



Danmarks  
Nationalbank

Monetary Review  
2nd Quarter

2000

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## Recent Monetary Trends

*This review covers the period from the middle of February to the middle of May 2000*

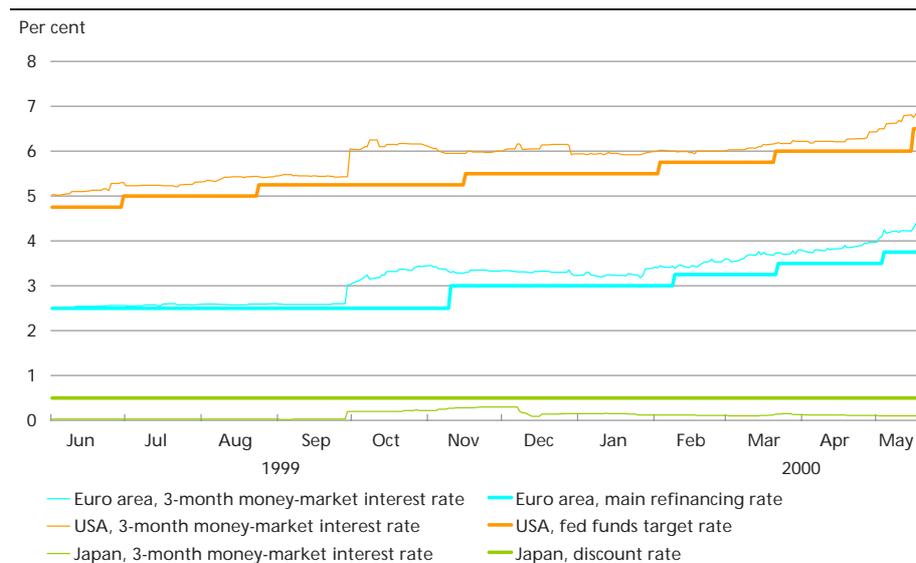
### INTERNATIONAL ECONOMIC BACKGROUND

On 21 March the US Federal Reserve raised its benchmark interest rate, the fed funds target rate, by 0.25 per cent, and on 16 May by a further 0.5 per cent to 6.5 per cent. The interest rate has now been raised on six occasions since the summer of 1999, cf. Chart 1, and is at the highest level since the start of 1991.

The background to the raising of interest rates was that growth in demand is now exceeding the growth in the output potential of the US economy, thereby aggravating the risk of rising inflation undermining the economy's otherwise favourable course. From the turn of the year until the beginning of April the yield on 10-year government bonds fell by around 1 percentage point to 6 per cent. The background included such factors as the unrest on the stock markets and a reduced supply of government bonds as a consequence of a considerable government finance surplus in the USA. As stability returned to the stock markets after

SHORT-TERM INTEREST RATES

Chart 1

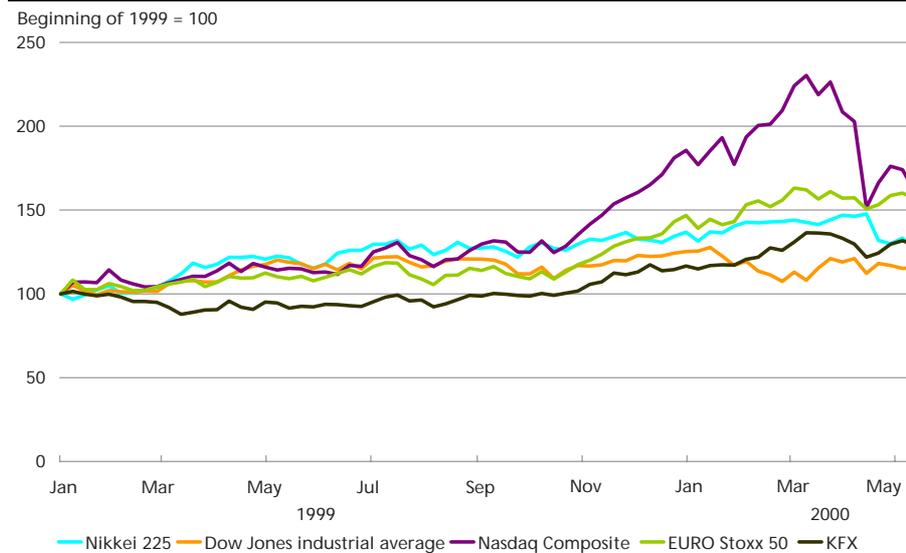


the plummeting prices in April, the long-term interest rates rose by just over 0.5 percentage point to 6.6 per cent in mid-May. Since the turn of the year the spread up to the 10-year Fannie Mae yield (Federal Mortgage Association, home financing in the USA) has widened by approximately 0.5 per cent. The widening reflects the combination of the reduced supply of government bonds and the substantial private borrowing requirement in the US economy in a market where a number of investors do not regard government bonds and other bonds, such as mortgage-credit bonds, as close substitutes.

Despite the measures to tighten monetary policy the strong growth in the US economy continued around the turn of the year. Revised national accounts for the 4th quarter of 1999 showed a growth rate of 4.2 per cent for 1999 overall, and according to the preliminary national accounts GDP increased at an annual rate of 5.4 per cent in the 1st quarter of 2000. The high growth rate is attributable to strong domestic demand, including private consumption, which via wealth effects is clearly affected by recent years' favourable development on the stock markets.

In the first three months of the year the IT stocks in the US Nasdaq index rose by 15 per cent, but fell by an equivalent rate in April, cf. Chart 2. The traditional Dow Jones index dropped by 5 per cent from January to March and was generally unaffected by the unrest on the stock markets in April, when primarily IT stocks were subject to a global price drop.

STOCK PRICES Chart 2



Note: Weekly observations.

Source: Bloomberg.

The greater volatility of stock prices and the adjustment of the price level are expected to lead to lower growth in consumption than would otherwise have been the case. This may contribute to reducing the substantial current-account deficit.

Unemployment in the USA fell further to 3.9 per cent of the labour force in April. Despite the significantly stronger dollar the tight labour-market conditions have begun to exert upward pressure on inflation. The inflation rate has thus risen considerably since the turn of the year, from 2.7 per cent p.a. to around 3.5 per cent in March and April. The increases can be attributed primarily to rising energy prices, although underlying inflation has also risen. Energy prices are driven up by the soaring oil price. Oil rose from around USD 10 per barrel (Brent) at the beginning of 1999 to more than USD 30 per barrel at the beginning of March 2000. The OPEC agreement at the end of March to raise oil production in the following three months led to a rapid drop, but by mid-May the price had again increased considerably.

Since the beginning of the year the dollar has strengthened considerably against the euro from just over USD 1 per euro to around USD 0.90 in mid-May. The dollar has strengthened in step with the continued upward adjustments of the growth estimates for the US economy.

The Japanese yen has weakened slightly against the dollar since the turn of the year and was in mid-May around JPY 110 per dollar. However, the yen has strengthened considerably since mid-1998 when the exchange rate was around JPY 145 per dollar. The strong yen reflects expectations in the financial markets of increased growth in Japan. Since the beginning of 1999 this has been reflected in substantial increases in the Japanese Nikkei index, cf. Chart 2. The Bank of Japan has repeatedly intervened in the foreign-exchange market to stop the yen's appreciation against the dollar. Japan's monetary policy is still as expansive as possible and the discount rate has been unchanged since the end of 1995, cf. Chart 1. For 1999 as a whole there was moderate growth in real GDP at 0.3 per cent, which nevertheless is an improvement compared to the decline in output by 2.5 per cent in 1998. However, there are still no clear indications of any real upturn in the economy since the available economic indicators do not entirely confer. The latest IMF forecast shows real GDP growth of 0.9 per cent in 2000, rising to 1.8 per cent in 2001.

During the period under review the European Central Bank, ECB, raised its official interest rates by 0.25 percentage point on two occasions, i.e. on 16 March and 27 April 2000. The rate of interest on the main refinancing operations thereby reached 3.75 per cent, cf. Chart 1, and the rates of interest on the deposit facility and the marginal lending facility reached 2.75 per cent and 4.75 per cent, respectively. The back-

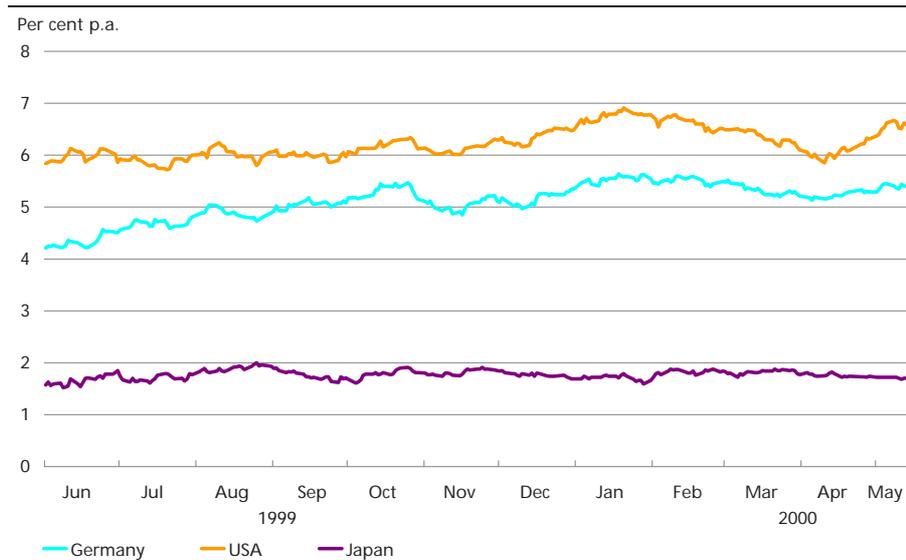
ground to the interest-rate adjustments was upward risks to price stability in the euro area, cf. the section on HICP and monetary-policy strategy below. The adjustments should be viewed in conjunction with the two preceding monetary-policy tightenings undertaken since growth in the euro area began to accelerate.

Expectations of adjustments to ECB interest rates affect the bids in the weekly operations. If the market expects interest rates to be raised before the next allotment of liquidity, the allotment ratios, which are normally around 5-10 per cent of the total bids, will typically be even lower due to the significant increase in the total amount of bids. However, the low allotment ratios are not found to impede the functioning of the system since counterparties have learnt to adjust their bids to the liquidity amounts actually required and an expected allotment ratio. Furthermore, the money market in the euro area is now almost fully integrated, with identical liquidity conditions and thereby identical day-to-day interest rates in all euro area member states as a result.

The long-term interest rate in the euro area has generally matched the development in the US long-term interest rate, which was 1 percentage point higher in mid-May, cf. Chart 3.

After the economy's slowdown from the autumn of 1998 to the spring of 1999 the national accounts data for the 4th quarter of 1999 confirmed renewed growth in the euro area. The rate of GDP growth was 2.3 per cent for 1999 as a whole. In the 4th quarter growth was broadly based, with improvement in both domestic demand and exports. Confid-

YIELDS ON 10-YEAR GOVERNMENT BONDS IN GERMANY, USA AND JAPAN Chart 3



ence indicators for the first months of 2000 point to a continued increase in economic activity. Unemployment in the euro area has declined since the 2nd half of 1997, to 9.4 per cent in March 2000. However, this figure conceals large national variations as the unemployment rates of the Netherlands, Luxembourg, Austria and Portugal were lower than the Danish unemployment rate of 4.8 per cent (measured in accordance with the ILO's definition), while Spain had the highest unemployment rate at 14.9 per cent.

On 9 March 2000 Greece officially applied for membership of the third stage of EMU and thus for participation in the single currency. Prior to its expected application Greece had revalued its currency by 3.5 per cent against the euro. At the time of the application the Bank of Greece lowered the leading interest rates, including the rate of interest on 14-day money-market transactions, which was reduced by 0.5 percentage point to 9.25 per cent. Furthermore, the Bank of Greece adjusted its monetary-policy instruments to those of the ECB. On 19 April the leading interest rates were lowered once more. This included the rate of interest on 14-day money-market transactions, which was reduced by 0.5 percentage point to 8.75 per cent. The tendency for the Greek drachma to weaken towards the central rate has been unchanged since mid-1999, and in mid-May the drachma was around 1.25 per cent stronger than its central ERM II parity.

Greece's application for membership of EMU was submitted to the President of the ECOFIN Council. Since then the European Commission and the ECB have each prepared convergence reports. On the basis of these reports the European Commission made the recommendation that Greece should join EMU as of 1 January 2001. The final decision on Greek participation will be taken at the meeting of the ECOFIN Council on 19-20 June in Portugal.

Convergence reports were prepared for both Greece and Sweden. In contrast to Denmark and the UK, Sweden is not a member state subject to a derogation, so it must be examined at 2-year intervals for compliance with the convergence criteria.

The conclusion of this year's examination of convergence was that Sweden still fails to meet the criterion for participation in ERM II. Since Sweden's monetary policy is based on an inflation target the Swedish krona continues to float against all other currencies, including the Danish krone and the euro. During the spring the Swedish krona strengthened against the euro, corresponding to an increase from just over kr. 0.86 to around kr. 0.91 per Swedish krona from the turn of the year until mid-May. Since 1997 the Swedish economy has undergone a sustained cyclical upswing driven by exports and most recently to an increasing

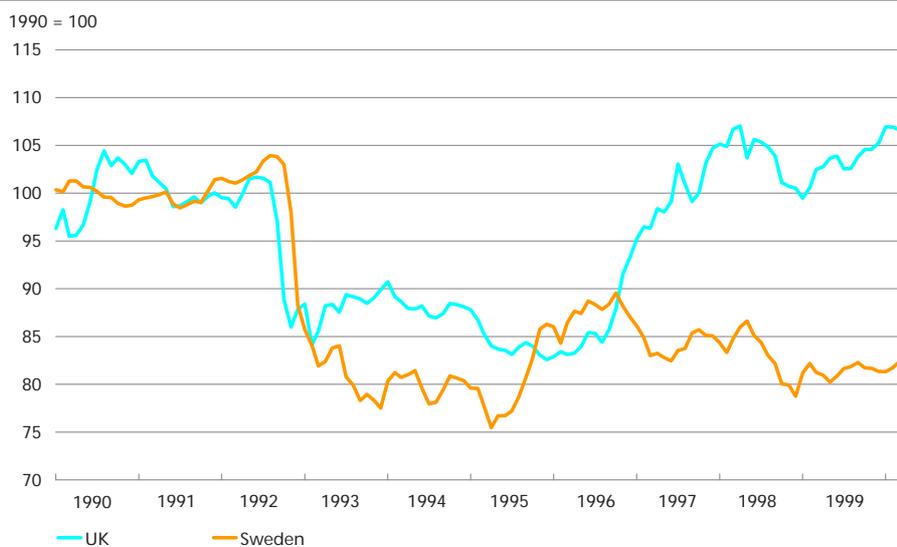
degree by domestic demand. Inflation is still low, but rising, and in April the annual rate of increase in HICP was 1.0 per cent. After the interest-rate adjustment on 9 February 2000 Sveriges Riksbank has not tightened monetary policy.

Since mid-1999 the Bank of England has raised the rate of interest on four occasions in response to an increase in the risk that inflation will exceed the inflation target of 2½ per cent in the retail price index excluding housing (RPIX). In April RPIX rose by 1.9 per cent p.a., which is generally unchanged compared to mid-1999. In terms of the broadbased retail price index, RPI, the rate of increase in consumer prices has nevertheless accelerated considerably since the autumn of 1999, to annual price increases of 3.0 per cent p.a. in April. The annual rate of increase in the Harmonised Index of Consumer Prices (HICP) was 0.6 per cent in April. The pound sterling is not part of ERM II. Since January 1999 sterling has strengthened by around 15 per cent against the euro, cf. also the development in the nominal effective exchange rate presented in Chart 4. Sterling's strength has drawn criticism of the interest-rate level by the sectors in the economy which are subject to international competition. The preliminary national accounts data for the 1st quarter of 2000 indicate a dampening of economic activity, especially in the manufacturing sector.

In Norway the recent national accounts data for the 4th quarter of 1999 confirm a significant increase in growth, primarily related to rising oil prices and oil production. Since the turn of the year the exchange

NOMINAL EFFECTIVE EXCHANGE RATES

Chart 4



Source: Own calculations.

rate has been around kr. 0.92 per Norwegian krone. The objective of Norway's monetary policy is to manage inflation with a view to contributing to a stable exchange rate in the long term. On 12 April 2000 Norges Bank raised the official interest rates, i.e. the current-account rate and the lending rate, by 0.25 percentage point. This was the first adjustment of interest rates since 23 September 1999.

## **HICP AND THE MONETARY-POLICY STRATEGY OF THE EUROSYSYSTEM**

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The monetary-policy strategy of the Eurosystem consists of a definition of price stability as well as two pillars that indicate the information on which the assessment of price stability is based. Price stability must be maintained in the medium term and is defined as a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below 2 per cent.

The first pillar comprises a reference value of 4½ per cent p.a. for monetary growth. Throughout the lifetime of the euro the actual monetary growth has exceeded this reference value. The growth in the monetary aggregate, M3, was thus 6.5 per cent in March, and 6.0 per cent when measured as a 3-month moving average. In connection with the interest-rate increases in March and April the continuing variation was perceived as an indication of ample liquidity in the euro area.

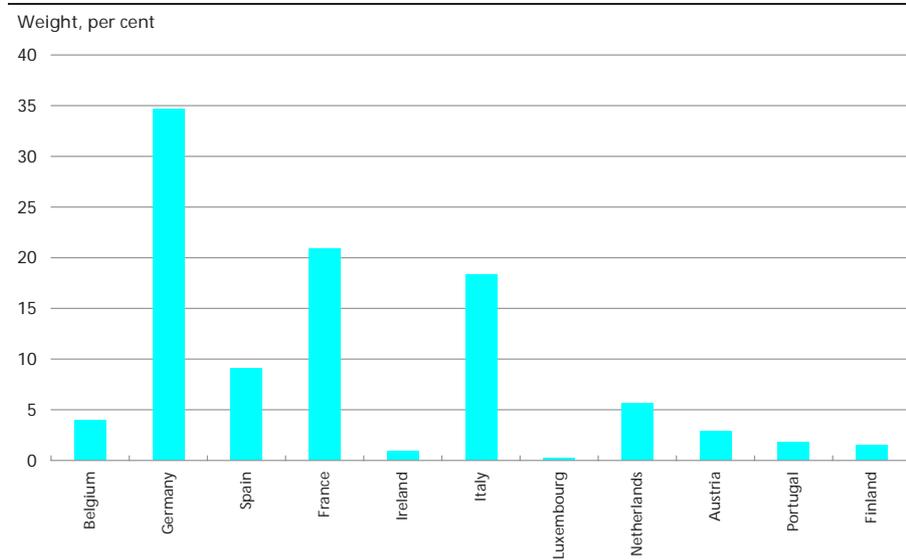
The second pillar makes it possible to include a wide range of other economic indicators in the assessment of the outlook for price stability.

The euro's weakening against the dollar since the New Year, as well as the high oil prices, have had a direct impact on prices via higher import costs and wholesale prices. However, the factor most relevant to price stability is whether these factors or any derived effects are expected to be sustained in the medium term. A weak euro in itself does not justify a tightening of monetary policy in the euro area.

The development in HICP for the euro area plays a central role in the conduct of monetary policy. Compared to consumer prices in the USA those in the euro area have taken a very moderate course, especially when recent years' development in the euro's exchange rate vis-à-vis the dollar is taken into account. In April the index rose by 1.9 per cent year-on-year after increasing at a rate of 2.1 per cent p.a. in March, which is primarily related to increasing energy prices. Non-energy HICP rose by 1.1 per cent p.a. An HICP growth rate of 2.1 per cent, as in March, is not as such in conflict with the price stability to be maintained in the medium term. HICP for the euro area is calculated by weighing together the national harmonised consumer price indices of the 11 euro area member states by means of country-specific weights calculated on the basis of

COUNTRY-SPECIFIC WEIGHTS IN AGGREGATE HICP FOR THE EURO AREA

Chart 5



Source: Eurostat.

consumption by households in the national territory, less expenditure on owner-occupied homes. This means that Germany and France together account for more than half of the total index, cf. Chart 5.

#### DEVELOPMENT IN INTEREST AND EXCHANGE RATES IN DENMARK

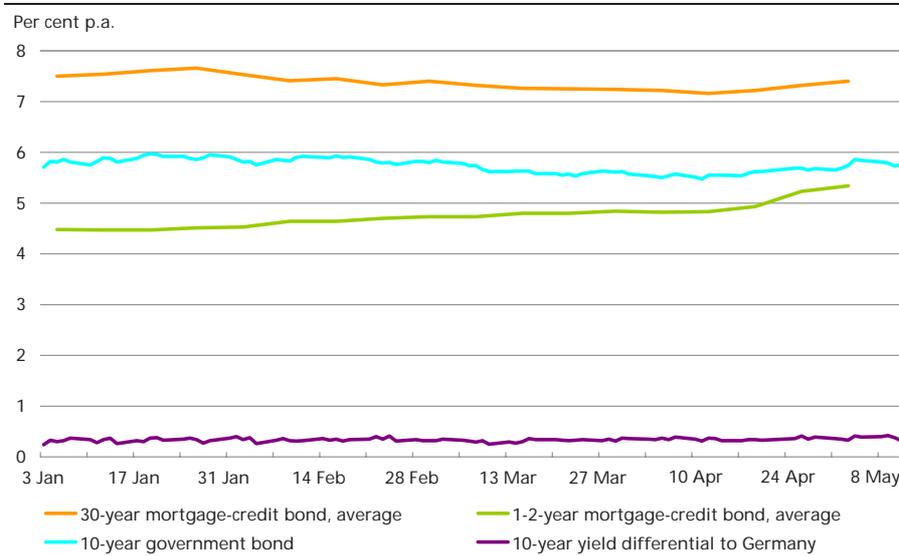
On 28 September 2000 Denmark will hold a referendum on its adoption of the single currency. The EMU debate has gained momentum since the announcement of the referendum date. Danmarks Nationalbank is in favour of Denmark's adoption of the single currency. Participation in EMU can ensure the continuation of the external framework for economic policy which has prevailed since the early 1980s<sup>1</sup>.

In direct connection with the raising of interest rates by the European Central Bank, ECB, on 16 March and 27 April, the Nationalbank on both occasions raised the official interest rates by 0.25 percentage point. In connection with the interest-rate adjustment on 27 April the discount rate and the current-account rate were thus raised to 3.75 per cent, while the lending rate and the rate of interest for certificates of deposit were increased to 4.10 per cent.

Most Danish banks raised their published lending and deposit rates by 0.5 percentage point after the interest-rate adjustment on 16 March as a

<sup>1</sup> Cf. Bodil Nyboe Andersen's speeches to the British Import Union and at the Annual Meeting of the Association of Danish Mortgage Banks, published in respectively Danmarks Nationalbank, *Monetary Review*, 1st Quarter 2000 and this Monetary Review.

BOND YIELDS AND LONG-TERM YIELD DIFFERENTIAL TO THE EURO AREA IN 2000 Chart 6



Note: Daily observations for government bond and yield differential. Weekly averages for mortgage-credit bond yields. These are calculated on the basis of new issues in open bond series.

Source: The Association of Danish Mortgage Banks.

large proportion of bank rates were kept unchanged after the Nationalbank's raising of interest rates on 4 February. The interest-rate adjustment on 27 April did not lead to any major changes in the published interest rates.

After a period of stability since the end of February, the money-market interest rates rose in the last half of April. In mid-May the 3-month money-market interest rate was 4.55 per cent. The interest-rate differential to the euro area was 0.31 percentage point, having widened slightly since the turn of the year. On 15 May the yield on the benchmark 10-year government bond was 5.80 per cent p.a. Since mid-February the 10-year yield differential to Germany has been in the range of 0.3-0.4 percentage point, with a slightly rising trend, resulting in a differential to Germany of 0.42 percentage point in mid-May. In mid-May the yield on the benchmark 30-year mortgage-credit bond was 7.57 per cent p.a.

The Association of Danish Mortgage Banks now publishes yield indices of the current development in yields on respectively 30-year mortgage-credit bonds underlying conventional 30-year fixed-rate mortgage loans, and the 1-2 year mortgage-credit bonds underlying adjustable-rate loans, cf. Chart 6<sup>1</sup>. Since the turn of the year the spread between

<sup>1</sup> A preliminary yield index for 30-year mortgage-credit bonds was described in Recent Monetary Trends, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 1999. This yield index was based on Nykredit's issues, whereas the new yield index compiled by the Association of Danish Mortgage Banks is based on new issues in open bond series by all issuers.

the two yield indices has narrowed, thereby eliminating part of the immediate benefit of lower repayments on home purchases financed via adjustable-rate loans.

Since the beginning of the year there has been an underlying tendency for the krone to weaken. This has led to intervention in support of the krone. In total the Nationalbank sold currency for kr. 24 billion up to end-April, of which more than half in January. From mid-February until Easter the krone was stable at around kr. 7.447 per euro. During Easter the krone weakened to more than 7.45 in a thin market, and in mid-May was close to its ERM II central rate of kr. 7.46038 per euro. Movements towards the central rate can be taken to indicate uncertainty of the outcome of the referendum, as well as the financial markets' expectations of endorsement of the adoption of the euro.

#### **DOMESTIC ACTIVITY AND THE BALANCE OF PAYMENTS**

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The preliminary national accounts for the 4th quarter of 1999 confirmed the picture of a soft landing for the Danish economy in 1999. In the 4th quarter of 1999 the rate of GDP growth was 2.0 per cent p.a. The annual growth rate for 1999 as a whole was 1.6 per cent, which is clearly a dampening compared to the growth rates of around 2.5-3 per cent in 1996-98. However the course throughout 1999 indicates that growth gained some momentum during the year, and the most recent estimates indicate annual GDP growth of around 2 per cent for the next few years.

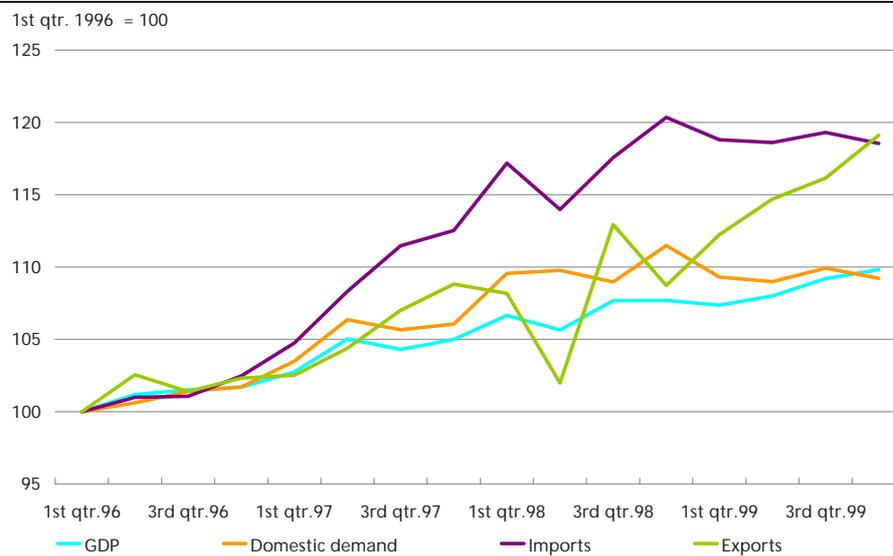
The lower growth in 1999 can be attributed to a significant dampening of domestic demand and imports, whereas exports showed substantial growth, cf. Chart 7. Net exports have thus improved significantly.

The foreign-trade statistics for the whole of 1999 show improved exports and a somewhat slower rate of increase in imports. The overall improvement in the trade balance was kr. 20 billion in 1999, while the balance of services improved by kr. 8 billion. The surplus on the balance of trade and services thus accounted for the significant improvement in the current-account surplus from kr. -12.9 billion in 1998 to kr. 15.3 billion in 1999.

The more favourable situation for exports can be attributed to several factors, including higher demand abroad, increased export capacity in step with the dampening of domestic demand, and improved competitiveness as a result of the development in exchange rates. The positive course continued in January and February, as indicated by the improvement in industrial confidence. The March order and turnover statistics of the manufacturing industry showed a small stagnation in turnover, but with a rising intake of orders from the export market.

QUARTERLY NATIONAL ACCOUNTS IN CONSTANT PRICES

Chart 7



Note: Seasonally adjusted figures in 1995 prices.

In view of the favourable outlook for exports it is important that growth in domestic demand continues to be moderate, to protect capacity utilisation, among other factors. The picture of dampened domestic demand is supported by the most recent confidence indicators, including car sales and consumer confidence, which nevertheless presented a small increase in April. After the extraordinarily high level of activity in building and construction in connection with the hurricane which swept across Denmark in December 1999 the confidence indicator for building and construction subsided, thereby returning to the 1999 level.

Statistics Denmark's statistics for cash prices indicated generally unchanged cash property prices from the 3rd to the 4th quarter of 1999. For the 1st quarter of 2000 the statistics of the Association of Danish Mortgage Banks showed a rather surprising increase in property prices by 5 per cent against the 4th quarter of 1999, although fewer homes than previously changed owner. The decrease in the number of home purchases and the price dampening indicate that the reduction of the tax deductibility of interest payments under the Whitsun package of economic measures has taken effect.

In connection with the dampening of domestic demand the growth in lending to households by banks and mortgage-credit institutes also declined throughout 1999 and into 2000, to an annual rate of just over 5 per cent in April. However, business lending, primarily by banks, continued to increase at approximately 12 per cent p.a., which has been the

trend since end-1998. This phenomenon is not unusual late in a boom<sup>1</sup>. The distribution of lending to residents by Danish banks and their foreign units has changed since the turn of the year, due to the abolition as of 1 January 2000 of the stamp duty on loan agreements which are not filed with the Title Register. As a consequence, several banks have begun to transfer loans to residents from foreign units (primarily based in Dublin) to banks or subsidiaries in Denmark. Total lending to residents is not affected by this restructuring.

Despite dampened economic growth throughout 1999 unemployment continued to fall. In March the seasonally-adjusted registered unemployment rate was 5.3 per cent. This development is not quite in accordance with the labour survey (AKU) for the 4th quarter of 1999, which shows increasing unemployment as from the 1st quarter of 1999, or with the decrease in employment calculated on the basis of payments to ATP (the Danish Labour Market Supplementary Pension Fund) in the 4th quarter of 1999. However the ATP data was subject to irregular fluctuations which may indicate a new seasonal pattern for 1998 and 1999 compared to previous years.

#### **PRELIMINARY COMPILATION OF DENMARK'S EXTERNAL DEBT**

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On 31 March 2000 Danmarks Nationalbank published a preliminary compilation of Denmark's external debt for 1999 based on the current-account balance and capital transfers, as well as calculated value adjustments for certain elements of the external debt. The final compilation is expected to be published in October 2000.

During 1999 Denmark's external debt decreased by kr. 125 billion to kr. 175 billion at end-1999, cf. Table 1. This figure may be subject to considerable revision when the final compilation based on a comprehensive questionnaire survey of the private sector is published in October.

The current-account surplus of kr. 15 billion for 1999 constituted only a small proportion of the decline of kr. 125 billion. By far the greatest share can be attributed to extraordinarily high value adjustments of the securities portfolio, cf. Table 2.

At end-1999 residents held net external assets as shares, and net liabilities as bonds. Since at the same time overall for the year stock prices rose by far more abroad than in Denmark, while bond prices fell, there was a considerable decrease in the overall external debt. As a percentage of GDP the external debt diminished from 25 per cent to 14 per cent

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<sup>1</sup> A more detailed account of the relationship between credit expansion and the cyclical course is found in Jens Verner Andersen, Hanne Lyngesen and Erik Haller Pedersen, *Credit Expansion During Two Booms*, Danmarks Nationalbank, *Monetary Review*, 2nd Quarter 1999.

DENMARK'S EXTERNAL DEBT Table 1

Kr. billion	Assets	Liabilities	Net liabilities	Net liabilities
	End-1999			End-1998
Danmarks Nationalbank .....	168	2	-166	-101
Central government .....	16	329	313	346
Other general government .....	56	12	-44	-15
Banks .....	569	597	28	-45
Other private sector .....	763	806	43	115
<b>Total .....</b>	<b>1,571</b>	<b>1,746</b>	<b>175</b>	<b>300</b>

Source: Denmark's External Debt 1999, preliminary compilation, Danmarks Nationalbank, 31 March 2000.

of GDP, cf. Chart 8. Of the decrease by 11 percentage points, 9 percentage points can be attributed to value adjustments, 1 percentage point to the current-account surplus, and 1 percentage point to GDP growth.

Viewed over a longer period the balance of payments is nonetheless still an important factor contributing to the development in the external debt. This appears from comparison of the external debt with the accumulated current-account balances, which shows that in the 1990s the effect of value adjustments was moderate, cf. Chart 8. The large value adjustments in 1999 also show that the real burden of the external debt is related to interest payments.

## DENMARK'S CONVERGENCE PROGRAMME

The Danish government's most recent convergence programme, which was prepared in accordance with the Stability and Growth Pact, sets out a number of objectives for economic development up to 2005, including the government budget balance and government debt. These factors play an important role since the Stability and Growth Pact sets out the

CHANGES IN SECURITIES PORTFOLIOS Table 2

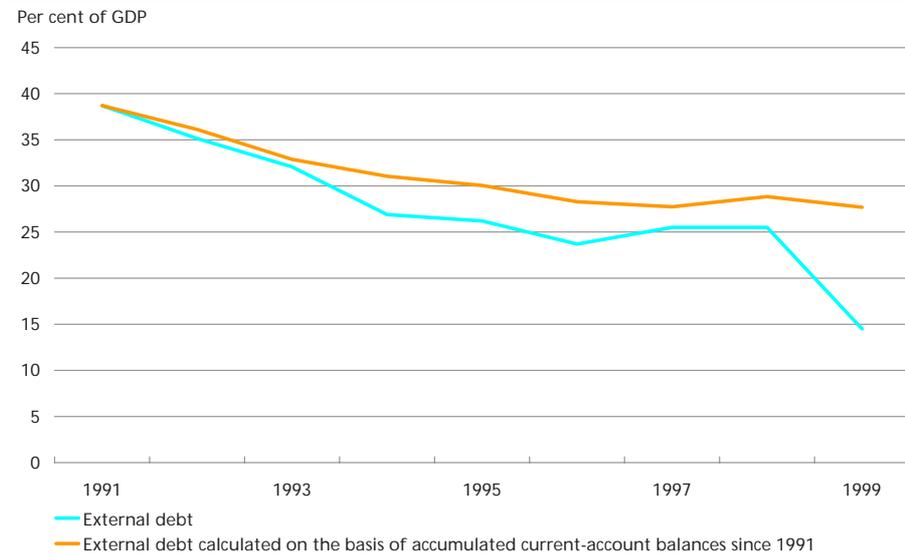
Kr. billion	End-1998	Net purchases	Value adjustment	End-1999
<b>Residents' holdings of foreign securities<sup>1</sup></b>				
Bonds, etc. ....	123	24	-1	145
Shares .....	208	43	106	358
<b>Non-residents' holdings of Danish securities</b>				
Bonds, etc. ....	624	32	-24	630
Shares .....	131	0	20	151

Source: Denmark's External Debt 1999, preliminary compilation, Danmarks Nationalbank, 31 March 2000. Solely includes portfolio investments.

<sup>1</sup> Excluding the Nationalbank's portfolio of foreign securities.

DENMARK'S EXTERNAL DEBT 1991-99

Chart 8



Sources: Statistics Denmark and Danmarks Nationalbank.

overall framework for fiscal policy in the individual EU member states. All member states must ensure that their government deficit and government debt do not become excessive. In principle, the government deficit must not exceed 3 per cent of GDP and the budget must be close to balance or in surplus in the medium term. The government debt must not exceed 60 per cent of GDP. If the debt exceeds 60 per cent of GDP it must be decreasing at an acceptable rate.

Compared to the euro area as a whole, with a government deficit of 1.2 per cent of GDP in 1999, Denmark has a favourable budget surplus of 3.0 per cent of GDP. The surplus can be attributed to Denmark's favourable economic course, as well as the fiscal-policy ambition to repay government debt. As a consequence of the Danish tradition for active use of fiscal policy to stabilise the economy, the need for a government budget surplus in Denmark is generally greater than in the euro area.

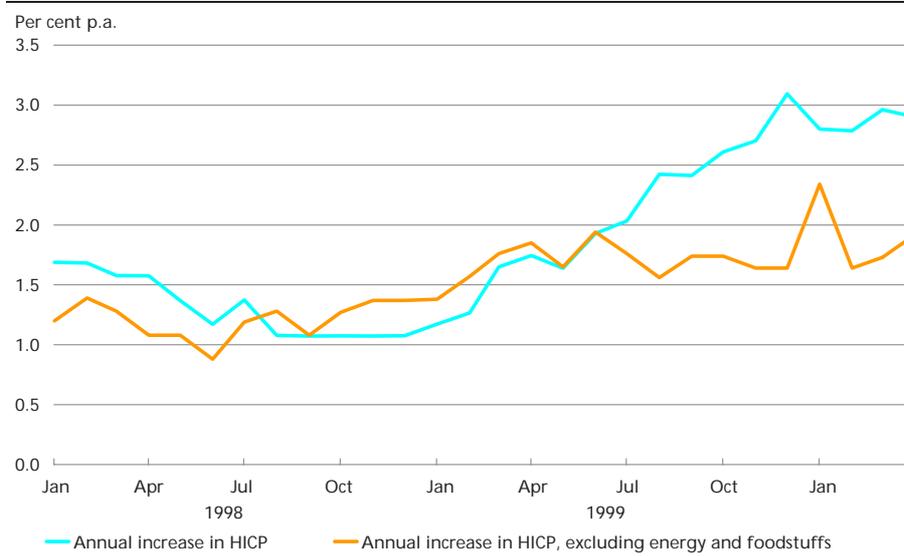
## DEVELOPMENT IN PRICES AND WAGES

The annual rate of increase in HICP for Denmark was 2.9 per cent in April, which was generally unchanged from the annual rate of increase of 3.0 per cent in March. Prices are buoyed up especially by energy and food prices, cf. Chart 9.

As from January 2000 Statistics Denmark made a number of adjustments to the methods used to calculate the consumer price index and

INFLATION IN DENMARK

Chart 9



the index of net retail prices. The weights were changed so as to better reflect the current consumption breakdown, and the overall effect is negligible. In addition, the sub-indices of the consumer price index are no longer subject to seasonal adjustment, and there is now greater harmony between the national consumer price index, CPI, and the EU Harmonised Index of Consumer Prices, HICP. However, the adjustments to the calculation of the traditional consumer price index mean that the interpretation of the annual increases in 2000 is associated with slight uncertainty.

In line with the development in HICP, the rate of increase in the traditional consumer price index fell marginally from 3.2 per cent in March to 3.1 per cent in April. Calculated retrospectively by the new method, the increase in consumer prices was 3.0 per cent in both March and April.

The increase in Denmark's HICP is somewhat higher than the increase in the euro area's HICP of 1.9 per cent in April. However, the current rate of inflation does not carry any significant weight in the calculation of the inflation criterion according to the Maastricht Treaty. The criterion is calculated as the percentage difference between the latest 12-month average of the index and the average for the preceding 12 months. Calculated by this method Denmark just matches the criterion value for April, cf. Chart 10.

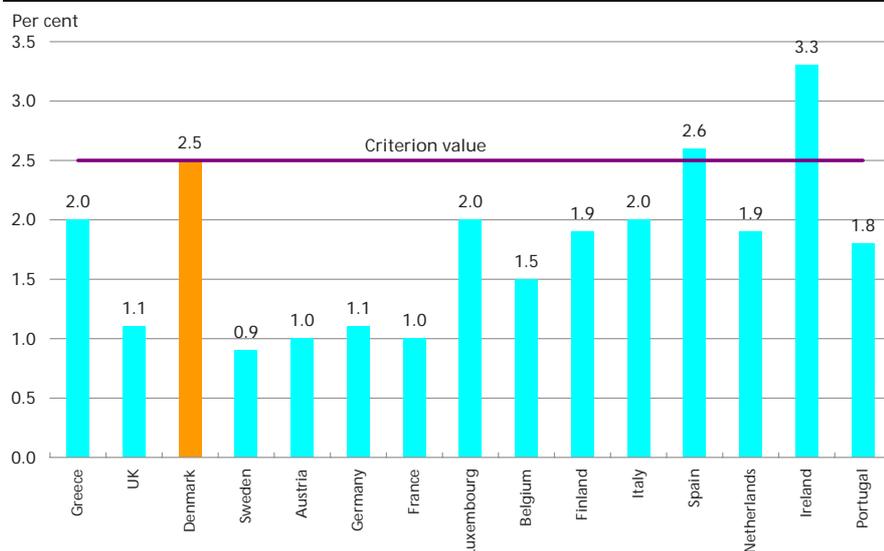
In January, the criterion was exceeded. The reason for the proximity of Denmark's inflation rate to the criterion value is that economic growth has been stronger in Denmark than in the euro area in recent years.

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 INFLATION AND THE INFLATION CRITERION OF  
 THE MAASTRICHT TREATY, APRIL
 

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Chart 10



Note: The most recent month in the compilation is April 2000. For each EU member state the increase in average HICP is shown for the period May 1999 – April 2000, compared to the average for the period May 1998 – April 1999. The criterion is the average of the three lowest inflation rates plus 1.5 percentage point.

Sources: Eurostat and own calculations.

Furthermore, increases in indirect taxes and prices subject to public administration have also played a role. In step with accelerating growth in the euro area during the year the inflation rates in the member states with the lowest inflation are expected to increase a little. Any exceeding of the criterion during 2000 is thus evaluated to be of a transitional nature. According to the most recent estimate by the European Commission Denmark will be closest to the criterion value in the 1st half of 2000.

As from May 1999 the collection of prices was moved from the week up to the 21st of a month to the week up to the 12th. This adjustment has had an impact on e.g. the clothing item, as the effect of the winter sale was included in the net prices for February. This contributes to the somewhat lower underlying inflation, as appears from "Other factors" in the 1st quarter of 2000 compared to the 4th quarter of 1999, cf. Table 3.

The development in "Other factors" reflects the development in domestic wages and profit margins and normally matches the cyclical course with a certain time lag. Growth in "Other factors" dampened during 1999, and this development is confirmed in the 1st quarter of 2000 – even when the effect of winter sales prices on clothing is disregarded. This matches the dampened domestic demand from end-1998 and may also reflect that the increases in import prices are not transmitted to consumers to their full extent, but that a proportion is absorbed

DEVELOPMENT IN CONSUMER PRICES AND NET RETAIL PRICES Table 3

	Consumer price index		Index of net retail prices	Energy	Imports	Domestic prices				
						Total	Food-stuffs	Rent	Public services	Other factors
	HICP	CPI	Weights							
			1.000	0.088	0.143	0.769	0.144	0.250	0.039	0.335
Year-on-year growth, per cent										
1993.....	1.3	1.4	-0.9	0.0	1.9	-0.2	2.1	1.7	2.7	
1994.....	2.0	1.6	-3.1	2.1	2.0	3.0	1.6	2.4	1.6	
1995.....	2.0	2.1	1.9	-2.5	2.5	2.2	3.1	1.8	2.0	
1996.....	2.1	2.1	2.0	6.6	0.1	1.9	1.7	1.6	2.4	
1997.....	1.9	2.2	2.2	2.7	0.9	2.4	3.6	2.8	1.8	
1998.....	1.3	1.9	1.5	-2.8	0.6	1.9	1.8	2.1	-0.9	
1999.....	2.0	2.5	2.1	2.1	-0.3	2.5	0.6	2.7	3.0	
1998 1st qtr. ...	1.6	2.0	1.8	-1.7	1.4	2.1	4.1	2.5	-0.4	
1998 2nd qtr. ...	1.4	2.0	1.7	-0.7	0.9	2.0	2.5	2.1	-1.5	
1998 3rd qtr. ...	1.2	1.7	1.2	-4.0	0.4	1.7	0.6	1.9	-1.9	
1998 4th qtr. ...	1.1	1.7	1.2	-4.7	-0.1	1.9	0.1	2.0	0.4	
1999 1st qtr. ...	1.4	2.0	1.5	-7.0	-0.7	2.4	0.3	2.8	2.1	
1999 2nd qtr. ...	1.8	2.3	1.8	-1.4	-0.8	2.4	-0.2	2.5	4.5	
1999 3rd qtr. ...	2.3	2.6	2.3	5.7	-0.2	2.5	0.7	2.8	3.8	
1999 4th qtr. ...	2.8	3.0	2.8	11.5	0.4	2.6	1.7	2.7	3.6	
2000 1st qtr. ...	2.8	3.1	3.4	24.1	2.1	2.1	2.6	3.1	3.6	

Note: Weighting basis as of December 1999.

The index of net retail prices is the consumer price index adjusted for indirect taxes, duties and subsidies for general price reductions.

"Other factors" is a measure of domestic market-determined inflation. "Other factors" normally increases faster than the index of net retail prices due to an overweight of services for which the price development is typically stronger than for other commodities. At the same time the demand for services viewed in the more long-term perspective will typically increase faster than the demand for other products.

HICP is the Harmonised Index of Consumer Prices.

as reduced profit margins. The slowdown of the rate of increase in wages and salaries from around 5 per cent in the 1st quarter of 1999 to just over 4 per cent at year-end also contributed to the dampening of the underlying inflationary pressure.

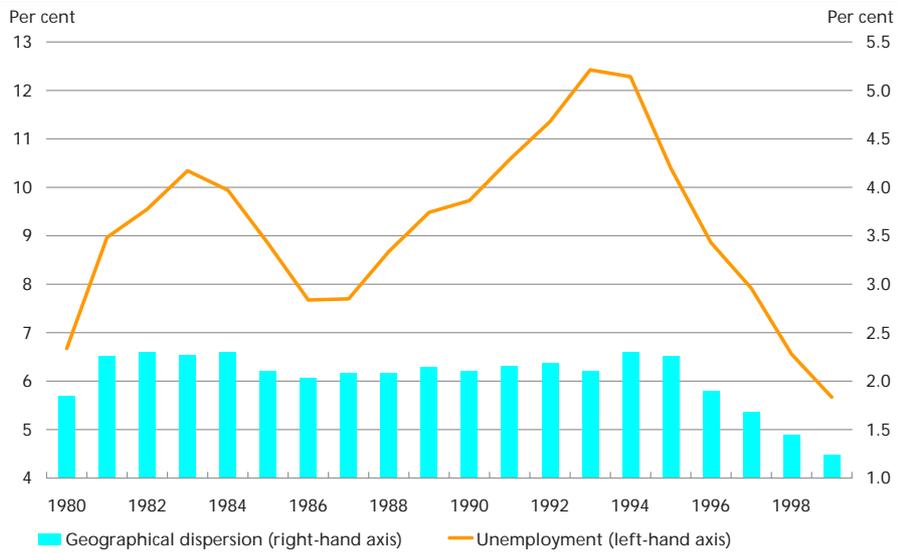
The strong decrease in unemployment since 1994 has not led to any substantial wage acceleration even though for a number of years wages and salaries in Denmark have shown a higher rate of growth than those of Denmark's trading-partner countries. This may reflect greater labour-market flexibility than in the 1980s. It can also be noted that, in contrast to the 1980s, the upswing in the 1990s has reduced the variations in unemployment rates between different regions of Denmark to a considerable degree, cf. Chart 11. The drop in unemployment has been greatest in the areas with a high starting level, such as Copenhagen. The reduction of the geographical variation may have contributed to reducing the increase in wages for a given unemployment rate.

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**MEASURE OF VARIATIONS IN UNEMPLOYMENT BETWEEN  
REGIONS IN DENMARK**


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Chart 11



Note: Variations in unemployment between regions of Denmark are measured by calculation a weighted standard deviation for registered unemployment on 14 counties, the City of Copenhagen and the Municipality of Frederiksberg.

Source: Statistics Denmark.

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## Financial Stability

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One of the principal tasks of Danmarks Nationalbank, like other central banks, is to contribute to the efficiency and stability of the financial markets. Financial stability is essential to maintaining sound macroeconomic development. The following analysis, prepared by Financial Markets (Danmarks Nationalbank), describes trends in the financial sector in Denmark and their implications for financial stability. The central banks in many other countries, among them Sweden, Norway and Finland, have prepared similar analyses of the development in the financial sector.<sup>1</sup>

The first section presents an analysis of the financial institutions, with special focus on banks. Then the trends in the non-financial sector are analysed since a large proportion of the financial sector's risks are associated with lending to that sector. Trends in the Danish and international financial markets are also of significance to the financial sector. These issues are considered in the third section. The final section outlines a number of the challenges the sector faces in the Nordic region.

The banks' overall financial result for 1999 is once again a sound surplus. Losses and provisions are low while costs have continued on an upward trend. The return on equity of the largest banks has increased, but for small and medium-sized banks it has decreased.

At international level proposals for amendment of the capital-adequacy rules have been submitted. The proposed amendments will ensure greater harmony between the capital-adequacy requirements and the risks assumed by the banks.

It is difficult to compare the financial results of the individual mortgage-credit institutes since they are part of financial groups according to varying structural models. It is more appropriate to focus on the various mortgage-credit institutes' share of lending. The distribution of market shares among the mortgage-credit institutes again changed in 1999.

Among the financial groups, the financial results of Den Danske Bank and Unidanmark improved in 1999, while the results of RealDanmark and Nykredit showed a decline. As an important step towards improving

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<sup>1</sup> For most recent issues cf. Sveriges Riksbank: *Financial Stability Report (1999/2)*, Norges Bank: *Financial Sector Outlook, Economic Bulletin 1999/4* and Bank of Finland: *Financial Stability in Finland, Bank of Finland Bulletin 1999/4*.

the information content of the financial statements, large financial groups initiated the introduction of new principles for presentation of accounts.

The risk of losses on extension of credit to the household sector is associated with a number of uncertainties, in particular the development on the property market. The continuing high prices for owner-occupied homes and the significant increase in financing with loans at floating interest rates mean that households are more exposed to the consequences of cyclical variations and interest-rate increases which also affect house prices.

The analysis of the overall business sector includes an evaluation of the development for an average business enterprise, but also an evaluation of selected business sectors as experience shows that the losses of financial institutions tend to be associated more with certain sectors than others.

The analysis is supplemented by an assessment of the distribution among business enterprises since an apparently positive average trend may conceal that several enterprises have actually undergone negative development, with a consequential risk of losses to the financial sector.

In general, the business community has achieved sound and appropriate development in profitability and capital structure. However, the earnings capability of 10 per cent of the poorest performing business enterprises has deteriorated, despite relatively favourable economic development. Other analyses show that sectors which have previously entailed losses for the financial institutions are to a greater extent representative of the rest of the business sector. Agriculture deviates from this pattern due to lower earnings.

Especially the banks, but to a certain extent also the other segments of the financial sector, are affected both directly and indirectly by the development on the Danish and international financial markets. The direct effect is via e.g. their portfolios of domestic and foreign securities, and the indirect effect is via customers' exposure to the financial markets, as well as the real-economic impacts of any market unrest.

The international financial markets returned to normal in 1999 after the period of unrest in the autumn of 1998. However, there are still a number of uncertainties in the financial markets, such as the risk of a considerable global slump in stock prices. This will not have any significant direct effect on the Danish banks, since shares account for a relatively small proportion of their balance sheets. However, the effect can become noticeable if a global drop in stock prices also has a significant

impact on the other financial markets, and thereby on the course of the real economy.

The following factors characterise the financial sector of the Nordic countries: cross-border integration, a high degree of concentration and the widespread use of modern technology.

In recent years the largest financial groups have established considerable activities in several Nordic countries.

With regard to technological advances, one example is the widespread use of Nordic Internet banks. The development of Internet banks can increase the strategic risk and is associated with considerable costs. In this respect it is important to closely monitor the development in costs and the risk profile. In the long term it is assumed that the higher costs are more than offset by improved earnings and opportunities for economies. For example, it cannot be ruled out that a need for restructuring of the branch network will arise once the Internet transactions have reached a certain level.



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## Trends in the Financial Sector

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This section describes trends in the financial sector in Denmark. The analysis is divided into three sections which concern respectively financial groups, banks and mortgage-credit institutes.

The degree of concentration of the Danish financial sector is relatively high compared to many other countries. As a result, only few groups have a large market share, and many groups and institutes have a relatively small market share, cf. "Structural Trends in the Financial Sector of the Nordic Region".

This is the background to the detailed analysis of the development trends in the largest financial groups between 1998 and 1999. The analysis focuses on market shares, earnings, costs and lending. The criterion for selection of the analysed groups was their participation in several segments of the financial markets.

The financial results of the different categories of banks<sup>1</sup> over the last 5 years are analysed with a view to e.g. identifying variations in trends between the groups. The three analysed categories of banks account for 99 per cent of the total balance sheet of Danish banks.

The analysis of trends for the mortgage-credit institutes is based on the development in market shares since comparisons of the financial results of mortgage-credit institutes are associated with problems of principle.

### THE LARGEST FINANCIAL GROUPS

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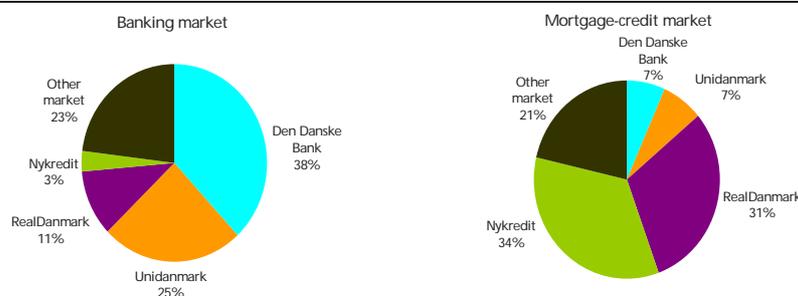
#### Market shares

The largest financial groups in Denmark are Den Danske Bank, Unidanmark, RealDanmark (previously Kapital Holding) and Nykredit and, with the exception of RealDanmark, they are involved in banking, mortgage credit and insurance activities and are thus key market participants in these three business areas. Chart 1 shows the market shares within banking and mortgage credit of the four largest financial groups. Only 3

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<sup>1</sup> The Danish Financial Supervisory Authority divides banks into categories based on working capital investments. Working capital consists of: deposits, issued bonds, etc., subordinate capital and equity according to the annual accounts at end-1998. Category 1: Banks with a working capital of kr. 25 billion and above (5 banks). Category 2: Banks with a working capital from kr. 3 billion to kr. 25 billion (16 banks). Category 3: Banks with a working capital from kr. 250 million to kr. 3 billion (76 banks). Category 4: Banks with a working capital of less than kr. 250 million (90 banks). The banks in category 4 are not included in the analysis. The number of banks in the various categories has changed in step with the growth in the size of the banks, and due to an adjustment of the working capital limits for the categories.

BANKS' BALANCE-SHEET SHARES IN 1999  
MORTGAGE-CREDIT INSTITUTES' SHARES OF MORTGAGE-CREDIT LENDING IN 1999 Chart 1



Sources: Annual accounts and the Danish Financial Supervisory Authority.

of these groups are represented in banking category 1 of the Danish Financial Supervisory Authority.

With a market share of 20 per cent Den Danske Bank is a key market participant in the life assurance market.<sup>1</sup> Unidanmark's share<sup>2</sup> of the life assurance market is 10 per cent, while the group's market share of the general insurance area is 22 per cent. Nykredit is also represented in the general insurance market with a market share of more than 2 per cent.

#### Development in the financial result between 1998 and 1999

The largest financial groups in Denmark experienced varying development trends in 1999. The bank-based groups, Den Danske Bank and Unidanmark, increased their profit after tax and return on equity<sup>3</sup> on 1998.

Den Danske Bank accounts for the highest return on equity among the large groups, cf. Chart 2. The profits of both mortgage-credit-based groups, RealDanmark and Nykredit, declined against 1998. RealDanmark's profit after tax was 25 per cent lower than in 1998.

#### Development in costs

Between 1998 and 1999 personnel and administration expenses accounted for the only major changes in the costs<sup>4</sup> of the financial groups. The personnel and administration expenses of all four groups increased, cf. Chart 3. The groups stated investments in information technology and staff increases as the reasons for the rising expenditure on personnel and administration. Den Danske Bank accounted for the greatest increase in these expenses at 20 per cent, which can be explained partly by the acquisition of new activities in 1999.

<sup>1</sup> 1998 figures – Annual Report of the Danish Financial Supervisory Authority 1998.

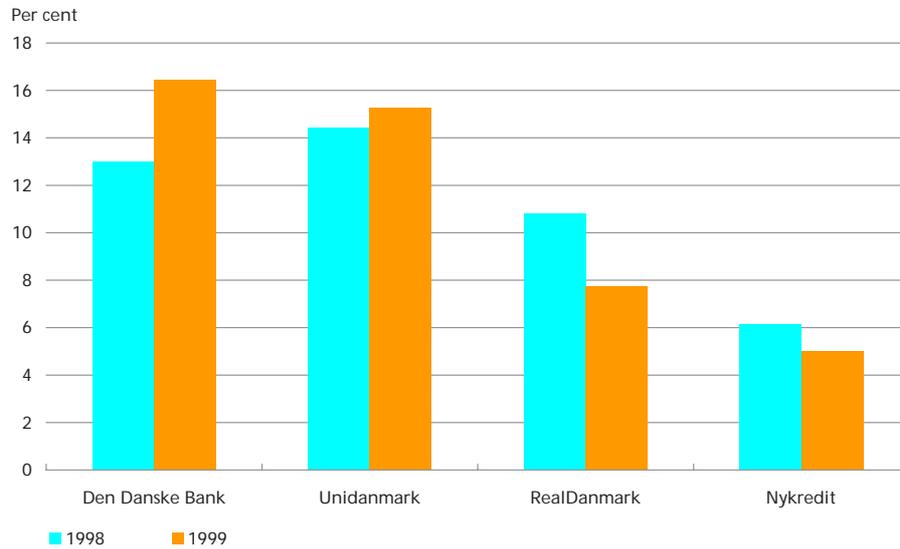
<sup>2</sup> Unidanmark's market shares are based on figures for Tryg-Baltica and Enhjørningen.

<sup>3</sup> Return on equity = profit after tax as a ratio of equity at end of period.

<sup>4</sup> Data from the traditional presentations of accounts.

RETURN ON EQUITY AT GROUP LEVEL

Chart 2

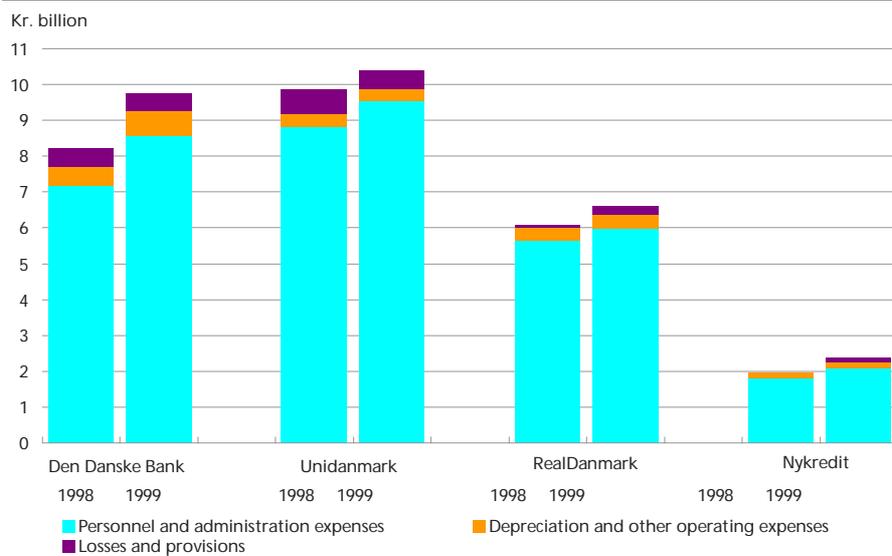


Source: Annual accounts.

The ratio of the year's losses and provisions to loans and guarantees for the four groups was between 0.03 per cent and 0.2 per cent in 1999. Losses and provisions are thus at a very low level.

DISTRIBUTION OF COSTS

Chart 3



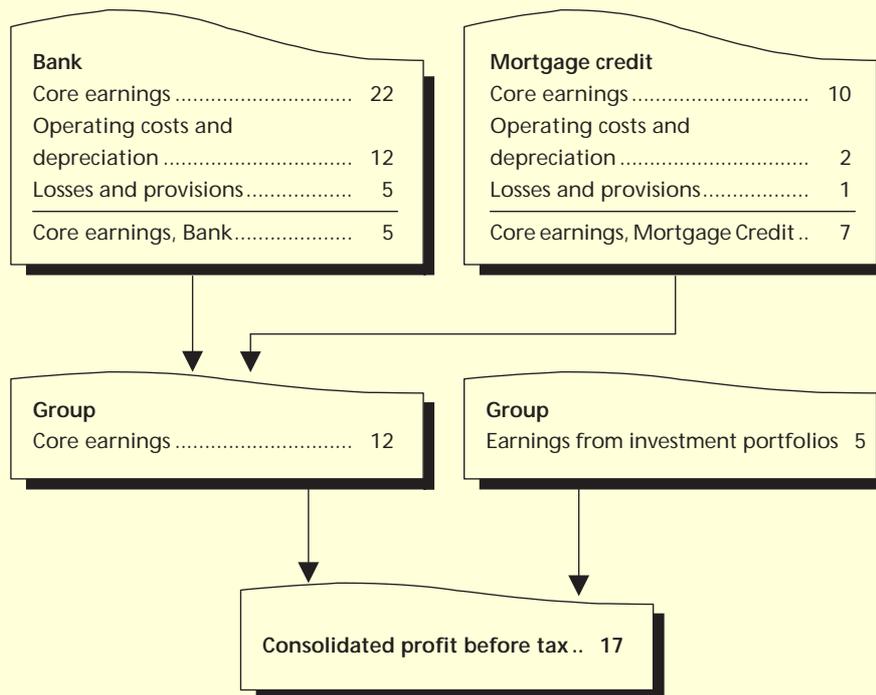
Source: Annual accounts.

## CORE EARNINGS AND EARNINGS FROM INVESTMENT PORTFOLIOS

Box 1

In August 1999 the Danish Bankers Association proposed a new method of presentation of accounts whereby a distinction is drawn between core earnings and earnings from investment portfolios. The new presentation method is intended to e.g. give a better overview of core earnings within the various business areas of a group.

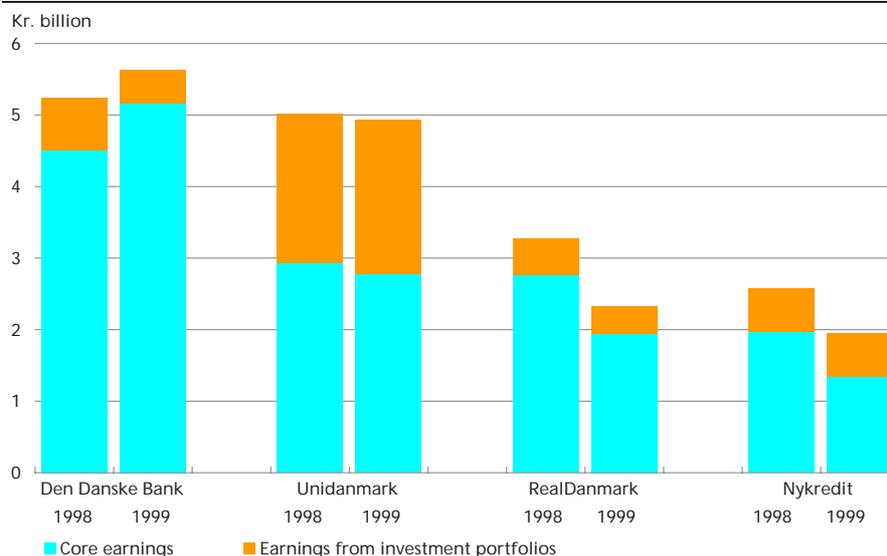
Core earnings show the operating results of the various business areas and comprise an intra-group statement of the funding required by the business area in question. The price of intra-group funding is called the funding rate. Earnings from investment portfolios comprise the earnings from stocks, bonds, foreign exchange and financial instruments which are associated with the portfolio for which the group manages its market risks. Earnings from investment portfolios are the return additional to the funding rate the group achieves by assuming market risks. The funding rate is deducted from the earnings from investment portfolios and carried as income in the business areas which obtained the funding. The sum of the core earnings of each business area is the core earnings for the entire group. Total core earnings are added to earnings from investment portfolios to obtain the ordinary result before tax. The new accounting principle is illustrated in the example below.



At present the groups apply varying definitions of business areas and delineations of core earnings and earnings from investment portfolios respectively.

CORE EARNINGS AND EARNINGS FROM INVESTMENT PORTFOLIOS

Chart 4



Note: In 1999 Den Danske Bank achieved a profit on sale of affiliated companies of kr. 703 million, which is not included in core or investment portfolio earnings. Unidanmark's profit from associated and affiliated companies as well as non-recurring income amounted to kr. 548 and kr. 242 million respectively in 1998 and 1999. These amounts are not included in core or investment portfolio earnings.

Source: Annual accounts.

### Core earnings and earnings from investment portfolios

All four financial groups have applied a new method to the presentation of the consolidated profit before tax in the annual accounts for 1999. The new presentation method, which divides the consolidated profit before tax into core earnings and earnings from investment portfolios, is described in further detail in Box 1.

The breakdown of ordinary profit on core earnings and earnings from investment portfolios is illustrated in Chart 4. The differences of definition between core earnings and earnings from investment portfolios between the groups are clearly apparent from the considerable differences in level<sup>1</sup>. Den Danske Bank and Unidanmark have thus chosen

<sup>1</sup> In the 1999 annual accounts the groups apply the following definitions of earnings from investment portfolios:

Den Danske Bank: earnings from investment portfolios comprise the profit on the own portfolio of the banking group and the general insurance activity. (The general insurance activity was finally divested on 31 December 1999.)

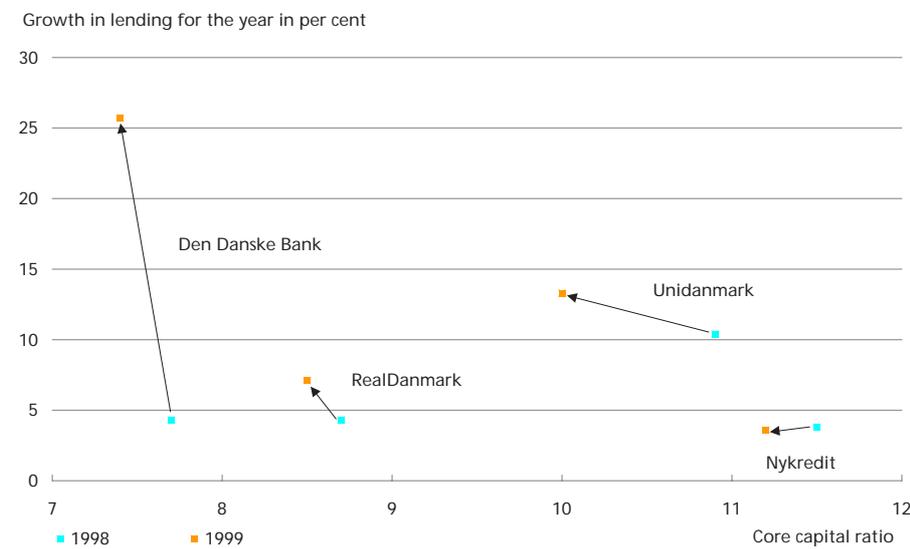
Unidanmark: earnings from investment portfolios for the bank correspond to the total return on the portfolio of stocks, bonds, etc. managed by the bank's central treasury department. Earnings from investment portfolios for insurance activities correspond to the equity share of the profit before costs of the investment activities, less a risk-free return on equity. Earnings from investment portfolios are thus an expression of the realised market risk achieved via the insurance group's placement of equity funds in securities, etc.

RealDanmark: division into core earnings and value adjustments. Value adjustments comprise all value adjustments, including reduction of remaining maturity.

Nykredit: earnings from investment portfolios are the extra return in addition to the risk-free money-market return on the securities portfolio. Earnings from investment portfolios thus express the extent to which the group's investments in liquid funds, bonds, stocks and financial instruments have contributed to increasing earnings.

## GROWTH IN LENDING AND CORE CAPITAL RATIO

Chart 5



Source: Annual accounts.

varying definitions of earnings from investment portfolios. The difference between the earnings from investment portfolios of the two groups is primarily a result of the method by which earnings from investment portfolios are calculated and included in the two groups' insurance companies, Danica and Tryg-Baltica.

The purpose of the new presentation of accounts is among other things to give a better overview of earnings in the various business areas. This should be regarded as a considerable improvement in the information content of the accounts. Uniform definitions of core earnings and earnings from investment portfolios, and of individual business areas, could contribute further to enhancing the comparability of the various groups.

### Credit growth and core capital ratio

The solvency ratio<sup>1</sup> of the four groups was between almost 11 per cent and 12 per cent and thereby clearly above the statutory requirement of 8 per cent. For all groups the core capital ratio<sup>2</sup> decreased marginally in 1999.

Unidanmark accounted for the strongest decrease in the core capital ratio. This can be attributed partly to the group's acquisitions during 1999, and partly to growth in lending. Growth in lending for Den

<sup>1</sup> Solvency ratio = liable capital as a ratio of risk-weighted assets, etc.

<sup>2</sup> Core capital ratio = core capital as a ratio of risk-weighted assets and off-balance sheet items.

ANNUAL RESULT OF BANKS IN CATEGORIES 1-3 Table 1

	1998 kr. billion	1999 kr. billion	Percentage change
<i>Accounting items</i>			
Net income from interest and fees .....	38.5	40.6	6
Value adjustments .....	1.0	1.8	75
Other ordinary income .....	2.2	1.9	-13
Result of financial items .....	41.6	44.2	6
Personnel and administration expenses, etc.	26.5	28.8	9
Depreciation of assets .....	1.9	1.7	-6
Other operating expenses .....	0.1	0.2	137
Losses and provisions .....	2.7	2.6	-5
Value adjustment of capital investments in associated and affiliated companies.....	3.6	3.4	-4
Ordinary profit before tax .....	14.0	14.3	2
Tax .....	2.1	2.5	16
Profit for the year .....	11.9	11.8	-1
<i>Selected balance-sheet items</i>			
Loans .....	606.1	686.2	13
Portfolio of stocks and bonds .....	357.1	373.5	5
Deposits .....	695.3	750.0	8
Equity .....	90.8	94.4	4
Balance-sheet total .....	1,450.3	1,567.0	8
Guarantees .....	255.2	317.0	24

Note: Details may not add due to rounding.

Sources: The Danish Financial Supervisory Authority 1998, annual accounts 1999.

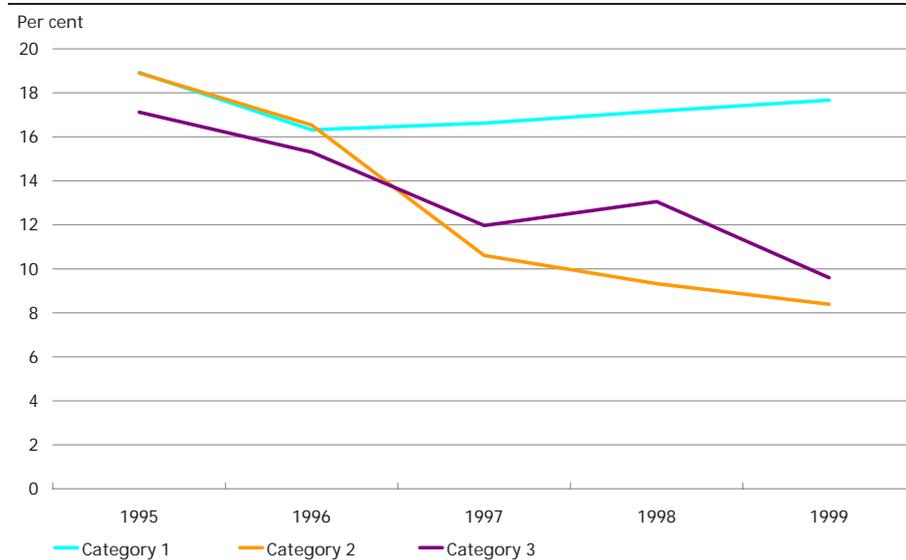
Danske Bank<sup>1</sup> and Unidanmark was almost 26 per cent and approximately 13 per cent respectively. Growth in lending for RealDanmark and Nykredit was less than 8 per cent in 1999. The correlation between growth in lending and core capital ratio is shown in Chart 5.

## THE BANKS

### Financial results

The financial results before tax of the banks in categories 1, 2 and 3 rose marginally in 1999 against 1998, cf. Table 1. Net income from interest and fees increased by 6 per cent, and value adjustments rose by a total of 75 per cent. However, this growth conceals decreases in value adjustments for the banks in categories 2 and 3. Personnel and administration

<sup>1</sup> In connection with management of the total credit risks Den Danske Bank in 1999 acquired a credit guarantee entailing a reduction of equity tied up in wholesale banking activities. This agreement comprises loans and advances totalling kr. 27 billion. (Source: Den Danske Bank's Annual Accounts 1999.) The global market for credit derivatives is accelerating strongly.

RETURN ON EQUITY IN THE BANK CATEGORIES Chart 6

Sources: The Danish Financial Supervisory Authority 1995-98. Annual accounts 1999.

expenses, etc., rose by 9 per cent, thereby continuing the trend of several years. Again in 1999 losses and provisions were very low. Lending increased by 13 per cent in 1999, while deposits rose by 8 per cent. Among off-balance sheet items guarantees increased by 24 per cent, which may be due to the banks' increased provision of guarantees in connection with mortgage-credit loans.

The banks in categories 1, 2 and 3 achieved pre-tax profits of respectively kr. 11.8 billion, almost kr. 1.2 billion and kr. 1.3 billion in 1999. For the fourth consecutive year the category 1 banks increased their return on equity<sup>1</sup>, while that of banks in categories 2 and 3 decreased. Among the categories the category 2 banks achieved the lowest return on equity in 1999, which was also the case in 1997 and 1998, cf. Chart 6.

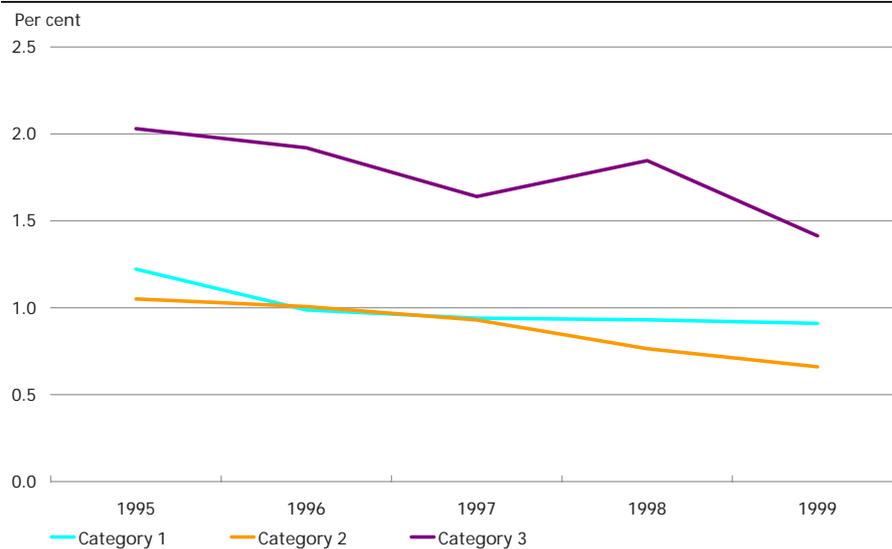
The development in return on equity may reflect changes in profitability and/or gearing. Pre-tax profit as a ratio of total assets is one measure of profitability. Chart 7 presents the development in profitability. Gearing can be expressed as total assets as a ratio of equity. The development in the gearing of the three categories of banks is shown in Chart 8.

The banks in category 1 have increased their gearing since 1995. In the last 4 years the higher gearing has resulted in a higher return on equity. The decrease in the return on equity of the category 2 banks during the

<sup>1</sup> Return on equity is calculated as ordinary profit before tax as a ratio of equity at end of period.

DEVELOPMENT IN PROFITABILITY

Chart 7

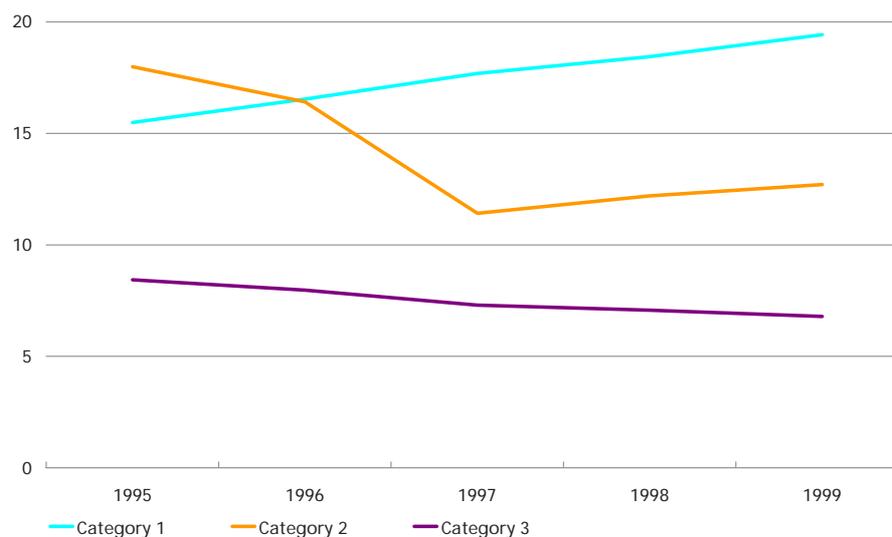


Note: Pre-tax profit as a ratio of assets.  
Sources: The Danish Financial Supervisory Authority 1995-98. Annual accounts 1999.

period can be attributed to a decrease in profitability as well as reduced gearing. The return on equity of banks in category 3 also fell during the period. This decline can be attributed primarily to reduced profitability rather than lower gearing.

DEVELOPMENT IN GEARING

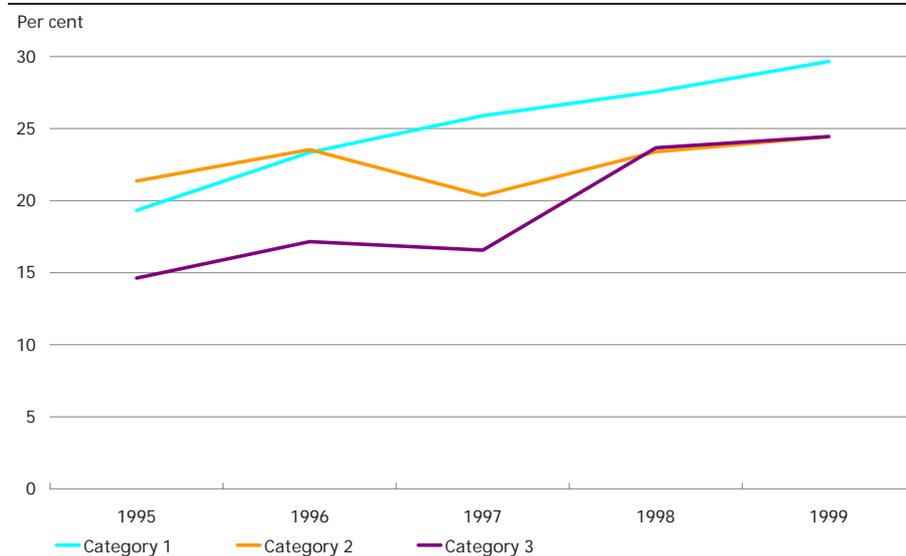
Chart 8



Note: Assets as a ratio of equity capital.  
Sources: The Danish Financial Supervisory Authority 1995-98. Annual accounts 1999.

SHARE OF NET INCOME FROM FEES OF TOTAL  
NET INCOME FROM INTEREST AND FEES

Chart 9



Sources: The Danish Financial Supervisory Authority 1995-98. Annual accounts 1999.

### Net income from interest and fees

The banks' net income from interest and fees rose in 1999 compared to 1998. The positive development is related particularly to the rising level of interest rates, a higher volume of deposits and lending, earnings from re-mortgaging transactions, and securities transactions.

The interest rate is an important parameter of competition among the banks. In recent years the competition in the banking sector has led to a reduction of the interest margin, which emphasises the need for other sources of income. The banks have therefore sought greater differentiation of the prices of the individual financial products.

The proportion of total net income from interest and fees which is net income from fees<sup>1</sup> is an indication of the significance of income from interest. In the period 1995-1999 the banks increased net income from fees as a proportion of total net income from interest and fees. The banks in categories 1 and 3 accounted for the most significant increase in the share of income from fees. The share of net income from fees rose for banks in category 2, although at a more moderate rate. The share of net income from fees is generally lower for the banks in categories 2 and 3 than for category 1 banks, cf. Chart 9.

<sup>1</sup> Net income from fees consists of net income from fees and commission plus dividend on capital investments.

## LOSSES AND PROVISIONS

Box 2

Losses and provisions is a net item of the banks' profit and loss account and is the sum of several offsetting internal accounts. The relation between the individual items of the balance sheet and the profit and loss account is presented below.

Should a bank suffer a loss on a debtor the asset (primarily loans and guarantees) is written off and the amount is carried under losses and provisions in the accounts.

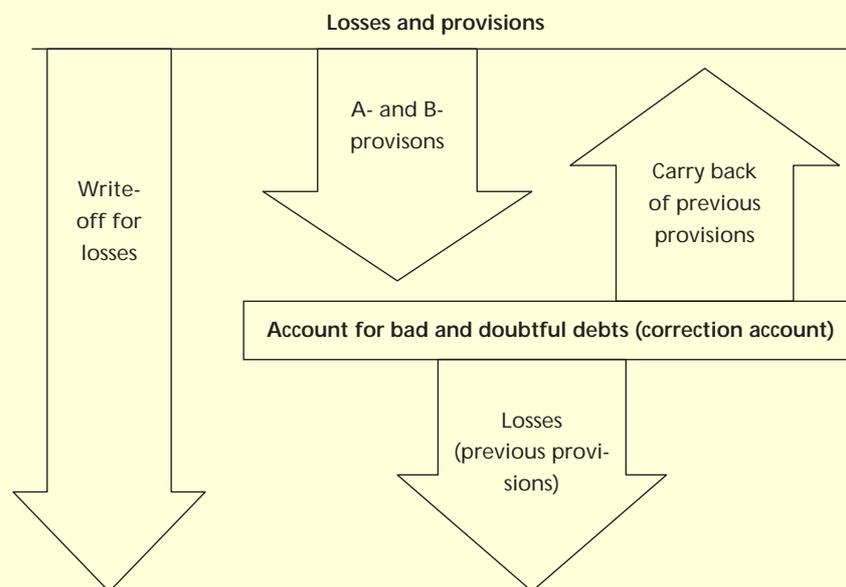
Had the bank expected the loss it would have allocated the amount to the account for bad and doubtful debts until the loss was realised. When a provision is allocated the asset is written down by the bank and the amount is carried under losses and provisions. Normally the debtor is not informed of the provision. There are two types of provisions. "A provisions" are for losses with a probable risk of losses, while "B provisions" are for losses which are assessed to be irredeemable, although the size of the loss cannot be fully estimated. Provision amounts are carried to the account for bad and doubtful debts, also called the correction account.

If the bank has already allocated provisions for a loan and the debtor unexpectedly fulfils its obligations to the bank, the latter will carry back the provision by writing up the asset and setting off the amount under losses and provisions.

The relations between the individual entries under losses and provisions are outlined below. The chart does not take into account repayments on claims previously written off.

## MOVEMENTS IN THE LOSSES AND PROVISIONS ITEM

Chart



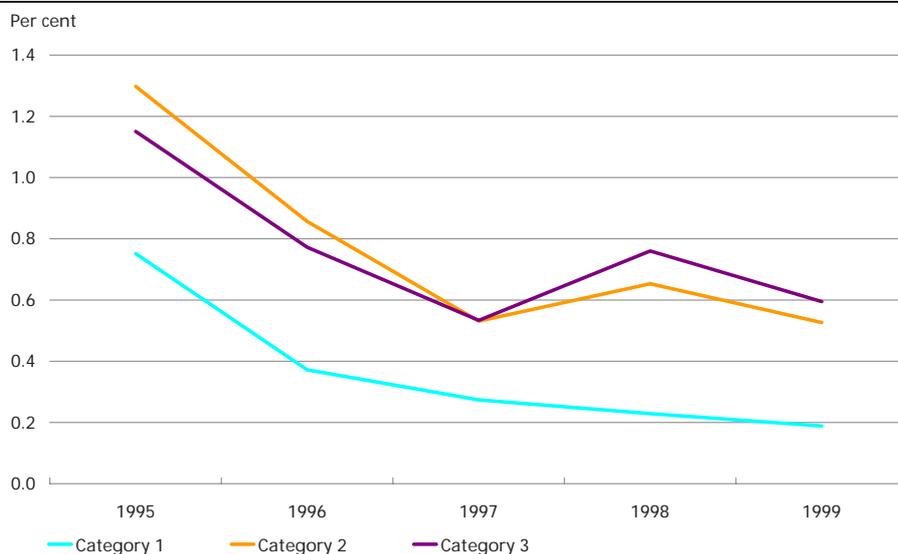
Source: The Danish Financial Supervisory Authority – Executive order on the presentation of accounts, etc., by credit institutions, specialised credit institutions and certain savings and lending institutions.

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**LOSSES AND PROVISIONS FOR THE YEAR AS A RATIO OF LOANS AND GUARANTEES**


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Chart 10



Sources: The Danish Financial Supervisory Authority 1995-98. Annual accounts 1999.

**Losses and provisions**

Losses and provisions were also low in 1999, cf. Table 1. Losses and provisions is a net item, which may not clearly reflect the level of actual losses and provisions during the year. The breakdown of the item is presented in further detail in Box 2. In 1999 new provisions amounted to more than kr. 10 billion, while provisions carried back were just over kr. 7 billion.<sup>1</sup> Net losses and provisions totalled kr. 2.6 billion.

For the three categories losses and provisions for the year as a ratio of loans and guarantees has been falling for the last 5 years, cf. Chart 10. This is related to declining losses and provisions and to an increasing volume of loans and guarantees. Losses and provisions as a ratio of loans and guarantees has been lower for banks in category 1 than for banks in categories 2 and 3 throughout the period.

Transfers of provision exposures between the banking categories can provide an indication of the development in each banking category's credit-risk policy. In volume terms transfers of provision exposures from banks in category 1 to banks in categories 2 and 3 in 1998 and 1999 exceeded the transfers from categories 2 and 3 to category 1. The credit risk of the banks in category 1 was reduced, but increased for the banks in categories 2 and 3 due to a net intake of provision exposures, cf. Table 2.

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<sup>1</sup> The Danish Financial Supervisory Authority, Market Development in 1999 for Banks (in Danish).

PERCENTAGE TRANSFER OF PROVISION EXPOSURES Table 2

Banking category	1998		1999	
	Disposed of	Received	Disposed of	Received
Category 1 .....	65.4	46.2	68.7	49.6
Category 2 .....	15.1	24.8	14.2	21.2
Category 3 .....	19.5	26.6	17.1	28.1
Category 4 .....	...	2.4	...	1.1
Sum .....	100	100	100	100

Note: Each year the Financial Supervisory Authority examines the number of exposures transferred to other banks for which a provision of at least kr. 100,000 has been booked. The survey comprises the banks in categories 1, 2 and 3 (97 banks). A total of 1,562 exposures were reported, totalling kr. 1,134 million in 1999. Total provisions amounted to kr. 601 million.

Source: The Danish Financial Supervisory Authority.

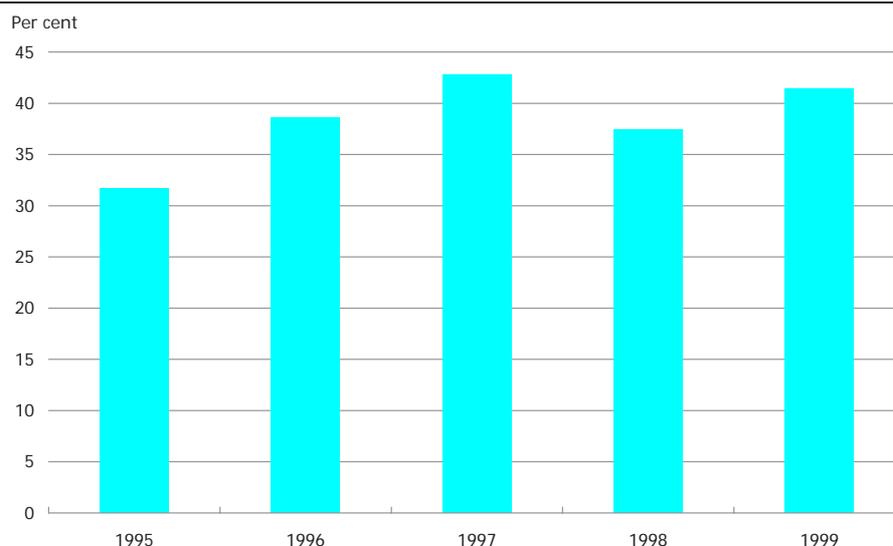
### Lending

Total lending has shown a constant year-on-year increase from kr. 440 billion in 1995 to kr. 686 billion in 1999. Non-business lending amounted to kr. 170 billion in 1999, while lending to the business sector and to the general government was kr. 499 billion and kr. 18 billion respectively.

A considerable proportion of the increase in lending is related to growth in lending to non-residents. In the period 1995-1999 lending by banks in category 1 to non-residents increased by kr. 121 billion to kr.

LENDING TO NON-RESIDENTS AS A RATIO OF TOTAL LENDING BY CATEGORY 1 BANKS

Chart 11



Note: The breakdown of lending on residents and non-residents is based on retrospective application of the present division into categories.

THE BANKS' BUSINESS LENDING AND GUARANTEE DEBTORS,  
BREAKDOWN BY SECTOR IN 1999 PER CENT

Table 3

Sector	Category 1	Category 2	Category 3
Agriculture .....	5	10	26
Fisheries .....	0	0	2
Manufacturing, ect. ....	22	11	9
Building and construction .....	3	5	8
Trade, hotels and restaurants .....	14	16	18
Transport .....	10	6	6
Financing .....	20	16	9
Property administration, etc. ....	16	23	13
Other .....	10	13	9
Sum .....	100	100	100

Source: The Danish Financial Supervisory Authority.

231 billion, while total lending to non-residents by banks in categories 2 and 3 was stable in the range of kr. 8 billion to kr. 14 billion. For the period taken as one lending by banks in category 1 to both residents and non-residents increased. Lending to non-residents accounted for the highest relative increase in the period. This appears from Chart 11, which shows an increasing proportion of lending to non-residents. The decrease in the share of lending to non-residents in 1998 may be a reaction to the global market unrest in the autumn of 1998, cf. "Trends in the Financial Markets".

Table 3 presents the breakdown of business lending and guarantee debtors in the 3 banking categories. In 1999 the market share of category 1 – measured in terms of business lending and guarantee debtors – was 86 per cent, while the market shares of categories 2 and 3 were 9 per cent and 5 per cent respectively. Manufacturing accounted for the largest individual share of loans and guarantees from category 1, while property administration, etc., accounted for the largest share from category 2. Agriculture accounted for the largest share from category 3, cf. also "Trends in the Non-Financial Sector".

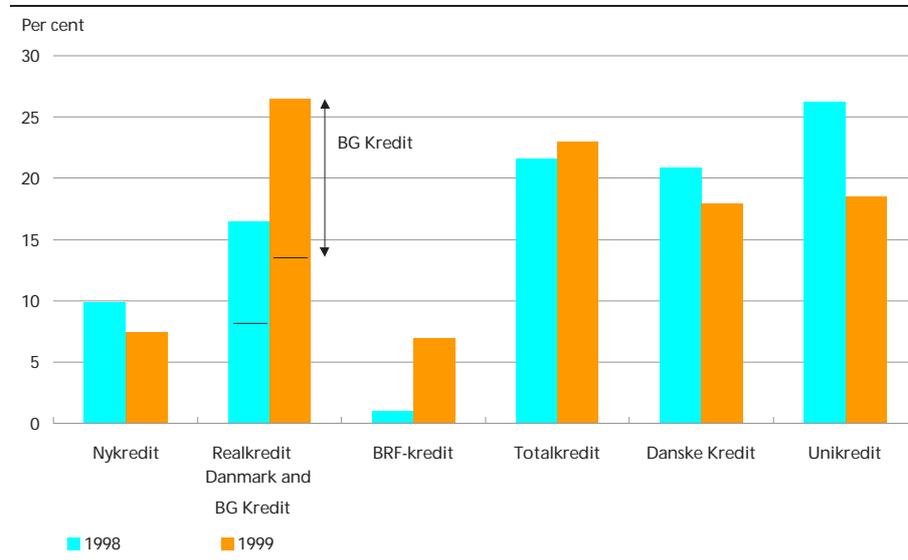
The solvency ratio of banks in categories 1, 2 and 3 declined from 12.9 per cent in 1995 to 11.8 per cent in 1999. The solvency ratio still exceeds the statutory requirement of 8 per cent.

In the light of such factors as the changing risk profiles of financial institutions and the emergence of new types of risk the Basle Committee<sup>1</sup> and the European Commission have submitted a proposal for amendment of the capital adequacy rules. This proposal takes account of finan-

<sup>1</sup> The Basle Committee, which has a secretariat at the Bank for International Settlements (BIS) in Basle, was established in 1975 in order to increase the stability of the international financial system. The Committee consists of the G-10 countries (Belgium, Canada, France, Germany, Italy, Japan, Netherlands, Sweden, UK, USA) and Switzerland and Luxembourg.

MORTGAGE-CREDIT INSTITUTES' SHARES OF NET LENDING

Chart 12



cial innovation and modern risk management techniques<sup>1</sup>. The proposed capital adequacy rules are designed to e.g. create greater harmony between the capital adequacy requirements and the risks assumed by the financial institutions.

## THE MORTGAGE-CREDIT INSTITUTES

Since mortgage-credit institutes are part of financial groups or close strategic alliances it is difficult to compare the financial results of the individual mortgage-credit institutes. This is related to differences in e.g. ownership structures, settlement methods between the distributor (often an estate agent or bank) and the mortgage-credit institute, as well as historical variations among the mortgage-credit institutes. As a consequence the following focuses solely on the development in market shares.

### Lending

Again in 1999 there was a change in the market shares for net lending<sup>2</sup> in the mortgage-credit market, cf. Chart 12. The share of net lending of

<sup>1</sup> Cf. Danmarks Nationalbank, *Report and Accounts 1999*, and [www.nationalbanken.dk](http://www.nationalbanken.dk).

<sup>2</sup> Net lending is defined as gross new lending less transfers and extraordinary redemptions, as well as ordinary repayments. Net lending comprises new loans for e.g. change of ownership, but also conversion loans, whereby the borrower moves the loan from one mortgage-credit institute to another.

Totalkredit, BRF-kredit, RealkreditDanmark and BG Kredit increased, while the share of Nykredit, Danske Kredit and Unikredit decreased.

The development in lending was also characterised by the growing significance of adjustable-rate loans. For the year as a whole adjustable-rate loans accounted for approximately 70 per cent of the increase in total lending. However, at end-1999 these loans accounted for only 6 per cent of the total lending volume.

In terms of total lending volume Nykredit and Realkredit Danmark continue to dominate, as appears from Chart 1.

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## Trends in the Non-Financial Sector

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Transactions with the non-financial sector are the basis for the activities of the financial sector. Most of the financial sector's risks are therefore associated with lending to the corporate sector and households. The future development in these areas is thus a key factor influencing the risks of the financial institutions.

The balance between debt and earnings is a significant element of the evaluation of trends in both the household and corporate sectors. The sensitivity to falling prices for net assets and rising interest rates for debt must be kept at a manageable level.

### HOUSEHOLDS

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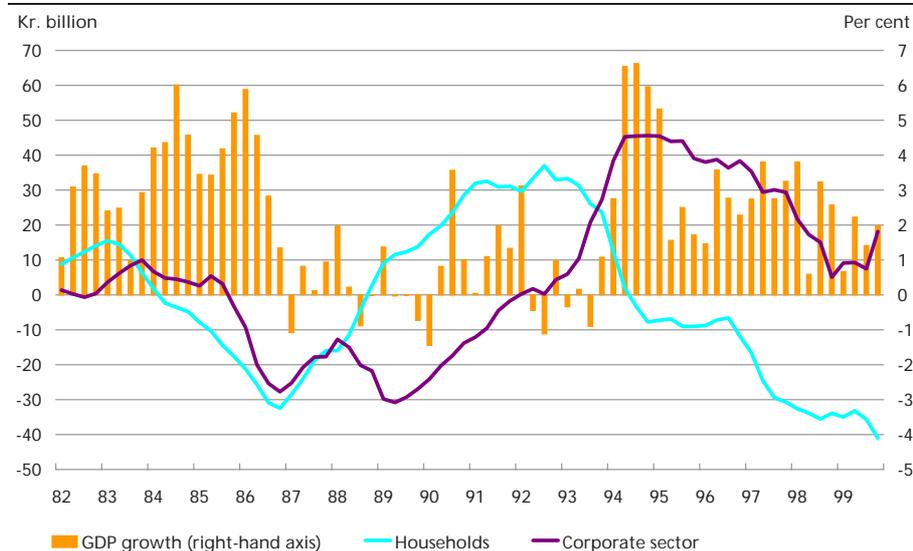
Lending to households by Danish financial institutions is predominantly to residents. Another characteristic feature is that the financial institutions' outstanding loans to an average household are modest in terms of the total volume of lending by financial institutions. The absolute risk of losses on the individual loans is therefore small, and the risk of considerable losses in the financial sector increases only in a situation where many households are affected.

An analysis of the risk to the financial sector related to lending to households is therefore based on the general economic trends in Denmark. Thereafter the focus turns to the development in the housing sector, which plays a vital role in determining the financial scope of households. This is partly because residential property is the largest element of households' assets, and partly because home financing accounts for the largest proportion of lending by the financial sector to households.

#### Financial savings

The Danish economy appears to have undergone a soft landing after a number of years of strong growth. A suitable balance between demand and savings for both the households and the corporate sector is an important prerequisite for continued stable development.

In periods of economic growth households will often tend to increase their expenditure faster than income. This typically results in a deterioration of their financial savings, which are defined as the difference between savings and investments. Furthermore, for the corporate sector

FINANCIAL SAVINGS OF HOUSEHOLDS AND CORPORATE SECTOR Chart 13

Note: A 4-quarter moving average is applied. GDP growth is calculated as the rate of growth over 4 quarters. Official statistics for the financial savings of the two sectors are available only up to 1995. An indicator for each of the two sectors has therefore been designed as a supplement to the official figures. The corporate sector solely comprises companies. It is not possible to separate the financial sector from the corporate sector. As the savings of the financial sector are relatively stable the lack of separation is probably of less importance as long as the main focus is on changes.

savings are associated directly with the international cyclical course, since the earnings of Danish business enterprises are also based on sales to markets abroad.

The economy's favourable development since 1993 has contributed to a decline in households' financial savings, cf. Chart 13. The reduction in savings can be attributed to capital gains on e.g. owner-occupied homes, leading to increased consumption.

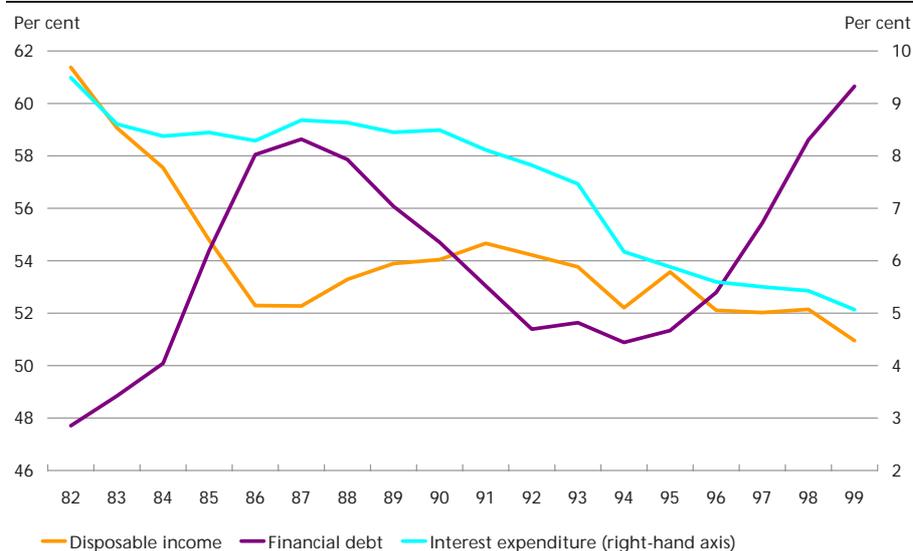
The financial savings of the corporate sector have been positive since the beginning of the 1990s due to such factors as the significant increase in domestic demand. Furthermore, it appears that in 1997 and 1998 investments by the business sector increased more strongly than savings, resulting in the erosion of financial savings. However, the development reversed in 1999, which can be attributed primarily to increased demand from abroad.

### Income and net assets

In terms of GDP the households' disposable income has shown a marginal decrease in recent years, cf. Chart 14. During the same period households' debt to financial institutions rose to approximately 60 per cent of GDP from a level of around 50 per cent in the beginning of the

HOUSEHOLDS' INCOME, DEBT AND INTEREST EXPENDITURE AS  
A PERCENTAGE OF GDP

Chart 14



Note: Financial debt is the bank loans and bond debt of households. For 1999 interest expenditure and disposable income are determined via own calculations and estimates of the economic development.

Sources: Tax statistics from Statistics Denmark, Financial Statistics from Danmarks Nationalbank, the Adam databank and the Economic Survey by the Ministry of Economic Affairs.

1990s.<sup>1</sup> The debt to financial institutions is thus now at a higher level than in the late 1980s.

Despite a rising debt ratio the households have reduced their expenditure on interest. Falling interest rates have thus had a stronger impact than the increasing debt ratio. The lower interest expenditure has entailed that the households' interest burden – defined as interest expenditure as a ratio of disposable income – has fallen from 15 per cent to the present level of approximately 10 per cent. However, an increasing debt ratio can present problems at a later stage since it increases households' exposure to the consequences of interest-rate increases.

The data present the development for the overall household sector, and thus solely indicate the average development. To gain an overall picture it is also important to focus on the distribution of debt and income on the individual households<sup>2</sup>.

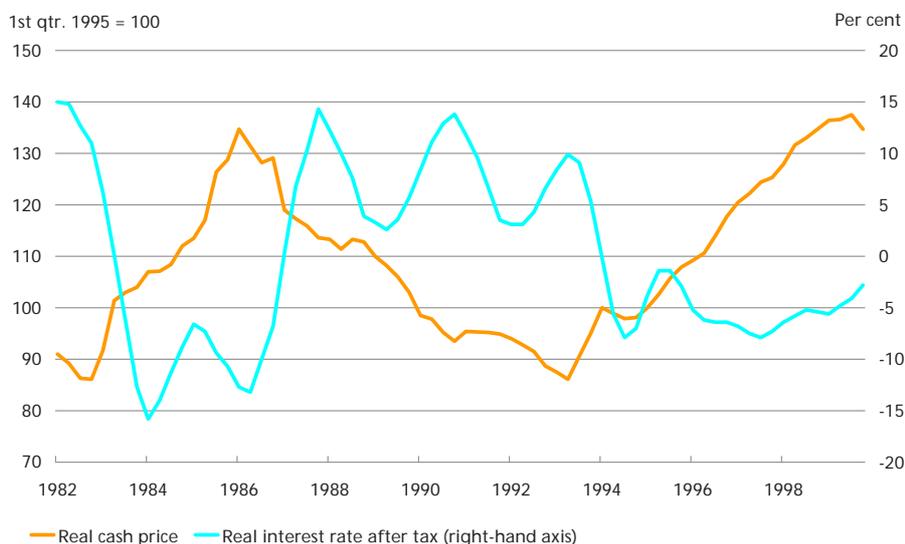
A suitable balance between income, savings and consumption is a prerequisite for continued stable development in the household sector. In

<sup>1</sup> It should be noted that the focus is exclusively on households' gross debt to financial institutions. However, from the viewpoint of the financial institutions this is the relevant item to use as the starting point for the analysis. Gross debt is thus an indication of the maximum risk. A subsequent evaluation may naturally reveal factors to explain a lower overall risk. In this connection account must be taken of the households' assets, as these are often provided as collateral for borrowing.

<sup>2</sup> The Finance Report 2000 contains a section on income distribution in Denmark.

REAL CASH PRICES FOR ONE-FAMILY HOMES AND REAL INTEREST RATE AFTER TAX

Chart 15



Note: The real interest rate after tax is deflated by cash prices.  
Sources: Statistics Denmark and Danmarks Nationalbank.

recent years consumption has to a high degree been driven by increases in housing assets. The future development will thus to a great extent be determined by the development in property prices. This applies particularly in a situation where households' debt to financial institutions has increased significantly. It is therefore vital to future stable development that appropriate scope for manoeuvre is maintained.

### The private housing market

Housing accounts for by far the largest share of the net assets of Danish households<sup>1</sup>. The development in the housing market is therefore considered very important in the assessment of households. Experience shows that price increases which turn out not to be robust may have extensive consequences for the household sector.

Homeowners have benefited from recent years' development in the property market. This is reflected in the strong decrease in the number of enforced sales compared to the beginning of the 1990s<sup>2</sup>.

The problems in the property market in the early 1990s were to a high degree related to the fact that the strong price increases in the mid-1980s proved to be untenable, cf. Chart 15. Many homeowners took

<sup>1</sup> Data from the Finance Report 1998/99 show that housing assets amounted to 94 per cent of GDP in 1997. For comparison, net balances on bank accounts were 7 per cent of GDP.

<sup>2</sup> The number of published enforced sales decreased from around 20,000 in 1990 to approximately 2,000 in 1999.

advantage of the appreciation of their property and raised supplementary loans, using the property as collateral. The subsequent decline in property prices meant that many households were technically insolvent during that period, but could still pay interest and instalments on their loans since the payments on the loans were constant.

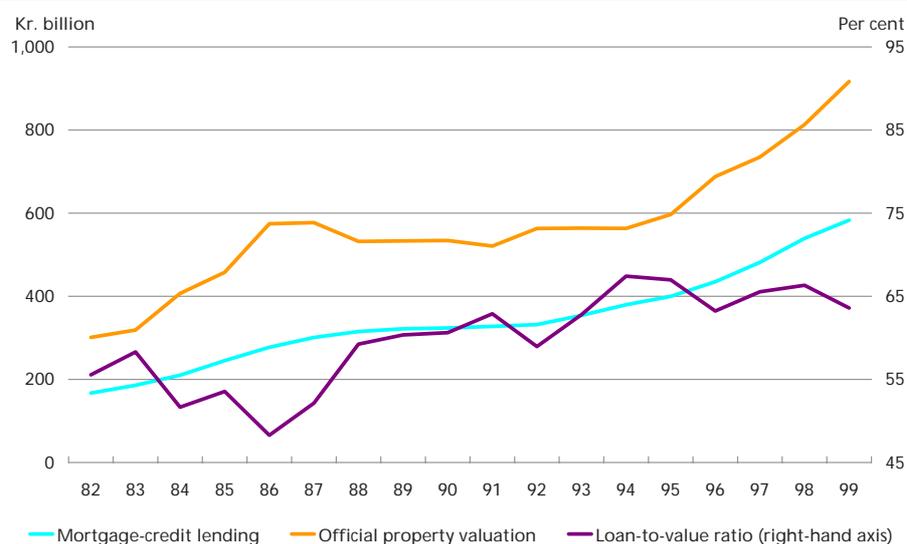
During the last 6 years the property market has been characterised by strong price increases. However, the most recent trend is more uncertain, as appears from data from the Association of Danish Mortgage Banks. The cash price for a one-family house thus fell by approximately 2 per cent in the last quarter of 1999 against the preceding quarter, while the 1st quarter of 2000 shows an increase of around 3 per cent. The trend is not quite consistent for all types of owner-occupied homes, and considerable regional differences also prevail.

House purchases appear to have decreased from the previous level, however. An increase in lead times is often accompanied by subsequent price drops.

By tradition fixed-rate mortgage-credit bonds have been the most common type of financing, but recently there has been great interest in variable-rate loans, or adjustable-rate loans. Total outstanding loans are

LOAN-TO-VALUE RATIO FOR PRIVATE OWNER-OCCUPIED HOMES

Chart 16



Note: The official property valuation is adjusted by the maximum lending limits (80 per cent for ordinary owner-occupied homes and 60 per cent for holiday houses). The loan-to-value ratio is calculated as mortgage-credit lending for private owner-occupied homes as a ratio of the adjusted official property valuations. In 1989 an average of the property valuations in 1988 and 1990 is included due to insufficient data. It should be noted that both property value and bond debt are underestimated due to higher property values than the official valuation and a higher bond debt as a result of the lack of adjustment for the discount factor. However, both factors have a similar effect and it is found that the figures give a true and fair view of the development.

Sources: Customs and Tax and Financial Statistics from Danmarks Nationalbank.

still at very low level, but are rising strongly. In 1999 approximately 70 per cent of all net new lending was based on loans at variable interest rates.

Even though there are potential savings from using adjustable-rate loans, it is also important for a household to have an adequate "buffer" in its budget to accommodate falling property prices and rising interest rates. This buffer should thus be greater than for the financing of equivalent amounts on the basis of fixed-rate bonds since interest-rate increases have a more immediate direct impact on the net repayments for mortgages financed by adjustable-rate loans than by fixed-rate loans.

The loan-to-value ratio is a significant factor in the assessment of trends in the housing market. It is defined as lending via mortgage-credit bonds as a ratio of the property value. Since 1993 the loan-to-value ratio has been relatively constant, although at a relatively high level compared to the development in the early 1980s, cf. Chart 16.

## **CORPORATE SECTOR**

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The largest proportion of lending by Danish banks is to the corporate sector in Denmark, cf. "Trends in the Financial Sector". The development of the Danish business community is thus vital to the soundness of the banks. A precondition for a healthy business community is the ability to achieve satisfactory earnings on the basis of an appropriate level of debt.

However, to a financial institution sound development is not only a question of the earnings and debt of an average business enterprise. The risk to the financial sector is just as dependent on the distribution among business enterprises. For example, an apparently positive trend in average terms may conceal both more positive and negative development in some business enterprises. This might entail an increase in the risk of losses to the overall financial sector, cf. Box 3.

Furthermore, experience shows that some business sectors are more likely than others to impose losses on the financial institutions. Selected business sectors are therefore treated separately below.

On assessing the development another vital factor is the degree of stability of structural conditions in the business sectors, especially new trends. The recent trends in the transition to a knowledge economy and the widespread use of information technology must be considered in this respect.

Due to the greater focus on products with a high research content the basis for the business community's future earnings will tend to be intangible assets such as goodwill and human capital, rather than traditional production facilities.

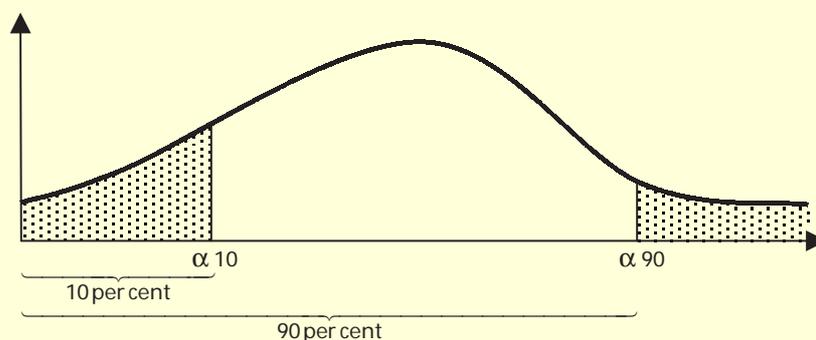
## METHOD TO ILLUSTRATE THE FINANCIAL STATUS OF BUSINESS ENTERPRISES

Box 3

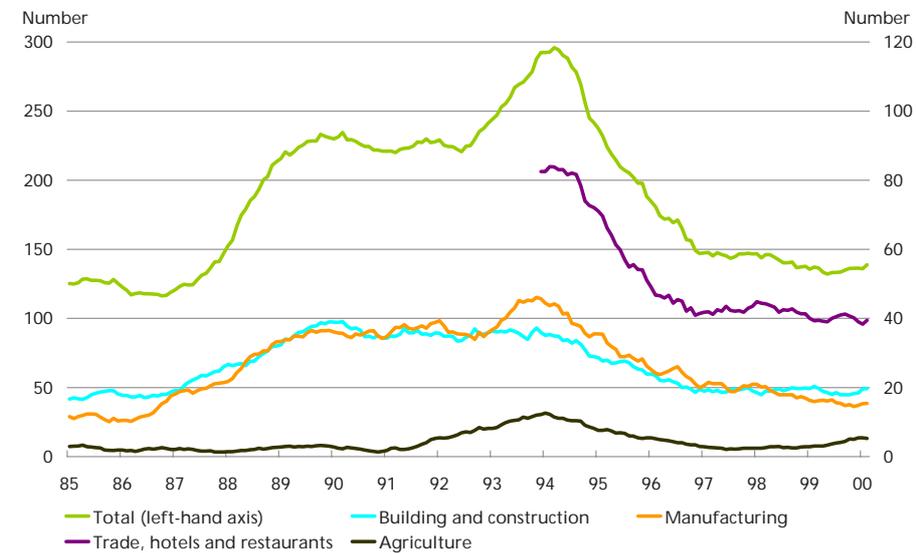
Two approaches are applied to analysis of the accounts of business enterprises. One is to consider the development in each financial key figure since 1989 for an average enterprise within the selected business sectors, and the second is to analyse the development of the poorest performing enterprises measured by a given key figure. Especially the latter is decisive to an assessment of the financial institutions' risk on business customers since e.g. 10 per cent of the business enterprises with the poorest key figures are often associated with the highest risk of losses. The purpose of the two methods is to compare the development over time and to compare the various business sectors.

The above analyses require the use of aggregated accounting data compiled by Statistics Denmark as from 1989 and the use of the database of the Danish Business Information Bureau. The latter contains the accounts for 1995-99 of all Danish public and private limited liability companies operating within the non-financial sector<sup>1</sup>. This makes it possible to calculate relevant key figures for each enterprise and thereafter to present the distribution. The focus is then on the 10 per cent of the enterprises showing the poorest development in a given key figure during the last 5 years. The latter is illustrated by using a "10-per cent fractile", cf.  $\alpha_{10}$  in the chart below. This distribution measure "distributes" data so that 10 per cent of the business enterprises have a key figure which is just less than or equal to the 10-per cent fractile, while the remaining 90 per cent have a higher key figure. For key figures such as return on net assets or debt servicing ratio it will thus be best for a business to have a higher key figure than the 10-per cent fractile.

The 90-per cent fractile is also used as a distribution measure in the analysis, cf.  $\alpha_{90}$  in the chart below. It is defined as the value which divides data so that 90 per cent of the business enterprises have a key figure which is less than or equal to the 90-per cent fractile, while the remaining 10 per cent have a key figure which is greater than the 90-per cent fractile. For a key figure such as the interest burden (interest expenditure as a ratio of profit before financial items) a key figure lower than the 90-per cent fractile is thus best for the business enterprise. The chart below shows the 10-per cent and 90-per cent fractiles.



<sup>1</sup> 1999 solely includes the companies which published accounts in 1999, so that all figures for 1999 in the following are preliminary figures.

INCIDENCE OF COMPULSORY LIQUIDATION IN THE BUSINESS COMMUNITY Chart 17

Note: A 12-month moving average is applied. Before 1993 it is impossible to divide trade, hotels and restaurants into separate items.  
Source: Statistics Denmark.

This development has consequences for the extension of credit in view of the greater importance of intangible assets to the net worth of business enterprises, which makes it more difficult to undertake actual lending against collateral. At the same time, the difference between value as a "going concern" and as an enterprise subject to compulsory liquidation will often be greater than for traditional business enterprises.

### The profitability and capital structure of business enterprises

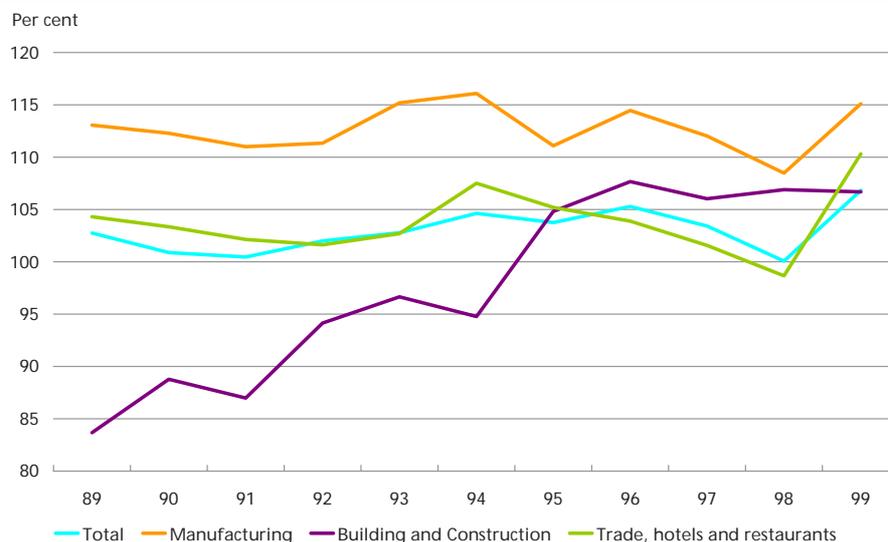
The recent development of the Danish business community has generally been positive. This is illustrated by such factors as the development in the number of compulsory liquidations, cf. Chart 17. The recession in the late 1980s and early 1990s, combined with a relatively high real interest rate, led to a strong increase in the number of compulsory liquidations. This was followed by a significant downward trend, and the number of compulsory liquidations is now very low in all sectors. This trend can be illustrated further by focusing on various financial data, including key figures, with special emphasis on liquidity, earnings, interest expenditure and debt.

### Liquidity

One measure of liquidity is cash funds in relation to short-term debt. However, certain other current assets are of such a nature that they can be realised quickly. This is taken into account in the liquidity measure

LIQUIDITY – AVERAGE DEVELOPMENT SINCE 1989

Chart 18



Note: Liquidity is defined as current assets less half of stocks as a ratio of short-term debt. "Total" includes all non-financial business enterprises and therefore includes more sectors than the chart shows.

Sources: Statistics Denmark, the Danish Business Information Bureau and own calculations.

applied in this case whereby a key figure which includes cash funds and one half of stocks has been calculated.

The development in liquidity has been relatively constant during the last more than 10 years, cf. Chart 18. Moreover, throughout the period liquidity was greater than 100, so that short-term debt at no time exceeded the most liquid funds. In terms of the 10 per cent of business enterprises with the lowest liquidity, the ratio is also relatively constant, cf. Chart 19. The low level for all business enterprises is primarily due to the inclusion of sectors which do not hold significant current assets affecting the balance sheet such as real property, business service, etc.

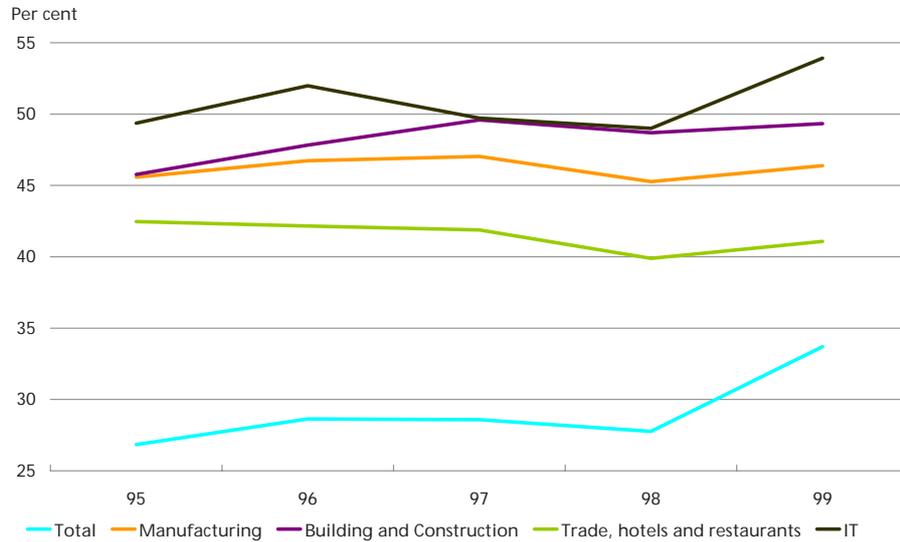
The IT sector is treated as a separate sector in terms of fractiles. This is primarily due to this sector's special characteristics compared to traditional business enterprises. Furthermore, IT enterprises have recently been in focus as a consequence of their diverging development from other industrial enterprises, as also described below.

### Earnings

Business enterprises' earnings capacity over an extended period can be illustrated by the return on net assets, which is the profit for the year before financial items as a ratio of assets. The profit is thus assessed in relation to the resources invested since naturally it is relevant to consider the assets required to achieve a given profit.

LIQUIDITY – THE 10-PER CENT FRACTILE

Chart 19



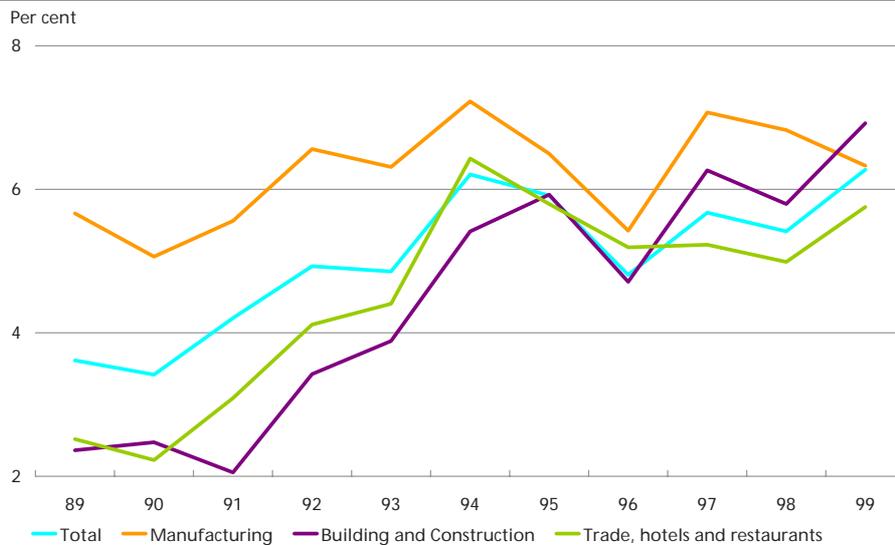
Note: Liquidity is defined as current assets less half of stocks as a ratio of short-term debt. See the explanation of the 10-per cent fractile in Box 3. "Total" includes all non-financial business enterprises and therefore includes more sectors than the chart shows.

Sources: The Danish Business Information Bureau and own calculations.

The return on net assets has increased over the last decade, and has been stable since 1995, cf. Chart 20. Furthermore, the return on net assets of most sectors has converged towards the same level. Of the 10 per

RETURN ON NET ASSETS – AVERAGE DEVELOPMENT SINCE 1989

Chart 20

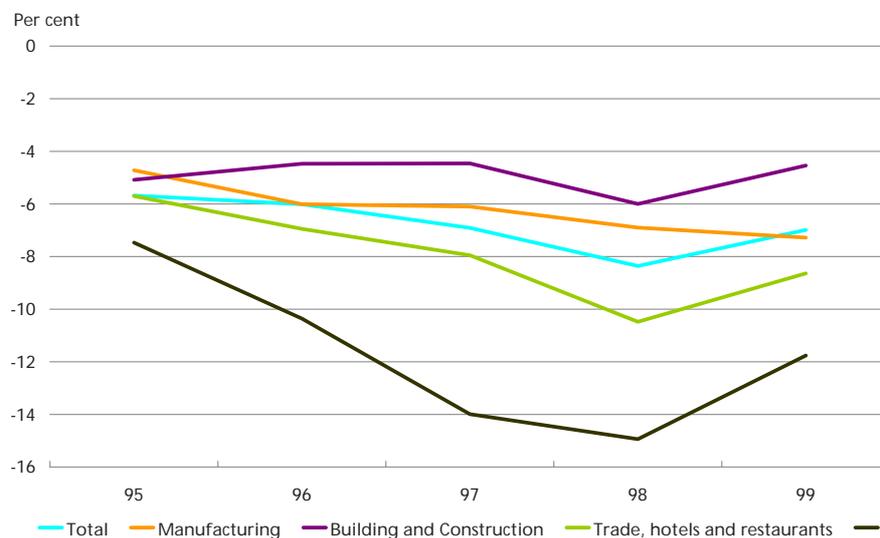


Note: The return on net assets is here defined as the primary operating result as a ratio of assets.

Sources: Statistics Denmark, the Danish Business Information Bureau and own calculations.

RETURN ON NET ASSETS – 10-PER CENT FRACTILE

Chart 21



Note: The return on net assets is here defined as the primary operating result as a ratio of assets. See the explanation of the 10-per cent fractile in Box 3.

Sources: The Danish Business Information Bureau and own calculations

cent of the poorest performing business enterprises, the return on net assets of this fractile was approximately -5 per cent in 1995, and generally deteriorated during the period, cf. Chart 21.

A comparison of the level for the 10-per cent fractile with data for companies which have previously initiated insolvency proceedings shows that around 65 per cent of the companies which previously filed for compulsory liquidation had a higher return on equity than -5 per cent, cf. Box 4 for more details of the method.

There are certain differences between the individual sectors. The IT sector is distinguished by a significantly lower level than the other business enterprises, but the level is also low for enterprises within trade, hotels and restaurants compared to the other sectors. This is also in line with the relatively high number of compulsory liquidations in the trade and restaurant sector, cf. Chart 17.

Another indicator of relevance to the development in the business community is the ratio between earnings and long-term debt. Since 1989 the capability to service debt has improved, cf. Chart 22.

Considering the 10 per cent of business enterprises least capable of servicing their debt it is apparent that they have all undergone negative development in debt in the last 5 years, cf. Chart 23. The IT sector stands out mainly because of its lower earnings, while building and construction, which previously showed considerable losses, is significantly posi-

## CAPABILITY TO SERVICE DEBT – AVERAGE DEVELOPMENT SINCE 1989

Chart 22

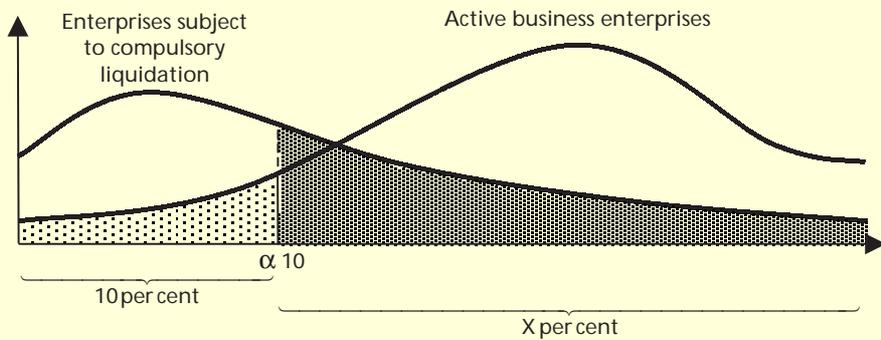


Note: The capability to service debt is defined as the primary operating result as a ratio of debt.  
Sources: Statistics Denmark, the Danish Business Information Bureau and own calculations.

## COMPARISON WITH DATA ON COMPULSORY LIQUIDATIONS

Box 4

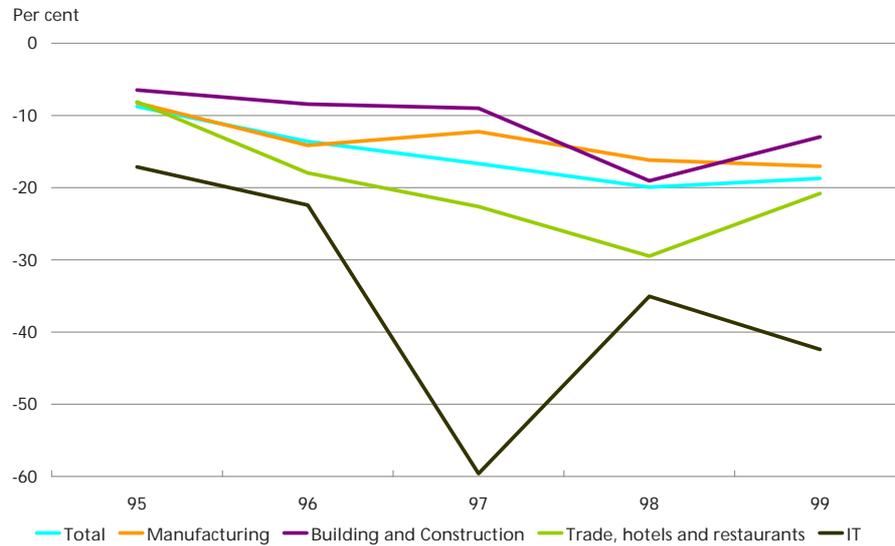
The database contains information on both active business enterprises and companies which are subject to compulsory liquidation. This makes it possible to compare the level of key figures for the two categories of business enterprise. For example, for a given key figure the 10-per cent fractile ( $\alpha 10$ ) for the active business enterprises can be compared with the number of business enterprises which have actually filed for compulsory liquidation at the same or a better level for the key figure in question, cf. the chart below. If a large proportion of the enterprises subject to compulsory liquidation were at a better level measured by the key figure in question, this has negative consequences for the future survivability of the active business enterprises.



<sup>1</sup> Further documentation can be obtained from Danmarks Nationalbank.

CAPABILITY TO SERVICE DEBT – 10-PER CENT FRACTILE

Chart 23



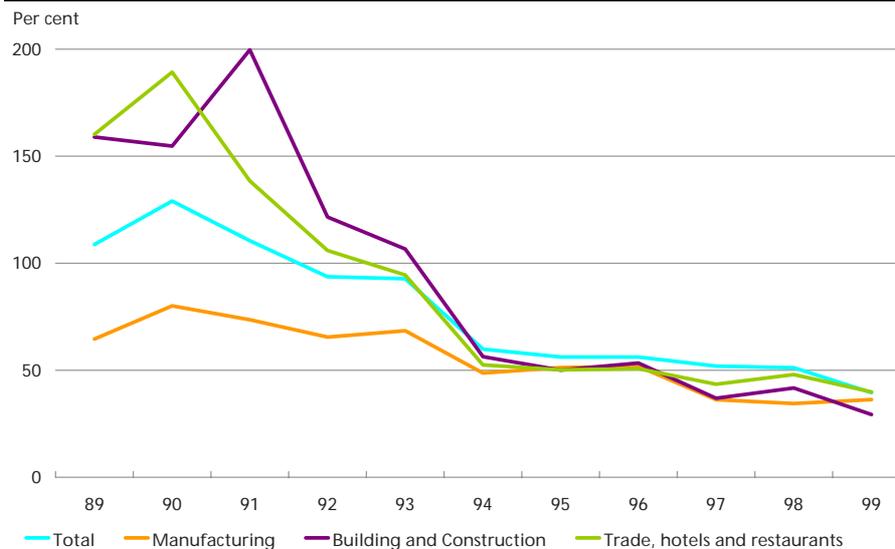
Note: The capability to service debt is defined as the primary operating result as a ratio of debt. See the explanation of the 10-per cent fractile in Box 3.

Sources: The Danish Business Information Bureau and own calculations.

tive. A comparison of the 10 per cent of poorest performing business enterprises with the business enterprises which have been subject to compulsory liquidation shows that 7 out of 10 business enterprises which

INTEREST BURDEN – AVERAGE DEVELOPMENT SINCE 1989

Chart 24

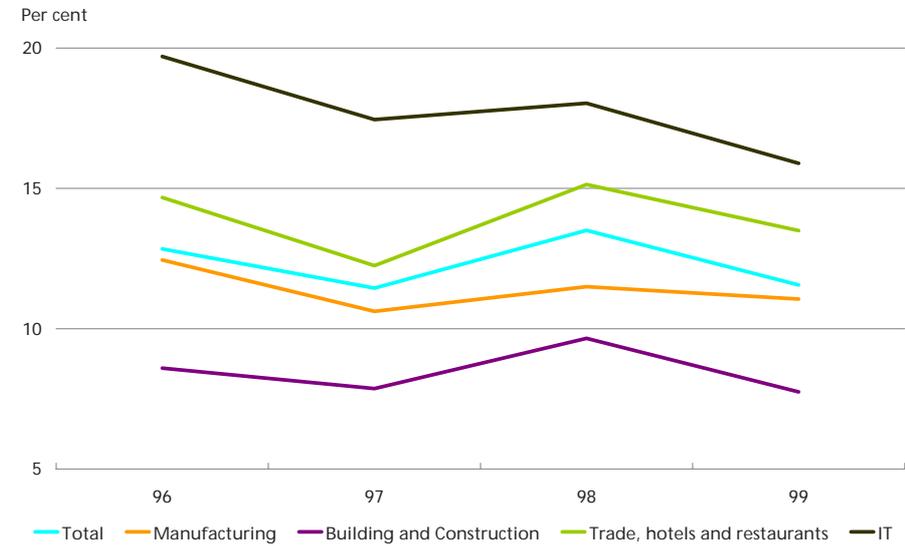


Note: The interest burden is defined as interest expenditure as a ratio of primary operating result.

Sources: Statistics Denmark, the Danish Business Information Bureau and own calculations.

INTEREST BURDEN – 90-PER CENT FRACTILE

Chart 25



Note: On consideration of the breakdown by enterprise, including the 90-per cent fractile, the definition of interest burden as applied in Chart 24 results in an incorrect breakdown of enterprises with negative earnings, so the interest burden is defined as interest expenditure as a ratio of assets, less the primary operating result as a ratio of assets. The levels in the two charts thus cannot be compared. 1995 is excluded since only data on net income from interest is available. As a consequence of the applied definition the 90-per cent fractile is analysed here since high interest expenditure as a ratio of primary operating result has a negative impact on the evaluation of the business enterprise. See also the explanation of the 90-per cent fractile in Box 3.

Sources: The Danish Business Information Bureau and own calculations.

filed for compulsory liquidation showed a better capability to service their debt, cf. also Box 4.

A factor often stated in connection with the accumulation of debt is that enterprises may succumb to the interest burden, i.e. their debt grows to such a size that earnings are insufficient to cover interest costs.

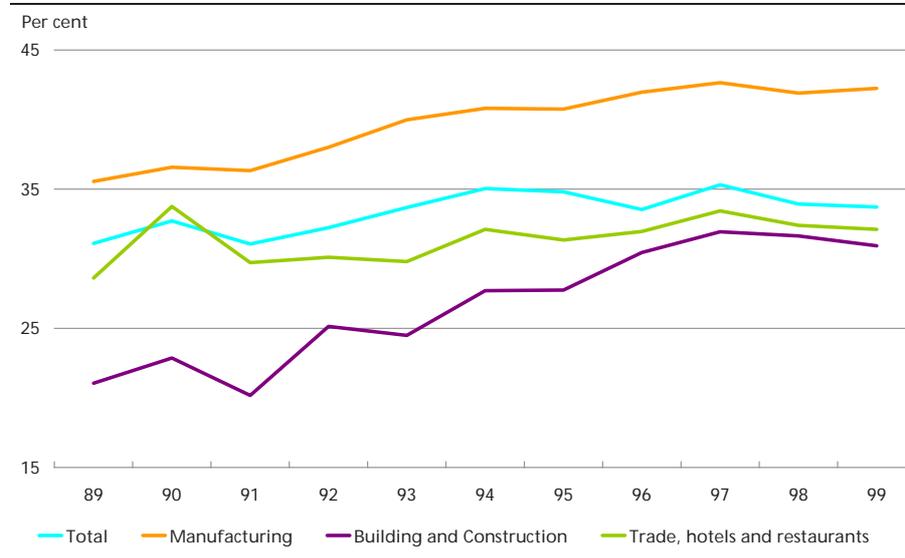
Interest expenditure as a ratio of primary operating result has declined steadily for all sectors over the last more than 10 years, cf. Chart 24. At the same time, all sectors have converged towards a level where interest expenditure accounts for approximately 50 per cent of earnings. Consideration of the 90-per cent fractile shows that the development of the 10 per cent of business enterprises with the highest interest/income ratio has been constant in recent years, cf. Chart 25. It is also apparent that there is a clear level hierarchy among the various sectors. The IT sector stands highest, primarily due to low earnings, while the building and construction sector has the lowest interest burden.

### Solvency

A significant factor on evaluating the risks associated with operating a business is an enterprise's ability to generate sufficient earnings over a

SOLVENCY – AVERAGE DEVELOPMENT SINCE 1989

Chart 26



Note: Solvency is defined as equity capital as a ratio of liabilities.

Sources: Statistics Denmark, the Danish Business Information Bureau and own calculations.

number of years. Solvency is one indicator of earnings over an extended period. It is defined as equity as a ratio of liabilities. The reason is that in principle increasing profits/losses are reflected in rising/decreasing equity.

All sectors have shown positive development since 1989, and the solvency ratio has increased, cf. Chart 26. The solvency ratio of the building and construction sector was particularly low in 1989, but has now risen from approximately 20 per cent to 30 per cent, which is still lower than for the other sectors in the analysis. There is significant variation in the pattern for the business enterprises with the lowest solvency ratio. All sectors have a 10-per cent fractile at by and large the same constant level of around 4-6 per cent, cf. Chart 27.

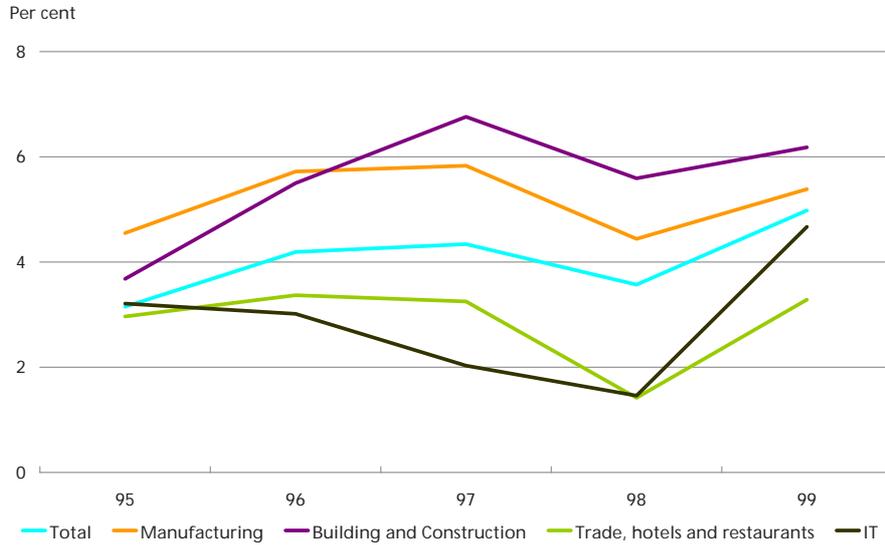
A comparison with data for compulsory liquidations shows that at a level of approximately 5 per cent almost half of the business enterprises which actually commenced insolvency proceedings had a higher solvency ratio, cf. Box 4.

Rather than focusing solely on equity, the overall capital structure can also be considered. A precondition for stable development is the absence of significant fluctuations in the short-term debt's share of the capital base. A typical indication of stress is an increase in the short-term debt's share of the total debt.

The short-term debt's share of the total liabilities is less than 55 per cent in 1999 for the sectors shown in Chart 28. For building and construction

SOLVENCY – 10-PER CENT FRACTILE

Chart 27



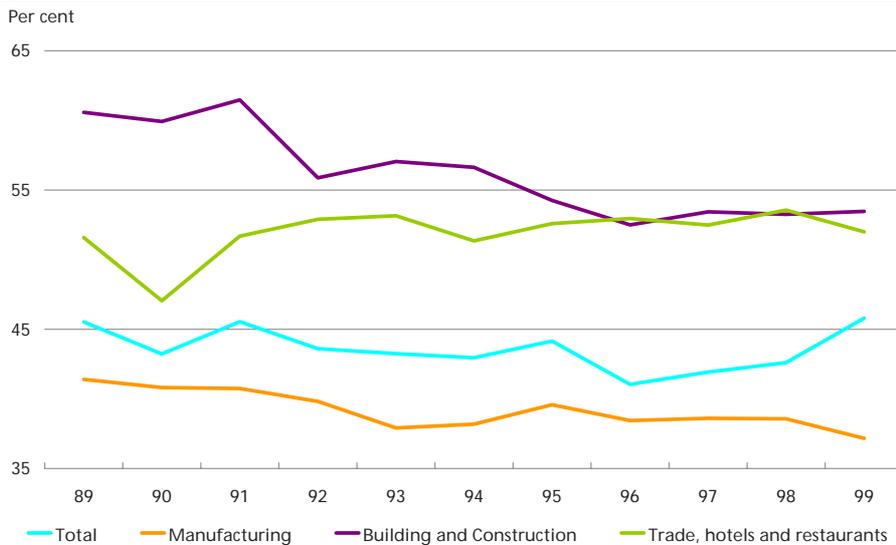
Note: Solvency is defined as equity capital as a ratio of liabilities. See the explanation of the 10-per cent fractile in Box 3.  
Sources: The Danish Business Information Bureau and own calculations..

the share was previously significantly higher than for the other sectors, but has now fallen to a lower level.

The 90-per cent fractile indicates that business enterprises with the highest short-term debt as a ratio of the balance sheet during the last

FOCUS ON SHORT-TERM DEBT – AVERAGE DEVELOPMENT SINCE 1989

Chart 28



Note: The short-term debt is evaluated as a ratio of total liabilities.  
Sources: Statistics Denmark, the Danish Business Information Bureau and own calculations.

FOCUS ON SHORT-TERM DEBT – 90-PER CENT FRACTILE

Chart 29



Note: The short-term debt is evaluated as a ratio of total liabilities. Here the 90-per cent fractile is analysed since a high short-term debt as a ratio of the balance sheet has a negative impact on the evaluation of the business enterprise. See the explanation of the 90-per cent fractile in Box 3.

Sources: The Danish Business Information Bureau and own calculations.

five years have shown relatively stable development, cf. Chart 29. It is also apparent that there are clear variations among the sectors. The level for manufacturing industry is thus considerably lower than for the other sectors, while the short-term debt of trade, hotels and restaurants and the IT sector is equivalent to or greater than 90 per cent of the total liabilities. The sectoral variations can be explained partly by varying balance-sheet structures.

### Distribution of debt in business enterprises

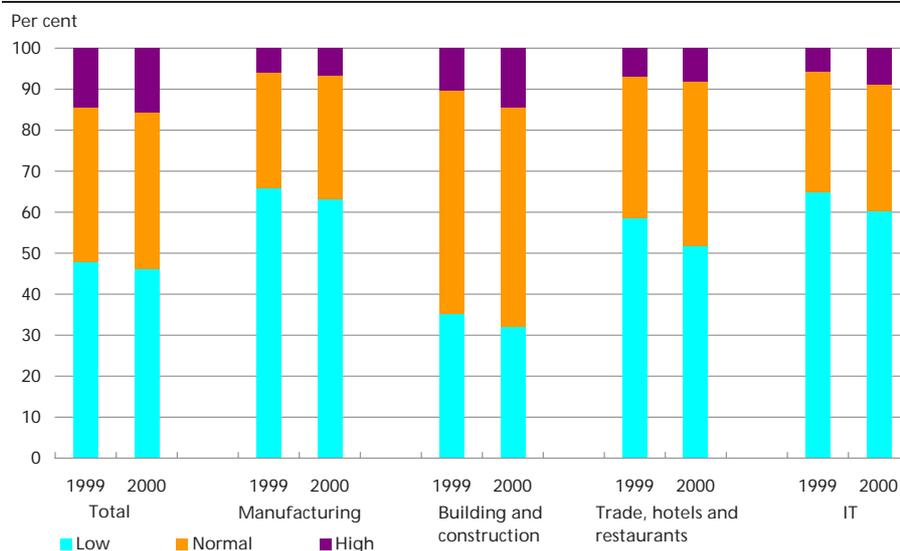
So far the focus has been on the development in relative key figures, and the breakdown of business enterprises on these key figures. However, from the viewpoint of a financial institution the absolute figures (amount of debt) are naturally also decisive to an assessment of the risk of losses.

Business enterprises which are found to entail a low risk account for around half of the debt of the business sector, cf. Chart 30, while business enterprises which are found to be associated with an above-average risk account for approximately 15 per cent. This share has been stable during the past year. The risk categories applied are described in further detail in Box 5.

With regard to the individual sectors, building and construction primarily stands out from the other sectors since a large proportion of its

## RISK CLASSIFICATION OF THE DEBT OF THE BUSINESS COMMUNITY

Chart 30



Note: The risk classification is based on the Danish Business Information Bureau. The measurement is made as of 1 February 1999 and 2000.

debt (approximately 50 per cent) is placed in business enterprises associated with a normal risk.

An important factor in the analysis is that this breakdown does not take the size of the business enterprises into account. A breakdown by number of business enterprises shows that the category associated with a below-average risk is less than 10 per cent of all enterprises (applies to all sectors). The implication is that debt evaluated to entail above-

## THE RISK CLASSIFICATION OF THE DANISH BUSINESS INFORMATION BUREAU

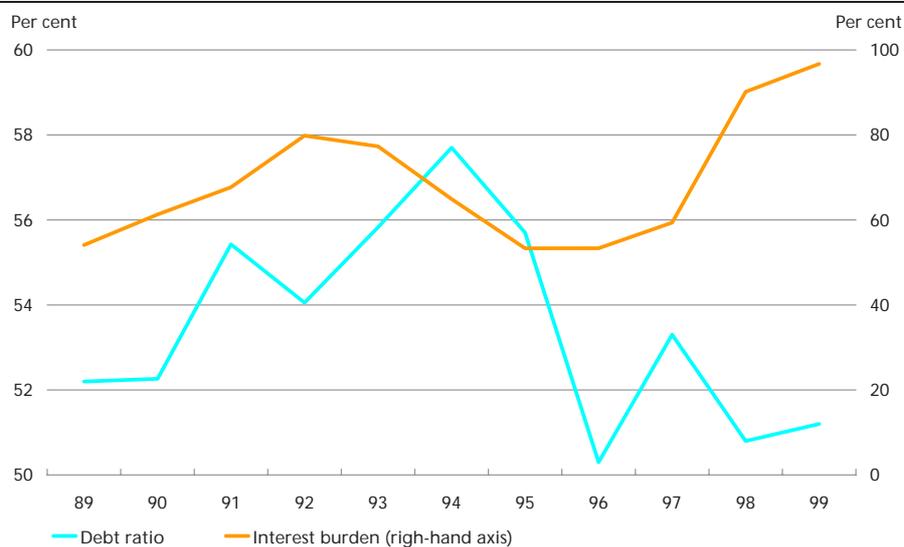
Box 5

Each enterprise in the data set has a rating from 0 to 100, with 100 as the highest rating. However, some enterprises are automatically given a rating of 0, due to various factors such as insufficient accounts information, or negative equity capital.

The rating is based on the following three criteria:

- Structure and size (legal structure, age and number of employees)
- Accounting figures (solvency and liquidity ratios, return on equity, profit for the year and equity capital)
- Other factors (notes, charges and individual assessment)

Each sub-segment is given a sub-rating of 0-100. Besides the weighted sub-items the total rating includes information on payment experience, i.e. whether due payment dates are exceeded systematically. The last-mentioned factor may have a weight of up to 25 per cent.

DEBT RATIO AND INTEREST BURDEN OF AGRICULTURE Chart 31

Note: The debt ratio is shown for both full-time and part-time agricultural enterprises. The interest burden is defined as commercial interest as a percentage of operating result and comprises agricultural enterprises of 5 hectares and above. Estimates for 1999.

Source: The Danish Farmers' Union.

average risk is held primarily by a large number of small and medium-sized enterprises.

### Development in agriculture

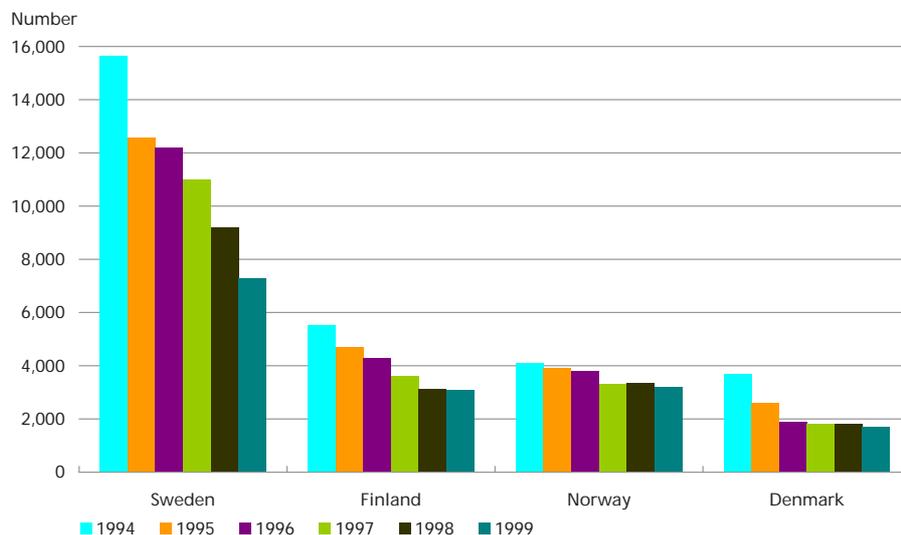
The trend for earnings in agriculture was favourable in the mid-1990s. This positive course was reversed in 1998, the decline continuing into 1999, according to estimates by the Danish Agricultural Advisory Centre. The development in prices may account for a significant share of the negative trend. In 1998 prices for many agricultural products fell, and this negative trend continued in 1999. The decline in earnings was not distributed equally among the various sub-sectors of agriculture. Pork producers were affected particularly severely, primarily due to significant drops in pork prices. However, the most recent development in prices has been more favourable.

As a result of the low level of earnings interest expenses as a ratio of earnings in agriculture have increased significantly in recent years, cf. Chart 31. In 1999 almost all of the operating profit was used to pay interest on loans.

However, despite the difficult conditions the number of compulsory liquidations and enforced sales is low, cf. Chart 17. The continuing low level of compulsory liquidations and enforced sales can be explained

INCIDENCE OF COMPULSORY LIQUIDATIONS IN THE NORDIC REGION

Chart 32



Source: Insolvenzen in Europa. 1999/2000 Creditreform.

partly by the appreciation of assets. The rate of growth for total assets in agriculture was thus higher than for borrowing, resulting in a falling debt to asset ratio in agriculture in recent years, cf. Chart 31. It appears that the debt ratio declined from around 60 per cent to 50 per cent in the period 1994-1999.

### Trends in the Nordic region

As stated above, Danish banks' activities primarily concern residents. However, the proportion of transactions with non-residents is increasing. The cross-border mergers and acquisitions within the Nordic region play an important role in this context, emphasising the growing relevance of an evaluation of the entire Nordic market, with particular focus on the business sector.

In recent years the Nordic countries have generally enjoyed a favourable business climate. The number of compulsory liquidations is therefore low in all Nordic countries<sup>1</sup>, cf. Chart 32.

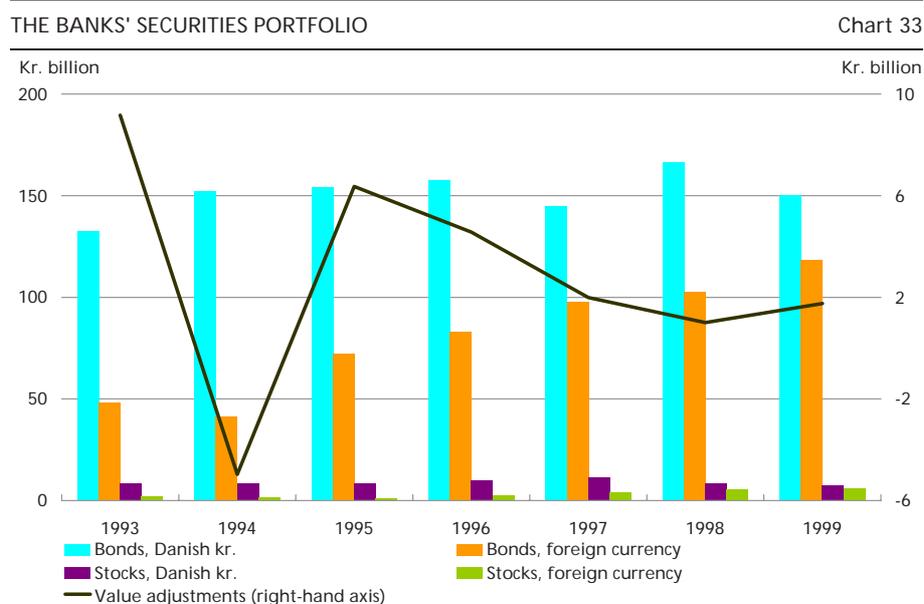
<sup>1</sup> For more details on trends in the Nordic countries reference is made to publications on financial stability issued by the central banks of the other Nordic countries. For the most recent issues cf. Sveriges Riksbank: *Financial Stability Report* (1999/2), Norges Bank: *Financial Sector Outlook, Economic Bulletin* 1999/4 and Bank of Finland: *Financial Stability in Finland, Bank of Finland Bulletin* 1999/4.

## Trends in the Financial Markets

The banks and to a certain degree also other parts of the financial sector, are affected directly and indirectly by the development on Danish and international financial markets. The direct effect is via the banks' own portfolios of Danish and foreign securities, cf. Chart 33, and the indirect effect is via customers' exposure to the financial markets as well as the real-economic effects resulting from fluctuations in the financial markets.

In view of the direct and indirect effects from the financial markets the development and stability on these markets are significant to the risks faced by the banks. This was emphasised in connection with the global market unrest in the autumn of 1998. Banks and their customers suffered losses on a number of market placements, of which some were inflated via gearing, cf. Box 6. At the same time, the market unrest gave rise to fears of a considerable global economic downturn, as a consequence of which the banks would suffer lower earnings and higher losses.

The most recent trends in the financial markets and the potential risk factors are considered below. Focus is on the international development



Note: Portfolios and value adjustments are based on figures for banks in categories 1-3, excluding pension funds.

Gearing is achieved by financing securities purchases by raising loans directly or indirectly via derivatives such as futures which on commencement only require payment of a small proportion of the nominal amount (initial margin)<sup>1</sup>. This increases the position and the potential return, but also the potential loss.

The amplification of losses in the event of market fluctuations adverse to the investor increases the risk of insolvency. If the gearing is generally high on several markets, among both the financial institutions and their customers, this may also lead to very strong price fluctuations. This will occur in step with both sales of securities to finance margin payments, etc., and reduction of the geared positions in order to reduce the risk of losses. The price fluctuations may intensify if market participants at the same time hold geared positions based on the same underlying strategies. This was the case in e.g. 1998 when the US hedge fund, LTCM, and several other financial institutions were severely affected as a result of geared speculation in the expectation of a general narrowing of interest-rate differentials.

The increased use of derivatives has made it easier to achieve a high gearing, but it is difficult to compile unequivocal measures of the development in gearing in the various markets. The IMF has calculated the development in gearing from March 1995 to June 1998 on the Over-The-Counter (OTC) market for derivatives<sup>2</sup>. In global terms these calculations show an overall increase of approximately 30 per cent in the gearing of all contract categories during the period in question. Most of the increase can be attributed to foreign-exchange contracts, which are often associated with very high risks compared to other contracts.

If positions up to the crisis in Russia had not been inflated by gearing the reaction to Russia's suspension of payments on its debt would probably have been less strong. The systemic risks would also have been considerably less. The subsequent general reduction of gearing can thus explain the relatively moderate reaction in the financial markets to Brazil's floating of its currency in January 1999.

<sup>1</sup> In general two types of margin payment are used: initial margin and variation margin. The former can be regarded as a deposit from the buyer to the seller of e.g. a futures contract to hedge against losses. Variation margin is typically day-to-day payment of gains and losses between buyer and seller.

<sup>2</sup> Cf. International Capital Markets: Developments, Prospects and Key Policy Issues, IMF, September 1999.

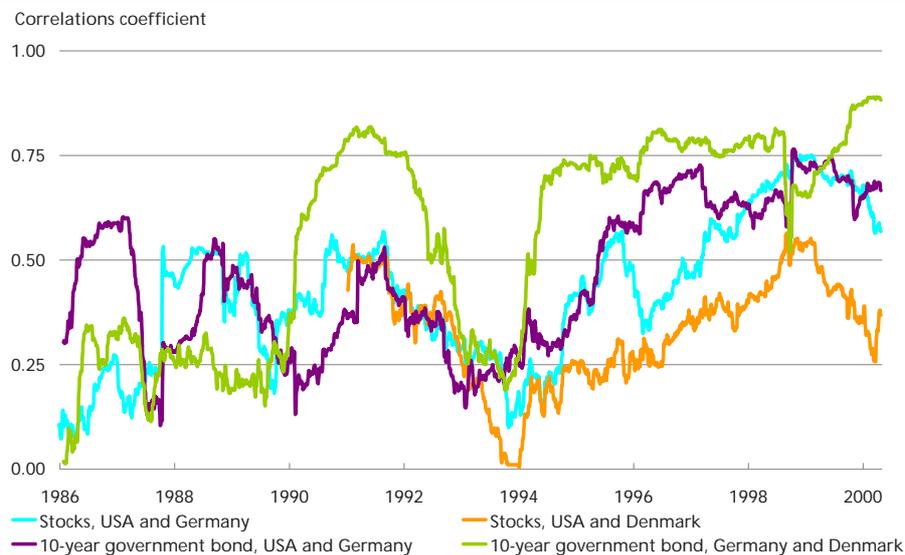
in view of the considerable interdependence of the global financial markets, including the Danish market, cf. Chart 34.

## GENERAL FINANCIAL MARKET TRENDS

In 1999 the international financial markets generally normalised to a degree after the market unrest in the autumn of 1998. The normalisation should be viewed against the background of the continued strength of the US economy, increasing growth in Europe and Southeast Asia, as well as increased efforts in Japan to stabilise the economy and banking sector, etc. Financial markets in 2000 have been characterised by strong increases and subsequent drops in the stock markets, with

## INTERDEPENDENCE OF FINANCIAL MARKETS

Chart 34



Note: Interdependence is stated as the correlation coefficient calculated as the correlation between weekly percentage changes over 1-year periods. A correlation coefficient with a positive value of 1 means that the series are completely synchronous. A correlation coefficient of 0 means that they are asynchronous, and a correlation of  $-1$  means that they are complete opposites.

considerable intra-day fluctuations, particularly in the markets for technology stocks. The development on the stock markets has had a relatively moderate impact on the interest markets and thus did not lead to any significant general increase in uncertainty on the financial markets.

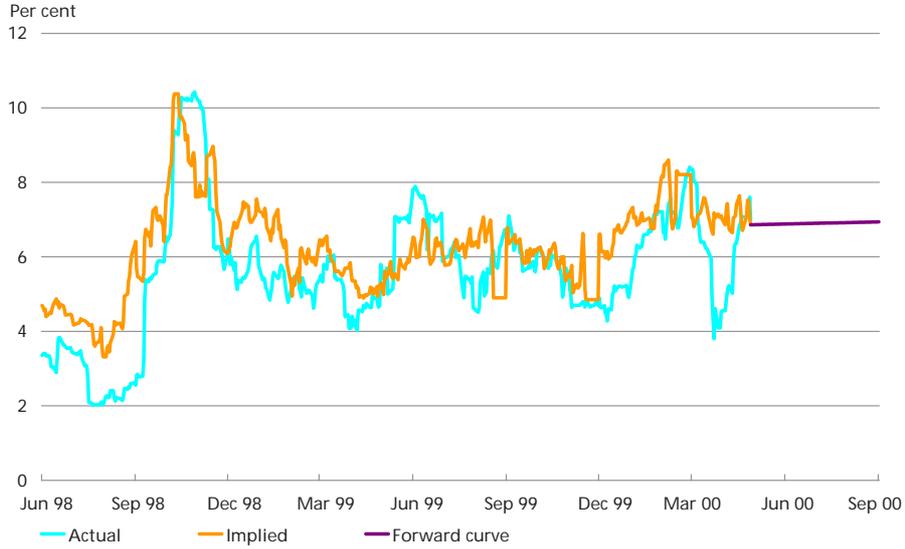
An often used measure of uncertainty is fluctuations in prices/interest rates, called volatility. In this respect a distinction is drawn between actual and implied volatility. Actual volatility is a measure of the *historical* fluctuations in e.g. the price of a given asset. Implied volatility is a measure of market participants' expectations of *future* fluctuations<sup>1</sup>.

In 1999 the actual and implied volatility of the bond market decreased, but to a higher level than immediately before the unrest in the autumn of 1998, cf. Chart 35. This general trend was also reflected in the stock markets, cf. Chart 36. At the same time, participants in both markets expect the risk to remain at its current level, shown by the generally flat implied forward volatility curves, cf. Charts 35 and 36. The implied volatility in the US Nasdaq index, with a high weight of technology stocks, has risen considerably since the beginning of 2000. The higher volatility must be viewed against the very strong price increases in the first months of the year, and the most recent strong price drops in these

<sup>1</sup> Cf. Leif Lybecker Eskesen, Is Last Autumn's Financial Crisis Over?, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 1999.

VOLATILITY ON THE US GOVERNMENT BOND MARKET

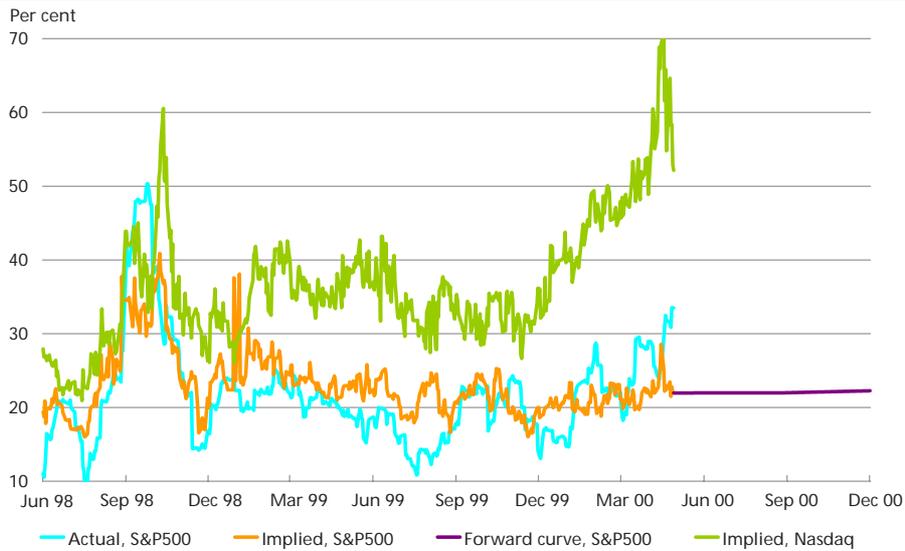
Chart 35



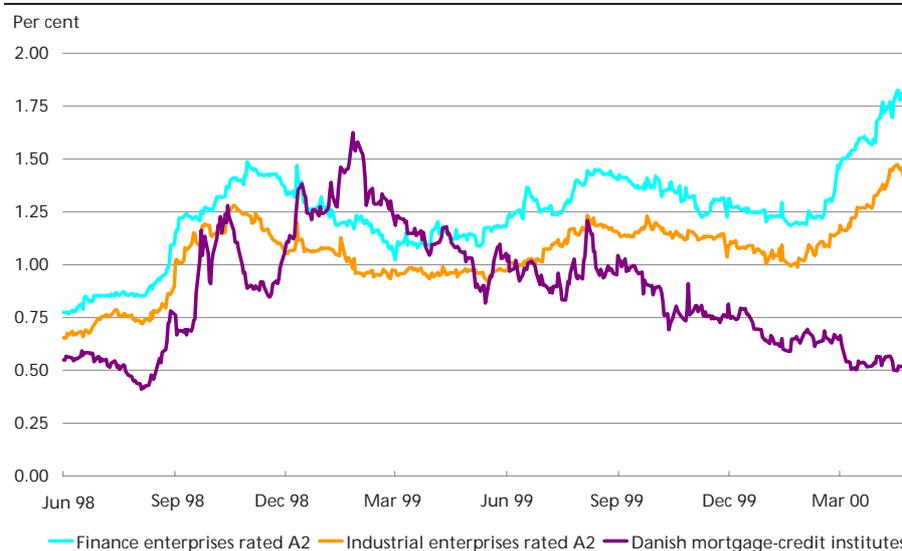
Note: Daily observations. *Implied volatility*: derived from stock-exchange-traded futures on the 10-year US government bond yield with a remaining maturity of approximately 1 month. It therefore corresponds to the expected volatility 1 month ahead. *Forward curve*: implied volatility derived from options on futures on a 10-year US government bond with a remaining maturity of between 1 and 4 months. This gives a picture of the expected volatility up to 4 months ahead. *Actual volatility*: calculated as standard deviations for day-to-day percentage changes over 1 month converted to an annual rate.

VOLATILITY ON THE US STOCK MARKET

Chart 36



Note: Daily observations based on futures and options on futures on the US stock indices S&P500 and Nasdaq. See also the note to Chart 35.

YIELD DIFFERENTIAL BETWEEN CORPORATE AND GOVERNMENT BONDS Chart 37

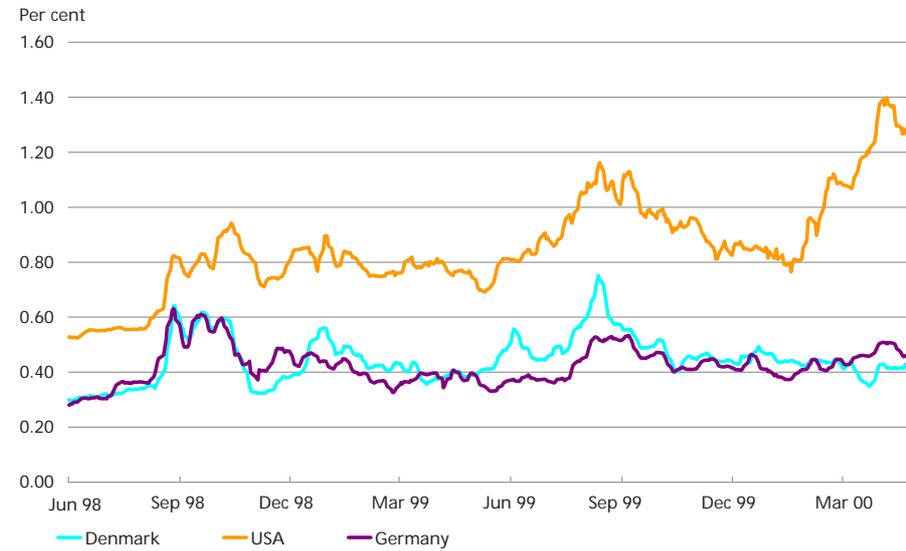
Note: The yield differentials for financial and industrial companies are calculated as the yield differential between 10-year issues by US finance and industrial companies with A2 credit ratings and a 10-year US government bond. The differentials for Danish mortgage-credit institutes are calculated as the differential between the yield on a 30-year mortgage-credit bond and a Danish 30-year government bond adjusted for the option premium associated with the option of early redemption of mortgage-credit bonds.

stocks, cf. Chart 39, which nevertheless reduced the implied volatility a little. However, whether the continuing high price levels are sustainable is still associated with some uncertainty. The high volatility level is nevertheless related primarily to this segment of the stock market.

An analysis of financial market trends will typically also focus on the variations in yields on various securities. These yield differentials, often termed spreads, give an impression of the market's perception of the variations in credit and liquidity risk among various bonds and interest-rate products. As the market unrest eased in 1999, most spreads between benchmark government bonds and bonds subject to a higher credit or liquidity risk narrowed, cf. Chart 37. This narrowing was particularly pronounced for bond issues by emerging economies, such as Russia and Brazil. However, the yield differential between corporate and government bonds, including between Danish mortgage-credit and government bonds, also narrowed considerably. But many yield spreads are still at a higher level than before the Russian crisis. This indicates that credit and liquidity risks were reassessed after the financial unrest in 1998.

SWAP SPREADS

Chart 38



Note: Swap spread calculated as the differential between the fixed interest rate on 10-year swaps and the 10-year government bond in the respective countries.

The spread between the yield on swaps<sup>1</sup> and government bonds is typically a good indicator of the market's perception of the credit risk associated with banks, since swaps are often concluded by banks. However, the size of these spreads is also affected by other factors, including the liquidity of the market understood as its resistance to fluctuations in the demand and supply. In 1999 the swap spreads were thus affected to a greater degree by liquidity conditions, especially in the US swap market. The US swap spread increased strongly from mid-1999, thereby affecting other swap spreads, including Danish spreads, cf. Chart 38. The background to the increase was insufficient capacity in the swap market to easily accommodate the higher activity during this period. The higher activity was a result of such factors as business enterprises' frontloading of bond issues due to fears related to the millennium rollover, leading to greater use of the swap market to hedge positions. Towards the end of 1999 the spreads narrowed in step with lower issuing activity and generally decreasing yield differentials to government bonds. However, the US swap spread and other US yield spreads widened again in 2000. This

<sup>1</sup> A swap is an agreement between two parties to exchange future payment flows. A simple example of an *interest-rate swap* is an agreement between two parties, A and B, to exchange payment flows based on respectively fixed and floating interest rates. For example, it can be agreed that payments from B to A are subject to a fixed interest rate, while payments from A to B are subject to a floating interest rate. This enables e.g. a bank to convert a floating-rate loan to a fixed-rate loan. The swap spread is the yield spread between the resulting fixed-rate loan and a fixed-yield government bond with the same maturity.

is probably due to a premium on US government securities, which were subject to scarcity due to a reduction of government issues and government repurchases of own securities, rather than more nervous markets.

## RECENT TRENDS IN THE STOCK MARKETS

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After the normalisation of the international financial markets in 1999 the development in 2000 was characterised by uncertainty on especially the US stock market. Further abrupt drops in the stock markets are currently perceived as a significant risk to the financial markets. However, these risks can be very difficult to pinpoint in advance as they are often due to unexpected factors<sup>1</sup>.

The US stock markets rose to historically high levels up to the start of the year, cf. Chart 39, and generally stock prices are still high despite the most recent price drops for technology stocks in particular. The sustained increase in the stock prices is due not least to the long period of growth in the USA. More specific factors include falling long-term US interest rates up to end-1998, higher growth in business enterprises' earnings, a more pronounced stock-buying culture, business enterprises' repurchases of own stocks, macroeconomic stability, a strong dollar, considerable capital inflows, etc.

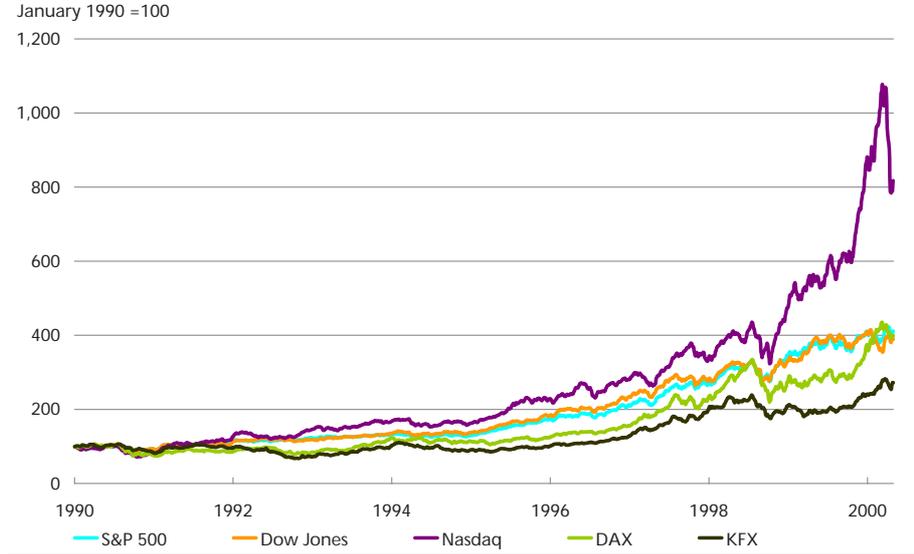
In addition, recent years' strong increase in stock indices with a high weight of technology stocks, such as the US Nasdaq index, has to a high degree been driven by widespread optimism regarding future earnings, particularly in enterprises with IT-related activities (such as Internet companies). This is evident from Chart 40 which illustrates the development in Price/Earnings(P/E) ratios in various stock indices, i.e. the ratio between the stock price and the preceding year's earnings. A high P/E e.g. reflects that investors do not attach any great importance to previous financial results as they are confident that earnings will rise in the future. Shares in enterprises in growth industries, such as technology, will therefore typically have higher P/E ratios than stocks in companies in more traditional industries. After strong increases, the Nasdaq index from mid-March to mid-April fell by approximately 30 per cent due to uncertainty regarding the earnings expectation on which the price levels were based.

However, the stock markets are still subject to high price levels despite the most recent decrease in P/E ratios. It is also uncertain whether the factors which have generally supported the US stock markets in recent

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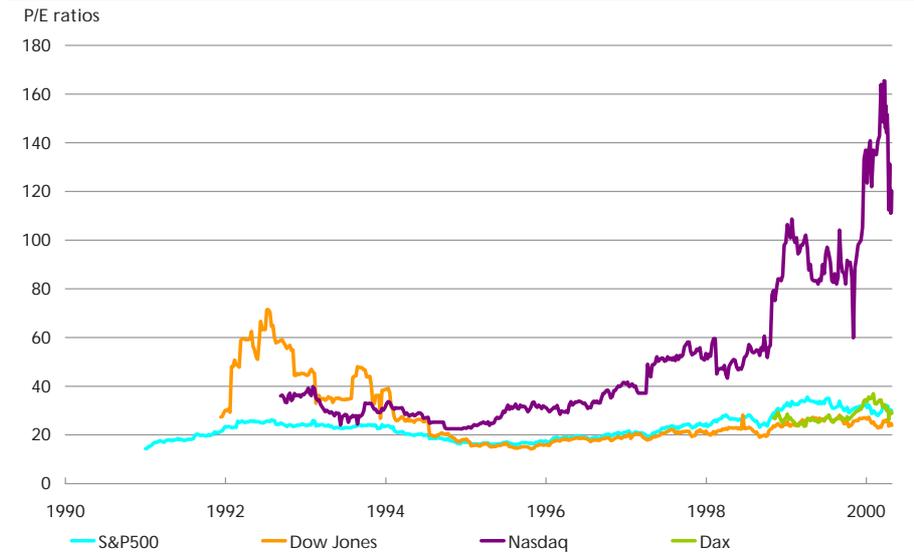
<sup>1</sup> A case in point is the US hedge fund LTCM, which used geared positions to speculate in e.g. the general narrowing of spreads. It therefore encountered significant difficulties during the market unrest in 1998, when the yield differentials widened. The hedge fund's problems were unexpected and led to large-scale market fluctuations once they became known.

DEVELOPMENT IN STOCK PRICES IN THE USA, GERMANY AND DENMARK Chart 39



Note: Daily observations. S&P500 and Dow Jones are relatively broad US stock indices, whereas the US Nasdaq index has a relatively high proportion of technology stocks. DAX and KFX are the broad German and Danish stock indices respectively.

PRICE/EARNINGS RATIO Chart 40



Note: The P/E ratio is the ratio between the price of an enterprise's share and earnings per share issued. It is calculated by dividing the market price of the share by the enterprise's earnings per share in the preceding 12 months.

might result in large price drops for the Internet stocks which so far have been buoyed up solely by the general optimism regarding this sector. In addition, more favourable growth prospects for Europe and Asia could lead to a relatively higher inflow of capital to these markets, to the detriment of the US market. This tendency would be reinforced if the current strength of the US dollar is redressed.

Any further significant and more general price drops in the US stock markets are likely to have not only local, but also global impact. Foreign investors thus hold a considerable proportion of US stocks. Moreover, a drop in the US markets might have a direct effect on the other stock markets, as well as interest and foreign-exchange markets. The magnitude of this effect depends on such factors as the level of gearing of the global financial system, cf. Box 6. Since a large proportion of US stocks are held by private investors a drop in stock prices can also have a negative impact on households' net assets, leading to a decline in private consumption in the USA, thereby dampening growth in the US economy. In view of the size of the US economy this could have a significant negative influence on the global economy, thus increasing the risk of instability in the global banking system.

Viewed in isolation, the effect on Danish banks of a global drop in stock prices would not initially be associated with any great risk, since stocks account for only approximately 1 per cent of the balance sheet. However, the effect could become considerably greater if the other financial markets and the economy in general are affected adversely, since the banks would then be subject to a wider range of direct and indirect effects, cf. above. For example, the banks' bond portfolio accounts for approximately 20 per cent of the total balance sheet, so that any drop in bond prices will have a stronger direct effect. However, a general drop in global stock prices is not likely to have a corresponding negative impact on the bond markets. Viewed in isolation, the greater uncertainty associated with falling stock prices will support the safer government bonds, to the detriment of corporate bonds. The impact on the banks will therefore depend on such factors as the compositions of their bond portfolios, i.e. the proportions of government bonds and other bonds. Customers' exposure on the stock markets and the other securities markets could also affect the banks via the losses suffered by customers. In connection with capital losses it is also generally the case that the effect on the banks will be amplified if their own exposures, and those of their customers, are inflated via gearing.



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## Structural Trends in the Financial Sector of the Nordic Region

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This article describes a number of characteristics of the financial sector in the Nordic region, as well as the structural trends of the last year. These trends have led to greater integration, so that large groups now have extensive activities in several Nordic countries. The largest Nordic groups' balance sheets, financial results and staff numbers are compared. In conclusion, there is a brief description of the challenges posed by the technological development, including Internet banking, to the financial institutions.

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### CHARACTERISTICS OF THE FINANCIAL SECTOR IN THE NORDIC REGION

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#### **Concentration in the Nordic banking sector**

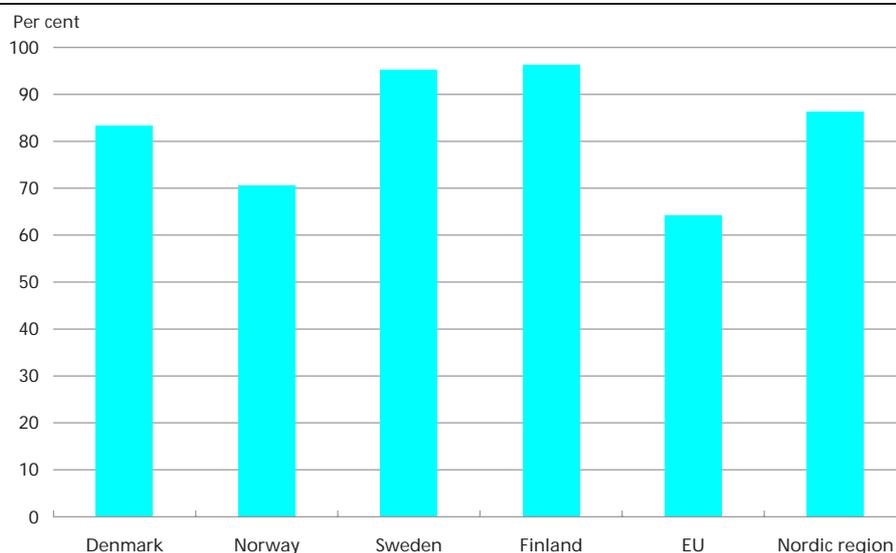
The largest banks have a very large market share in the Nordic region. In Denmark, Sweden and Finland the five largest banks in 1998 thus accounted for more than 80 per cent of the sector's total balance sheet, cf. Chart 41. The high degree of concentration in the Nordic countries can be attributed to such factors as the consolidation of the Nordic banks in the late 1980s and early 1990s. In some of the countries this was a consequence of a serious financial crisis in conjunction with a recession. Although the level of concentration is almost identical in the Nordic countries, there are variations in the structure of the banking sector in the various countries. For example, the Danish banking sector is characterised by a relatively large number of small banks<sup>1</sup>. A comparison of the Nordic banking sector with that of the entire EU shows that on average the 5 largest banks in each Nordic country accounted for 86 per cent of the total balance sheet in 1998, while the equivalent average for the EU member states was 64 per cent, cf. Chart 41. The low average concentration in the EU member states conceals the relatively high concentration in the banking sectors of a number of small countries (the Netherlands, Belgium and Portugal), while large countries (Germany, France and Italy) have a relatively low concentration in their banking sectors. The background to the high concentration in small countries may include that in certain areas of the sector banks need to be of a certain size in order to

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<sup>1</sup> Finland has numerous cooperative banks, but 246 of these have formed OKOBANK Group, which is regarded as a banking group.

CONCENTRATION IN THE BANKING SECTOR IN THE EU AND THE NORDIC REGION, END-1998

Chart 41



Note: The concentration is compiled as the total balance sheet of the five largest banks as a ratio of all banks' balance sheet as of 31 December 1998. Only banks registered in BankScope are included. The figures for the Nordic region exclude Iceland.

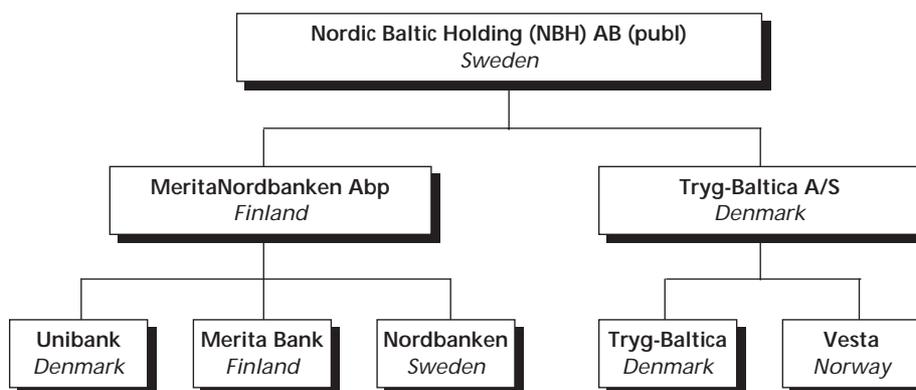
Source: BankScope.

function effectively. The level of concentration increased significantly in e.g. Spain, France and Italy due to a number of mergers and acquisitions among the large banks in those countries in 1999.

### The integration of the Nordic banking market

The integration of the Danish financial sector with those in the other Nordic countries has increased considerably during the past year, since some of the largest groups have been involved in cross-border mergers and acquisitions. Examples include Den Danske Bank's acquisition of Fokus Bank of Norway and Östgöta Enskilda Bank of Sweden<sup>1</sup>, FöreningsSparbanken's acquisition of Finance for Danish Industry (FIH) and SEB's agreement with Codan. Under the agreement between SEB and Codan SEB acquired Codan Bank from Codan, while Codan acquired Trygg-Hansa from SEB. The largest cross-border merger so far took place in the spring of 2000 between Unidanmark and MeritaNordbanken of Finland/Sweden, thereby creating the largest financial group in the Nordic region with an extensive physical presence in several Nordic countries. According to the future structure announced, Unibank will be a subsidiary bank of MeritaNordbanken domiciled in Finland, cf. Diagram 1.

<sup>1</sup> Östgöta Enskilda Bank was acquired as of 1 April 1997.



Source: Press release, merger of Unidanmark and MeritaNordbanken, 6 March 2000.

The emergence of cross-border groups increases the requirement of cooperation between the supervisory authorities of the various countries. The supervisory authorities in Denmark, Sweden, Finland, Norway and Iceland have concluded a cooperation agreement to extend their practical cooperation on the supervision of credit institutions, insurance and investment companies. This cooperation agreement e.g. includes provisions on the exchange of information and cooperation on inspections.

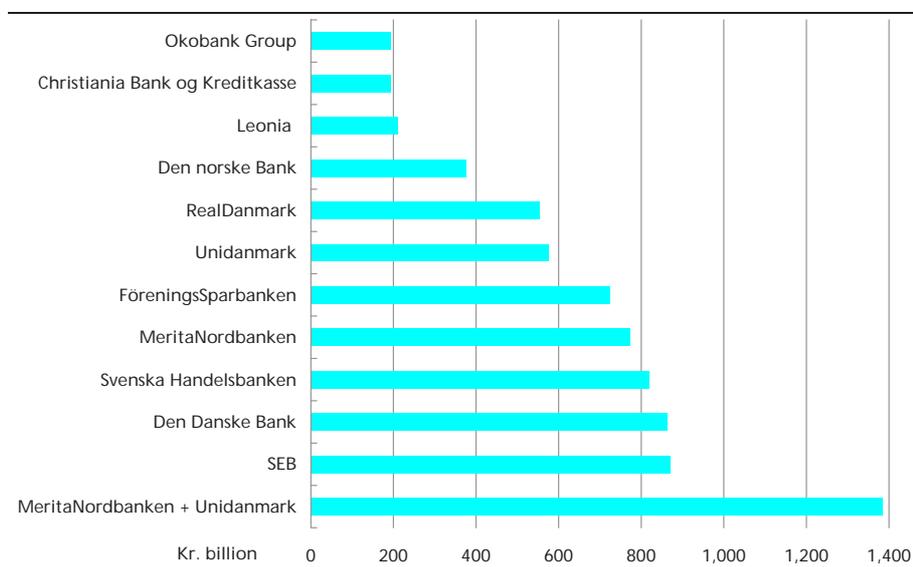
The current regulatory and supervisory structure has recently been debated at European level against the background of a report from an ad-hoc working party under the auspices of the EU Economic and Financial Committee. This was the Brouwer Report on Financial Stability. The report was published after discussion by ministers and central-bank governors at the informal meeting of the ECOFIN Council in Lisbon at the beginning of April 2000. The conclusions are e.g. that the present institutional structure in this area provides a cohesive and flexible basis for ensuring financial stability in the EU, while at the same time there is a need to strengthen practical cooperation, etc. It is recommended that the exchange of information and cooperation between supervisory authorities and central banks be strengthened in areas such as large financial institutions and market trends.

### Comparison of selected Nordic groups

As a result of the aforementioned restructuring measures the largest financial groups in the Nordic region now have activities in more Nordic countries than before, while the relative size of the groups has changed.

BALANCE SHEETS OF SELECTED NORDIC GROUPS, END-1999

Chart 42



Note: The balance sheets include non-consolidated companies which are estimated to be part of the Group's overall strategy.

Sources: MeritaNordbanken-Unidanmark: press release announcing merger. SEB: Annual Report 1999 – BfG is included (merger 3.1.2000). Den Danske Bank: Annual Report 1999. RealDanmark: Kapital Holding, Report and Accounts 1999. Svenska Handelsbanken: Annual Report 1999. MeritaNordbanken Group: Annual Report 1999. FöreningsSparbanken: Annual Report 1999, including FIH, excluding Hansapank. Unidanmark: Annual Report 1999 (excluding non-consolidated companies). Den norske Bank: Supplementary information for Investors and Analysts 1999 (including Postbank and Vital). Christiania Bank og Kreditkasse: Annual Report 1999. Annual Report 1999. Okobank Group: Financial Statement Bulletin for 1999.

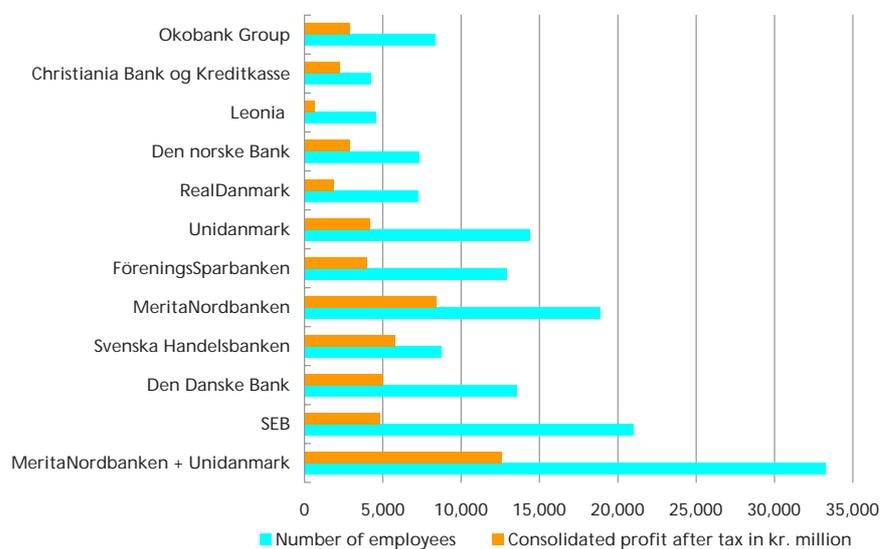
After the merger between MeritaNordbanken and Unidanmark this group is significantly larger than the second-largest groups in the Nordic region in terms of total balance sheet, cf. Chart 42. However, MeritaNordbanken/Unidanmark is not among the largest in Europe. For example, the balance sheet of Dutch ABN Amro is more than twice as high.

Comparison of numbers of employees in the selected Nordic groups not surprisingly shows that the MeritaNordbanken/Unidanmark group has the highest number of employees. The group has more than 10,000 more employees than the second-largest group, SEB, cf. Chart 43. Together MeritaNordbanken and Unidanmark at kr. 12.6 billion achieved the highest profit after tax in 1999. It is almost twice as high as the profit of the Svenska Handelsbanken group, which achieved the second-highest profit.

A comparison of the return on equity for the period 1995-99 of a weighted average of the largest groups in each country shows that the Danish groups achieved the most stable returns, cf. Chart 44. There was greater fluctuation in the returns on equity of the Swedish and Norwegian groups, but for the period as a whole their returns on equity were

NUMBER OF EMPLOYEES AND FINANCIAL RESULTS OF  
SELECTED NORDIC GROUPS IN 1999

Chart 43



Note: Number of employees and financial result of non-consolidated companies which are estimated to be part of the Group's overall strategy are included. SEB includes profit before tax for BfG, less 30 per cent as BfG's estimated profit after tax. Since the compilation methods for the number of employees are not completely identical, these figures are not fully comparable.

Sources: See sources of Chart 42.

higher. Furthermore, it should be noted that throughout the period there was only little variation between the returns on equity of the Danish groups, as illustrated by the interval between maximum and minimum in Chart 44. However, these results should be interpreted with some caution due to such factors as mergers and acquisitions during the period, which have entailed the restructuring of the groups on which the analysis is based.

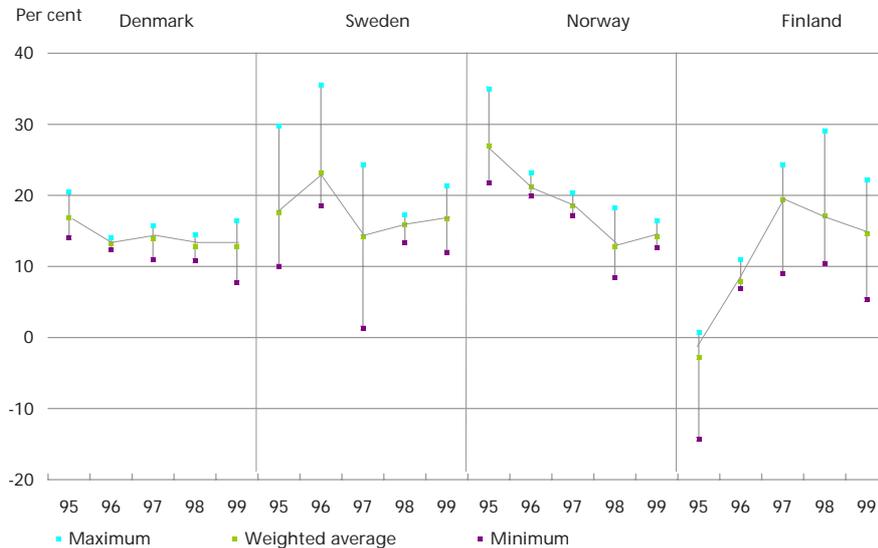
### Structural changes in the Nordic insurance market

For a number of years life assurance companies have been part of major financial groups. This enables the groups to offer a wider range of savings products. This is of increasing importance, in step with the greater emphasis on pension savings. General insurance is less frequently part of the portfolio of financial groups because the advantages of being able to offer both banking and general insurance products are considered less obvious by some banks.

In 1999 the ownership of several general insurance companies in a number of Nordic countries was restructured. Den Danske Bank sold its general insurance company to Topdanmark, and SEB of Sweden sold Trygg-Hansa to Codan. Nykredit and Unidanmark moved in the opposite direction. Nykredit negotiated a merger with Østifterne Insurance, and

RETURN ON EQUITY IN THE LARGEST NORDIC GROUPS

Chart 44



Note: Denmark comprises data for Den Danske Bank, Unidanmark and RealDanmark, and pro forma data for 1995-97. Sweden comprises data for MeritaNordbanken (Nordbanken for 1995-96), SEB, FöreningsSparbanken and Svenske Handelsbanken. Norway comprises data for Den norske Bank and Christiania Bank og Kreditkasse. Finland comprises data for MeritaNordbanken (Merita Bank for 1995-96), the Leonia Group (Leonia Bank for 1995-96) and Okobank Group as from 1996. Return on equity: profit after tax as a ratio of equity at year-end.

Sources: BankScope, except RealDanmark: Kapital Holding, Report and Accounts 1999. Leonia: Annual Report 1999. Okobank Group: Financial Statement Bulletin for 1999.

Unidanmark merged with Tryg-Baltica, which subsequently acquired the Norwegian insurance company Vesta. In 1999 the two financial groups were alone among the largest Nordic financial groups in including general insurance among their activities. After the merger of Unidanmark and MeritaNordbanken the largest Nordic group will also include general insurance, although as a minor element of the group's business scope.

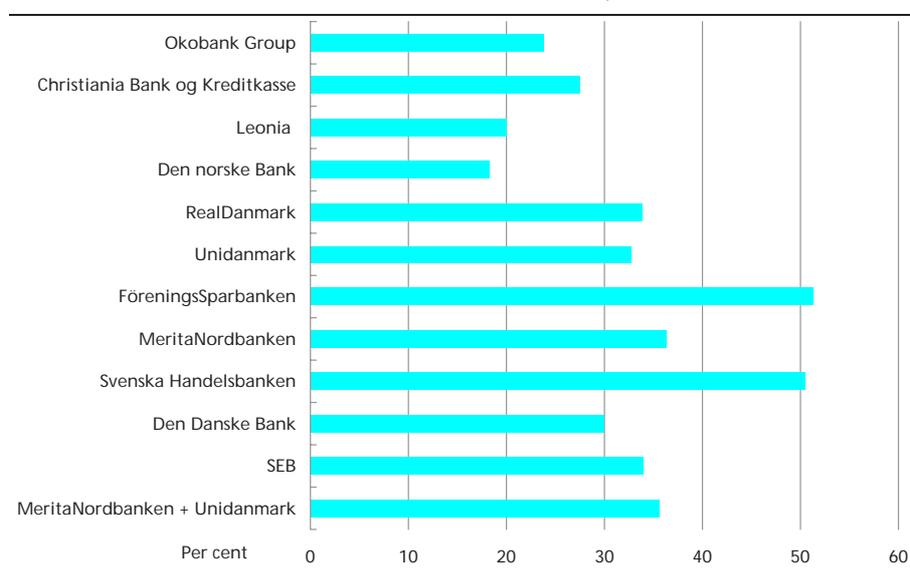
## ELECTRONIC BANKS IN THE NORDIC REGION

The financial sector of the Nordic region is characterised by widespread use of modern technology. For example, the Nordic Internet banks offer a very wide range of products and are ahead in the introduction of WAP (Wireless Application Protocol) services. There is a good basis for establishing Internet banks in several of the Nordic countries. This is e.g. due to the tendency in countries with a low population density for a large proportion of the population to have access to the Internet.

Especially in Finland, but also in Sweden, the banks have chosen to focus on Internet banks, while the Danish banks have also engaged in other electronic transaction technologies such as PC-based home

SHARE OF PRIVATE CUSTOMERS USING ELECTRONIC BANKS, END-1999

Chart 45



Note: Some data also include a small number of business customers. The data concerning telephone banking customers from Salomon Smith Barney is compiled at end-June 1999. The fact that the customers may have both telephone and Internet banking agreements is not taken into account. There are also strong variations in how frequently the customers use the electronic banks, as well as the range of services provided by the banks.

Sources: SEB: Annual Report 1999, telephone banking customers from Salomon Smith Barney "Net Winners & Losers", October 1999. Den Danske Bank: Annual Report 1999, telephone banking customers from Salomon Smith Barney. Svenska Handelsbanken: Annual Report 1999, telephone banking customers from Salomon Smith Barney. MeritaNordbanken: Annual Report 1999. FöreningsSparbanken: Annual Report 1999 and information directly from the bank. Unidanmark: Annual Report 1999. RealDanmark: Information directly from RealDanmark. The data solely includes BG Bank. Den norske Bank: Supplementary Information for Investors and Analysts 1999, including Tegligiro. Christiania Bank og Kreditkasse, Leonia and Okobank Group: Information directly from the banks.

banking and telephone banking<sup>1</sup>. In the following the three electronic transaction technologies – Internet, PC and telephone – are regarded as electronic banks.

Chart 45 shows private customers' use of the electronic banks of selected Nordic financial groups at end-1999. The largest Nordic banks (in balance-sheet terms) also appear to account for the most extensive use of electronic banking transactions among private customers. The comparison of the banks is subject to certain reservations, however, since e.g. to a minor degree the banks' compilation methods vary.

Not all services are directly suitable for distribution via electronic banks. Complex products (e.g. pension schemes) subject to complicated regulation and taxation, which are also of great financial significance to the customer, will require consulting services. By tradition customers

<sup>1</sup> According to the Danish Bankers Association approximately 542,000 private customers had a home banking agreement and approximately 83,000 business enterprises an office banking agreement with their banks as of 1 January 2000 in the form of an active PC-based or Internet-based scheme. Six months before, approximately 441,000 private customers and approximately 61,000 business enterprises had agreements with their banks. According to the Danish Financial Supervisory Authority, 90 banks offered banking services via the Internet at end-February 2000.

have sought advice and consulting at meetings with a consultant in person. For certain services this means that consulting can become an even more important parameter of competition.

### **Costs and earnings regarding electronic banks**

The simple transactions which customers can accomplish via electronic banks, such as transfers between accounts, provide great savings opportunities for the banks. For example, a transaction in a branch costs approximately 8 times more than if it is effected via the Internet<sup>1</sup>. On the other hand, it is easy for customers to use the Internet to gain information on prices and terms for competitors' products, thereby intensifying competition and exerting pressure on prices. At the same time the establishment and further development of electronic solutions entail considerable costs for the banks. If it is the bank's strategy to be a frontrunner, higher costs will be involved.

In a transition phase the implementation of new technology will primarily entail higher costs, but in the long term this can probably be more than offset by improved earnings and savings. For example, when the customer himself effects money transfers via electronic banks there is less need for the branches to handle such functions.

The costs of operating an Internet bank are very low compared to the costs of establishing and operating a network of branches. A very large number of customer prospects can be reached relatively inexpensively. By far the majority of Internet banks in the Nordic countries are established by banks with a well-established branch network, and the Internet banks are widely regarded as an additional distribution channel<sup>2</sup>.

Recently a number of Nordic banks with many Internet customers have announced reductions of the branch network due to the more widespread use of Internet banks. A need for restructuring of the branches therefore cannot be ruled out once Internet transactions have reached a critical mass. The extent of the possible restructuring measures will depend on the branch networks' coverage of the market area compared to the branch networks of competitors.

During the 1990s all Nordic countries have seen reductions in branch networks, cf. Chart 46. This can be attributed mainly to effectivisation measures as a consequence of consolidation in the sector, but also the growth in alternative distribution channels such as ATMs and electronic banks has played – and will continue to play – a role.

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<sup>1</sup> Moody's Investors Service, April 2000 "Nordic Internet Banking".

<sup>2</sup> In USA, where use of Internet services is widespread, there are only approximately 10 "pure" Internet banks, i.e. banks which customers can only contact via the Internet (or by telephone), and so far none of these banks have gained any significant market share.

## FUTURE PROSPECTS

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The use of modern technology in the Nordic financial sector will continue to be a significant factor in the sector's future development. In general, the technological development presents a number of challenges to the financial institutions which can entail gains or losses. The technology provides for production and distribution rationalisations, and for greater customisation of products. Furthermore, elements of the working processes can be outsourced to subcontractors or delegated directly to customers, allowing the banks to focus on core areas in which they have considerable expertise, such as consultancy. In addition, the banks can expand and improve customer relations by marketing non-financial products via the Internet.

Competition can also be intensified as customers become increasingly more well-informed, and business enterprises outside the financial sector may begin to use their brand names, customer information and distribution networks to expand their product ranges to include financial products. These enterprises can then choose to establish their own financial institutions (e.g. Internet banks) or conclude agreements whereby the established financial institutions act as subcontractors for certain financial services. Irrespective of which option is chosen, it will entail changes in the present structure of the financial sector.

One reaction to the aforementioned challenges might be the greater consolidation of the financial sector via mergers and acquisitions or strategic alliances. More alliances may also be established between the financial sector and enterprises outside the financial sector<sup>1</sup> such as telecommunication companies, due to the greater focus on electronic distribution channels.

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<sup>1</sup> Commerzbank cooperates with Deutsche Telekom. Deutsche Bank has concluded strategic alliances with e.g. Nokia, SAP, AOL Europe and Mannesmann. In Denmark e.g. Den Danske Bank has concluded an agreement with Framfab, an Internet consultancy in Sweden. Den Danske Bank and BG Bank have also concluded an agreement with Tele Danmark on banking information on Tele Danmark's WAP services.



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## Use of Euro in Affiliated Countries and Territories Outside the EU

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*Niels C. Andersen, Legal Affairs, and Niels Bartholdy, International Relations*

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### INTRODUCTION

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If Denmark's adoption of the euro is endorsed by the referendum in Denmark on 28 September 2000 it will be necessary to consider the currency arrangements for the Faroe Islands and Greenland. Today they both use the Danish krone as their currency<sup>1</sup>. The Faroe Islands and Greenland are part of the Kingdom of Denmark, but are not members of the EU.

Some of the present euro area member states have close economic relations with small states or territories which by tradition have used the present euro area member state's currency (e.g. the French franc) as their currency, but which are not members of the EU. The framework for the foreign-exchange cooperation between the euro area member states and these small states and territories after the introduction of the euro is set out in a number of EU decisions which are outlined in the following.

A common feature of the EU decisions is that all of the small states and territories in question will have the opportunity to preserve the currency association to the euro area member state by using the euro as their currency. There is every indication that they will avail of this opportunity. However, the more detailed legal arrangements between the individual euro area member states and the associated small states and territories remain to be clarified.

Finally, the article describes two EU decisions on the currency relations between France and the CFA zone and the Comoro Islands, and Portugal and Cape Verde after the two EU member states' introduction of the euro.

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<sup>1</sup> The Faroe Islands use the Danish coin series, but have their own series of banknotes in units of 1 króna. The banknotes can be exchanged for Danish banknotes in the ratio 1:1.

## MONACO, SAN MARINO AND VATICAN CITY

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Monaco, San Marino and Vatican City have the formal status of independent states which are not members of the EU. However, the three small states have very close relations with France (Monaco) and Italy (San Marino and Vatican City) and via conventions have concluded agreements on the use of the currency of their large neighbouring country.

By tradition the Principality of Monaco has used the French franc as its currency, i.e. banknotes and coins denominated in French francs are legal tender. Monaco also has its own coin series and these coins are not legal tender outside Monaco. Similarly, banknotes and coins denominated in Italian lire have traditionally been used in the Republic of San Marino and Vatican City, while both these countries have also issued their own coins, which are legal tender in Italy on a par with Italian lire.

On the introduction of the euro on 1 January 1999 the competence to conclude currency arrangements with third countries or territories outside the EU was transferred from national level in France and Italy to EU level (i.e. the Council of Ministers). On 31 December 1998 the Council of Ministers therefore adopted three decisions on the monetary relations with the three small states<sup>1</sup>. The three decisions set out the overall framework for the currency association. At the same time the EU authorises respectively France and Italy to negotiate and conclude agreements on behalf of the EU with the three small states. The European Commission and the European Central Bank, ECB, will be involved in the negotiations and the agreements will be submitted for consultation to the Economic and Financial Committee of the EU, EFC. The European Commission as well as the ECB and the EFC may require the agreements to be submitted to the Council of Ministers.

In the three Council decisions Monaco, San Marino and Vatican City are declared to be entitled to use the euro as their official currency and to give euro banknotes and coins the status of legal tender. The three states are subject to the obligation not to issue any banknotes, coins or monetary surrogates of any kind until the conditions for such issuance have been agreed with the EU. Furthermore, the three countries are subject to the obligation to introduce the EU rules on euro banknotes and coins and to cooperate closely with the EU in the fight against counterfeiting. Finally, credit institutions in the three countries are given access to the payment systems of the euro area on terms subject to ap-

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<sup>1</sup> Council decisions of 31 December 1998 on the position to be taken by the Community regarding an agreement concerning the monetary relations with respectively the Principality of Monaco, the Republic of San Marino and Vatican City (1999/96-98/EC), *Official Journal* No. L 30 of 4 February 1999, p. 31-36.

proval by the ECB. Furthermore, the EU decision concerning Monaco, which has the largest financial sector among the three states, also states the opportunity to impose requirements on financial institutions concerning minimum reserves and statistical reporting to the ECB.

As stated, the detailed agreements between France and Monaco and between Italy and San Marino and Vatican City remain to be finalised, presumably because it is not found strictly necessary to finalise the details until euro banknotes and coins are introduced in 2002.

### SAINT-PIERRE-ET-MIQUELON AND MAYOTTE

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Two small islands off the east coast of Canada (Saint-Pierre and Miquelon) and a small island north of Madagascar (Mayotte) are part of the Republic of France and hitherto have used the French franc as their currency, with French banknotes and coins as the only legal tender. The islands are formally designated as "French territorial communities". They are not members of the EU, in contrast to e.g. the French overseas departments to which the EU Treaty fully applies. On the other hand, the three islands are among the EU's associated overseas countries and territories.

The special conditions for Saint-Pierre-et-Miquelon and Mayotte have required the clarification of their monetary arrangements after the introduction of the euro in France. The Council decision of 31 December 1998 sets out the framework for these monetary arrangements<sup>1</sup>.

According to the Council decision the euro will be introduced as the currency of the three islands and as from 1 January 2002 France will grant legal tender status on the islands to banknotes and coins denominated in euro. The ECB and the national central banks (in practice Banque de France) may carry out the monetary functions and operations of the Eurosystem on the three islands. After consultation with the European Commission and the ECB France shall ensure that those elements of Community law which are or will be necessary for the functioning of Economic and Monetary Union (EMU) are applied in Saint-Pierre-et-Miquelon and Mayotte.

The Council decision should be interpreted to indicate that in reality the euro area is expanded to include Saint-Pierre-et-Miquelon and Mayotte. The ECB and the Eurosystem take over the central-bank duties, although in practice the central-bank functions are undertaken by Banque de France on behalf of the Eurosystem. Via its own legislation

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<sup>1</sup> Council decision of 31 December 1998 concerning the monetary arrangements in the French territorial communities of Saint Pierre-et-Miquelon and Mayotte (1999/95/EC), *Official Journal* No. L 30 of 4 February 1999, p. 29-30.

France shall ensure that all relevant Treaty provisions on EMU also apply on the three islands, even though the latter are not directly covered by the EU Treaty.

The details of the arrangements with Saint-Pierre-et-Miquelon and Mayotte also remain to be finalised – including the necessary amendments to French legislation.

#### **OTHER FOREIGN-EXCHANGE ARRANGEMENTS WITH THE EURO AREA**

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The introduction of the euro in France and Portugal and the transfer of competence in monetary and foreign-exchange issues from national to EU level have also required the clarification of these two member states' continuing currency relations with respectively the CFA zone and the Comoros and Cape Verde.

The CFA zone consists of two groups of countries, 6 in Central Africa and 8 in West Africa. Each of the two groups in Africa has its own economic and monetary union with a common central bank, and the currency in both groups of countries is the CFA franc, which is convertible at a fixed parity to the French franc. The CFA zone is also subject to common multilateral surveillance and convergence criteria for government budgets. The Comoros have their own central bank and their currency is the Comorian franc, which is also convertible to the French franc at a fixed parity.

Cape Verde has its own central bank and its currency, the Cape Verde escudo, is convertible to the Portuguese escudo at a fixed parity.

The EU Council of Ministers has adopted two decisions<sup>1</sup> authorising France and Portugal to continue their existing agreements on currency arrangements with respectively the CFA zone and the Comoros and Cape Verde. France and Portugal and their cooperation partners retain the sole responsibility for implementation of these agreements. No new agreements will thus be concluded on behalf of the EU. The fixed conversion rate against the French franc and the Portuguese escudo, which will both be replaced by the euro, shall be guaranteed solely via the national government budgets of respectively France and Portugal. Finally, the two member states shall keep the European Commission, the ECB and the EFC informed of any changes in the parity and of minor adjustments to the agreements. Any plans for major amendments (to the extent that the nature and scope of the agreement are affected) shall be submitted for approval by the EU Council of Ministers.

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<sup>1</sup> Council decision of 23 November 1998 concerning exchange rate matters relating to the CFA Franc and the Comorian Franc (98/683/EC), *Official Journal* No. L 320 of 28 November 1998, p. 58-59 and Council decision of 21 December 1998 on exchange rate matters relating to the Cape Verde escudo (98/744/EC), *Official Journal* No. L 358 of 31 December 1998, p.111-112.

There are many other examples of countries which have linked their currency either to the euro or to one of the national currencies in the euro area, such as the D-mark. However, these are purely unilateral currency arrangements which do not impose obligations on the ECB or euro area member states, irrespective of whether the regime is a "currency board" or a more traditional fixed-exchange-rate arrangement. It was therefore not necessary to set out Council decisions on such arrangements.

#### **THE FAROE ISLANDS AND GREENLAND**

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If Denmark decides to adopt the euro, as stated in the introduction, the currency arrangements for the Faroe Islands and Greenland will have to be considered.

The above presentation of Council decisions describes how such issues, which have varying degrees of similarity with the relations between Denmark and the Faroe Islands and Greenland, have been handled for the present euro area member states and their cooperation partners.

With regard to the Faroe Islands and Greenland it should be noted that Protocol no. 22 to the EU Treaty stipulates that the provisions of Article 14 of the Statute of the European System of Central Banks and the European Central Bank have no influence on Denmark's National-bank's right to carry out its existing tasks concerning the parts of the Kingdom of Denmark which are not part of the Community. The aforementioned Article 14 contains provisions on the national central banks, including their opportunities to carry out functions which are not set out in the Statute.



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## Currency Boards

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*Ulrik Bie, Secretariat and Niels Peter Hahnemann, International Relations*

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### WHAT IS A CURRENCY BOARD?

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In countries with currency boards a fundamental element of monetary policy is that domestic base money<sup>1</sup> must be fully covered by foreign-exchange reserves and gold. Strict interpretation of the rule entails that the responsible authority cannot acquire domestic financial assets, so that the base money is matched to the foreign-exchange reserve. At the same time, it must be possible to exchange currency freely without limitations to and from an anchor currency at a fixed exchange rate. This principle is laid down by law and can therefore only be changed by amendment of legislation. This also applies to the fixed exchange rate.

Currency boards originated in the British colonies<sup>2</sup>, where they were established primarily with a view to creating stable monetary conditions while retaining seignorage in the local area. The sole function of the colonial currency boards was to issue banknotes and coins against sterling deposits in London and vice versa: to exchange local currency for sterling. Most currency boards were based in the local area, but some had their headquarters in London. In the period after World War II until the colonies gained independence in the 1950s and 1960s by far the majority of the British colonies had currency boards. The former colonies usually established normal central banks upon independence.

The currency board countries were required to observe a number of rules, as was the case under the gold standard system.<sup>3</sup> Firstly, the exchange rate against the anchor currency had to be fixed. Secondly, a currency board could not influence the formation of interest rates in the money market. The colonial currency boards thus did not include monetary-policy instruments such as official interest rates. However, in most cases this did not present any major problems. Due to the economic structures in many colonies the banks often had restricted opportunities for investment in the local economies and the volume of bank deposits was limited compared to banknotes and coins in circulation. Many banks

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<sup>1</sup> Base money consists of banknotes and coins in circulation and any mandatory deposits by private banks to the central bank, here called M0.

<sup>2</sup> See Shannon (1952) for a detailed description of the British currency boards.

<sup>3</sup> Reference is made to Bie and Henneberg Pedersen (1999) for a review of the gold standard system.

were direct branches of British banks and the colonial banks generally held a major part of their assets in London. The banks functioned to a great extent as exchange bureaus. The individual currency boards had no discretionary powers and fluctuations in the foreign-exchange reserves had a direct impact on domestic liquidity, which consisted primarily of banknotes and coins.<sup>1</sup> For this reason the assets of a currency board had to be held in safe, readily negotiable government securities within the British Empire, rather than in domestic financial assets, even when the latter existed.

The currency board in its pure form described here may have procyclical effects. For example, if a major trading partner faces considerable economic difficulties, besides the initial shock to the economy this will also shake the confidence of external investors, leading in turn to a strong outflow of capital, and thereby a reduction of the foreign-exchange reserve. This would aggravate the domestic crisis. Similarly, a strong upswing would attract investment and thereby contribute to overheating the economy. This relationship also shows the extent to which currency board countries are affected by capital flows.

The introduction of a currency board in its pure form is the most extensive unilateral pegging of its currency which a country can undertake without introducing the currency of another country as its own. The sole function of a currency board is to issue local currency against that of the anchor country, and the primary difference between a currency board and using the currency of another country is the issue of the seignorage entitlement.

#### **PRESENT CURRENCY BOARD SYSTEMS**

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In recent years a number of countries have applied the principles of a currency board as the basis for their monetary systems, within the framework of a traditional central bank. A key difference between the currency boards of the colonies and the present currency board arrangements is that the cover of base money with the foreign-exchange reserve is not determined exactly (e.g. 110 per cent cover), but is subject to a minimum limit, typically at least 100 per cent. This creates the opportunity to accumulate foreign-exchange reserves and thereby establish a liquidity reserve for the central bank. The accumulation of surplus liquidity makes it possible to smooth the capital flows which always exist in open economies, and thereby establish a countercyclical instrument on a certain scale.

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<sup>1</sup> As a general rule the surplus liquidity of the British currency boards was 10 per cent.

COUNTRIES WHICH HAVE USED A CURRENCY BOARD REGIM  
IN A STABILISATION PROCESS

Box 1

*Hong Kong* reintroduced a currency board regime in 1983 after pressure against the Hong Kong dollar. The parity between the Hong Kong dollar and the US dollar is 7.8:1. In the years after 1988 Hong Kong had introduced a number of monetary-policy instruments which led to doubts as to whether the regime was a currency board or a traditional central bank. After a reform in 1998 the trend was towards a purer currency board regime.

*Argentina* opted for a currency board regime in 1991. The US dollar was the natural choice of anchor currency, as it was then and still is widely used for both savings and transactions. The parity between the Argentine peso and the US dollar is 1:1.

*Estonia* introduced a currency board in 1992. The original parity between the Estonian kroon and the D-mark was 8:1, giving a parity to the euro of 15.6466:1, cf. p. xx.

*Lithuania* introduced a currency board regime in 1994. This regime has been discussed on several occasions since its introduction due to such factors as the chosen dollar peg. This was in accordance with the pattern of trade at the time of introduction, but is in conflict with Lithuania's long-term objective of EU membership. The parity between the Lithuanian lit and the US dollar is 4:1.

*Bulgaria* introduced a currency board in 1997. The D-mark was chosen as the anchor currency on the basis of trade as well as strategic considerations. The original parity between the Bulgarian lev and the D-mark was 1,000:1, but after a monetary reform it became 1:1, giving a parity to the euro of 1.95583:1.

In contrast to the former British colonies the present currency board countries have an independent banking system in which bank deposits play a far greater role than e.g. during the gold standard period. The monetary-policy authority must therefore not only safeguard seignorage but also undertake a number of central-bank tasks in relation to the financial sector. Tasks involving lending to the banks can only be undertaken if the central banks in question hold surplus liquidity, cf. above.

Introduction of the currency board regime during the 1980s and 1990s was related to a stabilisation process, cf. Box 1.<sup>1</sup> Hong Kong re-established its currency board regime in connection with a currency crisis. For Argentina and the transition economies Estonia, Lithuania and Bulgaria the primary purpose of introducing currency boards was to reduce the very high inflation rates.

The background to introducing a currency board regime in economies with hyperinflation or very high inflation was first and foremost to quickly achieve economic-policy credibility.

<sup>1</sup> In Bosnia-Herzegovina a currency board was introduced in 1997 in connection with the implementation of the Dayton agreement. This currency board is very similar to that of the former British colonies due to the limited financial sector.

The problems regarding lack of credibility can be reduced by introducing rules<sup>1</sup> to prevent the authorities from reacting to events in a way which conflicts with their original promises. However, for some countries these limitations are not sufficient to achieve credibility, reduce inflation expectations and thereby support stable monetary conditions. If a country is already economically or politically vulnerable, it can be tempting to devalue the currency in the event of negative shocks to the economy,<sup>2</sup> rather than having to undergo a possibly tight period of adjustment – despite promises to the contrary. Both citizens and investors know this, so decision-makers have to convince citizens and investors of their willingness to embark on the long steady pull to restore the economy, rather than taking the easy way out in the short term.

In order to convince market participants of their commitment to a certain policy, the decision-makers have to send a signal of credibility to the market. This is where the currency board principles have a role to play. A currency board regime is a stronger peg than a traditional fixed-exchange-rate regime and is therefore also more difficult to exit. The signalling effect from introducing a currency board is thus that the cost of exiting a currency board system, i.e. loss of credibility, is so high that only credible decision-makers who do not wish to abandon the regime under any circumstances are willing to introduce such a regime.<sup>3</sup>

This argument is particularly important in countries which over a long period have proved unable to pursue a credible policy, or in transition economies which have not had the opportunity to prove their commitment to a chosen economic strategy based on a market economy. In these cases the need to demonstrate commitment and focus on a long-term strategy carries greater weight than the disadvantage of not being able to react to a negative shock.<sup>4</sup>

There are strong variations in the structure of the present regimes based on currency board principles. This applies to the legal basis as well as the scale of monetary-policy instruments. However, a recurring principle is that the rule of cover, and thereby the size of the foreign-exchange reserve, imposes certain limits on central banks' scope to extend liquidity to the financial sector, as well as on how they may extend credit (as lender of last resort) in connection with financial crises.

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<sup>1</sup> The introduction of rules is a significant conclusion in time inconsistency literature. See e.g. Kydland and Prescott (1977) and Barro and Gordon (1983) for a theoretical review.

<sup>2</sup> See e.g. Lohmann (1992) for a description of the consequences of negative shocks.

<sup>3</sup> A theoretical modelling is found in e.g. Cukierman, Kiguel and Liviatan (1992).

<sup>4</sup> A discussion hereof in relation to Estonia is found in Kraft (1999).

## THE FINANCIAL SECTOR

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Most currency board countries have been able to adapt to the limitations on financing of government deficits, but at one time or other they have all experienced considerable problems in relation to the financial sector.

A well-functioning interest-rate mechanism under a currency board regime requires that the central bank does not determine the money market interest rates and that the country in question is willing to accept a considerable tightening of liquidity and the possibility of a recession in connection with capital outflows and exogenous shocks. This also means that the short-term interest rates may be subject to considerable fluctuation in step with the financial sector's current liquidity requirement. This is one of the reasons that the financial sector is more vulnerable under a pure currency board than under other exchange-rate regimes. The vulnerability of the financial sector is the principal reason for modifications to the pure currency board.

As the financial sector develops, banknotes and coins in circulation will decline in importance compared to bank deposits in domestic currency. A currency board regime is thus more vulnerable to systemic crises<sup>1</sup>, since a general depositor demand for the conversion of bank deposits to the anchor currency will require increasingly larger foreign-exchange reserves.

In periods without any foreign-exchange unrest the currency board regimes will typically have foreign-exchange reserves which exceed the base money. The resulting surplus liquidity can be used to stabilise the financial sector, e.g. in the short-term via overnight transactions, or in connection with any financial crises arising. In view of the limited access to domestic liquidity the access to foreign capital in the event of a liquidity crisis plays an important role in the establishment of a robust financial sector. Minimum reserve and liquidity requirements imposed on the banking sector have proved to be appropriate instruments to equalise short-term fluctuations in the liquidity requirement and in relation to systemic crises.

Minimum reserve requirements entail that a proportion of the banks' deposits are placed on an account with the central bank. Minimum reserve requirements ensure a certain liquidity volume in the financial sector, which can be appropriate in countries whose financial supervisory systems are not firmly established. On the other hand, unless the reserves accrue interest, minimum reserve requirements will impede the

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<sup>1</sup> A systemic crisis in the financial sector arises when a large part of the sector cannot meet depositors' requirement to withdraw their deposits (liquidity crisis), which can e.g. be the case in the event of strong currency market turmoil and/or a general lack of confidence in the sector. A solvency crisis arises if a large proportion of the banking sector is insolvent in terms of market prices, which can be the case in the event of plummeting prices for financial assets.

development of the banking sector and thereby also of the economy in general. The distorting consequences can be reduced by introducing remuneration of mandatory deposits with the central bank. The level of minimum reserves can be used to manage the free liquidity in the financial sector. Raising the minimum reserve requirement reduces the immediate liquidity of the sector, while lowering the minimum requirement increases liquidity.

Argentina made active use of adjustments to the minimum reserve requirement during the crisis in Latin America in 1994-95, when Argentine banks were particularly severely affected due to their substantial exposure in Mexican securities. The crisis developed into a systemic crisis during which the central bank lowered the minimum reserve requirement for deposits in both dollars and pesos from 43 per cent to 30 per cent for on-demand deposits and from 3 per cent to 1 per cent for time deposits. This measure prevented a general liquidity crisis in the financial sector whereby the sector would not have been able to both fulfil the minimum reserve requirements and accommodate customers' withdrawal requests.

#### **ESTONIA'S CURRENCY BOARD REGIME**

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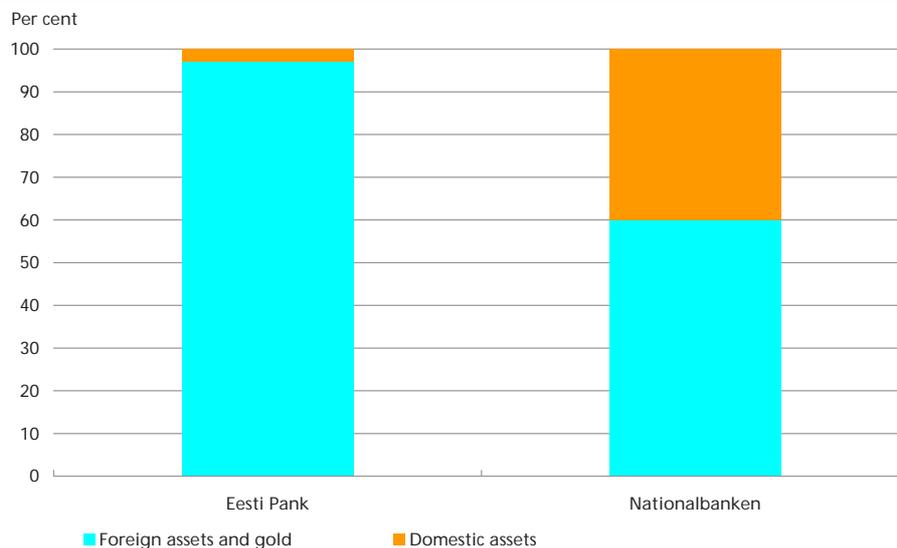
The following description of the Estonian system is meant to give an impression of how a currency board functions. Estonia's regime is interesting because it is relatively uncomplicated, and Estonia's economic achievements since independence are impressive. Moreover, Estonia was the first European country to use such a regime in connection with a process of stabilisation and has thereby served as a model for Lithuania and Bulgaria.

Estonia's currency board regime was established concurrently with the introduction of its national currency, the kroon, in June 1992. The regime is described in the "Law on the Security for the Estonian Kroon". The regime is based on three fundamental pillars, of which the most important is a fixed exchange rate vis-à-vis the D-mark of 8 kroon per D-mark, and therefore now 15.6466 kroon per euro. This exchange rate was originally fixed by Estonia's central bank, Eesti Pank, which has the competence to revalue, but not devalue, the kroon. Furthermore, the central bank's obligations, primarily the circulation of banknotes, may not exceed the bank's foreign-exchange reserves and gold. There are no restrictions of any kind to payments vis-à-vis non-residents with regard to current payments, capital flows or financial transactions.

Monetary financing of the government deficit is prohibited, and the central bank may not use the interest-rate instrument or other monetary-policy instruments to manage the money-market interest rate.

ASSETS OF EESTI PANK AND DANMARKS NATIONALBANK, END-1999

Chart 1



Sources: Eesti Pank and Danmarks Nationalbank.

The difference between a traditional central bank, such as Danmarks Nationalbank, and Eesti Pank is reflected in the individual balance-sheet items. Of Eesti Pank's total assets 97 per cent consisted of foreign exchange and gold at end-1999, compared to 60 per cent for Danmarks Nationalbank, cf. Chart 1.

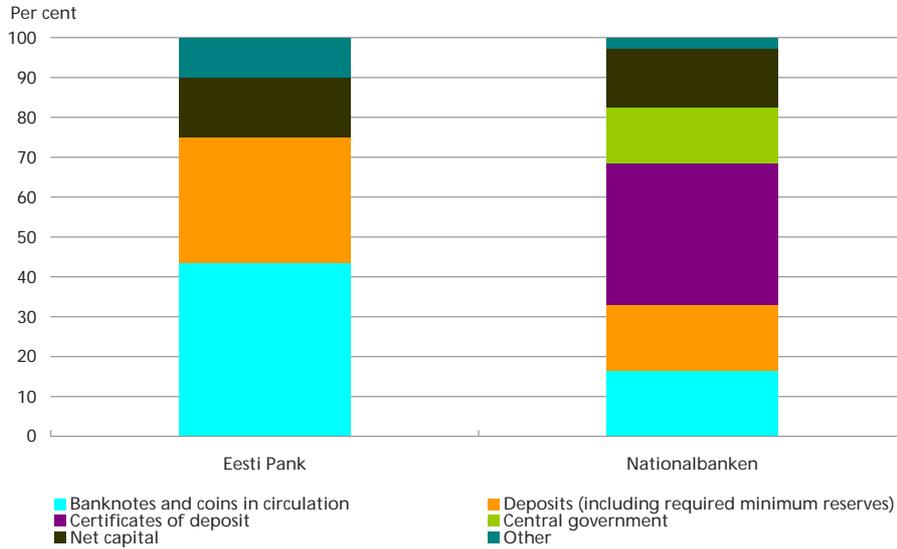
The composition of the liabilities reflects that Eesti Pank has fewer deposit facilities. For Eesti Pank banknotes and coins in circulation, together with deposits, primarily minimum reserves, account for 75 per cent of total liabilities, cf. Chart 2. The remainder were equity capital and commitments denominated in foreign exchange, including to the IMF. For the Nationalbank banknotes and coins in circulation and on-demand deposits amounted to 33 per cent, while certificates of deposit accounted for a further 36 per cent.

The Estonian currency board regime is relatively pure compared to those of other countries. Eesti Pank's most important monetary-policy facility is a standing, unlimited facility on the Estonian foreign-exchange market whereby the bank is obliged to trade D-marks for kroon with banks licensed in Estonia. These transactions are concluded at a fixed price, and since 1996 there has been no spread between the bid and offer rates. As from 1999 this facility covers the euro and its component currencies.

Under a currency board regime the central bank's opportunities for lending to the financial sector depend on whether the central bank has

LIABILITIES OF EESTI PANK AND DANMARKS NATIONALBANK, END-1999

Chart 2

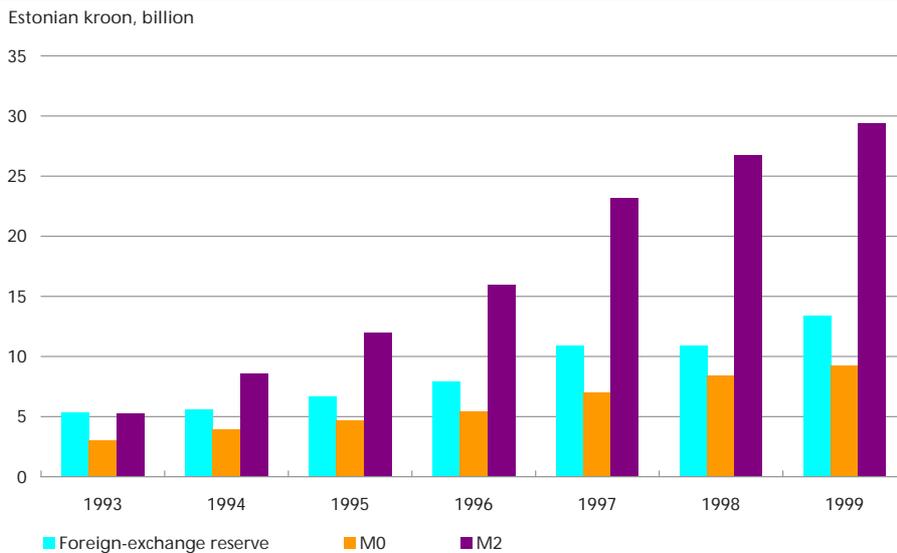


surplus foreign-exchange reserves. This has been the case in Estonia since the establishment of the currency board in 1992, cf. Chart 3, although the scale of lending to the banks has been very moderate.

At the end of 1999 the foreign-exchange reserve was 30 per cent higher than the base money, M0, for which Eesti Pank is obliged to pro-

FOREIGN-EXCHANGE RESERVE, M0 AND M2, IN ESTONIA, END-YEAR

Chart 3



vide cover in foreign exchange. The foreign-exchange reserve covers half of the monetary aggregate, M2, which e.g. comprises time deposits with commercial banks.

In practice, Eesti Pank has only made use of the intervention option on a few occasions in 1992-95 in connection with the dismantling of the former Soviet banking system and the transition to the currency board regime. The principle part of the reconstruction of the financial sector took place at this early stage of the reform process. In 1998, in view of the risk of financial instability Eesti Pank acquired 58 per cent of the shares in the private Optiva Pank.<sup>1</sup>

In 1993 Eesti Pank began to issue certificates of deposit to Estonian banks on a monthly basis. The foreign-exchange surplus makes this facility possible. Certificates of deposit were introduced in order to create an interbank market in which they could be used as collateral. However, the amounts involved have been very limited and the instrument lost its significance in 1996 when a more flexible method of calculating the minimum reserve requirements was introduced. In a future reform of the monetary-policy instruments the certificates of deposit will be eliminated.

Under the minimum reserve requirement a bank is required to deposit an amount with Eesti Pank corresponding to a percentage of the bank's domestic and external liabilities. Originally this was 10 per cent, but it was raised to 13 per cent in 1997 in view of the international currency market turmoil and the strong domestic credit expansion. Since 1996 the banks have been obliged to fulfil this requirement over a monthly average, subject to a daily minimum of 4 per cent. Failure to comply with the reserve requirement is subject to a penalty interest rate of 20 per cent of the shortfall.

In order to reduce the distorting consequences of the fact that only the banks are subject to minimum reserve requirements, since July 1999 the required reserves have accrued interest at the ECB's deposit rate. The money market thus operates within an interest-rate tunnel, of which the floor is the ECB's deposit rate and the ceiling is the penalty rate. The ECB's deposit rate also applies to deposits with the central bank which exceed the minimum reserve requirements. However, only moderate use has been made of this "deposit facility".

Since all bank deposits with Eesti Pank accrue interest, the banks are not subject to any particular incentive to offset inter-bank liquidity fluctuations. Estonia's money market is therefore relatively limited. The

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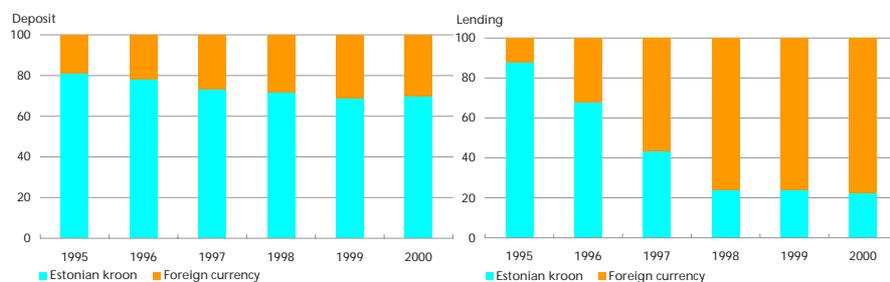
<sup>1</sup> Finnish investors have submitted a purchase offer for Eesti Pank's portfolio of equity securities. The sale is expected to be completed by the end of June 2000.

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**BREAKDOWN OF DEPOSITS AND LENDING BY ESTONIAN KROON AND FOREIGN CURRENCY**


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Chart 4



Note: Figures at year-end, but end-March 2000.  
Source: Eesti Pank.

same applies to the bond market. The modest volume of bonds is primarily caused by the fiscal policy pursued that has made it unnecessary for the general government to issue debt securities on any significant scale. The stock market is the most important financial market. Its total value was approximately 38 per cent of GDP at end-1999.

Foreign currencies account for an increasing proportion of the Estonian economy. In 1995-96 deposits denominated in foreign currencies with Estonian banks accounted for approximately 20 per cent, but after the Russian crisis the proportion increased to just under 30 per cent. At the end of March 2000, 76 per cent of all lending by Estonian banks was denominated in foreign currencies, cf. Chart 4. This reflects general confidence in the fixed exchange rate, but also exposes the banking sector to a significant credit risk in the event of the currency's devaluation.

Since 1992 the Estonian banking sector has been subject to widescale consolidation. The number of banks fell from 19 in 1993 to 7 at end-1999. The two largest banks play a dominant role and accounted for 84 per cent of the sector's total balance sheet at end-1999. These two banks are controlled by Swedish banks. A high degree of foreign ownership facilitates access to liquidity from abroad should the Estonian banking sector encounter difficulties. It also means that the credit risk to the sector as a whole is generally regarded as an intra-group risk for the individual owners. If Optiva Bank is acquired by Finnish investors the Estonian banking sector will be almost entirely subject to foreign ownership.

### The road ahead

As from 1992 Estonia had a clear strategy concerning EU membership and participation in EMU. Estonia thus chose the D-mark as its anchor currency, so that an exit strategy for Estonia would entail its adoption of the

euro. In connection with the negotiations for EU membership the issue of whether a currency board regime can replace participation in ERM II as a criterion for convergence on the examination of the country prior to participation in the third stage of EMU has become more urgent.

Eesti Pank finds that the Estonian currency board regime is fully equivalent to ERM II participation.<sup>1</sup> Eesti Pank emphasises that the current regime has made Estonians accustomed to the fact that monetary and foreign-exchange policy cannot be used to solve ad hoc problems. This has created the framework for a stability-oriented policy.

The European Central Bank, ECB, and the European Commission will consider the issue in due course.

A current topic of debate in Estonia is whether to introduce the euro prior to EU membership, i.e. whether Estonia should substitute its currency. This viewpoint is supported by several politicians and economists, but is endorsed by neither Eesti Pank nor the ECB, since it would entail loss of seignorage. Estonia's unilateral introduction of the euro would lead to a situation where Estonia uses the euro without having access to the ECB's monetary-policy facilities and without participating in the monetary-policy decisions either.

## EMPIRICAL EXPERIENCE

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It is difficult to make an actual empirical assessment of the comparative performance of countries which have used currency boards in their stabilisation processes and countries which have not. This is due to the relatively small amount of data available, as well as the difficulties in isolating the effect of the chosen exchange-rate regime from other elements of an often extensive stabilisation programme. Most empirical assessments include a number of developing countries which continued to use currency boards after independence.

Subject to this reservation the surveys show in general that currency boards or the use of a currency board regime result in higher growth and lower (and more stable) inflation.<sup>2</sup> Ghosh, Gulde and Wolf (1998) extend a survey to include the factors underlying the lower inflation. Traditional economic theory tends to explain the effect on the basis of the establishment of rules to curb monetary growth. According to the survey the predominant explanation is a lower velocity of money arising from increased confidence in the policy pursued. This emphasises the signal value of a currency board. Although the survey, as previously mentioned, is based on a wide range of countries, the result is

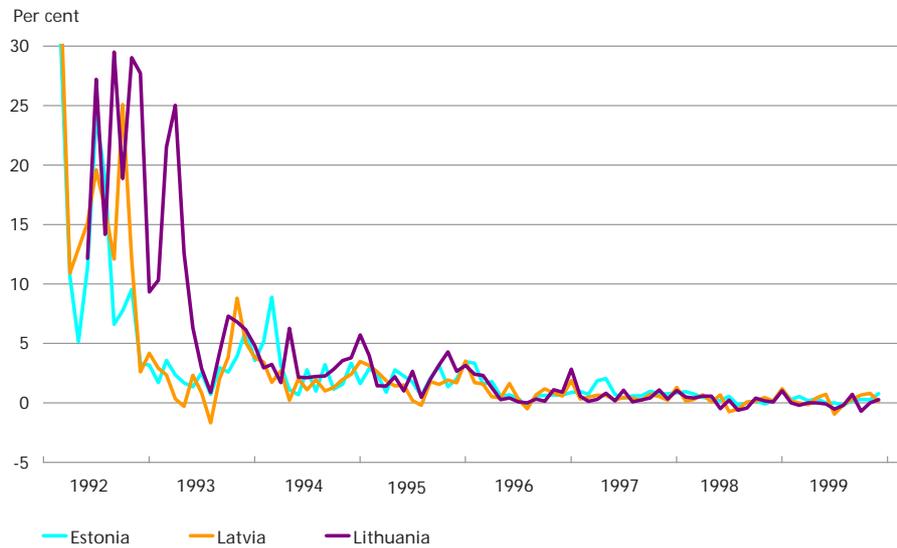
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<sup>1</sup> Cf. e.g. Eesti Pank (1999) for a review of Estonia's strategy for adoption of the euro.

<sup>2</sup> See e.g. Schuler (1996), Ghosh, Gulde and Wolf (1998) and Gulde, Kähkönen and Keller (1999).

DEVELOPMENT IN CONSUMER PRICES IN THE BALTIC COUNTRIES

Chart 5



Source: International Financial Statistics, IMF.

supported by a survey by Korhonen (1999) concerning eastern and central Europe. This survey indicates that the growth in the velocity of money has been lower in the Baltic countries than in e.g. Russia, Hungary and the Czech Republic.

#### The results in the Baltic countries

Despite differences in a number of areas the situation in all three Baltic countries is very similar. All three have re-emerged from the ruins of the former Soviet Union and are in the process of negotiating EU membership. Latvia differs from the other two countries in that it formally applies a traditional fixed-exchange-rate system, although the central bank de facto functions as if a currency board regime applied.

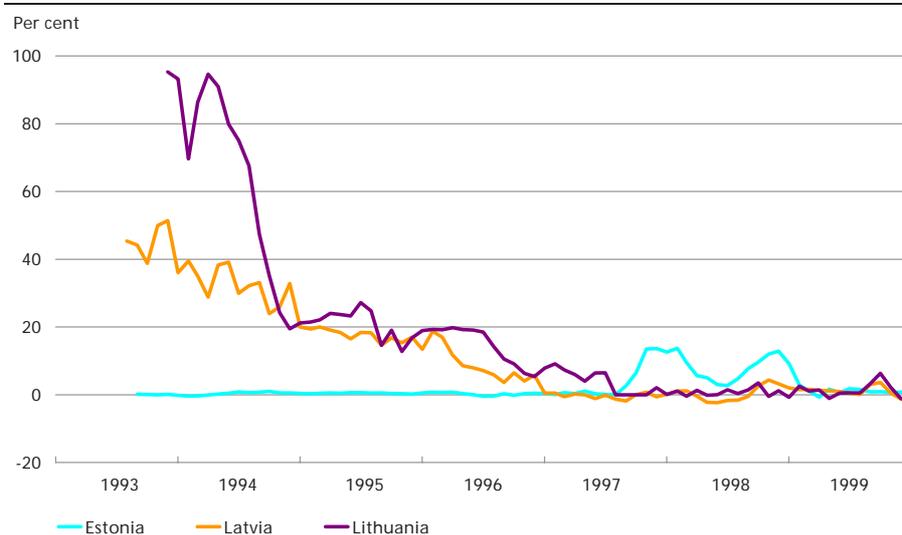
#### Inflation

The primary objective of establishing a currency board regime has been to reduce inflation and thereby create a stable framework for economic activity.

Each of the Baltic countries has succeeded in reducing inflation considerably. However, there is nothing to indicate that Estonia and Lithuania have reduced their inflation faster than Latvia, cf. Chart 5. On the contrary, during the period the rate of inflation was higher in Estonia than in the other two countries. However, this may be due to underestimation of the chosen exchange rate in 1992, and to considerable productivity improvements in the sector which is exposed to competi-

INTEREST-RATE DIFFERENTIALS TO THE ANCHOR CURRENCY'S  
INTEREST RATE (OVERNIGHT INTEREST RATE)

Chart 6



Note: Data is calculated as monthly averages. Estonia vis-à-vis the German interest rate, Lithuania vis-à-vis the US interest rate and Latvia vis-à-vis the SDR interest rate.

Source: International Financial Statistics, IMF.

tion.<sup>1</sup> In March 2000 the annual increase in consumer prices was 3.2 per cent in Estonia and Latvia and 0.8 per cent in Lithuania.

### Interest-rate convergence

Greater confidence in a fixed exchange rate will result in a lower risk premium and thereby a narrowing of the interest-rate differential to the anchor currency. Countries using currency boards should therefore show a greater degree of interest-rate convergence than countries with traditional fixed-exchange-rate regimes.

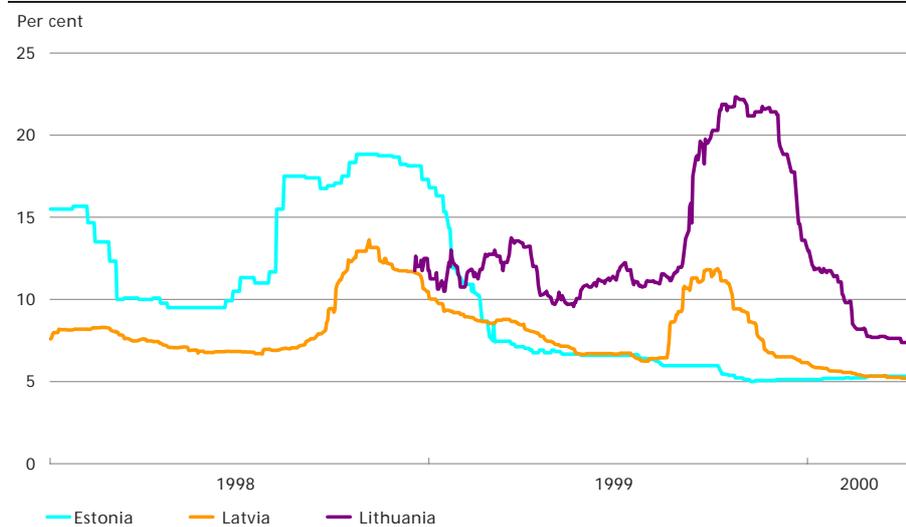
A comparison of the overnight interest rates<sup>2</sup> of the three Baltic countries makes the long period with a high degree of interest-rate convergence in Estonia particularly apparent, cf. Chart 6. The interest-rate convergence indicates that Estonia achieved widespread internal and external credibility for its fixed-exchange-rate policy at an early stage, so that its devaluation premium was very modest. In connection with the crises in Asia in 1997 and Russia in 1998 Estonia was exposed to stronger pressure than the other Baltic countries. Money-market interest rates rose significantly, but have since receded.

<sup>1</sup> Higher productivity increases than abroad in the sector exposed to competition lead to wage increases which will be transmitted to the protected sector. If productivity increases are lower in the protected sector than in the sector exposed to competition, this will entail rising prices for goods from the protected sector, which will intensify the pressure on costs in the sector exposed to competition. The overall result is a higher inflation rate. This is called the Balassa-Samuelson effect.

<sup>2</sup> For data-related reasons the overnight interest rate is used here.

3-MONTH MONEY-MARKET INTEREST RATES IN THE BALTIC COUNTRIES

Chart 7



Note: End-of-day quotations. Updated up to and including 1 May 2000.  
Source: EcoWin.

Lithuania's introduction of a currency board in 1994 also had a clear positive effect on its level of interest rates. In general, however, Lithuania has shown the lowest degree of interest-rate convergence. The background is such factors as the recurring discussion in Lithuania of when and how the currency board regime could be abandoned.<sup>1</sup> Under the original strategy from 1997 to phase out the regime Lithuania's currency, the litas, from 1999 would be pegged to the euro under a traditional regime. The time schedule has been revised on numerous occasions and the current plan entails a transition to pegging to the euro during the 2nd half of 2001, while maintaining foreign-exchange cover of 100 per cent.<sup>2</sup>

The discussion in Lithuania reflects the difficulty in assessing when a country has "sufficient credibility" to exit a currency board regime. The chances of abandoning the regime without this leading to unrest will improve if the trends for key economic indicators, e.g. government deficit and current-account deficit, are stable.<sup>3</sup> Without sufficiently convincing key economic indicators uncertainty regarding the choice of future regime can lead to a higher risk premium, cf. Chart 7.

Latvia's interest-rate differential has generally narrowed, which is related partly to the fact that the central bank de facto has functioned as

<sup>1</sup> Originally, the central bank was not in favour of introducing the currency board regime, cf. Camard (1996).

<sup>2</sup> See Kregžde (1999) for a review of Lithuania's strategy.

<sup>3</sup> See e.g. OECD (2000) for a discussion of this issue.

if a currency board regime with full cover of the base money applied. Furthermore, Latvia's central bank de facto applied pure currency board principles when it in the 2nd half of 1999, during strong pressure against the Latvian currency, the lat, allowed a substantial decrease in the foreign-exchange reserve to have an impact on domestic liquidity whereby the money market re-adjusted directly via higher interest rates.

Besides the opportunity to devalue the risk premium also entails a country-specific risk which e.g. covers the country's ability (or inability) to service external loans. Estonia has pursued a tight economic policy to support its currency board regime. Estonia's crisis management in 1998 thus included measures to further tighten economic policy. The choice of exchange-rate regime has therefore contributed to promoting a stability-oriented fiscal policy.

Latvia has sought to pursue an economic policy similar to Estonia's, while Lithuania has faced problems regarding large government finance deficits. In recent years this is due primarily to a scheme to cover the losses suffered by the population during the hyperinflation in 1992-93. This scheme has imposed a considerable burden on government finances. As a consequence the guarantee was suspended in November 1999.

## CONCLUSION AND PERSPECTIVES

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A high inflation rate in a country has substantial adverse impacts and necessitates a stabilisation process to normalise the economy and create a stable framework for economic activity. The use of a currency board regime in a stabilisation process of this type by no means guarantees that a country can quickly stabilise its economy. In principle the use of such a regime means that the country in question is obliged to implement reforms such as a restructuring of general government finances and reorganisation of the financial sector and the state-owned sector.

For countries where it is difficult to convince market participants of the level of commitment to the economic and monetary policy pursued a currency board regime entails the advantage that the political costs of abandoning the regime are greater than under a fixed-exchange-rate regime with unilateral pegging of the currency. The potential loss of credibility will thus be aggravated and, *ceteris paribus*, market participants will be more confident that politicians will allow the central bank to maintain the regime, even if the cost to the economy in the short term may seem high. Argentina and Estonia, and most recently Bulgaria, have succeeded in maintaining a tight economic policy and permitting major crises in the financial sectors by referring to the currency board regime. On the other hand, until recently the various governments in

Lithuania found it difficult to maintain tight budgetary discipline. This has contributed to weakening the Lithuanian currency board regime.

In conclusion, a currency board regime creates a framework for economic policy which the politicians then have to fill out.

A currency board regime must be compared with the other opportunities<sup>1</sup> open to a country to pursue a fixed-exchange-rate policy, i.e. a unilateral fixed-exchange-rate regime and currency substitution.

A unilateral fixed-exchange-rate policy provides greater scope for a response to major exogenous shocks. This e.g. concerns the opportunity to pursue a discretionary policy if the currency comes under pressure (the interest-rate instrument) as well as enhanced institutional access to adjustment of the exchange rate. Latvia's example shows that it is possible to maintain a unilateral fixed-exchange-rate policy if a tight economic policy is pursued and the confidence of the markets has been gained. The Bank of Latvia has nevertheless pursued a policy which to a great extent is based on the currency board regime.

In a number of respects currency substitution, i.e. unilateral abandonment of a national currency in favour of the currency of the anchor country, is in theory superior to currency boards. It entails several advantages, in particular a lower level of interest rates, since the foreign-exchange premium is eliminated, although an exit premium continues to exist. The key economic drawback is the loss of seignorage. Compared to the situation only a few years ago, currency substitution as a possible exchange-rate regime cannot be ruled out in advance. To some extent the successful use of the currency board regime has contributed to stimulating consideration of the currency substitution option.

The use of a currency board regime in a stabilisation process cannot be isolated from the other elements of reform. The question is whether Estonia's significantly better performance than most other transition economies since the mid-1990s is due to its choice of monetary system, or its general economic policy and not least its structural policy?

In general, the countries which have used currency boards in their stabilisation processes have experienced sound economic development and the currency board regime has contributed to creating stable framework conditions. Furthermore, the regime has remained intact. The currency board countries have succeeded in maintaining a fixed exchange rate vis-à-vis their anchor currencies during a period of high turbulence on the financial markets. Argentina is the only country in South America which did not devalue its currency against the dollar during the 1990s, while the Baltic countries are the only countries in eastern and central Europe not to devalue against their respective anchor currencies since 1994.

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<sup>1</sup> ERM II is not considered here, as it is an option only available to a limited group of European countries, including Denmark.

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# Danmarks Nationalbank's Risk Management

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*Ib Hansen and Christian Ølgaard, Financial Markets*

## INTRODUCTION

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Like other financial institutions, Danmarks Nationalbank is exposed to a number of financial risks. This article presents an overview of the financial risks to which the Nationalbank is exposed, as well as the risk management principles applied.

The Nationalbank's primary tasks are to issue banknotes and coins and to conduct the foreign-exchange and monetary policy. The Nationalbank therefore holds assets in Danish kroner and in other currencies. As a consequence, the Nationalbank cannot avoid certain risks. For example, the foreign-exchange reserve will always be associated with exchange-rate risk. Other risks – such as interest-rate risk – are more a reflection of the weighing of risk against earnings.

The Nationalbank's policy is to measure the inherent risks which cannot be avoided, while the risks which can be avoided are to reflect explicit decisions and a weighing of risk against benefit. As a consequence, the Nationalbank's risks are considered on an overall basis. The interest-rate risk is thus not considered in isolation for respectively the foreign-exchange reserve and the portfolio of domestic securities, and the size of the foreign-exchange reserve as such does not affect the total interest-rate risk to the bank. The foreign-exchange reserve is placed in several markets in order to reduce the interest-rate risk to the bank. Foreign exchange is traded on forward terms to ensure that the exchange-rate exposure is predominantly in euro, thereby minimising the exchange-rate risk.

The bank's credit risks are kept at a very low level, and the objective is to avoid credit losses completely. The very high credit standing of counterparties, the diversification of exposures and the provision of collateral for loans are therefore important factors.

Besides the market and credit risks Danmarks Nationalbank, like other financial institutions, is exposed to legal and operational risks. However, these are not considered in this article.

PRINCIPAL ITEMS OF THE NATIONALBANK'S BALANCE SHEET,  
END-1999 (KR. BILLION)

Table 1

Assets		Liabilities	
Domestic bonds .....	38	Banknotes and coins in circulation	46
Foreign-exchange reserve .....	161	Central government's account .....	40
Gold .....	5	The banks' net position .....	73
		Other .....	2
		Net capital .....	42

Note: The "Other" liabilities item comprises other liabilities less other assets.

### KEY ASPECTS OF THE NATIONALBANK'S BALANCE SHEET

As an element of monetary and foreign-exchange policy the Nationalbank is responsible for fixing the official interest rates. The Nationalbank may also steer the krone rate by buying and selling foreign exchange. Sale of foreign exchange by the Nationalbank will strengthen the krone, while purchase of foreign exchange will weaken the krone.

The Nationalbank is the banker to the banks. This role implies that the Nationalbank makes accounts available to the banks and settles inter-bank payments. The banks' total outstanding with the Nationalbank is affected particularly by the Nationalbank's purchase and sale of foreign exchange, while the central government's payments via its account with the Nationalbank lead to temporary fluctuations. The accounts with monetary-policy counterparties are subject to the Nationalbank's official interest rates.

Danmarks Nationalbank is the sole issuer of banknotes. The banks contact the Nationalbank when they need new banknotes, whereby their claims on the Nationalbank are reduced.

As the basis for a discussion of the Nationalbank's risks a useful approach is to consider its balance sheet and the factors affecting the various items thereof. Table 1 presents a simplified balance sheet for the Nationalbank.

The net position is defined as the banks' current-account balances plus placements for up 14 days in certificates of deposit, less loans from the Nationalbank.

$$\boxed{\text{Current-account holdings}} + \boxed{\text{Certificates of deposit}} - \boxed{\text{Loans from the Nationalbank}} = \boxed{\text{Net position}}$$

The Nationalbank's balance sheet is affected by several types of transaction. The most important in terms of risk are purchase and sale in the

SALE OF FOREIGN EXCHANGE FOR KR. 1 BILLION		Table 2
Kr. billion	Assets	Liabilities
Foreign-exchange reserve .....	-1	
The banks' net position .....		-1

foreign-exchange market and the central government's foreign-exchange borrowing, which both affect the foreign-exchange exposure.

In order to *support* the krone rate the Nationalbank purchases kroner and sells foreign exchange, thereby reducing the foreign-exchange reserve as well as the banks' net position, cf. Table 2. All in all, the exchange-rate exposure is reduced.

It makes little difference to the Nationalbank's risk exposure how the banks reduce their net position with the Nationalbank since all monetary-policy accounts are subject to the official interest rates, cf. above.

When the central government raises a loan denominated in foreign exchange the Nationalbank purchases the foreign-exchange proceeds, which are then included in the foreign-exchange reserve, cf. Table 3. The central government's krone-denominated proceeds are deposited to the central government's account in kroner. This account is subject to the official interest rates. In an isolated analysis of the Nationalbank's balance sheet the central government's raising of a foreign-exchange loan corresponds to the purchase of foreign exchange from the market – since in both cases the foreign-exchange reserve and loans, which are subject to the official interest rates, will increase.

CENTRAL-GOVERNMENT BORROWING IN FOREIGN EXCHANGE FOR KR. 1 BILLION		Table 3
Kr. billion	Assets	Liabilities
Foreign-exchange reserve .....	+1	
Central government's account with the Nationalbank .....		+1

The balance sheet is also affected by a number of other factors – such as central-government payments and transactions with the International Monetary Fund (IMF), etc. – which are of less importance in terms of risk exposure. In principle the balance sheet is calculated at market value and is therefore also subject to shifts due to fluctuations in interest and exchange rates.

Besides the transactions affecting the balance sheet the Nationalbank has undertaken a number of transactions which do not affect the balance sheet directly. These are primarily forward purchase and sale of

foreign exchange as an element of the management of the foreign-exchange reserve, cf. below.

### THE NATIONALBANK'S CORE EARNINGS

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Just like other enterprises the Nationalbank's risk profile should be viewed in the light of such factors as the bank's earnings. The Nationalbank's earnings are primarily from three core areas:

- *Banknotes and coins*: the circulation of banknotes and coins can be regarded as an interest-free loan to the Nationalbank. The revenue from this "loan" is placed in order to accrue interest. This is called seignorage.
- *Foreign-exchange reserve and financing thereof*: from the Nationalbank's viewpoint the foreign-exchange reserve reflects krone-denominated loans from either the banks or the central government, and placements in foreign exchange. As the interest rate for kroner is higher than the interest rate for euro, and the krone is stable vis-à-vis the euro, in isolated terms the foreign-exchange reserve entails a cost to the Nationalbank. A weakening of the krone implies a gain for the Nationalbank – again viewed in isolated terms – since the value of the foreign-exchange reserve measured in Danish kroner increases.
- *The bank's net capital*: the net capital is set off by assets generating a return.

There are naturally also other core areas, but their contribution to the Nationalbank's earnings is less significant.

The three core areas are closely related to the Nationalbank's role as central bank, and the yield can be termed the bank's core earnings. This represents the bank's earnings if the risk of capital losses due to fluctuations in interest and exchange rates was kept at the lowest possible level, and if the bank were solely to conclude transactions which are a consequence of its role as central bank.

Such an investment strategy would imply that the Nationalbank conducted very short-term borrowing and placements in kroner at the official interest rates, that foreign assets were placed at short-term euro interest rates, and that accounts in foreign exchange were held in euro.

In the case of this strategy the bank's earnings would vary from year to year in step with the short-term interest rate and the short-term interest-rate differential to the euro area, but the Nationalbank would not be exposed to value adjustments due to interest-rate fluctuations.

THE NATIONALBANK'S CORE EARNINGS		Table 4	
	Interest <sup>1</sup> per cent p.a.	Amount <sup>2</sup> kr. billion	Result kr. billion
Counterpart of banknotes and coins .....	4.10	46	1.9
Foreign-exchange reserve and financing thereof .....	-0.35	160	-0.6
Counterpart of net capital .....	4.10	42	1.7
<b>Total .....</b>			<b>3.0</b>

<sup>1</sup> For banknotes and coins and net capital the Nationalbank's lending rate at the beginning of May. For the foreign-exchange reserve the difference between the ECB's official interest rate and the Nationalbank's lending rate at the beginning of May.

<sup>2</sup> End-1999.

At the interest rates prevailing at the beginning of May 2000 and in view of the composition of the balance sheet at end-1999, the Nationalbank's core earnings can be estimated at approximately kr. 3.0 billion per year, cf. Table 4.

An increase in the foreign-exchange reserve entails a decrease in the Nationalbank's core earnings, all other things being equal. This reflects that the Nationalbank borrows at the short-term official Danish interest rate and makes placements at the short-term euro interest rate, which is normally lower than the Danish interest rate.

#### THE NATIONALBANK'S FINANCIAL RISKS

However, the Nationalbank's actual profit is also affected by a number of risk factors. These are *market-related* factors, primarily interest and exchange rates, and *credit-related* factors, i.e. factors related to the counterparties' ability to fulfil their obligations. Some risks are inevitably linked to the aforementioned core areas, but the Nationalbank is also exposed to risks which are not strictly derived from the bank's role as central bank. The Nationalbank's profit thus in addition to the core earnings also reflects earnings achieved by undertaking additional risks. These risks, which are additional to the inevitable risks, are a consequence of the guidelines for the composition of the Nationalbank's portfolio, which are determined by the Board of Governors.

The Nationalbank's risk of losses is attributable primarily to the interest-rate risk associated with the placement of the foreign-exchange reserve and the domestic portfolio. The Nationalbank's exchange-rate risk is relatively modest since its foreign-exchange exposure is denominated primarily in euro. In contrast to private banks, which seek to achieve earnings by assuming credit risks, the Nationalbank's objective is to avoid credit losses.

### Interest-rate risk

The Nationalbank has placed its domestic portfolio and part of its foreign-exchange reserve in bonds at a certain maturity. On the one hand, this entails a risk of capital losses in connection with interest-rate increases, but on the other hand, it will normally lead to higher earnings since long-term interest rates are normally higher than short-term interest rates. The measure of sensitivity to changes in interest rates is the sensitivity of the market value denominated in kroner to an interest-rate change of 1 percentage point (the krone duration).

The total interest-rate sensitivity is distributed on the financial markets in the euro area, the USA, Japan and the UK, cf. Table 5. This is primarily to diversify the risk of capital losses. Experience shows a certain correlation (covariation) between the various financial markets. This correlation is less than perfect, so that the risk of capital losses is reduced by diversifying the interest-rate risk and placements on several markets.

It is relatively simple to assess the interest-rate sensitivity of most of the bonds which the Nationalbank holds. However, this does not apply to Danish mortgage bonds, which entail a prepayment right for the issuer. The complex interest-rate sensitivity of mortgage bonds depends on several factors, such as the current level of interest rates, the interest-rate volatility and the future prepayment behaviour of homeowners. The interest-rate sensitivity of the mortgage bonds is assessed using an option model, and experience is evaluated on an ongoing basis with a view to improving the results from the model. Previously, interest-rate sensitivity was calculated on the basis of factors compiled by the Danish Financial Supervisory Authority for calculation of the banks' sensitivity to changes in interest rates. These factors are updated every quarter, but this interval is too long for an appropriate adjustment of the overall interest-rate risk if there are changes in interest-rate sensitivity arising from interest-rate fluctuations.

INTEREST-RATE SENSITIVITY OF THE NATIONALBANK		Table 5
Capital loss in kr. billion on a general 1 per cent increase in interest rates	End-1998	End-1999
Kroner .....	1.1	1.1
Euro <sup>1</sup> .....	1.3	0.9
Pound sterling .....	0.2	0.2
Swiss franc .....	0.0	0.0
Dollar .....	0.6	0.5
Yen .....	0.2	0.2
<b>Total .....</b>	<b>3.4</b>	<b>2.8</b>

<sup>1</sup> For 1998 euro comprises ECU and the sum of the national currencies of the euro area member states.

When foreign exchange is bought and sold only very short-term placements are affected. The Nationalbank's total interest-rate sensitivity thus remains unaffected by changes in the foreign-exchange reserve. This can be attributed to two factors. Firstly, changes in the foreign-exchange reserve do not affect the net capital. As stated above, changes in the foreign-exchange reserve are set off by changes in either the banks' net position or the central government's account. Secondly, an increase in the foreign-exchange reserve does not improve the Nationalbank's earnings capacity. In other words: the Nationalbank's ability to absorb losses is not affected by changes in the foreign-exchange reserve.

### **Exchange-rate risk**

The Nationalbank cannot avoid the exchange-rate risk associated with fluctuations in the krone rate. This risk is closely associated with the Nationalbank's foreign-exchange reserve. Since the krone is closely linked to the euro via the ERM II agreement, this unavoidable risk can be seen as the risk of a strengthening of the krone vis-à-vis the euro, which will – in isolated terms – inflict a loss on the Nationalbank.

On the other hand, the Nationalbank can avoid the exchange-rate risk related to the fluctuation of the euro vis-à-vis e.g. the dollar. This is achieved by maintaining a low sensitivity to other currencies than the euro.

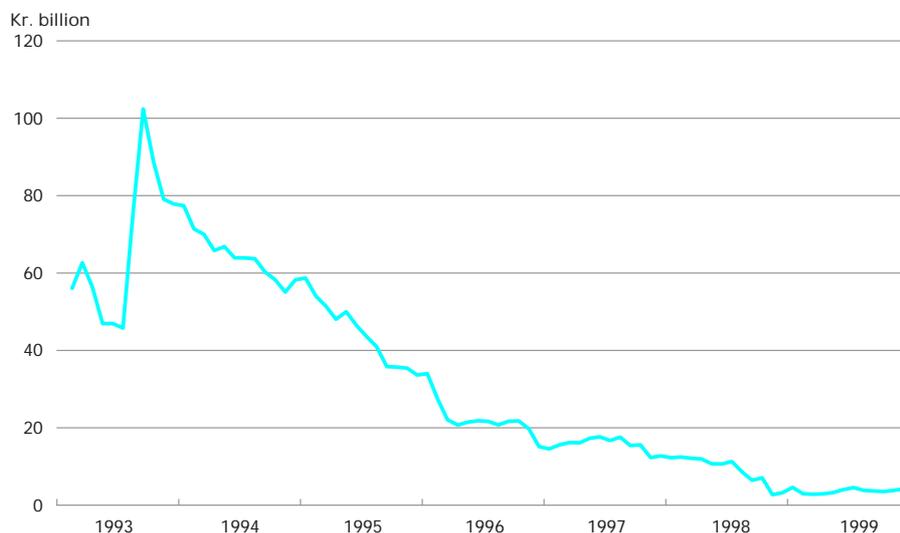
As the central government's foreign-exchange-denominated debt is raised primarily to provide the Nationalbank with an adequate foreign-exchange reserve, and as the Nationalbank's profit is transferred to the central government, since 1992 the currency distribution applied by the Nationalbank and the central government has been subject to coordinated management. This eliminates large-scale fluctuation in the total risk to the central government and the Nationalbank on the central government's raising or repayment of loans. The composition of the total foreign-exchange-denominated placements (or foreign-exchange debt) of the central government and the Nationalbank is determined jointly by the Nationalbank and the Ministry of Finance. The basic principle is that the net placements of the central government and the Nationalbank taken as one shall be subject to a limited exchange-rate risk in addition to the inevitable risk exposure vis-à-vis the euro.

The gross exposure of the Nationalbank and the central government to other currencies than the euro is determined within the framework for net placements.

In step with the repayment of the central government's loans, especially in dollars, throughout the 1990s and in view of the improved placement opportunities on the European markets, the Nationalbank's

THE NATIONALBANK'S EXPOSURE TO NON-EURO CURRENCIES

Chart 1



Note: Before 1999 euro currencies consist of ECU and the national currencies of the euro area member states. The Nationalbank's exposure in these currencies is not included.

exposure in non-euro area currencies has been reduced sharply, cf. Chart 1.

As stated in the section on interest-rate risk, a proportion of the foreign-exchange reserve is placed in the financial markets of the USA, Japan and the UK. To ensure a low exchange-rate risk dollars, yen and pounds sterling are sold forward against euro, so that by far the largest proportion of the foreign-exchange exposure is denominated in euro, cf. Table 6, while the interest-rate sensitivity is spread across several markets.

As a general rule the sole effect of the Nationalbank's sale or purchase of foreign exchange is a change in the euro exposure. This ensures that the "voluntary" exchange-rate risk remains unchanged.

The Nationalbank also holds a stock of gold. The associated risk is not hedged<sup>1</sup>.

### Liquidity risk

Naturally, the foreign-exchange reserve must be available if there is a need to support the krone. The reserve is therefore placed in securities which can quickly be converted to liquid funds available for intervention. Part of the reserve is held as bank deposits. Placements in bonds

<sup>1</sup> The Nationalbank's gold stock is described in further detail in Ulrik Bie and Astrid Henneberg Pedersen, The Role of Gold in the Monetary System, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 1999.

FOREIGN-EXCHANGE EXPOSURE OF THE NATIONALBANK Table 6

Market value, kr. billion	End-1998, net	End-1999		
		Placements	Forward contracts	Net
Euro <sup>1</sup> .....	109	110	55	164
Pound sterling .....	0	12	-11	1
Swiss franc .....	-1	0	0	0
Dollar .....	2	38	-38	0
Yen .....	-1	11	-9	2
Gold .....	4	5	0	5
<b>Total</b> .....	<b>111</b>	<b>174</b>	<b>-3</b>	<b>172</b>

Note: Negative net amounts indicate that the Nationalbank holds liabilities.

<sup>1</sup> For 1998 euro comprises ECU and the sum of the national currencies of the euro area member states.

are spread across various liquid markets. Certain bonds can thus still be sold, even if there are liquidity problems in individual markets. Finally, investments are also made in bonds with a high credit rating which can be pledged as collateral for loans, cf. below. In this way the bonds can be used to obtain liquid funds, even though they are not sold. The Nationalbank has entered into agreements with several international banks, so that bonds can quickly be provided as collateral for loans. This also ensures that the interest-rate risk is not necessarily affected should bank deposits prove insufficient.

Another element of the liquidity reserve is the central government's Commercial Paper programme which is administered by the Nationalbank. This credit facility can provide credit of up to USD 12 billion at short notice. In accordance with the ERM II agreement, the Nationalbank also holds an automatic borrowing right at the ECB should the krone reach the fluctuation limit vis-à-vis the central rate.

### Credit risk

The Nationalbank may suffer losses if a counterparty defaults on its obligations. This is called the credit risk. Unlike commercial financial institutions the Nationalbank does not pursue the objective of gaining a profit by undertaking a credit risk. Commercial financial institutions must expect that some of their customers (counterparties) will default and thereby cause credit losses. By comparison, the objective of the Nationalbank's credit-risk management is to avoid credit losses.

The credit-policy objective is addressed in three ways. Firstly, the Nationalbank uses counterparties with a high credit standing. In the assessment of counterparties' credit standing very great importance is attached to the ratings published by well-reputed international rating agencies. Secondly,

the placements are spread across various highly-rated counterparties. Thirdly, to a large extent collateral for the Nationalbank's claims is required.

The *foreign-exchange reserve* is placed in bonds and bank deposits. Only bonds issued by highly rated states or by units which are either explicitly or implicitly guaranteed by such states are purchased. Deposits are made only with banks with a suitably high rating at relatively short maturities. To supplement the high rating requirements, agreements on the provision of collateral have been concluded with a number of banks. In recent years the placement pattern has shifted towards a larger proportion of collateralised bank deposits by the Nationalbank, cf. Table 7.

The Nationalbank has accounts with certain international organisations such as the International Monetary Fund (IMF) and the Bank for International Settlements (BIS) which are unrated, but are regarded as counterparties with a very high credit standing. The account with the IMF reflects the Nationalbank's international commitments.

The *domestic portfolio* is placed in Danish central-government bonds as well as mortgage bonds and similar bonds of a high credit quality.

The Nationalbank is also exposed to a credit risk in connection with monetary-policy operations whereby the banks may raise short-term loans, as well as settlement transactions with intraday drawings on the Nationalbank, and the banks' cash depots. This risk is managed via a collateral requirement.

TOTAL CREDIT EXPOSURE ON THE FOREIGN-EXCHANGE RESERVE AND THE DOMESTIC SECURITIES PORTFOLIO, ETC. END-1999 Table 7

Kr. billion	Bonds		Bank accounts		Supra-national institutions	Total
	Governments	Other	Collateralised	Uncollateralised		
Aaa .....	51.3	15.3	0.0	4.1	2.7	73.4
Aa1 .....	13.5	0.7	-	3.0	-	17.2
Aa2 .....	2.1	1.5	3.4	6.6	-	13.5
Aa3 .....	12.3	12.7	21.1	17.3	-	63.4
A1 .....	-	-	0.9	2.9	-	3.8
A2 .....	-	-	-	3.0	-	3.0
A3 .....	-	-	0.2	-	-	0.2
No rating .....	-	5.4 <sup>1</sup>	0.9	0.0	22.4 <sup>2</sup>	28.8
<b>Total .....</b>	<b>79.1</b>	<b>35.7</b>	<b>26.6</b>	<b>36.8</b>	<b>25.1</b>	<b>203.3</b>

Note.: Moody's credit rating is used. The scale extends from Aaa to D, where Aaa is the highest credit rating. For more details of ratings reference is made to Kristian Sparre Andersen and Anders Matzen, The Use of Ratings in the European Capital Markets, cf. Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 1998.

<sup>1</sup> Individual Danish mortgage-credit institutes and similar.

<sup>2</sup> Covers solely BIS and IMF.

## QUANTIFICATION OF FINANCIAL RISKS

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Tables 5, 6 and 7 show the Nationalbank's sensitivity to interest-rate, exchange-rate and credit factors, which all contribute to the Nationalbank's financial risk. However, the sensitivity is not the sole indicator of the Nationalbank's risk of losses due to changes in these factors. Evaluating the Nationalbank's risk profile is fairly complicated since besides the sensitivity measures it also requires an assessment of the probability of future changes in respectively interest-rate, exchange-rate and credit factors.

The risk of losses also depends on the future covariation between the various risk factors. A low covariation allows the Nationalbank to reduce the risk of losses by diversifying its placements on various markets. In this situation there is little probability of losses on one market occurring simultaneously with losses on another. On the other hand, a high covariation often implies that losses on one market coincide with losses on another, so that diversifying the portfolio will not significantly reduce the total risk.

During the last 10 years there has been considerable development of methods for quantification of risks. This applies especially to the quantification of market risks, i.e. the risk of losses due to changes in interest and exchange rates. Extensive data is usually available on the historical development of interest rates and exchange rates, which can be applied to statistical analyses. However, extensive data does not guarantee that the future pattern of fluctuation will follow the historical pattern.

There is no unequivocal measure for compilation of the total market risk. Therefore various different market risk measures should be considered in order to gain an impression of the probable losses with the current or other portfolio compositions.

It is far more difficult to quantify credit risk than market risk. The primary reason is that it is more difficult to quantify the probability of credit losses, not least vis-à-vis counterparties of a high credit quality.

### Value-at-Risk

The most common measure of market risk is Value-at-Risk (VaR), which shows the maximum loss for a given period, with a given probability.

The Nationalbank calculates two different VaR measures – analytical and historical VaR. The horizon chosen is 1 year, which allows for comparison of the VaR estimates with annual earnings.

The *analytical VaR* is calculated on the basis of estimated correlations between and volatilities of (in principle) all relevant financial variables.

THE NATIONALBANK'S VALUE-AT-RISK, END-1999		Table 8	
Level of significance 95 per cent, 1-year horizon Krn. billion	Analytical	Historical	
	Excl. gold <sup>1</sup>	Excl. gold	Incl. gold
Incl. krone/euro risk .....	3.3	5.2	5.0
Excl. krone/euro risk .....	3.2	3.3	3.7

<sup>1</sup> At present, it is not possible to include gold in the calculation of analytical VaR.

Combined with data on the composition of the Nationalbank's portfolio an estimate of the bank's analytical VaR is achieved.

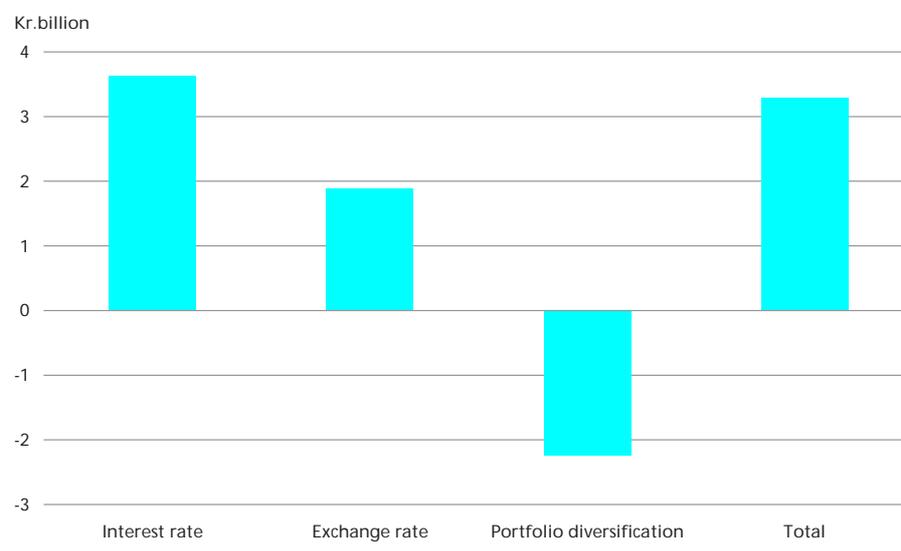
Analytical VaR presents several methodological problems. A general problem is that a normal distribution of price changes on the financial variables is assumed. Experience shows otherwise since in practice the "tails" are thicker than those of the normal distribution. The risk of large losses thus tends to be underestimated in these calculations.

A more specific problem in relation to the Nationalbank is the horizon for the VaR estimate. The applied correlations and volatilities received from an external supplier are typically calculated on the basis of the immediate past, so that observations which are older than three months are insignificant. However, as stated, for the Nationalbank a risk horizon of 1 year has been chosen. In other words, the risk is evaluated on the basis of a significantly shorter data history than the horizon for the VaR estimate.

The *historical VaR* is calculated on the basis of the actual development in interest and exchange rates over a number of years. Specifically, the change in interest rates (distributed on 1-year maturity segments) and exchange rates is calculated from the end of one period to the end of the following period. On the basis of the Nationalbank's portfolio structure at end-1999 the Nationalbank's value adjustment can then be calculated using these changes in interest and exchange rates. Based on data for the period 1991-2000 110 independent monthly value adjustments are calculated, sorted by size and annualised. The 5-per-cent fractile in the resulting distribution (corresponding to the 6th largest loss) is the historical VaR with a significance level of 95 per cent and a horizon of 1 year.

One weakness of this method is that it does not fully capture structural shifts in volatility or correlations over time. The development in interest and exchange rates 5-10 years ago is considered to be just as representative of the future as the development in the most recent year.

Despite their weaknesses both VaR measures are found to make a significant contribution to the calculation of the Nationalbank's market risks. The key results are shown in Table 8.

CONTRIBUTIONS TO ANALYTICAL VALUE-AT-RISK Chart 2

It appears that, excluding gold, analytical VaR amounted to kr. 3.3 billion at end-1999. This means that, based on analytical VaR, with a probability of 95 per cent the Nationalbank's maximum capital loss will be kr. 3.3 billion over the coming year. In autumn 1998, when the financial market unrest after the crisis in Russia was at its peak, analytical VaR amounted to kr. 7.2 billion, but has subsequently declined gradually as markets have become more stable.

Most of the analytical VaR can be attributed to the risk associated with the development in interest rates, cf. Chart 2. The chart also shows that the Nationalbank's VaR is reduced significantly by portfolio diversification.

The historical VaR, excluding gold, is at kr. 5.2 billion higher than the analytical VaR. This can be attributed primarily to the considerably greater volatility of the krone/euro risk in the first half of the 1990s than in recent years. Especially the currency unrest in Europe in 1992-93 and again in 1995 plays a role.

In view of the fixed-exchange-rate policy the krone/euro risk is not a traditional market risk. For as long as this policy is pursued the risk in real terms is zero in the longer term – despite small day-to-day fluctuations. Furthermore, unlike almost all other financial entities, the Nationalbank not only has the opportunity, but also the obligation, to influence the course of the krone/euro exchange rate. Only a strengthening of the krone vis-à-vis the euro will entail a loss for the Nationalbank.

The krone/euro risk is thus an inherent risk which it can be advantageous to isolate when calculating the Nationalbank's VaR. This implies

only a marginal reduction of the analytical VaR, while the historical VaR decreases by 30-40 per cent. The VaR estimates for the two methods are thereafter of the same size at kr. 3-3.5 billion.

Gold can be included in the calculation of historical VaR. However, the effect on the result is modest, even though gold is among the assets on the Nationalbank's balance sheet associated with the greatest market risk. Inclusion of gold even reduces VaR slightly in the calculation, which includes the krone/euro risk, cf. Table 8. This should be regarded as a statistical coincidence, however. In more general terms, the calculations reflect a low correlation between the price of gold (in kroner) and the price of the other financial variables. In other words, gold contributes less to the risk than would appear at first sight.

### **Stress scenarios**

The VaR estimates provide information on the general risk of losses, but not about losses in the extreme cases (in the extreme left-hand "tail" of the distribution of value adjustments). Stress scenarios are useful in this respect.

Stress scenarios are calculation examples whereby the consequence of an extreme market development is investigated. Naturally, the results of stress scenarios depend on the degree of stress applied. The scenarios must be extreme, while still appearing realistic.

The approach taken here is to consider the historical development in interest and exchange rates in the period 1991-2000 and to identify particularly unfavourable periods. On the basis of the portfolio composition at end-1999 the estimated loss to the Nationalbank is calculated in the event of an identical development. Three concrete scenarios have been specified.

1. The annual period which would give the greatest total interest-rate and exchange-rate losses.
2. The annual period which would give the greatest total interest-rate loss, combined with the annual period which would give the greatest total exchange-rate loss. The losses do not have to coincide.
3. The annual period which for each 1-year maturity segment in each currency would give the greatest interest-rate loss, combined with the annual period which for each currency would give the greatest exchange-rate loss. The losses do not have to coincide.

The three scenarios result in total capital losses of kr. 11-17 billion, cf. Table 9. The largest loss is the result of a general increase in interest

STRESS SCENARIOS, END-1999

Table 9

Kr. billion	Incl. krone/euro risk			Excl. krone/euro risk		
	Total loss	Interest-rate loss	Exchange-rate loss	Total loss	Interest-rate loss	Exchange-rate loss
Scenario 1 .....	10.8	3.8	7.0	7.4	6.5	0.9
Scenario 2 .....	13.7	6.6	7.0	8.0	6.6	1.4
Scenario 3 .....	16.8	8.4	8.4	10.6	8.4	2.1

rates by 2-3 percentage points, combined with a strengthening of the krone by approximately 4 per cent.

Like the calculations of VaR the stress scenarios are affected by the krone/euro risk, and especially by the gradual strengthening of the krone after its weakening in August 1993. If this factor is disregarded the loss is considerably lower.

### Summary

The Nationalbank's net capital was kr. 42 billion at the end of 1999 and the Nationalbank's core earnings are in the range of kr. 3 billion per year. The bank's credit risk can be described as very modest. Against this background a maximum loss on interest and exchange rates (excluding krone/euro movement) of approximately kr. 3.5 billion in 19 out of 20 years is no source of concern.

The stress scenarios result in major losses, but do not pose a serious threat to the bank's net capital. In the most extreme and very unlikely of the scenarios described the loss amounts to approximately 40 per cent of the bank's net capital. For comparison, in 1994, when the Nationalbank's dollar exposure was considerably greater than today, the capital loss amounted to 30 per cent of the net capital.

The overall conclusion is that the Nationalbank is exposed to a fairly moderate market risk and that the total risk profile can be characterised as prudent.



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## A Changing Stock-Exchange Environment

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*Birgitte Søgaard Jensen, Financial Markets, and  
Lone Natorp, Payment Systems*

### INTRODUCTION

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The structure of the European stock-exchange environment is changing rapidly. Almost every day, new alliances between stock exchanges, stock-exchange privatisations, Internet exchanges and electronic exchanges, as well as online brokers, etc. appear in the media. The changes are driven primarily by intensified competition, which is related to the deregulation of stock exchanges, technological progress and the increasing internationalisation of the securities markets.

This article outlines the trends on the European market and also presents a forward-oriented perspective: will the stock-exchange market be centralised or will it continue to consist of a host of local, national stock exchanges? How will the stock exchanges cope with tomorrow's competitive conditions? What will the ownership structure be?

First, the present market structure and the opportunities for securities trading available today are described. One of the objectives is to describe how the new market participants differ from the traditional stock exchanges. The factors driving change are thereafter described. In the second part of the article various topics are discussed, such as the consolidation of stock exchanges, the new market participants' influence on the stock exchanges and on brokers, ownership issues, and finally the regulation of securities trading. For each topic possible scenarios of future development are envisaged.

### THE STOCK-EXCHANGE MARKET – PAST AND PRESENT

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Historically, stock exchanges have been national institutions holding exclusive rights to conduct their activities. As a general rule, by tradition there was one stock exchange in each country. In recent years, several stock exchanges have been restructured as limited liability companies and the monopoly has been lifted. It is a widespread belief that the stock exchanges must be operated on market terms and be subject to effective competition. This implies that it can no longer be taken for granted that each country must of necessity have (at least) one stock exchange.

The focus of the article is stock exchanges and trading in securities listed on a stock exchange. The following description of the principal functions of the stock exchanges and the various methods by which securities can be traded is the basis for the rest of the article.<sup>1</sup>

### **The principal functions of stock exchanges**

A stock exchange has two principal functions. The first is the listing of securities. The stock exchange must approve prospectuses for the eligible securities and also administer the statutory information obligations imposed on the issuers.

Secondly, the stock exchange is a marketplace for its members to trade the listed securities. Previously, the brokers gathered physically on the floor where the price was fixed by auction. In the late 1980s the Copenhagen Stock Exchange was one of the first in the world to introduce electronic trading. Today, most stock exchanges have introduced electronic trading systems in some form or other, so it is no longer necessary for the brokers to be physically present at the stock exchange.

Besides offering the market a trading system, the stock exchanges also manage price information. Sale of price information can be an important part of the stock exchanges' business area.

### **Trading in listed securities**

The dealers<sup>2</sup> can trade securities directly on a stock exchange, but some trading often takes place via a telephone market or a broker – in technical terms an "inter-dealer broker" – with subsequent notification to the stock exchange. Investors have traditionally traded securities via a dealer who then purchased/sold from his own portfolio or passed on the order to a stock exchange. The opportunities for dealers and investors to trade listed securities have undergone significant changes in recent years.

A number of Alternative Trading Systems (ATS) have emerged in recent years, particularly in the USA, whereby the participants can trade listed securities among themselves, without being members of a stock exchange. The participants can enter their buy or sell orders to the system which automatically checks for prices at which these orders can be matched. Chart 1 presents an ATS. Most alternative trading systems are open to securities dealers and/or institutional investors, but typically not to private investors.

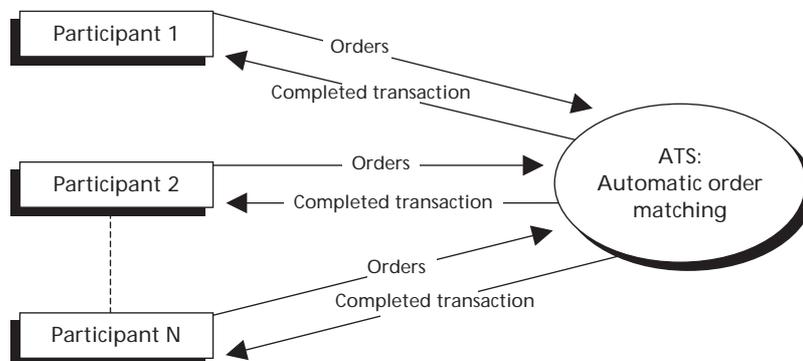
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<sup>1</sup> Clearing and settlement of the transactions are not considered in this article. Reference is made to Jesper Berg and Mogens Kruse, Securities Settlement in an International Perspective, this *Monetary Review*, p. 135ff.

<sup>2</sup> By Danish law a securities dealer can be a bank, a mortgage-credit institute, an investment company, Danmarks Nationalbank or the Danish Finance Agency.

## ALTERNATIVE TRADING SYSTEM (ATS)

Chart 1



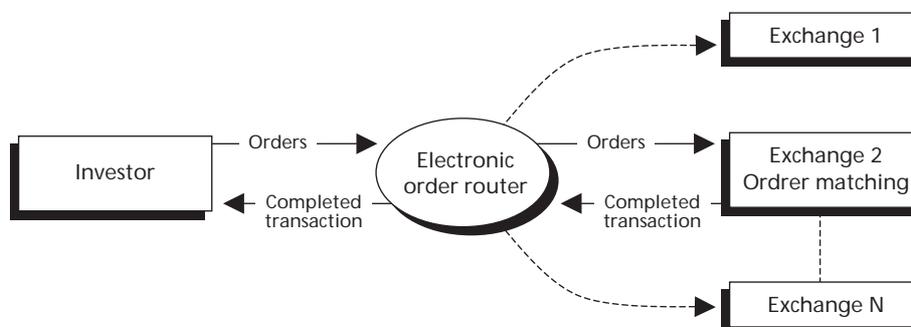
In terms of functions it is difficult to distinguish an ATS from a stock exchange. This is emphasised by the fact that a company can be established as an ATS and later be approved as a stock exchange. Typically, the stock exchanges have a listing function, while ATS are based on trading in securities listed elsewhere. The regulation of alternative trading systems is described in the last part of this article.

The alternative trading systems are well-established in the USA where they account for almost one third of total turnover in securities listed on NASDAQ, the exchange for IT stocks. ATS are just beginning to emerge in Europe. EuroMTS is an example of an ATS where securities dealers can trade large liquid European government bonds, cf. Box 1. Instinet and Tradepoint are ATS where the participants can trade stocks among themselves.

Listed securities can also be traded via an automatic order-routing system. The provider of this system is a member of several stock exchanges and thus offers investors to enter their orders to the relevant stock exchanges, cf. Chart 2. The background to this activity is e.g. tech

## ELECTRONIC ORDER ROUTEING

Chart 2



**Stocks**

*Instinet* was established in as early as 1969 and is one of the most well-known examples of an ATS in the USA. On Instinet stocks listed on e.g. the New York Stock Exchange are traded. The investors (professional dealers and institutional investors) can view the sell and buy orders for a given share, accept an order, engage in anonymous price negotiation with the orderer, or enter an anonymous sell or buy order to the order book. Since the price is generated in the system it is also possible to trade after office hours on the stock exchange on which the stock is listed.

*Tradepoint Stock Exchange* started as an ATS in the UK in 1992, but was approved as a stock exchange in 1995. Professional dealers and institutional investors can enter anonymous orders to the system for automatic matching. Most listed stocks in the UK, and in the future also other European debt securities, can be traded via Tradepoint.

*JIWAY* was launched in February 2000 and is expected to commence operations in September. JIWAY is applying for the status of authorised stock exchange in the UK, but has not yet achieved authorisation. It aims to offer trading of 6,000 blue chips from Europe and the USA.

**Bonds**

*EuroMTS* is the European electronic inter-dealer broker. The MTS system was originally developed in 1988 in Italy as the trading system for Italian government bonds. In 1998 a separate private limited liability company, EuroMTS, was formed to undertake the construction of a trading system for benchmark bonds in the euro area, based on the same technology as MTS. EuroMTS is a wholesale system where professional dealers can trade large liquid bonds anonymously – first and foremost bonds from Germany, Italy and France. More and more countries are establishing national MTS systems for trading of less liquid bonds.

The plans to establish *BrokerTec* were launched in June 1999 with expected start in the summer of 2000. Like EuroMTS, BrokerTec is an electronic inter-dealer broker for bond trading, but trading in e.g. US bonds will also be offered.

*BondClick.com* is primarily for institutional investors who will be able to meet and trade European government bonds via this system. The plans to establish BondClick.com were launched in January 2000 and are not very detailed as yet.

**Electronic order routing**

*E\*Trade Group* is a US Internet investment company offering private investors order routing to a stock exchange. Apart from the company in the USA subsidiaries have been established in several countries such as Canada, Australia, France, Sweden, UK, Japan, South Korea and now also Denmark. E\*Trade has acquired the majority shareholding in Difko Børsmæglersekskab, which is now called E\*Trade Danmark Børsmæglersekskab. The vision is for all E\*Trade companies to be based on the same technology so that in the future they can be inter-connected as one global network.

nological differences between the various stock exchanges. The order router establishes electronic links to the various stock exchanges, while the investor requires only a link to the order router.

In Denmark a small number of banks offer electronic order-routing services to either the Copenhagen Stock Exchange and/or stock exchanges abroad, but more are in the pipeline. At present, Denmark has one Internet investment company. E\*Trade is an international order router, cf. Box 1.

Both the alternative trading systems and the automatic order routers use electronic networks of interlinked computers. These can be closed networks requiring special equipment for connection, or an open network on the Internet.

In order to assess the potential changes in the stock-exchange markets in the coming years, the next section considers the factors which have driven the development so far.

## FACTORS DRIVING CHANGE

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Several factors have played a decisive role in the development of the stock exchanges. The technological development and the greater internationalisation have caused competition to intensify, while the advantage of being the first/largest on the market (the network effect) has had the opposite effect.

### Technology

In several respects the development of information technology has had a decisive impact on changes in the securities trading area. Firstly, complex orders can now easily be processed in the electronic trading systems. Secondly, the systems can accommodate a virtually unlimited number of participants, in contrast to e.g. traditional floor trading where the number of participants is physically limited. Thirdly, IT development has eroded geographical borders. In principle, all that participation in an electronic trading system requires is the installation of a terminal/PC and a link to the system.

There are considerable economies of scale in relation to securities trading.<sup>1</sup> This is due to the relatively high costs of establishing a trading system and the low costs of increasing the trading volume in the system or including additional participants. Whether the economies of scale have increased or decreased as a result of the technological development is difficult to assess, but the establishment costs have probably decreased in step with the technological development. This has

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<sup>1</sup> An empirical study of 37 stock exchanges shows that substantial economies of scale can be achieved in the trading function, while this advantage is less pronounced for the other functions of the stock exchanges, cf. Markku Malkamäki, Are there economies of scale in stock exchange activities?, Bank of Finland, *Discussion Papers*, 4/99.

led to greater competition in the stock-exchange area since other parties besides the traditional stock exchanges make trading systems available.

### **Internationalisation**

The stock-exchange market is characterised by increasing internationalisation. The technology has made cross-border trading possible and simple, while deregulation has provided the basis for exploitation of these opportunities. The EU Investment Services Directive, ISD, has provided market participants with the opportunity for remote membership of stock exchanges abroad and the stock exchanges can now establish electronic access abroad.

The internationalisation of the stock-exchange environment has also been driven by the demand side, in particular via the investment behaviour of institutional investors. In view of the growing volume of pension savings the role of the institutional investors is of increasing importance to the development in the stock-exchange area. Investors' portfolios are subject to greater diversification with a view to higher returns. The investments are diversified into several different types of securities (stocks, bonds, etc.), sectors and especially nationalities. This has also increased the institutional investors' focus on trading costs, thereby exerting downward pressure on stock-exchange trading costs.

The introduction of the euro has acted as a strong catalyst for this development since investors can now spread their investments on several countries without assuming any exchange-rate risk. This has been particularly important to institutional investors which are typically subject to placement rules restricting the volume of investments denominated in foreign exchange.

### **The network effect – the advantage of being first and largest**

Technological development and increasing internationalisation have intensified competition in the stock-exchange area, while the advantage of being first/largest in the market has probably served as an impediment to competition.

Generally, it is an advantage to the users of a trading system that it has several participants. This is because the liquidity in the system is assumed to increase with the number of participants. This means that investors can trade at lower spreads, buying and selling without the price of the securities being adversely influenced from the point of view of the investor. Thanks to the positive effect of many participants in the same system (network effect), the investors tend to use the large, well-established marketplaces.

The traditional stock exchanges have enjoyed the advantage of being first in the market. At the same time, substantial establishment costs have impeded competition. In view of these conditions the traditional stock exchanges have not always had any great incentive to introduce new technology and to develop in accordance with customers' requirements. For example, the largest stock exchanges were the last to introduce automatic trading systems to replace floor trading. On the largest US stock exchange, the New York Stock Exchange, floor trading continues to be an important element in trading.

### **CONSOLIDATION OF THE STOCK-EXCHANGE MARKET**

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The pressure from investors for lower trading costs (both directly and indirectly as smaller spreads), improved liquidity and immediate access to international trading has turned these factors into some of the most important parameters of competition. In Europe, the traditional stock exchanges are seeking to meet these demands by establishing cross-border cooperation.

#### **Cooperation: alliances and mergers**

Stock-exchange cooperation can be either an alliance or a merger. Until recently only stock-exchange alliances have been formed in Europe.

One of the most widely discussed alliances was established in July 1998 between the London Stock Exchange (LSE) and Deutsche Börse as a common trading platform for European stocks. The general recognition of the advantage of being first in the market quickly induced other stock exchanges to look for, and find, partners for cooperation. This was the start of the race to be the first to achieve a sufficiently large customer base (critical mass).

In May 1999 the London/Frankfurt cooperation was expanded to include six other stock exchanges.<sup>1</sup> The eight stock exchanges announced their intention to launch a pan-European exchange in November 2000. However, there have been problems with this cooperation. It was not possible to agree on a common integrated trading system, but only on mutual access to the existing trading systems of the individual stock exchanges. Moreover, several members of the alliance have alternative plans: in March three alliance members – Paris, Brussels and Amsterdam – announced their intention to merge into one stock exchange with a common trading system under the name of Euronext. In May the stock exchanges in London and Frankfurt followed suit by announcing their plans for a merger under the name of iX, also with a common trading system.

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<sup>1</sup> The stock exchanges of Paris, Amsterdam, Brussels, Madrid, Milan and Zurich.

In the Nordic region the Copenhagen Stock Exchange and the Stockholm Stock Exchange in 1998 concluded a cooperation agreement on the establishment of a joint Nordic securities market – NOREX – for all types of securities. The Nordic alliance is based on a common trading system, SAXESS. At present only stocks are traded in this system, but as from autumn 2000 it will also be possible to trade bonds. The aim is for additional Nordic and Baltic stock exchanges to become part of this cooperation. The stock exchanges in Norway, Iceland and the three Baltic states have announced their intention to participate.

### **Perspectives**

As yet there is no clear picture of Europe's stock-exchange environment in the future. As stated, there have been many announcements and declarations of intent concerning cooperation, but the major concrete steps forward have not yet been taken. Cooperation is important to utilising economies of scale. In this way trading costs can be reduced and liquidity increased. Against this background the continued consolidation of the stock market can be expected.

To begin with, the consolidation is expected to concern the trading function, which is especially subject to economies of scale. In this connection the establishment of a common integrated trading system has been emphasised as an important parameter for the success of cooperation. Such cooperation will probably to a greater extent than mutual access to the trading systems of the individual stock exchanges be able to utilise potential economies of scale.

In accordance with the considerations of economies of scale the establishment of a common trading platform has been a central issue in the stock-exchange cooperation initiated so far. The alliance between the eight European stock exchanges has not been able to agree on a common trading system. The decision-making process in an alliance can easily become ineffective. This may be reflected by the merger of three of the alliance members into Euronext, and of two alliance members into iX. However, the NOREX alliance is a good example of how development can take place within alliances. One advantage of an alliance is that it is better able to accommodate European diversity regarding for example habits, languages and legislation. Furthermore, alliances can ensure that stock-exchange trading continues to have a national dimension.

The second main function of the stock exchange, the listing of companies, is probably less subject to economies of scale than the trading function.<sup>1</sup> At the same time, especially for small, nationally-oriented com-

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<sup>1</sup> Markku Malkamäki, cf. previous footnote.

panies, the monitoring of the stock-exchange-listed companies and the management of the information published on the stock exchange require familiarity with the region and personal contact with the companies. Stock-exchange listing is therefore not expected to be subject to the same degree of consolidation.

Overall, a picture emerges of a stock-exchange environment characterised by a "principle of subsidiarity":<sup>1</sup> The trading function, which is characterised by economies of scale, will probably be centralised in a small number of large stock exchanges, if not in one single European stock exchange. On the other hand, it is likely that the stock-exchange listing of small companies in particular, which is best achieved on a regional basis, will continue to be decentralised.

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#### COMPETITION BETWEEN OLD AND NEW

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The alternative trading systems compete with both the stock exchanges and securities dealers. In the area of order routing the new automatic systems compete with the original securities dealers. They have introduced electronic systems in only a few cases.

##### **Can the stock exchanges meet the competitive challenge?**

As stated, the alternative trading systems offer trading in securities listed on a stock exchange in an electronic system whereby investors' buy and sell orders are matched at prices generated in the system. A precondition for the existence of the alternative trading systems is thus the listing of the stock. The alternative trading systems are in this respect dependent on the output from the stock exchanges and in their present form are therefore not a serious competitor to the stock exchanges. The issue of interest here is rather the extent to which the alternative trading systems will be preferred.

The alternative trading systems which are becoming established in Europe are intended to create a European platform for trading in European blue chips and/or bonds. Their success will depend on whether the stock exchanges offer the same product, and on whether it is offered at competitive prices. So far none of the stock exchanges' initiatives have resulted in the establishment of a common European platform. However, if this is achieved before the alternative systems gain a footing, the liquidity will be concentrated at the stock exchanges and it will be considerably more difficult for the alternative trading systems to attract busi-

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<sup>1</sup> The principle of subsidiarity is a concept in the EU Treaty whereby decisions are made as close to the citizens as possible.

ness, cf. the previous consideration of the network effect. However, EuroMTS has already attracted a proportion of the bond trading volume, and it can be difficult for a European stock-exchange alliance to win back this volume.

The alternative trading systems may not necessarily be able to offer significantly lower trading costs than those prevailing on the European stock exchanges: in the USA part of the explanation for the success of the alternative trading systems is that they have been able to offer electronic trading, while e.g. the New York Stock Exchange continues to conduct floor trading. A survey of conditions in the USA has shown that trading via an alternative trading system is generally associated with lower costs than traditional trading.<sup>1</sup> The European stock exchanges have made more progress in introducing electronic trading systems. This indicates that they will be better able to compete with the alternative trading systems than the US stock exchanges.

In a situation where the European stock exchanges offer a shared platform for cross-border trading there will probably still be some scope for the alternative trading systems. This is because the latter to some extent also offer other services than the traditional stock exchanges. For example, ATS offer anonymity vis-à-vis the counterparty, which is not always possible on a stock exchange. Anonymous trading may lead to a better price, especially for large transactions.<sup>2</sup> In addition, an ATS typically accepts institutional investors as members, whereas the stock exchanges have traditionally applied more restrictive membership principles.<sup>3</sup> One of the arguments in favour of limiting access to a stock exchange is that the members must be willing to accept each other as counterparties.

Institutional investors can be expected to resort to ATS for a proportion of their trading activities. By trading directly in the marketplaces without the intermediation of securities dealers they achieve greater independence from external parties and at the same time can make savings.

### **The changing role of securities dealers**

So far the securities dealers have bought and sold securities on behalf of the investor, and also offered consulting services. This role can be expected to lose significance, but it is not likely to disappear entirely.

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<sup>1</sup> Ian Domowitz and Benn Steil, Automation, Trading Costs, and the Structure of the Trading Services Industry, *Brookings-Wharton Papers on Financial Services*, 1999.

<sup>2</sup> It appears from an analysis of the Italian trading system for government bonds (MTS), which introduced anonymity for bids/offers in July 1997, that anonymity is less cost-intensive for large transactions, cf. A. Scalia and V. Vacca, Does Market Transparency Matter? A Case Study, Banca d'Italia, *Temi di discussione*, number 359, October 1999.

<sup>3</sup> An amendment to the Danish Securities Trading Act has just been adopted. It enables a stock exchange to give institutional investors access to trade directly on the stock exchange.

Insofar as ATS take over trading from the stock exchanges the securities dealers will risk that they are no longer used as intermediaries in connection with buying and selling securities. This disintermediation, which can also be observed in other areas of the financial sector, will probably reduce the core business of the securities dealers. However, a professional intermediary will still be required in many cases. Firstly, as yet there are no other trading platforms for private investors. Secondly, in view of the credit risk associated with trading with private investors in particular, a central counterparty which takes responsibility for the completion of the transaction will still be required.

The extent to which the need for a professional intermediary to ensure completion of transactions will be fulfilled by new automatic order routers or by traditional securities dealers will very much depend on whether the latter succeed in establishing similar automatic systems.

To many investors there is no longer a natural connection between consulting and the completion of a transaction. To these investors, automatic order routing is the obvious trading method. However, continued demand for consulting from some investors can still be expected. In view of today's constant flow of information and the development of increasingly more complex products there will still be a need for a specialist function for collection, management and especially interpretation of information.

## **OWNERSHIP STRUCTURE OF THE STOCK EXCHANGES**

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The increased competition intensifies demands on stock exchanges to show adaptability and profitability. It is important for the stock exchanges to be structured to make the right strategic decisions and thus achieve satisfactory earnings. Many stock exchanges are or have been owned by a fund – and this structure often entailed that ownership was equivalent to membership, leading to an inappropriate decision-making process.

The importance of ownership structure can be illustrated by comparing Eurex and LIFFE (London International Financial Futures and Options Exchange). Eurex is an electronic derivatives exchange established in 1998.<sup>1</sup> Eurex has already overtaken LIFFE as the largest derivatives exchange in Europe. One explanation might be that LIFFE has taken too long to adapt to market conditions and introduce electronic trading, which in part can be attributed to an ownership structure whereby ownership and membership are equivalents.

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<sup>1</sup> Eurex was originally established as a merger between the derivatives segment of Deutsche Börse and SOFFEX, the derivatives segment of the Swiss stock exchange, but the Eurex trading platform is now also used on the Finnish stock exchange. Eurex has recently announced that they intend to form a transatlantic alliance with CBOT (Chicago Board of Trade) in 2000.

The significance of ownership structure has led many stock exchanges to restructure as limited liability companies in recent years. Examples are the stock exchanges in Stockholm (1993), Copenhagen (1996) and Amsterdam (1997). The London Stock Exchange and Deutsche Börse will be restructured in the spring of 2000, and the Oslo Stock Exchange is expected to follow suit during 2000.

The Copenhagen Stock Exchange was restructured as a private limited liability company in 1996 when the stock-exchange monopoly was lifted (Stock Exchange Reform II). The background to the reform was *that* direct influence by ownership on the management is achieved, *that* the group of owners can be matched more flexibly to the development, *that* the owners will have greater responsibility with regard to the development of the marketplace, and *that* cross-border cooperation can be established more easily. Had the Copenhagen Stock Exchange not been restructured it would therefore hardly have been possible to opt for participation in the NOREX cooperation. The decision was taken at an important time and was at the forefront of the trends now prevailing in the rest of Europe.

The restructuring of a fund-owned stock exchange as a limited liability company is a fundamental prerequisite to creating a dynamic stock exchange. However, the ownership composition is not without significance. If there is still considerable accordance between owners and members there is a risk that it will still be difficult to implement decisions contrary to the immediate interests of certain owners.

## **SUPERVISION AND REGULATION OF STOCK EXCHANGES**

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The development in the stock-exchange area presents new challenges to the supervisory authorities. Firstly, a network-based, international stock-exchange market is more complex and thus more difficult to monitor. Effective supervision therefore requires closer cooperation between the national supervisory authorities. Secondly, stock-exchange regulation must be adapted to consistently accommodate the wide range of old and new trading opportunities.

### **European cooperation**

In 1997 the European supervisory authorities established the Forum of European Securities Commissions (FESCO) with the purpose of ensuring the fair and effective implementation of the single market for financial services. A high degree of harmonisation is achieved by issuing guidelines and standards which the members are obliged to implement at national level. Standards are issued for new areas as well as areas already subject

to Community law. In the latter case the standards can ensure the uniform implementation of directives. Via cooperation FESCO contributes to more effective cross-border supervision.

### Regulatory delineation of stock exchanges

The *regulatory delineation* of a stock exchange is stipulated under the present legislation, but it is difficult to establish a clear distinction between stock exchanges and ATS on the basis of function. EuroMTS, cf. Box 1, and the national MTS are cases in point. In some countries the national MTS are registered as stock exchanges, and in others as investment trusts.

In many countries securities trading legislation has a two-tier approach: a company offering functions related to securities trading will *either* be regulated as a stock exchange and should fulfil capital requirements, etc., *or* as an investment company<sup>1</sup> subject to less stringent requirements. The emergence of ATS therefore makes it necessary to assess whether the alternative trading systems sufficiently fit into the existing set of rules – and if so in which respects – or whether adjustments are required to ensure a level playing field.

The USA is the first country to explicitly consider the regulation of alternative trading systems. In the USA an ATS itself can choose to be registered as a stock exchange or as a broker-dealer while *simultaneously* fulfilling supplementary requirements which to a certain extent correspond to the requirements of a stock exchange. Box 2 presents a brief introduction to the US "Regulation ATS".

So far there has been no need for regulatory measures in Europe, but an assessment of the current rules will also be necessary at European level if the current development continues. At national level the debate is slowly gaining momentum in the UK: in January 2000 the UK supervisory authority, FSA, submitted a proposal for the regulation of stock exchanges and trading systems to all interested parties for consultation.<sup>2</sup> At the European level FESCO, cf. above, has established a group of experts to investigate alternative trading systems. The European Commission's action plan for financial services includes several issues which are either directly or indirectly relevant to the stock-exchange area.<sup>3</sup> There is thus no doubt that the regulation of ATS is on the agenda in Europe in the coming years.

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<sup>1</sup> The terms investment trust, broker-dealer and investment company cover the same type of enterprise, but appear in the legislation of the EU, the USA and Denmark respectively.

<sup>2</sup> The FSA's approach to regulation of the market infrastructure, January 2000, is available on the FSA's Web site [www.fsa.gov](http://www.fsa.gov).

<sup>3</sup> In October 1998 the European Commission issued the communication: Financial Services: Building a framework for Action. On the basis of this communication in May 1999 the Commission issued an actual plan of action. Further information is available on the Commission's Web site at [www.europa.eu.int/comm/internal\\_market/en/finances/actionplan](http://www.europa.eu.int/comm/internal_market/en/finances/actionplan).

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**REGULATION OF ALTERNATIVE TRADING SYSTEMS IN THE USA**

Box 2

The USA is the first country to consider explicitly the regulation of alternative trading systems. In December 1998 the federal supervisory authority on the US market, the Securities and Exchange Commission (SEC) adopted "Final Rules on the Regulation of Exchanges and Alternative Trading Systems" (in the following called Regulation ATS) which applies to the regulation of alternative trading systems. Under the new rules an ATS can choose whether to be registered as a stock exchange and thereby subject to regulation according to the existing rules, or to be regulated as a broker-dealer, with simultaneous compliance with Regulation ATS. However, the exception is made that the SEC may require registration as a stock exchange if the trading system is a market of such magnitude that this is in the interest of society.

Regulation ATS defines an alternative trading system as a system which only stipulates rules and either offers a marketplace, i.e. facilities for bringing together bids and offers, or offers functions related to those of a stock exchange. It is explicitly stated that internal order books are not covered by the definition of an ATS. Regulation ATS sets the following requirements:

- The ATS must be registered as a broker-dealer.
- Operation and adjustment of the ATS must be notified to SEC.
- SEC must be assisted in connection with examination of the activities of participants.
- A mandatory transaction register must be prepared.
- Regular trading reports must be submitted to SEC.
- Trading information shall be confidential.
- The word "exchange" must not be included in the name of an ATS.
- Market transparency.
- Fair and equal access to ATS.
- Standards for system capacity, integrity and safety.

Alternative trading systems in which one paper accounts for more than 20 per cent of turnover must meet all 10 requirements. Medium-sized systems in which one paper accounts for more than 5 per cent of turnover must meet the first 8 requirements. Small ATS with less than 5 per cent of the turnover in all securities traded in the system must meet only the first 7 requirements. For further information see [www.sec.gov/rules/finrindx.htm](http://www.sec.gov/rules/finrindx.htm).

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**CONCLUDING REMARKS**

The technological development, together with deregulation and the internationalisation of the stock-exchange market, have intensified competition in the area. This competition has required structural adjustments and the European stock-exchange market has not yet found a new equilibrium. The fact that many major investment banks are shareholders in several of the new companies shows that the future market structure is difficult to predict, so that at the moment bets are hedged. However, on the basis of the factors which have contributed to influ-

encing the development it is possible to point out possible scenarios for the coming years.

The continued consolidation of the stock exchanges must be expected, with emphasis on utilising economies of scale in the trading function. This requires agreement among the stock exchanges to establish a common integrated trading system. A prerequisite for cross-border cooperation is that the national stock exchanges are structured as limited liability companies. It must therefore be expected that the stock exchanges which have not yet been dematerialised will be so in the near future.

The alternative trading systems are expected to be of a certain scale. However, they are not expected to be as successful in Europe as in the USA. The European stock exchanges have come far in the introduction of electronic trading systems, and are expected to be in a stronger competitive position vis-à-vis ATS than was the case for the stock exchanges. The role of the securities dealers will probably be affected by the competition to a greater extent, but the consulting function will still be required, in view of the greater complexity of the market.

As a consequence of internationalisation, national supervisory legislation is no longer adequate. In the coming years the supervisory authorities will face the major challenge of finding a regulatory set-up which ensures continued development, a level playing field and protection of the investor.



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## Securities Settlement in an International Perspective

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*Jesper Berg and Mogens Kruse, Payment Systems*

### **Introduction**

In Denmark settlement of securities transactions is predominantly via the Danish Securities Centre, VP. In 1983 Denmark was the first country in the world to replace physical securities with electronic registration in a register database (dematerialisation). Both the authorities and the increasing competition make increasing demands of the securities depositories, and there are indications that the former national structures are being dismantled. The securities depositories are key cooperation partners to the central banks, and generally the central banks have taken an active interest in this development. The restructuring of VP from a self-governing institution to a limited liability company is a step towards giving VP greater scope for its future activities.

This article first gives a brief presentation of securities settlement and VP. Then the generally accepted international securities settlement standards are reviewed, including the standards developed under central-bank auspices. Thereafter a number of deliberations are described concerning securities settlement in relation to the Economic and Monetary Union, EMU, as well as the current concentration trends in this area. Finally, an account is given of the restructuring of VP and the perspectives this presents.

It is concluded that the VP system still has facilities to ensure its international competitiveness. However, in the next few years this area can see substantial changes and the extent to which the traditional national structures will remain is still to be seen.

### **Securities settlement and the role of the Nationalbank**

When securities are traded a distinction is typically drawn between the conclusion of the transaction and the subsequent exchange of services by the parties. This exchange is called<sup>1</sup> clearing and settlement, or quite sim-

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<sup>1</sup> The Danish Securities Trading Act contains special definitions of a number of concepts related to securities trading, including clearing and settlement.

## FACTS ABOUT VP

Box 1

The principal tasks of VP are to register the issue and ownership of securities in an electronic register and to undertake settlement of securities transactions. VP was established in 1980 when registration and settlement of bonds commenced, first as paper-based securities and in 1983 as dematerialised securities. In 1988 this was widened to include stocks. Today, securities for close to kr. 3,000 billion are registered in VP, cf. the Table below.

## ISSUES AND TRANSACTIONS IN VP IN 1999

Kr. billion

Market value (year-end) of circulating bonds.....	2,012
Market value (year-end) of circulating stocks, etc.....	954
Turnover of bonds per year.....	26,794
Turnover of stocks per year.....	229
Clearing of traded amounts per year.....	22,010
Number of accounts, 1,000.....	2,500

Source: The Danish Securities Centre, VP.

The statutory basis for VP includes the Securities Trading Act and the Executive Order on Securities Registration. On the adoption of the Securities Trading Act in 1995 VP's monopoly for the registration of securities in Denmark was cancelled. VP is subject to supervision by the Danish Financial Supervisory Authority.

VP is a self-governing institution with a Board appointed by the Minister for Economic Affairs on the recommendation of organisations representing VP's stakeholders.

The direct participants in securities settlement are the Nationalbank, banks, mortgage-credit institutes, investment companies and major customers. VP's group of stakeholders also particularly includes issuers whose issues are registered with VP, as well as investors whose ownership is registered in VP. Even though both parties are registered individually in VP, the contact with VP is typically via the banks (the account-holding institutions). VP also undertakes the mediation of periodic payments (interest, instalments and dividend).

The basis for the price fixing of VP's services is to create balance between expenditure and revenue.

ply settlement. In this article, settlement is used as a common designation for both these stages<sup>1</sup>.

Another key concept is registration. Today securities, like account deposits, are registered in an electronic register. As for real estate deals, the actual transaction can take place in many different ways, at many

<sup>1</sup> In practice the securities depositories operate with even more processes as part of the exchange of services by the parties. The process can thus be divided into four stages: first, the trade; second, the match, i.e. ensuring accordance between the two trading parties' data on the trade; third, clearing, i.e. preparation of deals for settlement and control that the deliveries are available; fourth, settlement, i.e. exchange of money and securities.

## SPECIAL VP FACILITIES

Box 2

Compared to other securities depositories, VP has two special facilities. These are settlement of a chain of transactions against the major international securities depository, Euroclear, without loss of value days, and the collateral right.

VP's settlement structure is related closely to settlement in Euroclear. This is because many international investors hold their Danish securities in Euroclear. Euroclear has an account with VP which corresponds to Euroclear's international investors' holdings of Danish securities. Among the professional dealers it is not unusual for the same paper to be traded many times on the same day. The close coordination between VP and Euroclear's settlement cycles ensures that this chain of transactions, involving both investors registered in VP and in Euroclear, can be settled on the same day. Securities can thus be traded backwards and forwards several times within the same day.

VP's collateral right is a special type of collateral which facilitates settlement. The collateral right means that the direct participants can use securities purchased in a settlement as collateral for loans to finance that settlement. Normally, securities collateralisation requires the securities to be acquired first. In addition, the collateral right does not bind particular securities as collateral, but only requires sufficient collateral to be held in the safekeeping account used. On normal collateralisation individual securities are tied up. The collateral right therefore provides for the more flexible administration of collateral.

different locations, including via more informal systems. On the other hand, registration and settlement are subject to a very fixed framework which to a great extent adheres to the principles for registration of ownership of real estate. Securities registration and settlement have therefore in a historical perspective been a more stable business area than the operation of trading systems<sup>1</sup>.

Box 1 presents factual information on VP, which cooperates closely with Denmark's Nationalbank on settlement of securities trades. The Nationalbank is responsible for the settlement of the money side of the transactions. In principle, a securities trade is settled by drawing on the buyer's monetary account with the Nationalbank and registering the purchase to the buyer's securities account with VP. Buyers who do not hold accounts with the Nationalbank undertake settlement via another account holder connected to VP. Settlement of the money side takes place simultaneously with the settlement of the securities, which ensures that both the funds and the securities are available. This is called Delivery versus Payment, or DvP, cf. the description of international standards. Certain VP facilities which are special in international terms are described in Box 2. Besides being the primary settlement bank for VP the

<sup>1</sup> A number of new securities trading methods are described in more detail in Birgitte Søgaard Jensen and Lone Natorp, A Changing Stock-Exchange Environment, this *Monetary Review*, p. 119ff.

## RISKS IN SECURITIES SETTLEMENT

Box 3

Traditionally, a distinction is drawn between three different types of risk in relation to securities settlement.

Firstly, there is the *principal risk*. This is the risk of loss of the equivalent value of the traded securities due to the compulsory liquidation of the counterparty, so that neither securities nor funds can be delivered. A very common way of reducing the principal risk is the simultaneous delivery of funds and securities (DvP).

Secondly, there is the *replacement risk*. This is the risk of losing the unrealised value of a transaction if the counterparty cannot deliver either funds or securities. The purchaser of the paper will thus have an unrealised gain if the value of the paper increases between the conclusion and settlement of the transaction. The replacement risk is not eliminated by DvP even though it is a type of credit risk, like the risk on the principal. It can e.g. be reduced by real-time gross settlement (RTGS).

Thirdly, there is the *liquidity risk*. This is the risk that neither funds nor securities are received at the agreed time. This means that there can be a shortfall of money or securities which have already been used for other transactions. The liquidity risk is not eliminated by DvP either.

The three different types of risk can all give rise to *systemic risk*. Systemic risk is the risk that a participant's inability to settle imposes further settlement problems on other participants.

Nationalbank is also connected to VP as a dealer, the administrator of central-government securities issues and as an investor. Finally, most of the banks' collateral pledged for loans from the Nationalbank is registered in the Danish Securities Centre.

### International securities settlement standards

As for payment systems in general, there has been increasing international interest in the design of securities trading systems, as well as recognition of the need for consideration of a number of issues related to the risks presented by these systems. Box 3 gives a brief description of the various types of risk in securities settlement systems. The central banks of the G-10 countries, under the auspices of the Bank for International Settlements, BIS, as well as the European Central Bank, ECB, and its predecessor, EMI, have drawn up generally accepted securities settlement standards<sup>1</sup>.

<sup>1</sup> The examples stated are not an exhaustive list of the securities settlement standards, but are generally recognised as the most important. A number of organisations in the area of securities settlement publish their ongoing recommendations on various aspects of securities settlement. The first actual initiative was the report, *Clearance and Settlement in the World's Securities Markets*, Group of Thirty, New York & London, 1989. The most recent initiative is the report, *New Frontiers in Clearing and Settlement*, ISMA, 1999.

In 1992 G-10 categorised DvP systems in order to assess the advantages and drawbacks of the various systems<sup>1</sup>. G-10 also described the extent to which its Lamfalussy standards can also be applied to securities settlement systems. The Lamfalussy standards<sup>2</sup> are internationally accepted standards for payment systems which apply net compilations. The standards aim to reduce the risks in the systems via e.g. the requirement of a well-supported legal basis and risk management procedures.

G-10 has defined three types of DvP system:

- Model 1: Gross settlement of securities and money, i.e. each trade separately.
- Model 2: Gross settlement of securities and net settlement of money.
- Model 3: Net settlement of securities and money.

Model 2 is considered by many not to be real DvP, since there is a timing difference between settlement of securities and settlement of money. VP mainly applies model 3, but it is also possible to use model 1. Model 1 makes greater requirements of the participants' liquidity, but does not imply the same accumulation of settlement and related risks as model 3.

Regarding use of the Lamfalussy standards, G-10 concluded that they are applicable to securities settlement systems, but their actual use must reflect the potential systemic risks in the system concerned.

In 1999 G-10 appointed a working group which, on the basis of previous work, is to draw up a new set of standards for securities settlement systems for global application. This work is the continuation of the recently published report on global standards for payment systems<sup>3</sup>.

In 1998 the EMI (the predecessor of the ECB) published its standards for securities settlement systems which can be used as part of the extension of eurocredit<sup>4</sup>. The standards are in formal terms ECB's user requirements of the securities depositories which supply services as an element of the provision of collateral for the Eurosystem's credit operations, but in practice they are considered as general standards for securities settlement systems in general. The standards are described in more detail in Box 4. Like the Lamfalussy standards their intention is to reduce systemic risks via e.g. the requirement of a well-structured legal basis and risk management procedures. An additional requirement is that the

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<sup>1</sup> *Delivery versus Payment in Securities Settlement Systems* ("the Parkinson Report"), G-10, Basle, 1992 is available at [www.bis.org](http://www.bis.org).

<sup>2</sup> *Report of the Committee on Interbank Netting Schemes of the central banks of the Group of Ten countries*, G-10, Basel, 1990. The report is available at [www.bis.org](http://www.bis.org).

<sup>3</sup> *Core principles for systemically important payment systems*, G-10, Basel, 1999. The report is available at [www.bis.org](http://www.bis.org).

<sup>4</sup> *Standards for the use of EU securities settlement systems in ESCB credit operations*, EMI, 1998. A report which compares the EU securities depositories with these recommendations can be found at [www.ecb.int](http://www.ecb.int).

THE ECB'S STANDARDS FOR SECURITIES SETTLEMENT SYSTEMS  
CONNECTED TO EUROCREDIT

Box 4

In 1998 the EMI (today the ECB) published a report with standards for securities settlement systems which can be applied to the provision of eurocredit. The purpose was to safeguard the ESCB against risks on the provision of collateral via the securities depositories for loans from the ESCB.

The report sets out the following 9 standards:

- The systems and the links between them must have a clear legal basis to ensure the finality of both payments and securities settlements.
- The systems must settle payments via central banks on a DvP basis.
- The systems must have a direct relation to the issuers, either via their own systems or via a link to other depositories with such a relation.
- The systems and the links between them must be subject to supervision and/or inspection by competent authorities.
- The systems must provide sufficient information on risks related to the company and must have objective access requirements.
- The systems must have adequate risk management procedures in the event of a participant's default on its obligations, and must also minimise conflicts of interest.
- The systems must with intra-day effect be able to transact final delivery versus payment (DvP).
- The systems' opening hours must be in accordance with those of the TARGET payment system, including with regard to the cross-border provision of collateral.
- The systems must have reliable technical infrastructures and must be able to reopen within 4 hours of a disaster.

systems can settle the money side of securities transactions via central banks, to the extent that trading is against credit from the Eurosystem.

Of the EU member states' securities depositories only the Swedish VPC and French SICOVAM fulfilled all 9 standards on the publication of the report. VP complied with 8 of the standards and today fulfils all 9. VP also has some facilities which no other securities depositories so far have been able to match, cf. Box 2. VP is thus today among the most sophisticated depositories in Europe.

### **Securities settlement in the European Monetary Union, EMU**

A sustaining principle of the ECB's monetary policy is that credit from the Eurosystem can only be extended against full provision of collateral. This applies regardless of whether the credit is provided as an element of the ECB's monetary-policy operations or as an element of payment settlement. Another principle is that while monetary-policy decisions are taken centrally, i.e. under the auspices of the ECB, the operational performance of the monetary-policy operations is decentralised to the national central banks. At the same time, the objective of the Eurosystem is

for all banks in the Eurosystem to have the same access to credit, regardless of where they are located.

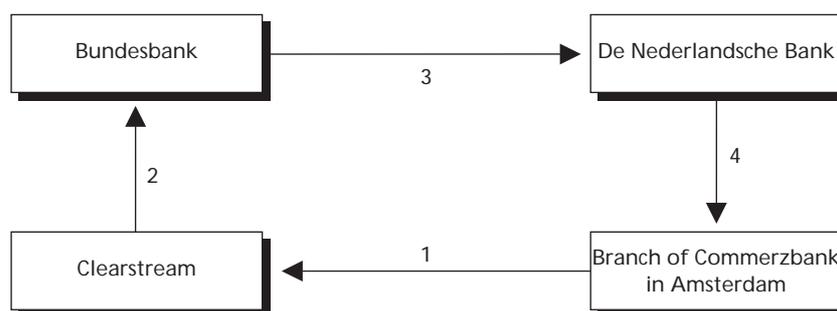
These principles and this objective are the basis for the common interest of the European central banks in securities settlement systems within EMU.

In order to fulfil these objectives the central banks have, firstly, formulated a number of requirements of the quality of the collateral to be pledged by the counterparties for credit from the Eurosystem. Approved collateral is divided into two categories, of which the first, Tier 1, consists mainly of euro-denominated stock-exchange-listed bonds issued by euro area member states which are subject to a very high credit rating. Tier 2 consists of other euro-denominated securities issued by euro area member states which are subject to a high credit rating. Against a guarantee from the country's central bank, certain securities issued in Denmark or other member states outside the Eurosystem can be used as collateral for intraday credit. Secondly, the Eurosystem has set out the requirements presented in Box 4 of the quality of the securities settlement systems which can be used as an element of the settlement of collateral for credit from the Eurosystem. The Eurosystem regularly investigates compliance with the standards and publishes the results of the surveys. Finally, the Eurosystem actively supports procedures to increase the cross-border provision of collateral.

Today, the central banks use two strategies to achieve this objective. As previously stated, the central banks have defined standards for use of

THE CORRESPONDENT CENTRAL BANKING MODEL

Chart 1



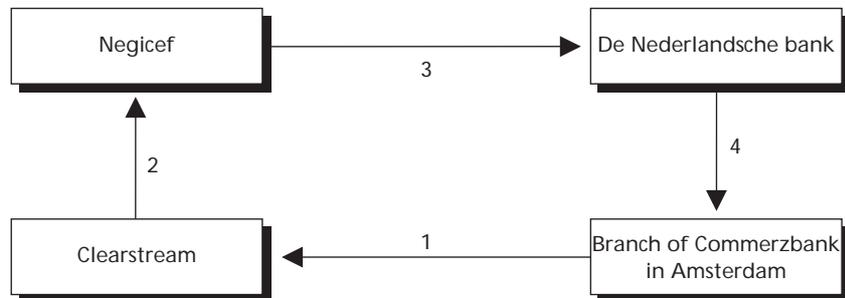
In both Charts 1 and 2 Commerzbank's branch in Amsterdam requests credit from De Nederlandsche Bank (the Dutch central bank) against German securities as collateral. The Bundesbank (the German central bank) in Chart 1 acts as correspondent to De Nederlandsche Bank.

1 : Commerzbank requests Clearstream (the German securities depository) to transfer securities to the Bundesbank's safekeeping account.

2 : The Bundesbank checks that the securities have been received in the safekeeping account and stand at Tier 1 or 2.

3 : The Bundesbank notifies the value of the safekeeping account to De Nederlandsche Bank.

4 : De Nederlandsche Bank grants credit to Commerzbank.



Negicef (the Dutch securities depository) in Chart 2 uses its link to Clearstream (the German securities depository).

1 : Commerzbank requests Clearstream to transfer securities to Negicef.

2 : Negicef receives the securities and

3 : credits them to the safekeeping account of De Nederlandsche Bank (the Dutch central bank).

4 : De Nederlandsche Bank extends credit to Commerzbank.

securities settlement systems. These standards also concern the links between securities depositories, cf. below concerning concentration trends in securities settlement. Currently, the Eurosystem has approved 53 of these links as suitable for settlement of collateral for credit from the Eurosystem. Prior to the establishment of these links, as a temporary solution the central banks had developed a model to support cross-border collateralisation (the correspondent central banking model). The difference between the correspondent central banking model and links between securities depositories is illustrated in Charts 1 and 2.

Both models are based on the existing national infrastructure. In the correspondent central banking model the central banks play a role which it would be more natural to allocate to a private system, since the central banks provide a service which the securities depositories themselves can supply. In the longer term the intention is therefore for the correspondent central banking model to be discontinued.

### Concentration trends for securities settlement in Europe

Today, there are more than 20 securities depositories in the EU. Two are international depositories (Euroclear and Clearstream), while the others are still primarily related to individual member states. The large number of depositories is based mainly on historical circumstances and entails great variations between the legal and market-based framework for the depositories' activities in each country. So far, cross-border securities transactions have predominantly been mediated by banks or via the international depositories.

At the request of the EU central banks the European securities depositories have drawn up technical standards for links between the depositories as a model for the cross-border collateralisation of securities.

The large number of securities depositories, the general trend for national infrastructure monopolies to be lifted, the consequences for the European financial markets of the introduction of the single currency, and a general expansion of international cooperation have raised the issue of whether there is still room for national securities depositories.

Against this background, the securities depositories of Denmark (VP), Sweden (VPC) and Norway (VPS) initiated cooperation in 1998 for the purpose of supporting closer Nordic cooperation in the stock-exchange area and to prepare for future broader European cooperation. The vision in the longer term was to create a joint Nordic clearing and settlement company called S4 (Scandinavian Securities Settlement System).

S4 would be designed as an element of a future joint European securities settlement infrastructure. The cooperation on S4 was suspended in 1999.

Since 1999 there have been signs of consolidation of the largest European securities depositories: Deutsche Börse Clearing, the German securities depository, merged with one of the international securities depositories (Cedel) under the name Clearstream. SICOWAM, the French securities depository, announced on 24 March 2000 that it will merge with the other international securities depository (Euroclear). Both alliances invite other securities depositories to participate in the cooperation.

Via these and other cooperation arrangements steps have been taken for greater concentration of the European securities settlement structure. This can have consequences for the ECB standards, cf. above, and the procedures which so far have supported a decentralised settlement structure. It is expected in many quarters that in the long term there will be only one or perhaps a small number of depositories in Europe. The high costs of adapting the individual national financial sectors' links (interfaces) to a common international depository is the principle argument against this trend. However, there is no doubt that the smaller, national securities depositories will face far more intensive competition in the coming years than they have been accustomed to so far.

### **Reorganisation of VP and perspectives**

For many years there have been suggestions to amend VP's structure from a self-governing institution to a limited liability company. In its report from 1995 the Stock Exchange Committee thus recommended that VP be

given such an opportunity<sup>1</sup>. This recommendation was followed up with special restructuring rules in the Securities Trading Act. The intention was to expand VP's opportunities to participate in international competition, including greater opportunities to adapt to changing commercial conditions. So far, VP has solely undertaken core functions in connection with securities registration, clearing and settlement. The potential business area of VP extends beyond these core functions, however. In principle, VP can handle most of the functions regarding securities administration which today are handled primarily by banks.

A number of different restructuring models were discussed by the Stock Exchange Committee. One central element was the treatment of the own funds of the self-governing institution. A second important element was whether registration should remain in the same company as clearing and settlement. In the registration area VP undertakes a number of tasks regarding the legal status of assets which are of great importance to society, and VP is not exposed to the same competition in this area as for clearing and settlement. The restructuring rules in the Securities Trading Act are therefore drawn up so that VP can be restructured as a limited liability company by division or by retaining the functions in the same company.

On 17 April 2000 VP's Board decided that VP would be restructured as a limited liability company and that VP's functions would be retained in the same company. This restructuring is taking place in accordance with the restructuring rules in the Securities Trading Act and has now been implemented with retroactive effect as from 1 January 2000. VP's existing own funds will be encapsulated in the new company as a tied reserve. The shareholders of the new company will be the stakeholders today represented on VP's Board, which also represent VP's most significant customers. The share capital will be distributed at 43 per cent to banks and securities dealers, 28 per cent to mortgage-credit institutes, 13 per cent to the Nationalbank, 8 per cent to share issuers and 8 per cent to investors.

The objectives of this restructuring are to give VP the best opportunities to operate on a commercial basis under the amended market conditions, cf. above, possibly by merger or closer international cooperation of another type. The restructuring of VP from a self-governing institution to a limited liability company will also mean that the Board will acquire an actual ownership role. As a result, an increasing number of commercial requirements will be made of VP.

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<sup>1</sup> Stock-exchange Reform II, Report no. 1290, Ministry of Business and Industry, 1995.

The internationalisation of securities settlement makes the potential competition between VP and the largest banks all the more intense. Today, the greatest proportion of cross-border securities settlement and registration is via the largest banks. A Danish owner of a foreign paper will thus typically hold the asset for safekeeping in a safekeeping account with a large bank which is responsible for contact with the issuer, possibly via the issuer's bank or a foreign securities depository. On the establishment of the aforementioned links VP will be able to acquire a large share of this business area, since in the future foreign securities can be registered via VP. The establishment of links should also be in the interest of every party, since it is a relatively less expensive method of registering securities than the current manual procedures.

VP might find itself in competition with private banks in a number of other areas. VP could expand the types of securities covered. It could also expand the group of customers and/or the types of services, and it could engage in several other markets. In all areas VP will be in direct competition with the banks. The banks thus had no great incentive to participate in such expansion of VP's product range while VP was organised as a self-governing institution. The banks will lose revenue sources without gaining a share of VP's earnings<sup>1</sup>.

The banks' support for an expansion of VP's business area will thus in practice require that they achieve a share of the gains from the shared infrastructure, e.g. via co-ownership. The restructuring of VP and the extensive ownership interests of the banks must be considered in this light. The incentive problem has probably not been solved finally, but the first step towards a solution has been taken.

Historically, VP has been a securities centre for Danish securities issues. On the establishment of VP the role of securities centre for Danish securities issues was equivalent to being a securities centre for Danish investors. The increasing internationalisation of securities portfolios makes this no longer the case. Foreign securities now account for a large proportion of Danish investors' placements, and foreign investors have held a considerable share of Danish securities issues in recent years. The latter is also of significance to VP's share of clearing and settlement of Danish securities.

It will be natural for VP to accommodate Danish investors and also undertake registration, clearing and settlement of their foreign securities. Without this opportunity VP cannot avoid losing commercial scope, and the burden of the dominating overheads for this type of business will be

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<sup>1</sup> This problem also exists in other countries, cf. Consolidation in the securities settlement industry, the European Central Bank, *Monthly Bulletin*, February 2000.

distributed on fewer parties. The challenge faced by the securities depositories will be to establish a homogeneous link (interface) for the national dealers and investors, irrespective of the country of issue of the securities concerned.

**Concluding remarks**

Securities settlement is a key element of securities trading, which makes VP an important part of the Danish financial infrastructure. There is international consensus on the requirements which must be made of the design of securities settlement systems. In a historical perspective, comparison of the system's functionality with the international standards shows that VP has performed very well. The greater internationalisation of this infrastructure area too makes it uncertain whether a national infrastructure can be sustained. The restructuring of VP as a limited liability company is the first step towards creating an opportunity for VP to operate on more commercially-oriented terms, and if necessary, embark on cooperation with other securities depositories.

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## Speech by Governor Bodil Nyboe Andersen at the Annual Meeting of the Association of Danish Mortgage Banks on 13 April 2000

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In recent years I have on this occasion expressed the Nationalbank's concern about the balance of the Danish economy. We have repeatedly emphasised the need for a "soft landing".

The background has been a higher growth rate in Denmark relative to our trading-partner countries for most of the 1990s. The growth was driven primarily by strong domestic demand. The ensuing problems were an increasing rate of inflation and a rapid deterioration in the balance of payments.

As it turned out, regarding the balance of payments the concerns of the Nationalbank – and many others – were proved groundless last year. A deficit of kr. 13 billion in 1998 was reversed to a surplus of kr. 14 billion in 1999.

This is an extremely favourable development which can be attributed to the "soft landing" of the Danish economy in 1999, among other factors. The annual rate of growth in domestic demand fell from more than 4 per cent to almost zero in 1999. Nevertheless, total output continued to grow, although at a slightly more moderate rate. Exports increased strongly, while imports were relatively stable.

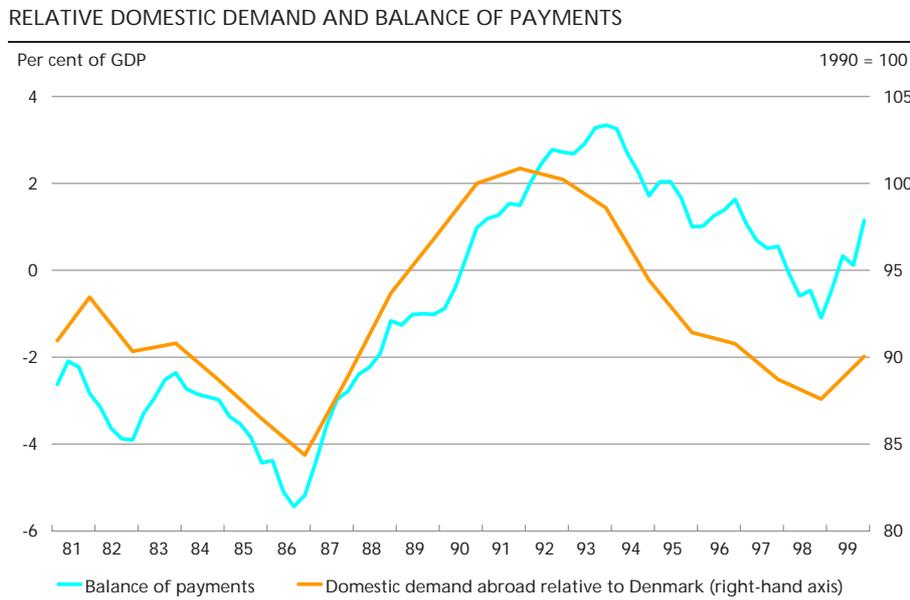
One of the Nationalbank's all-time favourite charts is domestic demand in Denmark relative to that of our trading partners, viewed against Denmark's balance of payments.

In 1997, 1998 and the beginning of 1999 this relationship emphasised the need for a dampening of public as well as private consumption.

This was the very objective of the Whitsun package of economic measures, but it took a considerably longer time than we and others had expected before it had an impact on demand.

In 1999 the effects of the Whitsun package were supported by the increasing bond yields, but tended to be offset by more extensive use of adjustable-rate mortgage loans. All in all, however, the outcome was an increase by only just below 1 per cent in domestic demand in 1999, against 3.5 per cent in 1998.

Danish exports were buoyed up by the strong dollar, pound sterling and Swedish krona, but mostly by the economic upswing in our trading-partner countries. The tenor of the world economy has turned pos-



itive, not only in the USA, but also in Europe where the economic outlook is now considerably more favourable than was the case only six months ago. Since more than half of Denmark's foreign trade is with the euro area member states the increasing optimism and growth in these countries are naturally decisive to the development in Denmark's exports.

It is important to emphasise that the improvement in the economic balance must be maintained in the coming years, requiring a sufficiently tight economic policy.

These days the "new economy" concept is mentioned in the press almost daily. It has come to encompass all the current economic trends. In this sense, we can easily agree that we are indeed experiencing the "new economy". In this sense it is just the name of a few contemporary trends without any explanation or theory.

The concept is used, for example, to characterise the new business enterprises which are based on the most recent technological achievements. The concept is also used to describe conventional business enterprises' adjustments to greater use of e-business, or ventures into new high-tech areas such as biotechnology. Finally, the "new economy" concept is used to describe recent years' very strong share price increases, as well as the recent strong volatility of share prices in the IT sector.

However, for several years the concept of "new economy" has been used in the economic debate to describe the fact that the USA has seen

very strong, sustained growth, combined with a low rate of unemployment without actual inflation problems. This development contrasts strongly with previous periods when a high growth rate entailed inflation. It contrasts particularly with the low growth and high inflation of the 1970s.

How do the economists explain this development?

One group of explanations says that the new technology has provided for far more efficient production, management and communication. This has dramatically boosted productivity, and yesterday's restrictions, such as a tight labour market, are now less important to the development in prices and wages. This explanation also ties in with the strong price increases for real property and especially equities, since in these sectors supply is slow to expand to match increasing demand.

Is this merely a change of level or have we entered a new era? The invention of the steam engine marked the beginning of the industrial age. Is information technology the steam engine of our time?

A more broad-based interpretation of "new economy" is that the fundamental economic theories have been made redundant by the entirely different reaction patterns of our time. Perhaps we should look more closely at our inflation theories in view of the recent trends.

The tendency is most pronounced in the USA, but also European countries with a tight labour market have relatively low inflation – at any rate compared to the 1970s. Whether this can be attributed to technology or intensified international competition, or other factors entirely, is a challenge for research economists.

What is Denmark's role in all this? At first sight, the "new economy" does not appear to prevail in Denmark as our inflation rate is somewhat higher than that of many of our trading partners. However, at the same time, it should be pointed out that Denmark, too, has managed to achieve a significant reduction in the rate of unemployment with simultaneous strong growth without ensuing price increases of the magnitude seen in 1987, not to mention 25–30 years ago.

The fixing of the referendum date concerning Denmark's possible adoption of the euro has made the Economic and Monetary Union a key issue in the Danish debate.

For more than ten years the Nationalbank has been involved in this issue and our standpoint is well-known. It is clearly stated in the following:

"Denmark has already achieved most of the economic benefits of establishing economic and monetary union. The transition to the third stage will thus primarily ensure that the positive results that have fol-

lowed from the gradual convergence with the other stability-oriented European economies can be upheld.

The reality of the changes in monetary policy will be the relinquishment of formal competence, in exchange for the achievement of a real influence."

This could have been written this year, but the quotation is actually 8 years old. It appeared in Danmarks Nationalbank's Report and Accounts 1991, issued in March 1992, just before the referendum on the Maastricht Treaty. The text contains two arguments which are just as important today as they were then.

The first argument is that adoption of the euro will allow Denmark to continue the economic policy which began with the fixed-exchange-rate policy in the 1980s.

The second argument is that Denmark has no independent monetary policy, in real terms, although in formal terms we do. The independent element of our current monetary policy is limited to periods of foreign-exchange unrest when the interest rate instrument is used to stabilise the krone. Otherwise we tend to "shadow" the monetary policy of the euro area.

Adoption of the euro would give Denmark influence on this monetary policy. Denmark thus gains real influence by transferring formal competence.

Since 1992 two things have happened which are of significance to the viewpoint of the Nationalbank.

The first is that the third stage of Economic and Monetary Union has commenced and the euro was introduced as from 1 January 1999 – in 11 member states.

I must admit that until sometime in 1996 the Nationalbank was in some doubt as to whether this project would ever be realised, but it did. So this issue is no longer of interest. The euro is a reality, adopted by 11 – soon 12 – EU member states. This is the current state of affairs.

Another important change has occurred since the 1991 annual report was written.

After a series of speculative attacks on the European Monetary System, EMS, in 1992-93 a considerable relaxation of the EU's fixed-exchange-rate system was required. Some countries withdrew from the EMS, while the fluctuation band was expanded considerably.

These events emphasised the vulnerability of fixed-exchange-rate systems, particularly for countries failing to observe the ground rules concerning parallel economic development. But countries like Denmark, whose economic development is fundamentally sound, also experienced foreign-exchange unrest from time to time. Such unrest was not always

caused by developments in Denmark. Unrest concerning other currencies sometimes had a spin-off effect on abroad's perception of the Danish krone. However, Denmark succeeded – occasionally with strong use of the interest-rate instrument – in maintaining the krone's parity, which has remained unchanged since 1987.

In view of the most recent experience the Nationalbank's view is that Denmark's adoption of the euro would be a natural continuation of the fixed-exchange-rate policy. It would not entail any major economic adjustments from the previous situation. Adoption of the euro would constitute a framework for continuation of the stability-oriented economic policy that has served us well for two decades. At the same time, we would gain influence on the monetary policy which is in any case decisive to us.

A few years ago, I attended a conference at which an American professor told us all about the financial innovations and products in the USA which could be useful to us in Europe. He emphasised among other issues the tendency in the USA for business enterprises to obtain capital by issuing securities rather than raising bank loans.

Europe has not had the same tradition for corporate-bond issues. However, data indicate that this market is attracting more interest after the introduction of the euro. This development is also in the interest of the banks', since they are less and less inclined to tie up capital in large loans with a low margin. This trend can be attributed to the increasing focus on shareholder value.

The professor also presented another US market trend which he believed Europe should take a greater interest in: asset-backed securities issued e.g. on the basis of a loan portfolio.

This was rather amusing to a Dane, as Denmark has more than 200 years' experience of this so-called new tendency in the form of our excellent mortgage-credit system. This type of financing is also long-established in Germany.

Under the Danish mortgage-credit system mortgage-credit loans are used primarily for financing of homes, but many business enterprises also raise mortgage-credit loans as an alternative source of financing.

The business community's extensive access to mortgage-credit financing has contributed to the relatively limited issue of corporate bonds in Denmark. However, the fact that the Danish business community is characterised by a relatively large number of small and medium-sized enterprises also plays a role.

The mortgage-credit market is not only attractive seen from the borrower's point of view. Danish mortgage-credit bonds are characterised

by a high degree of security and also provide a higher yield than government bonds. As a result, there is no doubt that Danish and international investors alike will continue to show interest in mortgage-credit bonds, even in competition with corporate bonds.

In Germany loans are raised to finance home purchases, but the public sector also raises loans on a considerable scale via "Pfandbriefe", the German equivalent of our mortgage-credit system.

Not only the USA has discovered the benefits of this type of financing. In France, a recent legislative amendment has made it more attractive to create a market for bonds against real property or government loans as collateral. After a similar legislative amendment issuing bonds against real property as collateral is now also a more attractive option in Spain.

All in all, there are indications that our good old mortgage-credit system is now the high of fashion.

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## Press Releases

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### **ON 16 MARCH ON INTEREST RATE INCREASE**

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The discount rate is raised by 0.25 per cent to 3.50 per cent. Likewise the rate of interest on the banks' current accounts with the Nationalbank is raised by 0.25 per cent to 3.50 per cent. The Nationalbank's lending rate and the rate of interest on certificates of deposit are raised by 0.25 per cent to 3.85 per cent. The increase will have effect as from 17 March 2000.

The interest rate increase should be viewed against the background of the European Central Bank's raising of interest rates.

For further information please contact Bjarne Skafte on telephone +45 33 63 60 21.

### **ON 27 APRIL ON INTEREST RATE INCREASE**

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The discount rate is raised by 0.25 per cent to 3.75 per cent. Likewise the rate of interest on the banks' current accounts with the Nationalbank is raised by 0.25 per cent to 3.75 per cent. The Nationalbank's lending rate and the rate of interest on certificates of deposit are raised by 0.25 per cent to 4.10 per cent. The increase will have effect as from 28 April 2000.

The interest rate increase should be viewed against the background of the European Central Bank's raising of interest rates.

For further information please contact Bjarne Skafte on telephone +45 33 63 60 21.



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Danmarks Nationalbank's Statistical Publications

### Symbols and Sources

0 Magnitude nil or less than one half of unit employed.

... Data not available or of negligible interest.

Some of the most recent statistics can be provisional. Due to rounding-off there may be small differences between the sum of the individual figures and the totals stated.

Date of going to press: 26 June 2000.

The Tables section of this publication is thus based on more recent information than the equivalent section of the Danish edition.

Danmarks Nationalbank is the source for Tables 1-6, while the Copenhagen Stock Exchange is the source for series of bond yields and the share-price index in Table 1. Statistics Denmark is the source for Tables 7-11, apart from the exchange-rate series in Table 9, for which Danmarks Nationalbank is the source.

INTEREST RATES AND SHARE-PRICE INDEX

Table 1

Effective end-of-year/ from	The Nationalbank's interest rates		End of period	Inter-bank interest rate, 3-months uncollat- eralized	Bond yields		The Copenha- gen Stock Exchange share- price index (total)
	Discount rate	Lending and certifi- cates of deposit			10-year central- govern- ment bond	30-year mortgage- credit bond	
							1.1.83 =100
1995 .....	4.25	4.60	1995 .....	4.65	7.23	8.36	366
1996 .....	3.25	3.50	1996 .....	3.57	6.52	7.87	472
1997 .....	3.50	3.75	1997 .....	3.93	5.63	7.28	676
1998 .....	3.50	3.95	1998 .....	4.05	4.35	7.10	639
1999 .....	3.00	3.30	1999 .....	3.57	5.64	7.31	768
Feb. 4, 2000	3.25	3.60	1999 May .....	3.03	4.56	6.97	632
Mar. 17, 2000	3.50	3.85	Dec .....	3.57	5.64	7.31	768
Apr. 28, 2000	3.75	4.10	2000 Jan .....	3.70	5.91	7.43	777
Jun. 9, 2000	4.25	4.70	Feb .....	4.13	5.82	7.30	809
			Mar .....	4.15	5.57	7.16	868
			Apr .....	4.50	5.68	7.25	864
Jun. 26, 2000	4.25	4.70	May .....	4.67	5.72	7.48	883

SELECTED ITEMS FROM THE NATIONALBANK'S BALANCE SHEET

Table 2

End of period	The foreign- exchange reserve (net)	Notes and coin in circula- tion	The central govern- ment's account with the National- bank	The banks' and the mortgage-credit institutes' net position with the Nationalbank			
				Certifi- cates of deposit	Deposits (current account)	Loans	Total net position
1995 .....	63.6	34.7	38.8	33.6	1.9	44.0	-8.5
1996 .....	85.2	36.6	35.0	30.6	15.2	33.7	12.1
1997 .....	129.7	38.7	34.0	52.1	18.0	19.8	50.3
1998 .....	101.4	41.0	37.1	34.2	12.4	29.6	17.0
1999 .....	165.3	46.4	39.7	99.4	5.9	33.0	72.4
1999 May .....	142.7	40.8	59.3	49.0	7.7	22.9	33.8
Dec .....	165.7	46.4	36.5	99.4	6.0	33.0	72.4
2000 Jan .....	148.6	41.6	47.6	67.3	6.9	27.4	46.8
Feb .....	141.4	41.2	38.5	61.1	15.9	27.3	49.7
Mar .....	138.8	41.3	63.4	56.8	3.4	34.8	25.4
Apr .....	133.8	43.6	56.0	79.2	4.7	57.6	26.3
May .....	132.8	43.2	52.2	58.1	16.0	45.8	28.3

FACTORS AFFECTING THE BANKS' AND THE MORTGAGE-CREDIT  
INSTITUTES' NET POSITION WITH THE NATIONALBANK

Table 3

	Central-government finance			Net purchase of foreign exchange by the National-bank	The National-bank's net bond purchases	Other factors	The banks' and the mortgage-credit institutes' net position with the Nationalbank	
	Domestic gross financing requirement	Sales of domestic central-government securities	Liquidity effect				Change in net position	End of period
	Kr. billion							
1995 .....	138.8	137.2	1.6	32.9	-7.2	-8.4	18.9	-8.5
1996 .....	94.7	96.0	-1.2	25.9	-0.1	-3.9	20.6	12.1
1997 .....	73.8	73.0	0.8	43.2	-1.5	-4.3	38.2	50.3
1998 .....	64.1	68.0	-3.8	-28.7	3.2	-4.0	-33.2	17.0
1999 .....	67.9	68.8	-0.9	62.7	1.9	-8.3	55.3	72.4
1999 May.....	5.4	-2.8	8.2	0.7	0.3	-0.9	8.3	33.8
Dec.....	20.3	4.1	16.2	0.4	-1.4	-2.7	12.5	72.4
2000 Jan .....	-0.9	14.6	-15.5	-12.7	0.5	2.2	-25.6	46.8
Feb .....	8.0	-0.3	8.2	-6.3	0.5	0.4	2.9	49.7
Mar .....	-14.9	11.0	-25.9	-1.6	0.0	3.2	-24.3	25.4
Apr.....	13.5	7.7	5.8	-3.4	0.0	-1.5	0.9	26.3
May.....	5.6	1.9	3.7	-1.0	0.3	-0.9	2.0	28.3

SELECTED ITEMS FROM THE FINANCIAL INSTITUTIONS' BALANCE SHEET,  
AND THE MONEY STOCK

Table 4

End of period	Mortgage-credit institutes		The banks					Money stock
	Domestic lending		Domestic lending		Residents' deposits		Holdings of domestic bonds	
	Total	of which: Owner-occupied dwellings	Total	of which: Private individuals	Total	of which: Private individuals		
		Kr. billion						
1995 .....	783.2	399.4	286.7	114.8	491.4	164.3	176.8	410.1
1996 .....	828.4	434.1	302.7	122.3	527.8	172.8	181.0	439.8
1997 .....	888.2	481.3	330.1	131.1	556.5	185.6	174.9	462.6
1998 .....	968.7	539.3	373.4	141.3	573.3	195.1	199.3	476.7
1999 .....	1,032.2	582.7	392.2	145.8	595.6	194.1	185.2	496.0
1999 May.....	1,012.3	565.5	382.2	139.3	604.8	211.1	184.5	512.2
Dec.....	1,032.2	582.7	395.1	147.6	594.8	194.0	186.2	495.9
2000 Jan .....	1,038.0	586.5	429.7	145.3	607.8	195.6	187.6	507.4
Feb.....	1,043.5	590.4	432.3	146.0	603.3	195.8	188.8	503.7
Mar .....	1,045.5	592.4	456.4	151.9	600.2	193.9	182.1	502.1
Apr.....	1,050.9	595.6	468.0	148.8	608.4	204.2	179.0	509.6
May.....	1,059.1	600.1	472.1	147.9	617.6	206.2	188.8	519.9
Change compared with previous year, per cent								
1995 .....	4.1	5.4	6.1	8.7	3.2	7.6	-3.4	4.1
1996 .....	5.1	7.9	6.8	6.9	7.2	5.1	-2.7	7.2
1997 .....	6.8	9.9	9.9	8.8	5.3	7.4	-4.4	5.2
1998 .....	7.8	10.1	13.7	8.7	2.8	4.9	11.8	2.9
1999 .....	6.3	7.7	5.9	4.5	3.7	-0.6	-6.6	4.0
1999 May.....	7.3	8.9	11.5	6.5	4.6	2.5	-6.1	5.1
Dec.....	6.3	7.7	5.8	4.4	3.7	-0.6	-6.6	4.0
2000 Jan .....	5.5	7.0	17.4	5.8	1.1	-3.0	1.6	0.7
Feb.....	5.2	6.6	15.4	5.5	2.3	-4.6	-2.7	2.0
Mar .....	5.4	6.5	18.5	6.5	3.8	-2.4	-11.4	3.8
Apr.....	4.7	6.1	24.0	6.0	0.0	-2.2	2.2	-0.9
May.....	4.6	5.9	24.5	7.6	2.0	-2.4	2.9	1.5

THE BANKS' LENDING

Table 5

End of period	From banks in Denmark				From Danish-owned banks abroad			
	To Danish residents		To non-residents		To Danish residents		To non-residents	
	In kroner	In foreign currency	In kroner	In foreign currency	In kroner	In foreign currency	In kroner	In foreign currency
	Kr. billion							
1995 .....	272.4	14.3	35.5	31.4	27.6	46.8	2.8	68.3
1996 .....	287.8	14.9	44.1	40.8	37.3	36.7	3.9	93.5
1997 .....	312.7	17.4	61.7	49.9	46.4	38.2	3.4	132.0
1998 .....	346.5	26.9	26.6	46.8	52.5	43.9	3.1	148.6
1999 .....	356.7	35.5	33.4	60.4	62.4	60.9	3.2	218.8
1999 May.....	352.2	30.0	50.4	57.0	58.2	48.4	3.7	177.1
Dec.....	359.3	35.8	33.5	60.6	62.4	60.9	3.2	219.0
2000 Jan .....	380.0	49.7	25.1	55.3	49.6	48.6	2.5	226.0
Feb .....	379.9	52.4	25.3	53.6	48.3	47.4	2.2	231.0
Mar .....	401.2	55.2	27.4	51.7	45.2	47.8	2.4	232.7
Apr.....	407.9	60.1	25.0	47.5	42.0	45.9	2.1	242.3
May.....	411.8	60.3	21.5	53.8	40.8	44.1	2.0	231.4
	Change compared with previous year, per cent							
1995 .....	6.5	0.6	6.4	-24.1	-3.2	-12.3	2.4	26.6
1996 .....	6.8	5.5	24.4	29.5	34.8	-21.6	39.7	37.7
1997 .....	9.5	17.3	40.3	22.7	24.5	4.2	-13.6	41.4
1998 .....	11.4	54.1	-56.8	-6.2	13.1	15.0	-8.1	12.9
1999 .....	3.7	33.1	25.8	29.4	18.8	38.7	2.4	47.4
1999 May.....	8.9	54.3	-30.2	7.2	13.3	30.6	30.4	19.2
Dec.....	3.7	32.8	25.8	29.3	18.8	38.7	2.4	47.4
2000 Jan .....	12.5	76.5	-35.4	15.6	-5.1	16.2	-38.3	46.8
Feb .....	9.9	80.6	-37.0	11.4	-5.7	11.9	-36.6	43.1
Mar .....	13.1	81.4	-37.2	-3.2	-14.5	10.8	-36.1	35.3
Apr.....	17.4	100.1	-47.3	-12.1	-24.3	1.1	-41.7	39.1
May.....	17.8	102.5	-57.3	-5.3	-29.9	-8.9	-45.2	30.8

## EXTERNAL PAYMENTS (NET PAYMENTS FROM ABROAD)

Table 6

	Current payments	Capital transfers	Financial payments				Errors and omissions	Increase in the foreign-exchange reserve
			Total	of which:		Danish krone-denominated bonds		
				Direct investments				
				Foreign in Denmark	Danish abroad			
Kr. billion								
1995 .....	6.5	-0.5	1.6	21.5	-16.6	37.8	5.8	13.4
1996 .....	13.2	0.2	14.2	2.7	-14.4	30.8	-6.8	20.8
1997 .....	9.7	0.7	52.7	18.5	-27.8	44.8	-20.1	43.0
1998 .....	-7.5	0.3	-17.4	45.0	-26.5	2.2	-4.6	-29.2
1999 .....	14.2	0.9	52.7	59.6	-66.5	7.7	-3.6	64.2
May 98 – Apr 99	-6.0	0.8	24.1	27.0	-27.4	33.3	3.9	22.8
May 99 – Apr 00	15.3	0.5	10.3	116.2	-74.6	-37.4	-34.7	-8.6
1999 Apr.....	-0.1	0.0	2.8	0.3	-2.9	8.0	-1.7	1.0
Nov .....	-3.8	0.0	5.9	1.2	3.6	-14.3	-0.4	1.6
Dec.....	4.2	-0.1	1.5	14.8	-15.4	-10.1	-7.8	-2.3
2000 Jan .....	0.8	0.1	-24.9	1.7	-4.0	4.1	7.3	-16.7
Feb.....	1.2	0.0	9.9	1.7	-2.1	-5.8	-18.3	-7.1
Mar .....	3.1	0.1	-6.0	12.1	-3.1	6.7	0.2	-2.6
Apr.....	-2.3	0.0	4.5	48.7	-7.2	-7.8	-7.3	-5.0

GDP BY TYPE OF EXPENDITURE

Table 7

	GDP	Final domestic demand				Total	Exports of goods and services	Imports of goods and services
		Private consumption	General-government consumption	Gross fixed capital formation	Change in inventories			
		Kr. billion						
1995 .....	1,009.8	509.6	260.3	189.3	9.3	968.4	357.5	316.1
1996 .....	1,060.9	533.2	274.6	198.4	2.5	1,008.7	379.4	327.2
1997 .....	1,112.0	564.0	284.5	218.0	6.5	1,073.1	405.7	366.8
1998 .....	1,163.8	594.3	300.1	236.3	10.9	1,141.6	410.7	388.5
1999 .....	1,213.3	613.7	312.5	237.9	-1.6	1,162.5	444.0	393.1
1998 Q4 .....	299.1	156.9	76.2	62.7	-1.6	294.1	105.7	100.7
1999 Q1 .....	292.5	149.0	76.7	60.4	-0.7	285.4	103.2	96.1
Q2 .....	302.7	151.1	78.3	61.2	-0.5	290.1	108.1	95.4
Q3 .....	302.7	151.4	78.8	57.2	1.4	288.7	111.8	97.8
Q4 .....	315.3	162.2	78.6	59.1	-1.8	298.2	120.9	103.8
Real growth compared with previous year, per cent								
1995 .....	2.8	1.2	2.1	11.6	...	4.2	2.9	7.3
1996 .....	2.5	2.5	3.4	4.0	...	2.2	4.3	3.5
1997 .....	3.1	3.7	1.3	8.0	...	4.4	4.1	8.0
1998 .....	2.5	3.5	3.0	6.7	...	4.3	2.2	7.3
1999 .....	1.6	0.7	1.1	-0.7	...	-0.5	7.0	1.3
1998 Q4 .....	2.6	3.3	3.1	5.2	...	5.1	0.3	7.1
1999 Q1 .....	0.6	2.7	1.5	4.5	...	-0.2	3.7	1.5
Q2 .....	2.2	-0.9	1.1	3.0	...	-0.8	12.3	3.8
Q3 .....	1.5	0.8	1.2	-3.0	...	1.0	2.8	1.7
Q4 .....	2.0	0.3	0.4	-6.8	...	-2.1	9.7	-1.4
Real growth compared with previous quarter (seasonally adjusted), per cent								
1998 Q4 .....	0.0	0.8	0.9	0.8	...	2.8	-3.7	2.4
1999 Q1 .....	-0.3	0.0	0.0	1.0	...	-3.3	3.2	-1.3
Q2 .....	0.6	-1.5	0.0	-2.5	...	0.4	2.2	-0.2
Q3 .....	1.1	1.5	0.4	-2.3	...	1.1	1.3	0.6
Q4 .....	0.6	0.3	0.0	-2.6	...	-0.1	2.5	-0.6

## PRINCIPAL ITEMS OF THE BALANCE OF PAYMENTS (NET REVENUES)

Table 8

	Goods (fob)	Services	Goods and services	Wages and property income	Current transfers	Total current account
Kr. billion						
1995 .....	37.3	4.8	42.2	-20.2	-9.6	12.3
1996 .....	45.5	4.9	50.4	-21.2	-11.7	17.5
1997 .....	37.8	1.6	39.5	-24.7	-8.6	6.2
1998 .....	25.9	-3.8	22.1	-25.3	-9.7	-12.9
1999 .....	45.9	4.4	50.3	-20.2	-15.0	15.1
Apr 98 – Mar 99.....	28.6	-2.8	25.8	-20.6	-10.4	-5.2
Apr 99 – Mar 00.....	45.7	3.0	48.6	-22.7	-14.2	11.7
1999 Mar .....	2.5	-0.2	2.3	-1.6	-1.6	-1.0
Oct .....	5.4	1.0	6.4	-1.7	-2.0	2.6
Nov .....	5.6	-0.3	5.4	-6.8	-1.3	-2.8
Dec.....	4.5	1.2	5.8	-1.8	-2.2	1.7
2000 Jan .....	1.2	-1.9	-0.7	-1.2	1.4	-0.5
Feb.....	2.8	-0.7	2.1	-1.2	0.0	0.9
Mar .....	3.0	0.7	3.6	-2.0	-0.9	0.7

PRICES AND EXCHANGE RATES

Table 9

	Consumer price index	Index of net retail prices	Wholesale price index	Kroner per EUR 100	Kroner per USD 100	Effective krone rate	Real effective krone rate based on consumer prices
	Change compared with previous year, per cent			Average		1980=100	
1995 .....	2.1	2.0	2.9	...	560.53	103.9	106.4
1996 .....	2.1	2.0	1.1	...	579.59	102.9	105.7
1997 .....	2.2	2.2	1.9	...	660.86	100.0	103.0
1998 .....	1.9	1.5	-0.6	...	669.70	101.3	104.6
1999 .....	2.5	2.1	0.5	743.56	698.34	99.6	104.2
1999 May.....	2.1	1.6	-0.8	743.32	699.14	100.1	104.6
Dec.....	3.2	3.0	4.7	744.05	735.52	97.3	102.3
2000 Jan .....	3.2	3.4	4.2	744.40	733.58	97.3	102.1
Feb.....	3.0	3.3	5.7	744.53	756.23	96.9	102.0
Mar .....	3.2	3.5	6.0	744.74	771.57	96.2	101.5
Apr.....	3.1	3.4	5.7	745.02	785.65	95.5	100.9
May.....	3.3	3.5	6.4	745.68	820.97	95.0	100.6







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# Danmarks Nationalbank's Statistical Publications

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## **"Nyt" (News)**

This series of publications presents the latest key figures from the statistics for the development in the Danish financial markets. All first publication of financial statistics from Danmarks Nationalbank is in "Nyt" and the statistics are issued immediately after compilation. The text of all tables is translated into English.

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