as a ratio of *Life-insurance provisions* in a pension company. Equity reserves and *Bonus reserves* together contribute to evaluation of the company's ability to pay a bonus and its financial strength, i.e. the company's resilience to fluctuating returns and unforeseen insurance and financial risks.

Exchange-rate risk is the risk of exchange-rate fluctuations that generate losses. See also *Market risk*.

Fair value states 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.

Financial derivative is 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.

Floating interest rate. An interest rate, which is floating during the maturity of the loan, e.g. that is agreed to float in step with another interest rate.

Gearing (financial). External financing as a ratio of equity.

Going concern. A company that is expected to continue its activities.

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

Guaranteed interest rate, also called the maximum technical interest rate, is 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 agreement. The interest rate is based on a number of assumptions regarding risk of disability, mortality, and interest rates and costs.

Implied volatility. The theoretically derived *Volatility* in the Black-Scholes option price model for an underlying financial asset, calculated on the basis of the observed option prices. It follows that this type of volatility can not be directly observed.

Income from fee and commission comprises *inter alia* brokerage commission and commission on safekeeping accounts, guarantee commission, fees for use of payment systems and remortgaging fees, as well as ordinary borrowing fees.

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*.

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

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

Interest-rate risk. The risk that interest rate fluctuations generate losses. See also *Market risk*.

Internal interest rate. See *Yield to maturity*.

Investment banking. Activities related to analysis of and trading in securities and financial consulting services in connection with e.g. stock issues, public offerings and mergers and acquisitions.

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

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

Liable capital. Credit institutions' capital base required for compliance with the statutory *Solvency requirement*. Liable capital comprises *Core capital* and *Supplementary capital*, and the latter may not exceed half of the liable capital. Liable capital is adjusted for e.g. capital elements in other credit institutions.

Life-insurance provisions are measured by the actuaries appointed by the pension companies. Life-insurance provisions are divided into three sub-categories: *Guaranteed benefits*, *Bonus potential related to future premiums*, and *Bonus potential related to benefits on premium-free policies*. See also *Insurance provisions* and *Collective bonus potential*.

Liquidity is 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 is 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 stock prices) will impose losses. See also *Value-at-Risk*.

Maximum technical interest rate. See *Guaranteed interest rate*.

Median. The numerical value dividing data into two equal shares of which one half is below and the other is above the median. Corresponds to the 50th *Percentile*.

Operating income over operating expenses is a key performance indicator to express banking institutions' earnings capability. The measure is calculated as financial result over *Ordinary costs*.

Operational risk. The risk of losses due to insufficient or unsuccessful internal procedures, human or system errors, or external events.

Option. A *Financial derivative* granting the owner(buyer) the right, but not the obligation, to buy or sell an underlying instrument (e.g. a product, a security or a currency) at an agreed price (strike price) at an agreed future time. The seller of an option is obliged to recognise the owner's right. An option may be used as a hedging measure against market trends generating losses.

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

Ordinary profit of banks comprises e.g. net interest income, net fee and commission income, value adjustments, and the result of capital interests in associated and affiliated companies, less *Ordinary costs*.

Par. A price of 100 per cent of a paper's nominal value.

Percentile. The numerical value indicating the share of the observations below that value. For example, the 25th percentile for the *Return on assets* is the point below which 25 per cent of the companies with the lowest returns on assets lie.

Portfolio. A holding of assets.

Profitability. See *Return on equity*.

Provisions. For loans on which a loss is expected, the banking institution must write down the loan and book the amount under losses and provisions. There are two types of provision: A provisions are for losses with a probable risk, and B provisions for losses that are deemed inevitable, but the size of the loss cannot be fully estimated. Provisions are gathered in the *Correction account*.

Rating. An assessment of *Credit standing* given by rating agencies such as Fitch, Standard & Poor's and Moody's. Rating is typically used in connection with securities issue, and accounts for the probability of default and the size of the loss.

Return on assets describes a company's ability to achieve a return on invested capital. It is calculated as the company's profit as a ratio of its assets.

Return on equity is a measure of a company's profitability, i.e. its ability to achieve a return on the owners' investment. Return on equity is calculated as the company's profit as a ratio of equity capital.

Risk-weighted items. The risk-weighted assets and off-balance-sheet items, i.e. items subject to *Credit risk*, share risk, *Interest-rate risk*, *Exchange-rate risk*, commodity risk, etc. See also *Solvency requirement*.

RTGS system is a real-time gross settlement system in which payments are settled individually, immediately, and finally to the participants' accounts.

S&P500. US abbreviation of Standard & Poor's 500 Stock Index. It consists of the 500 most traded US stocks and is e.g. used as an underlying index for stock futures and stock *Options*.

Securitisation. The process of pooling lending as the basis for securities issue.

Settlement. Completion of the participants' trade by final settlement of agreed commitments. See also *Clearing* and *VP*.

Solvency. See *Solvency ratio*.

Solvency is an expression of a company's ability to sustain losses, i.e. the proportion of the company's assets that can be lost before the losses affect its borrowed capital. Calculated as the ratio of *equity capital* to assets.

Solvency margin. The statutory capital requirement of pension companies. The solvency margin is calculated on the basis of the *Life-insurance provisions* subject to a number of minor additions. See also *Capital base (pension companies)*.

Solvency ratio is a key indicator, defined as *Liable capital* as a ratio of *Risk-weighted items*. See also *Solvency requirement*.

Solvency requirement. The statutory solvency requirement imposed on credit institutions. For a credit institution *Liable capital* must account for at least 8 per cent of the credit institution's *Risk-weighted items*. See also *Solvency ratio*.

Standard deviation measures the distance from the observations to the average in the data material.

Subordinate capital is external financing that in the event of compulsory liquidation is not repaid until after other debt has been settled. Subordinate capital, subject to certain requirements, may be included in the credit institutions' *Supplementary capital*. See also *Liable capital*.

Supplementary capital. Capital deposits in credit institutions offered as *Liable 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.

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 floating interest rates. In contrast to a currency swap there is no exchange of principal between the parties to an interest-rate swap. The overall value of a swap is usually zero on conclusion, but may subsequently become positive or negative, depending on market developments in interest and exchange rates.

Term structure of interest rates is the relationship between securities' yields and maturity. 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. A model to measure *market risk*. For a given *Portfolio* and within a fixed time horizon the model calculates the maximum loss that may arise with a given probability, based on historical experience. Abbreviated to VaR.

VaR. See *Value-at-Risk*.

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

VP is the 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, as well as *Clearing* and *Settlement* of securities deals. All stock-exchange-listed securities and a number of unlisted securities are held electronically at VP Securities Services.

Working capital comprises deposits, issued bonds, *subordinate capital* and *equity capital*. See also *Category 1 banking institution*.

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

Zero-coupon yield. The *Yield to maturity* on a zero-coupon paper, i.e. a paper with no ongoing accrual of interest, and where the redemption payment falls due when the loan matures. The borrowing costs for a zero-coupon paper are solely the *Capital loss on issue*.