



Danmarks  
Nationalbank

Financial stability

D A N M A R K S  
N A T I O N A L  
B A N K 2 0 1 2



## FINANCIAL STABILITY 2012

The small picture on the cover shows a characteristic section of Danmarks Nationalbank's building, Havnegade 5 in Copenhagen. The building, which was constructed in 1965-78, was designed by the architect Arne Jacobsen (1902-71).

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## Foreword

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Under the 1936 Danmarks Nationalbank Act, Danmarks Nationalbank must maintain a safe and secure currency system and facilitate and regulate the traffic in money and the extension of credit. One of Danmarks Nationalbank's main objectives is thus to contribute to the stability of the financial system.

Danmarks Nationalbank defines financial stability as a condition whereby the overall financial system is robust enough for any problems within the sector not to spread and prevent the financial system from functioning as an efficient provider of capital and financial services.

In its financial stability publication, Danmarks Nationalbank assesses financial stability in Denmark and presents its views and recommendations on measures that may contribute to enhancing financial stability. Furthermore, the publication is intended to stimulate debate about topics of relevance to financial stability and provide input for public authorities, individual financial institutions and financial sector organisations in relation to risk-assessment issues.



# Summary and Recommendations

## SUMMARY

### Banks

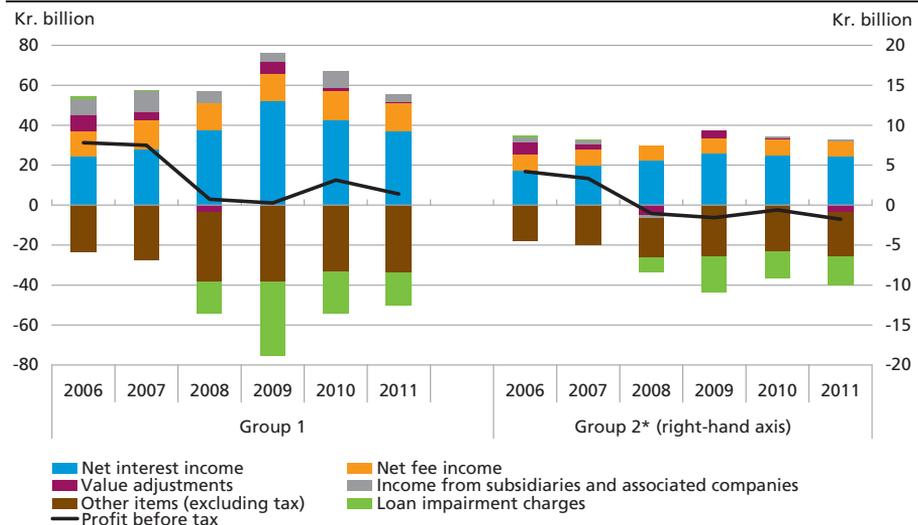
The number of banks in Denmark is declining. During the crisis, some banks have been acquired by the winding-up company, i.e. the Financial Stability Company, while others have merged. The six largest banks account for 85 per cent of total bank lending, while around 100 smaller banks account for the rest. Looking ahead, the downward trend in the number of banks is likely to continue.

Since the financial crisis set in, the banks have reduced their total lending. This trend has to some extent been offset by increased lending by mortgage banks. The mortgage banks, which only provide loans against real property as collateral, account for more than half of total lending by Danish credit institutions.

Bank earnings remained low in 2011, cf. Chart A. The five largest banks posted profits, but in general earnings were lower than in 2010. The fall in earnings was mainly attributable to lower net interest in-

EARNINGS BROKEN DOWN BY KEY ITEMS, BANKS

Chart A



Note: "Other items" comprises income from shares, other operating income, other operating costs, staff and administration costs, depreciation and profit from assets held temporarily.

Source: Danish Financial Supervisory Authority and own calculations.

come, reflecting factors such as a reduced lending volume and higher funding costs.

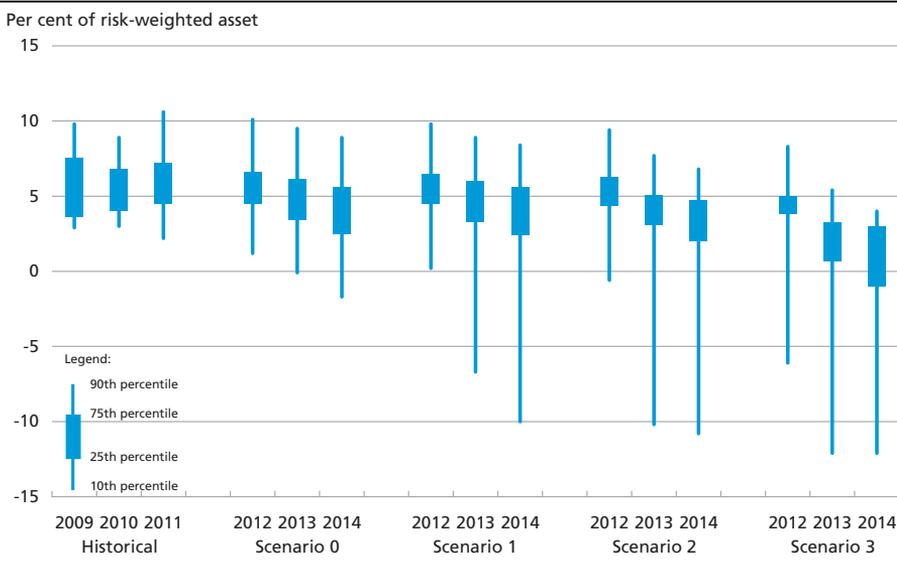
Generally, the large banks strengthened their capital bases in 2011, while several medium-sized banks reduced their excess capital adequacy due to large loan impairment charges. It is important for banks with low excess capital adequacy to continue their efforts to strengthen their capital bases.

For many banks, a key task in the coming years will be to prepare for the forthcoming strengthened capital requirements. Higher profits are an important element in this context since they boost the banks' resilience to losses, and retained profits can contribute directly to increasing the capital base. In addition, higher profits make it easier to raise fresh capital in the market.

Danmarks Nationalbank's stress test model provides a basis for assessing the capitalisation of the 13 largest Danish banks in various macroeconomic scenarios, cf. Chart B. The stress test shows that the largest banks are robust. For the four banks that in the autumn of 2011 participated in the capital test performed by the European Banking Authority, EBA, via Danish credit groups, excess capital adequacy remains positive in all Danmarks Nationalbank's stress test scenarios, and Common Equity Tier 1 capital remains above 9 per cent – even if government capital injections are not included.

## EXCESS CAPITAL ADEQUACY

Chart B



Source: Danish Financial Supervisory Authority and own calculations.

Among the smaller banks included in the stress test, a few will need to strengthen their capitalisation, especially from 2014. The assessment is that any problems among small banks can be solved within the existing framework for mergers and resolution.

The large banks' use of short-term debt issuance has been reduced considerably in recent years. In an unstable market situation it is important that large banks with access to the international capital markets use periods of more favourable market conditions to refinance their debt well in advance, whenever possible.

Most of the small and medium-sized banks with customer funding gaps at the start of the crisis have narrowed these gaps in recent years or turned them into surpluses. This is positive since these banks generally have limited market access.

The banks' outstanding debt with government guarantees has decreased by kr. 22 billion over the last year, to kr. 118 billion at the end of the 1st quarter of 2012. Of this, debt issued by small and medium-sized banks amounts to kr. 44 billion. This debt matures in 2012 and 2013. For a few small and medium-sized banks, government-guaranteed issues still make up a substantial share of the balance-sheet total. It is important for the small and medium-sized banks to continue their adjustment to a business model that is viable in the longer run. The opportunities to borrow from Danmarks Nationalbank have been increased, which will provide flexibility in this respect.

### **Mortgage banks**

The mortgage banks' earnings from administration margins have risen in recent years. Loan impairment charges in the period 2008-11 were largely offset by the increase in administration margins over the same period, cf. Chart C. Some administration margins have been increased with effect from 2012; this will further increase the mortgage banks' earnings and resilience.

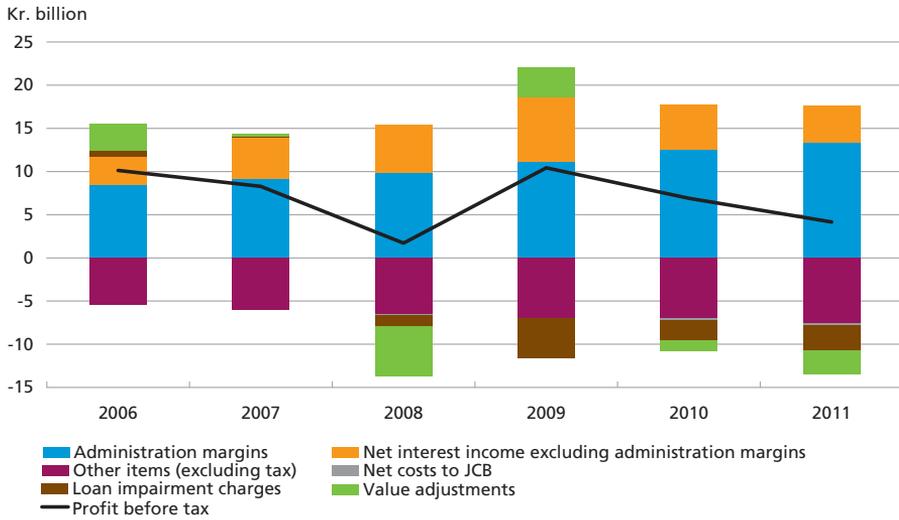
The mortgage banks are working on various adjustments to their business models with the aim of reducing refinancing risk on adjustable-rate loans and the potential need for top-up collateral if property prices fall. There is no "silver bullet" solution, and each mortgage bank will have to weigh the pros and cons before choosing which measures to implement.

### **The corporate sector and the households**

Since 2008, financing of commercial properties has led to large loan impairment charges and been the reason why a number of small banks have failed. Enforced sales of commercial properties remained high in 2011.

EARNINGS BROKEN DOWN BY KEY ITEMS, MORTGAGE BANKS

Chart C



Note: "Other items" comprises staff and administration costs, net fee income, depreciation of assets, other operating costs and other ordinary income. Profit from equity investments in associates and group enterprises are not included.

Source: Danish Financial Supervisory Authority and own calculations.

For most business sectors, impairment charges on loans and guarantees fell from 2010 to 2011, but they rose sharply for agriculture. One of the underlying factors was a fall in the price of agricultural land. Agricultural earnings improved in 2011, but debt ratios and interest-rate sensitivity remain very high in this sector.

In 2012, estimated corporate failure rates are still expected to be higher than in the pre-crisis years. Overall, credit quality will also be a major issue for the banks in 2012.

The housing market damped considerably in 2011. The fall in house prices means that the collateral pledged for the households' loans from banks and mortgage banks has declined in value. In the current recession, the structure of housing taxes contributes to the drop in house prices. More appropriate housing taxes and gradual phasing-out of access to deferred-amortisation mortgage loans would help to curb the undesirable fluctuations in the housing market – for the benefit of financial stability, the real economy and homeowners.

## SPECIAL TOPICS

### Macroprudential policy

Macroprudential policy should contribute to preventing and mitigating systemic risks in the financial sector, e.g. by making credit institutions

build up capital buffers in good times. In other words, macroprudential policy should supplement other macroeconomic stabilisation policies, such as fiscal policy, so that the financial sector makes a sustainable contribution to economic developments.

At the EU level, the institutional framework for macroprudential policy was laid down with the establishment of the European Systemic Risk Board, ESRB. The task of the ESRB is to prevent and reduce systemic risks in the EU. Macroprudential policy will predominantly be conducted at the national level, and the ESRB has recommended that all member states establish institutional frameworks for macroprudential policy. In Denmark, the issue is being considered by the Committee on the Structure of Financial Supervision. Due to the integration of the financial markets, international coordination of national measures is important. In the EU, the ESRB should undertake such coordination. Since macroeconomic conditions vary considerably among EU member states, there should be adequate flexibility for macroprudential policy at the national level.

### **Modelling loan impairment charges in the stress test model**

Internationally, the financial crisis has led to renewed focus on development of models for assessing financial stability, not least in relation to macro stress testing of banks' capitalisation. A core element of macro stress testing is the calculation of banks' loan impairment charges in macroeconomic scenarios in which the economy is hit by severe negative shocks. Danmarks Nationalbank has developed two new approaches to modelling of banks' loan impairment charges. These approaches have been implemented in Danmarks Nationalbank's stress test model.

### **Enforced sales of owner-occupied housing**

Since the financial crisis hit Denmark in 2008, the number of enforced sales of owner-occupied housing has risen considerably, although it remains low compared with the level in the early 1990s.

Enforced sales have been particularly high for homes bought in the years immediately before the crisis. The probability of enforced sale is significantly lower for homes bought from 2009 onwards than for homes bought just before the crisis. One reason could be that these homes have fallen less in value than homes bought just before the crisis. This also indicates that from 2009 onwards households have become more prudent when purchasing homes, and that the banks and mortgage banks have tightened their credit policies and enhanced the requirements for household finances.

The number of enforced sales varies substantially across Denmark. The most severely affected area is Western and Southern Zealand.

## RECOMMENDATIONS

On the basis of analyses in this report and in Danmarks Nationalbank's other publications, Danmarks Nationalbank recommends a number of initiatives to address significant risks in the financial sector. Hence, the recommendations are aimed at strengthening financial stability in Denmark. Danmarks Nationalbank's recommendations can be grouped into seven areas, cf. Table A.

### The banks' capitalisation

In *Financial stability 2011*, Danmarks Nationalbank recommended that the banks ensure a sufficient capital base to meet the tighter capital requirements under the new capital adequacy rules, even in a worse-than-expected economic scenario. The need for capital might be met by not distributing dividends or by raising capital in the market.

In 2011, the large banks in group 1 improved their capital bases, primarily by raising capital in the market, but also by retaining profits. As regards the medium-sized banks in group 2\*, the capital bases of several banks have been reduced due to losses in 2011. Some of the medium-sized banks have been posting low profits for a number of years. Dan-

OVERVIEW OF DANMARKS NATIONALBANK'S RECOMMENDATIONS		Table A
Area	Recommendation	Status
The banks' capitalisation	Banks with low excess capital adequacy should continue to focus on strengthening their capital, including their earnings.	Risks have been partly reduced
The banks' liquidity	Small and medium-sized banks should, if required, continue their adjustment to a business model that is viable in the long run.	Risks have been partly reduced
Mortgage banks	The refinancing risk of adjustable-rate loans should be addressed and solutions should be found that will reduce the risk that the requirement for top-up collateral will lead to financial instability.	Risks have been partly reduced
Resilience of the households	Credit institutions' lending practices should ensure that individual households do not assume risks exceeding their financial capabilities.	Risks have been partly reduced
Systemically important financial institutions	Special regulatory and supervisory requirements should be imposed on systemically important financial institutions.	A task force has been set up
Macroprudential policy	An institutional framework has to be established for developing, assessing and implementing macroprudential instruments.	The recommendation is new
Curbing large fluctuations in house prices	Taxation of real property should follow house prices and access to deferred-amortisation mortgage loans should be gradually phased out.	No improvement

marks Nationalbank's stress test shows that the large banks are robust, while a few of the smaller banks included in the stress test will need to strengthen their capitalisation, especially from 2014.

Danmarks Nationalbank recommends that banks with low excess capital adequacy continue their efforts to strengthen their capitalisation.

For many banks, a key task in the coming years will be to prepare for the forthcoming strengthened capital requirements. Higher profits are an important element in this context since they boost the banks' resilience to losses, and retained profits can contribute directly to increasing the capital base. In addition, higher profits make it easier to raise fresh capital in the market.

### **The banks' liquidity**

In last year's report, Danmarks Nationalbank recommended that the banks prepare for the expiry of government-guaranteed debt and ensure that their business model is viable in the longer run.

Most of the small and medium-sized banks with customer funding gaps at the start of the crisis have narrowed these gaps in recent years or turned them into surpluses. For a few small and medium-sized banks, government-guaranteed issues still make up a substantial share of the balance-sheet total. Work is underway, cf. Bank Rescue Package 5, to find a special solution to the funding challenge faced by one of the large banks, FIH Erhvervsbank.

Danmarks Nationalbank recommends that the small and medium-sized banks continue their adjustment to a business model that is viable in the longer run.

### **Mortgage banks**

In *Financial stability 2011*, Danmarks Nationalbank recommended that the mortgage banks should address the refinancing risk in relation to adjustable-rate loans and take precautions against a situation with a considerable need for top-up collateral for loans financed via covered bonds, SDOs.

In 2011, the sector set up a working group on refinancing risk and tabled a number of ideas. In addition to further spreading of refinancing, these ideas include issuance of bonds with longer maturities and reduction of investors' credit risk. It is important that the mortgage banks continue working on these initiatives and find robust solutions. Ultimately it is about maintaining investor confidence in the system – also under unusual market conditions.

Several mortgage banks have presented specific models aimed at limiting the potential need for top-up collateral. Danmarks Nationalbank

recommends that the mortgage banks continue to work on sustainable and permanent solutions supporting financial stability.

### **Resilience of the households**

In last year's report, Danmarks Nationalbank recommended that households ensure that their finances are sufficiently resilient to fluctuations in both payments and house prices. It was also emphasised that lenders to households should perform realistic "stress tests" under different conditions when offering advice and considering loan applications and should not let households take on greater risks than their finances would allow. Danmarks Nationalbank still recommends that when granting loans credit institutions ensure that households do not take on greater risk than their finances allow.

There are indications that homeowners who bought their homes in 2009 or later have a significantly lower risk of enforced sale than those who bought their home in the pre-crisis years. This indicates that both buyers and lenders now make more realistic assessments of the finances of the individual households.

Danmarks Nationalbank will continue to analyse the households' resilience in more detail.

### **Systemically important financial institutions**

In *Financial stability 2011*, Danmarks Nationalbank recommended that the requirements for systemically important financial institutions, SIFIs, both in terms of regulation and supervision, should be so strict that the risk of failure is eliminated to the greatest possible extent, and that large credit institutions prepare for tighter capital and liquidity requirements. The Danish government has set up a committee of experts, including representatives of Danmarks Nationalbank, to recommend criteria for determining which Danish credit institutions are systemically important. The committee is also to present recommendations for the enhanced requirements to be imposed on Danish SIFIs and look into how any Danish SIFIs that become distressed are to be handled.

### **Macroprudential policy**

At the EU level, the institutional framework for macroprudential policy was laid down with the establishment of the ESRB. In December 2011, the ESRB recommended that all EU member states set up national macroprudential mandates by the summer of 2013. A well-defined institutional framework is a precondition for efficient macroprudential policy. According to the ESRB, the national macroprudential institutions should be able to identify, monitor and assess systemic risks and to de-

velop and implement the necessary measures. This requires access to – and possibly control of – a suitable range of macroprudential instruments.

Danmarks Nationalbank recommends that an institutional framework be established for developing, assessing and implementing macroprudential instruments.

### **Curbing large fluctuations in house prices**

Previous analyses have shown that deferred-amortisation loans and the freeze on property taxes have amplified fluctuations in house prices.<sup>1</sup> Gradual phasing-out of access to deferred-amortisation loans and reintroduction of housing taxes that match developments in property values could reduce the house-price fluctuations triggered by shocks to the demand for housing.

Besides their negative real economic effects, large house-price fluctuations have a substantial impact on financial stability. When house prices go down, the collateral behind the loans granted by banks and mortgage banks is eroded. Furthermore, the mortgage banks' need for top-up collateral increases. Finally, there are indications that households which bought their home at a time when prices were rising strongly are particularly vulnerable when prices subsequently fall.

Danmarks Nationalbank recommends that the link between property value tax and the current property valuation be restored. If the rate of property value tax is reduced, this can be done without increasing the overall level of taxation. Danmarks Nationalbank also recommends that access to deferred-amortisation mortgage loans gradually be phased out.

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<sup>1</sup> Cf. Niels Arne Dam, Tina Saabye Hvolbøl, Erik Haller Pedersen, Peter Birch Sørensen and Susanne Hougaard Thamsborg, Developments in the market for owner-occupied housing in recent years – can house prices be explained?, Danmarks Nationalbank, *Monetary Review*, 1st Quarter 2011, Part 2.



# Report Section



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# 1. The Structure of the Danish Financial Sector

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*The number of banks in Denmark is declining. During the crisis, some banks have been acquired by the winding-up company, i.e. the Financial Stability Company, while others have merged. The six largest banks account for 85 per cent of total bank lending, while around 100 smaller banks account for the rest. Looking ahead, the downward trend in the number of banks is likely to continue.*

*Since the financial crisis set in, the banks have reduced their total lending. This trend has to some extent been offset by increased lending by mortgage banks. The mortgage banks, which only provide loans against real property as collateral, account for more than half of total lending by Danish credit institutions.*

## **THE NUMBER OF BANKS IS DECREASING**

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On 24 May 2012, the Danish banking sector, groups 1-4, comprised a total of 107 banks, savings banks and cooperative banks. The number has been declining steadily for decades – a trend that has continued during the financial crisis, cf. Chart 1.

A number of banks have become distressed and been taken over by the government winding-up company, the Financial Stability Company, while others have merged, cf. Appendix 2. Especially the group of medium-sized banks has shrunk, cf. Chart 2. In other words, the trend is towards a few large and many small banks. Looking ahead, the downward trend in the number of banks is likely to continue.

Several banks became distressed during 2011, and a few small banks encountered problems in early 2012. The sound activities of these banks are being continued by other banks, while the Financial Stability Company is winding up the remaining exposures. Bank Rescue Package 4 from August 2011 included several initiatives designed to create a greater incentive for sound banks to take over, in full or in part, the activities of distressed banks, cf. Box 1. The experience with Bank Rescue Package 4 has been positive.

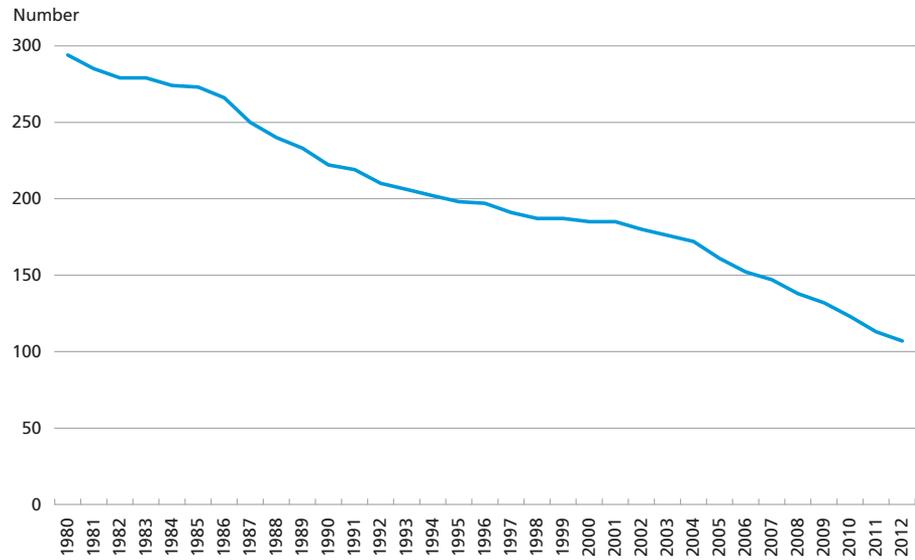
## **DECLINE IN BANK LENDING – GROWTH IN MORTGAGE LENDING**

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As at 31 March 2012, total lending by Danish banks amounted to kr. 2,080 billion, cf. Chart 3. Lending is highly concentrated. The six large

NUMBER OF BANKS IN DENMARK

Chart 1

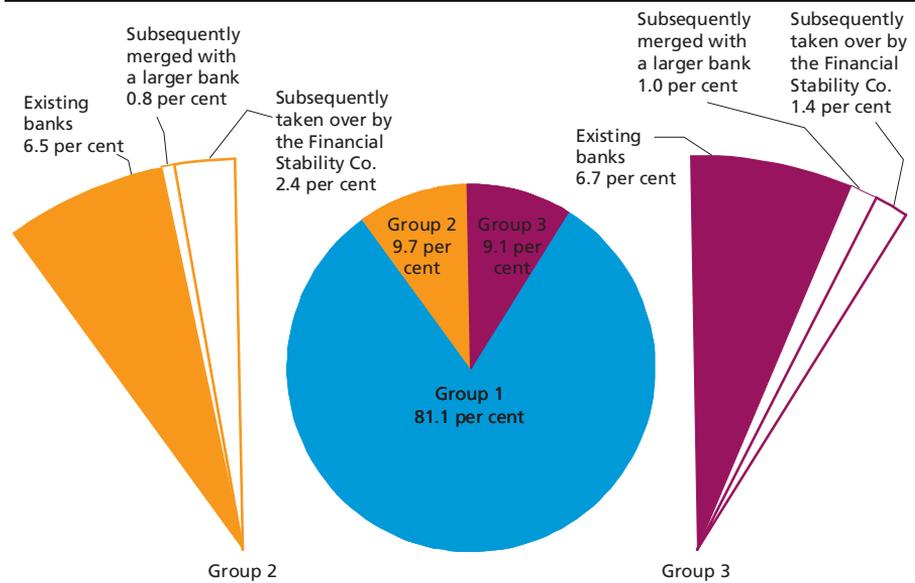


Note: Banks in the Danish Financial Supervisory Authority's groups 1-4. The most recent observations are from 24 May 2012. Other observations are from the end of the year.

Source: Danish Financial Supervisory Authority and Kim Abildgren, Bodil Nyboe Andersen and Jens Thomsen, *Monetary History of Denmark 1990-2005*, Danmarks Nationalbank, 2010.

DANISH BANK ASSETS AT THE END OF 2007

Chart 2



Note: The Chart is based on the Danish Financial Supervisory Authority's groups 1-3 at the end of 2007 and does not allow for subsequent inter-group migration. Consequently, this grouping differs from the other charts in this report, which are based on Danish Financial Supervisory Authority's groups at the end of 2011, cf. Appendix 1.

Source: Danish Financial Supervisory Authority and own calculations.

## HANDLING DISTRESSED BANKS

Box 1

The Danish resolution scheme for handling distressed banks, Bank Rescue Package 3, came into force on 1 October 2010. The scheme has been applied twice. It offers an alternative to compulsory liquidation and, like compulsory liquidation, entails a risk that shareholders and unsecured creditors may incur losses. The objective of the resolution scheme is to ensure that ordinary customers do not immediately experience any difference in the day-to-day handling of their banking transactions and may continue to use their payment cards, internet banking, etc. Coverage by the Guarantee Fund for Depositors and Guarantors is the same as for compulsory liquidation.<sup>1</sup>

In the course of 2011, the opportunities for finding a private-sector solution for distressed banks improved. Bank Rescue Package 4 from August 2011 included two different models that are designed to create a greater incentive for sound banks to take over, in full or in part, the activities of a distressed bank before resolution under Bank Rescue Package 3 becomes necessary. The objective was to strengthen the opportunities for resolution of a distressed bank without losses for non-subordinate creditors. This reduces the risk of contagion effects between banks.

Model 1 enables both the Guarantee Fund for Depositors and Guarantors and the Danish government to provide compensation to a sound bank that is willing to take over all parts of a distressed bank, except share capital and subordinate capital. It is a precondition that neither the Guarantee Fund nor the Danish government is worse off than in case of resolution of the distressed bank under Bank Rescue Package 3. Thus the Guarantee Fund may provide compensation up to an amount equivalent to the estimated disbursements to cover depositors in the event of resolution under the resolution scheme, while the Danish government may provide compensation up to an amount equivalent to the estimated loss on any individual government guarantees that the bank in question might have obtained from the Danish government under Bank Rescue Package 2. An earn-out agreement is to ensure that the government receives compensation if, three years after the takeover, it turns out that the distressed bank makes larger profits than had been expected.

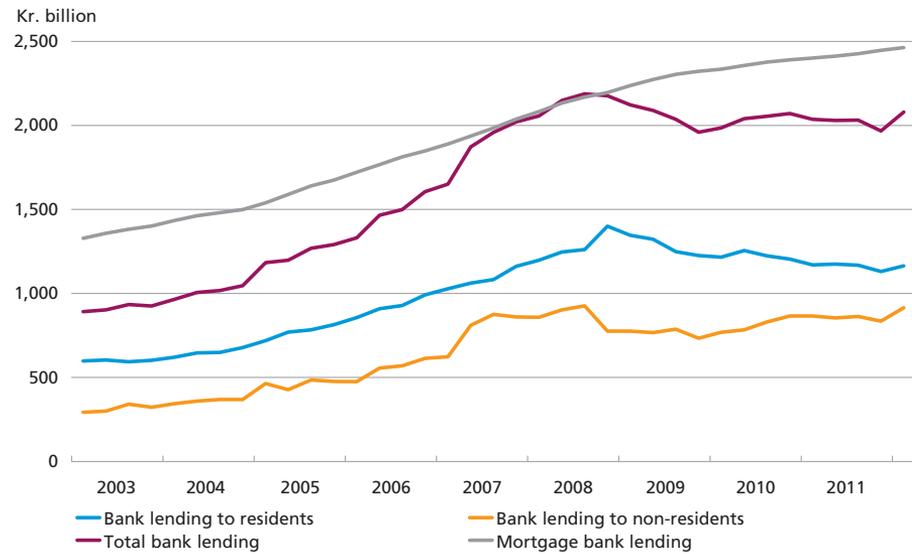
Under model 2, the Financial Stability Company takes over all parts of a distressed bank, except share capital and subordinate capital, and immediately afterwards transfers the sound parts of the bank to another, sound bank. As a minimum, this transfer is to include all exposures to private customers. The Guarantee Fund and the Danish government may provide compensation to the Financial Stability Company – provided that neither the Guarantee Fund nor the Danish government is worse off as a result of this solution than they would have been in case of resolution of the bank under Bank Rescue Package 3. The Financial Stability Company will subsequently be in charge of the resolution of the unsound parts of the distressed bank, while the operation of the sound parts is carried on by the acquiring bank.

Bank Rescue Package 4 (in this case model 2) was first used in October 2011, when Max Bank became distressed. The sound parts of Max Bank are being carried on by Sparekassen Sjælland, while the Financial Stability Company is in charge of the resolution of the unsound parts. With the compensation from the Guarantee Fund and the Danish government, it was possible to handle Max Bank without losses for depositors and other non-subordinate creditors.

<sup>1</sup> The resolution scheme is described in more detail in Ulrik Løgtholdt Poulsen and Brian Liltoft Andreassen, Handling of Distressed Banks in Denmark, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 2011, Part 1.

LENDING BY DANISH BANKS AND MORTGAGE BANKS

Chart 3



Note: Quarterly observations. The most recent observations are from the 1st quarter of 2012. Lending to all sectors, excluding monetary financial institutions, MFIs. Bank lending comprises lending by the Danish Financial Supervisory Authority's groups 1-4, excluding banks under the Financial Stability Company.

Source: Danmarks Nationalbank.

banks in group 1 account for 85 per cent of total bank lending, while the group of medium-sized banks, group 2\*, and the group of small banks, group 3\*, each account for 7 per cent. Other banks, which are not included in the analyses in this report, account for 1 per cent of total bank lending. The breakdown by group is described in Appendix 1.

Lending by Danish banks to non-residents totalled kr. 915 billion as at 31 March 2012, accounting for 44 per cent of total lending by Danish banks. Lending to customers in other Nordic countries, the UK and Ireland accounted for most of this lending.

Lending by branches of foreign banks in Denmark amounted to kr. 79 billion as at 31 March 2012. In addition, Danish enterprises had raised loans with foreign credit institutions of close to kr. 280 billion, the insurance and pension sectors accounting for about half of this amount.

Since mid-2008, the banks have reduced their total lending. This trend has, to some extent, been offset by increased lending by mortgage banks, which only provide loans against real property as collateral. As at 31 March 2012, total mortgage lending amounted to kr. 2,463 billion. The mortgage banks thus account for more than half of total lending by Danish credit institutions.

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## 2. The Banks' Earnings and Capital

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*Bank earnings remained low in 2011. The five largest banks posted profits, but in general earnings were lower than in 2010. The fall in earnings was mainly attributable to lower net interest income, reflecting factors such as a reduced lending volume and higher funding costs.*

*Generally, the large banks strengthened their capital bases in 2011, while several medium-sized banks reduced their excess capital adequacy due to large loan impairment charges. It is important for banks with low excess capital adequacy to continue their efforts to strengthen their capital bases.*

*For many banks, a key task in the coming years will be to prepare for the forthcoming strengthened capital requirements. Higher earnings are an important element in this context since they boost the banks' resilience to losses and can contribute directly to increasing the capital base via retained profits. In addition, higher earnings make it easier to raise fresh capital in the market.*

*The earnings of the Nordic banking groups vary considerably. National differences influence both the size of credit losses and the financial frameworks for the groups. The earnings of Danske Bank are lower than those of its Nordic competitors. The group's buffers against future losses are found to be substantial.*

### **BANKS IN DENMARK**

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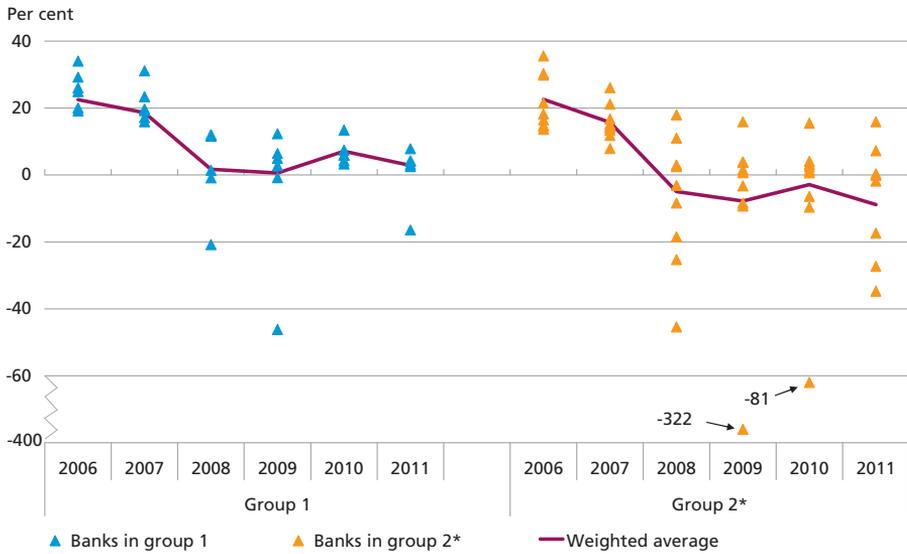
#### **Low earnings despite lower loan impairment charges**

Bank earnings remained low in 2011. The five largest banks in group 1, Danske Bank, Jyske Bank, Nordea Bank Danmark, Nykredit Bank and Sydbank, all posted profits for 2011, although the profits were generally lower than in 2010. The weighted average return on equity in group 1, including FIH Erhvervsbank, was 2.9 per cent before tax, i.e. 4.2 percentage points lower than in 2010, cf. Chart 4.

The medium-sized banks in group 2\* also showed the same picture of generally lower earnings in 2011. These banks generally recorded poorer earnings than the group 1 banks, but with substantial variations within the group. Despite the financial crisis, one third of the banks were able to maintain relatively stable earnings, while the rest recorded losses. The weighted average return on equity was -8.8 per cent before tax, down 6.0 percentage points on 2010.

RETURN ON EQUITY

Chart 4

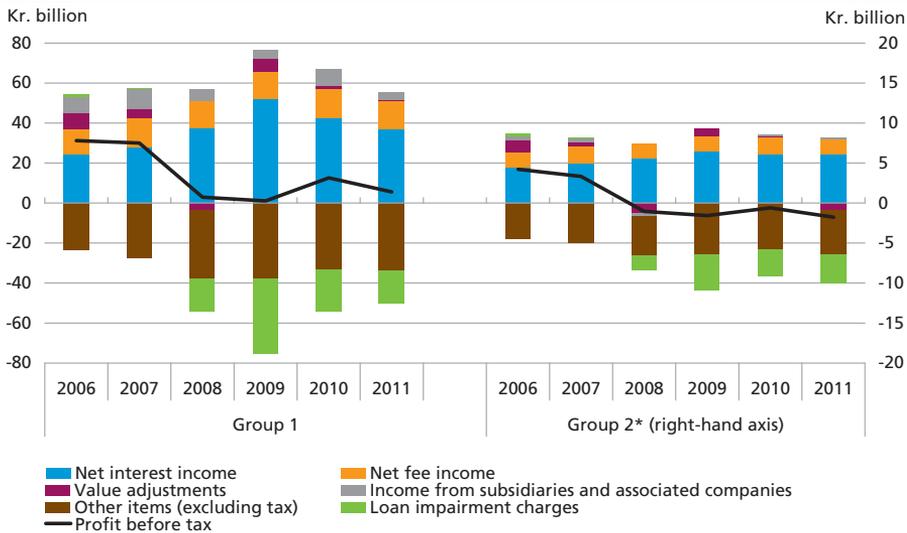


Note: Return on equity before tax is calculated as profit before tax as a percentage of average equity.  
 Source: Danish Financial Supervisory Authority and own calculations.

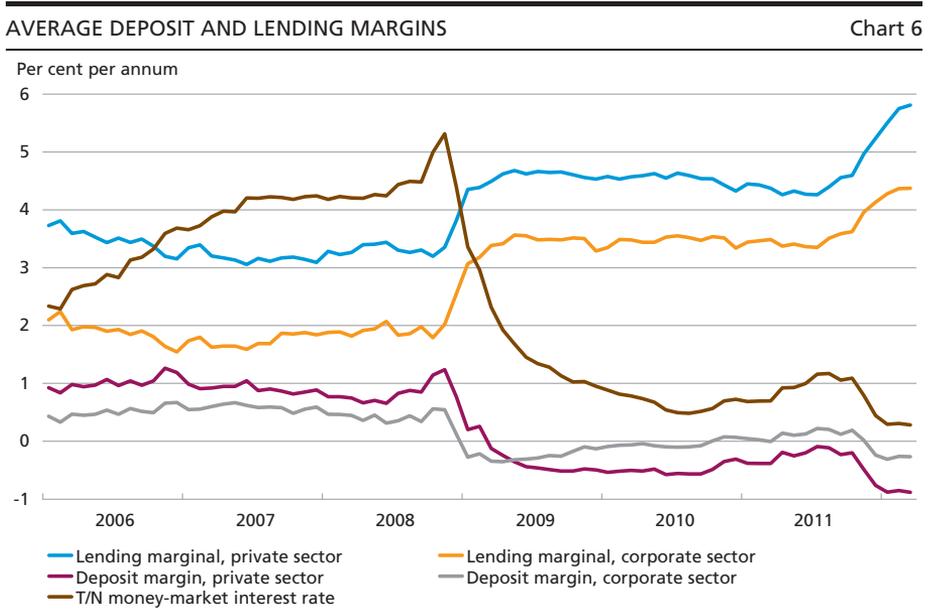
The lower earnings in group 1 mainly reflect a drop in net interest income, cf. Chart 5. For the largest bank, Danske Bank, the decrease in earnings can also be attributed to lower profits in its subsidiary Danica.

EARNINGS BROKEN DOWN BY KEY ITEMS, BANKS

Chart 5



Note: "Other items" comprises dividend from shares, other operating income, other operating expenses, staff and administration expenses, depreciation and profit from assets held temporarily.  
 Source: Danish Financial Supervisory Authority and own calculations.



Note: Lending margins are calculated as the difference between the average lending rate and the T/N money-market interest rate. Deposit margins are calculated as the difference between the T/N money-market interest rate and the average deposit interest rate. The calculation of the corporate sector margins does not include financial enterprises. The calculations are based on deposits and lending in Danish kroner.

Source: Danmarks Nationalbank.

The decline in net interest income in group 1 partly reflects a fall in total lending of 6 per cent relative to the level at end-2010. In addition, the interest income on the banks' bond holdings fell, while the funding costs rose. The higher funding costs should be viewed in light of such factors as renewed turmoil in the international capital markets, particularly in the autumn of 2011, and intensified domestic competition for deposits, cf. Chapter 3.

A comparison of the average deposit and lending rates with short-term money-market rates illustrates the development in the banks' deposit rates relative to the cost of alternative funding as well as the pattern of lending rates relative to alternative investment in the money market, cf. Chart 6. The combination of intensified competition for deposits and the continued fall in money-market rates resulted in lower deposit margins. The banks increased the price of lending to compensate for the higher funding costs. The widening of the lending margins exceeded the narrowing of the deposit margins, so all in all the spread between lending and deposit rates increased. Several banks have stated that they have plans for further price increases in 2012 with a view to strengthening earnings.

Since mid-2008, loan impairment charges have constituted the predominant challenge for the banks' earnings. While credit quality gener-

## NEW RULES ON LOAN IMPAIRMENT CHARGES

Box 2

In March 2012, the Danish Financial Supervisory Authority issued a new Executive Order on Financial Reports for Credit Institutions and Investment Companies, etc., which implies stricter rules for loan impairment charges. The new rules were based on the experience from e.g. Amagerbanken, where a change of management led to significantly higher loan impairment charges. The Danish Financial Supervisory Authority's aim of the new rules is to narrow the scope for when an estimate can be assumed to be reasonable and appropriate. This is to enhance the credibility of the banks' loan impairment charges and improve confidence in the banks' financial reports.

Like the Danish Financial Supervisory Authority, Danmarks Nationalbank has also observed a need for a more harmonised and prudent approach in the banks' assessments of the need for of loan impairment charges, so Danmarks Nationalbank has expressed its support of the new rules.

According to the International Financial Reporting Standards, IFRS, there must be objective evidence of impairment before a loan impairment charge is made. The new rules of the Executive Order on the Financial Reports are also based on the IFRS, but set more detailed minimum criteria for when objective evidence of impairment may be assumed to exist. Moreover, the new rules of the Executive Order on Financial Reports contain more detailed guidelines for how to compile the size of the loan impairment charges. In this connection, the Executive Order distinguishes between two types of customer exposures :

- Customer exposures that may be based on the customer's assets.
- Customer exposures that can be based on the customer's earnings capacity.

When objective evidence of impairment is found to exist for a customer exposure that may be based on the customer's assets, the loan should, as a main rule, be written down to the current value of the collateral pledged. As regards property loans, the impaired loan value must reflect the expected proceeds from a sale within six months. Customer exposures that may be based on the customer's assets comprise private and corporate customers with investments in properties, ships or securities that are high relative to the customer's general earnings capacity and capitalisation/solvency.

When objective evidence of impairment is found to exist for a customer exposure that can be based on the customer's earnings capacity, the loan impairment charges should reflect the relevant strategy for that customer, e.g. default or compounding the customer's debt. For corporate customers, the basis should be the current operating results, and only in special cases may it be assumed that the operating results will improve for more than three years. Basically, it must be assumed that all assets are realised within 5 years. A customer exposure can be based on the customer's earnings capacity if the customer is able to service the loan to a more than limited extent independently of the assets pledged as collateral for the loan.

The Danish Financial Supervisory Authority finds that most banks already make impairment charges on distressed property loans in accordance with the new rules. For the small group of banks, for which loan impairment charges will increase, the Danish Financial Supervisory Authority has assessed that they have predominantly made full capital reservation for the loans in question. Consequently, the banks' excess capital adequacy is generally not expected to be influenced by higher loan impairment charges to any considerable extent. The new Executive Order on Financial Reports takes effect for the first time in the banks' interim reports for the 1st half of 2012.

ally showed signs of improvement in 2010, the picture in 2011 was more mixed. In group 1 the impairment charge ratio for loans and guarantees to private customers fell from 0.7 per cent in 2010 to 0.5 per cent in 2011, while the impairment charge ratio for loans and guarantees to corporate customers declined from 1.2 per cent to 1.1 per cent. Group 2\*, on the other hand, posted higher loan impairment charges than in 2010, since the impairment charge ratio for loans and guarantees to private customers rose from 0.9 per cent to 1.0 per cent, while the impairment charge ratio for loans and guarantees to corporate customers increased from 2.4 per cent to 2.7 per cent.

In 2011, both groups recorded particularly high loan impairment charges on agriculture and commercial properties, but loan impairment charges were also high for building and construction in group 1. A large share of the loan impairment charges on agriculture were made in the 4th quarter. In December 2011, the Danish Financial Supervisory Authority informed the banks and mortgage banks about valuation of agricultural land for the purposes of calculation of capital needs and loan impairment charges. These prices form the basis of the assessment of the need for loan impairment charges in the banks' financial reports for 2011.

Danish banks' exposure to the vulnerable Southern European countries continued to be very limited. One bank, Jyske Bank, had to make impairment charges on a minor holding of Greek government bonds during 2011 – by kr. 299 million, corresponding to 1 per thousand of the bank's balance-sheet total.

In 2012, the Danish Financial Supervisory Authority has laid down detailed guidelines for the banks' impairment charges on loans and guarantees. Generally, the Danish Financial Supervisory Authority does not expect the new guidelines to entail any pronounced increase in the banks' loan impairment charges, cf. Box 2.

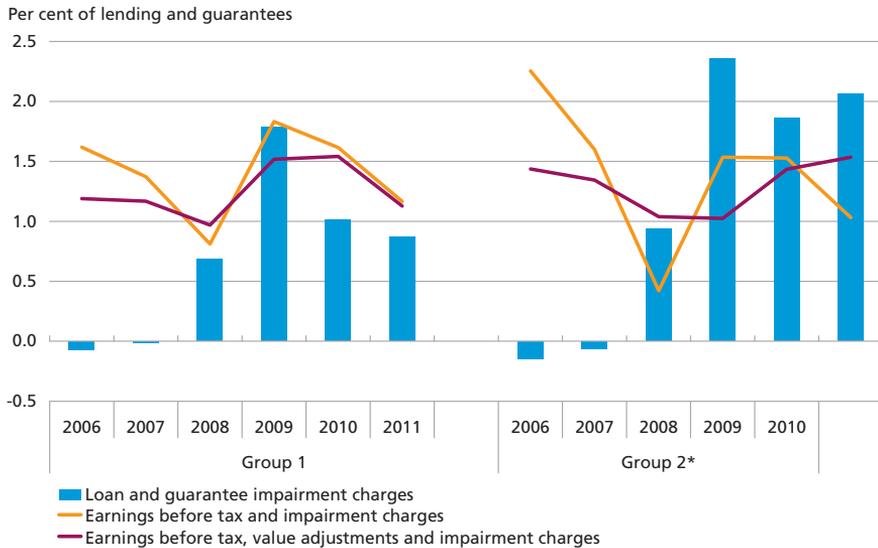
Sound profits are key to the banks' ability to absorb unforeseen loan impairment charges and losses and may contribute to strengthening the banks' capital bases. Group 1 saw a considerable fall in earnings before loan impairment charges from 2010 to 2011, also before value adjustments, cf. Chart 7. For group 2\*, earnings have been substantially lower than the banks' loan impairment charges for the last three years, reflecting a loss for the group overall.

### **Costs for distressed banks**

During 2011 the Guarantee Fund for Depositors and Investors paid out a total of kr. 3.8 billion to depositors in Amagerbanken and Fjordbank Mors as well as compensation of kr. 0.9 billion to the Financial Stability Company in connection with the split of Max Bank. Originally, the banks were

EARNINGS AND IMPAIRMENT CHARGES ON LOANS AND GUARANTEES

Chart 7



Note: Loan impairment charges and earnings are calculated as a ratio of loans and guarantees before loan impairment charges.

Source: Danish Financial Supervisory Authority and own calculations.

to pay a corresponding amount to the Guarantee Fund for Depositors and Investors, but the banks were actually charged kr. 2.2 billion less due to higher dividend from Amagerbanken and Fjordbank Mors. A few banks also suffered minor credit losses on direct exposures to the three distressed banks. In future, the banks' contributions to the Guarantee Fund for Depositors and Investors will be more evenly distributed, cf. Box 3.

### Continued reduction of the sum of large exposures

The banks' focus on reducing the concentration risk has diminished the level of large exposures. In group 1, the sum of large exposures had been reduced to kr. 71 billion at end-2011 against kr. 120 billion in 2010. In group 2\*, the relative reduction is somewhat smaller, from kr. 10 billion in 2010 to kr. 9 billion in 2011. As a percentage of excess capital adequacy, the sum of large exposures has increased in group 2\*, cf. Chart 8.

There is considerable dispersion across the banks in group 2\*, and due to relatively modest excess capital adequacy a few banks are substantially vulnerable to losses on large exposures.

### Adjustment to the Supervisory Diamond limit values

Generally, the banks must meet the limit values of the Danish Financial Supervisory Authority's Supervisory Diamond by end-2012. The adjustment process has been ongoing since June 2010, when the Danish Finan-

**NEW FUNDING MODEL FOR THE GUARANTEE FUND FOR DEPOSITORS AND INVESTORS**

Box 3

On 22 March 2012, the Folketing (Danish Parliament) adopted a legislative amendment entailing that the bank department of the Guarantee Fund for Depositors and Investors, the Fund, will be funded via a fixed annual contribution. The amendment, which derives from the political agreement on Bank Rescue Package 4, is to ensure that the banks' contributions to the Fund will be more evenly distributed. The amendments entered into force on 30 March 2012.

So far, the funding of the Fund has been based on commitments from the banks, but only a minor share of the Fund's assets has been contributed ex ante. In future, the banks' contributions to the Fund's bank department will be a fixed annual rate of 2.5 per thousand of the net deposits covered as at 1 October in the previous year. Currently, this corresponds to kr. 1.9 billion. The contribution obligation ends if the bank department's assets exceed 1 per cent of the net deposits covered.

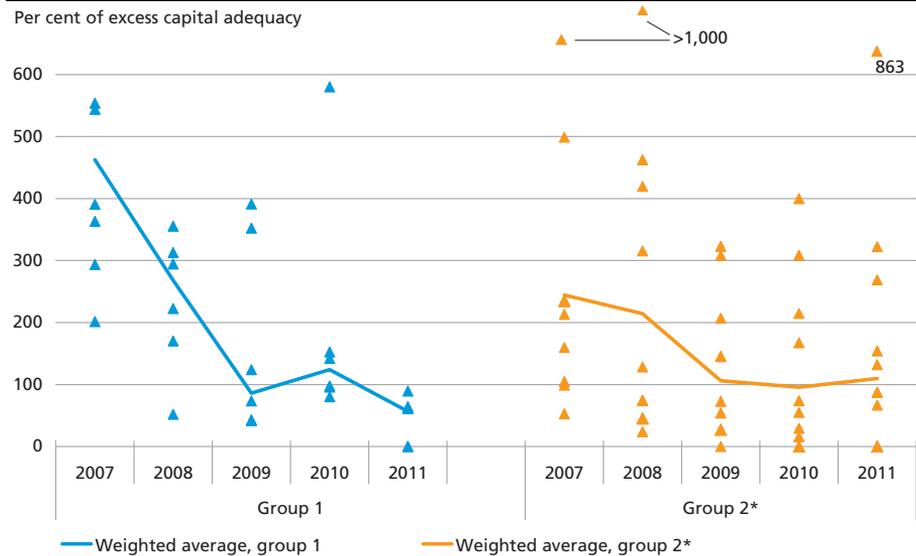
The Board of the Fund may extraordinarily raise the annual contributions if warranted by the finances of the bank department. Moreover, after negotiation with Danmarks Nationalbank, the Danish Financial Supervisory Authority may order the Board to raise the annual contribution extraordinarily if warranted by the finances of the bank department.

The new funding model has no influence on the cover from the Fund in the event of a bank's default. The Fund continues to cover ordinary deposits registered by name up to the equivalent of 100,000 euro, while full cover is provided for certain special deposits.

On 12 July 2010 the European Commission presented a proposal for a new Deposit Guarantee Directive. The adjusted funding model will enable the Fund to accommodate the future Directive requirements better, including a higher degree of ex ante funding. The negotiations on the new Directive are still in progress.

**SUM OF LARGE EXPOSURES**

Chart 8



Note: Calculated on the basis of the Danish Financial Supervisory Authority's key ratio for total large exposures, the individual capital need and solvency ratio.

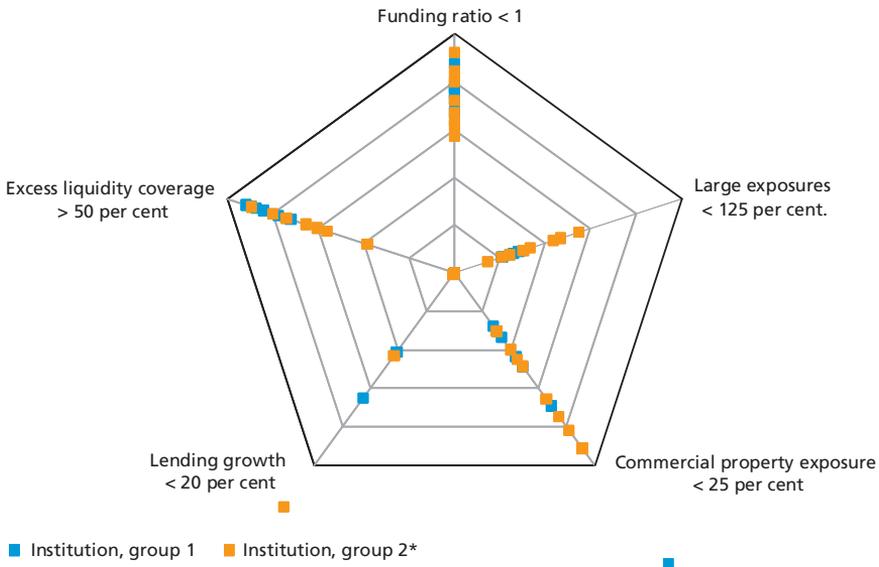
Source: Danish Financial Supervisory Authority and own calculations.

cial Supervisory Authority introduced the Supervisory Diamond as a future supervision tool.

If the limit values are exceeded, the Danish Financial Supervisory Authority will enter into a dialogue with the bank in question and implement a suitable supervisory response based on specific and individual assessment. The supervisory response may include e.g. sharpened supervision with more frequent reporting on the adjustment to the relevant limit value or a risk disclosure statement, possibly to be published. In more serious situations, e.g. in the event of repeated cases of exceeding the limit value or lack of response from the bank, the Danish Financial Supervisory Authority may require a statement from the bank on its finances and future prospects or may initiate a functional investigation of the relevant area of risk. Ultimately, the Danish Financial Supervisory Authority may order the bank to limit certain business areas, products or customer segments, for example.

With two exceptions, all banks in groups 1 and 2\* complied with the limit values for the five benchmarks of the Supervisory Diamond at end-2011, cf. Chart 9. As a result of the acquisition of the healthy parts of Max Bank, Sparekassen Sjælland recorded higher lending growth than the limit value of 20 per cent, which was thus justified. FIH Erhvervsbank has high property exposure, but in the spring of 2012 it demerged and divested its property finance activities, cf. Box 4. The bank can therefore be expected not to exceed the limit value for property exposure at end-2012.

THE DANISH FINANCIAL SUPERVISORY AUTHORITY'S SUPERVISORY DIAMOND Chart 9



Note: Compiled as at the end of 2011. The excess liquidity cover is shown on an inverse scale with the edge of the diamond corresponding to excess cover of 50 per cent and the centre of the diamond corresponding to excess cover of 500 per cent. Mergers after 1 January 2012 are not incorporated.

Source: Danish Financial Supervisory Authority and own calculations.

## DIVESTMENT OF FIH ERHVERVSBANK PROPERTY EXPOSURES

Box 4

FIH Erhvervsbank originally specialised in funding small and medium-sized enterprises, but prior to the financial crisis, it built up a considerable portfolio of property exposures. FIH Erhvervsbank has traditionally raised funding by issuing bonds, while deposits have been very limited.

Under Bank Rescue Package 2, FIH Erhvervsbank received Additional Tier 1 capital from the government to the amount of kr. 1.9 billion, and at the same time issued debt with individual government guarantees totalling kr. 42 billion. The individual government guarantees expire in 2012 and 2013, and FIH Erhvervsbank faced a considerable challenge in refinancing this debt. If the bank was unable to obtain the necessary refinancing, the government would be obliged to redeem the government-guaranteed debt.

As part of Bank Rescue Package 5 from March 2012, the Financial Stability Company entered into a conditional agreement with FIH Erhvervsbank on taking over the bank's property finance exposures. The objective of the agreement is to strengthen FIH Erhvervsbank's funding situation to enable it to provide funding again to small and medium-sized enterprises, and to avoid a strong reduction in lending, which could potentially have negative knock-on effects on other banks. Under the agreement, FIH Erhvervsbank demerges property exposures totalling approximately kr. 17 billion to a new company, which will be acquired by the Financial Stability Company. As a result of the demerger, FIH Erhvervsbank will have a claim on the new company. This claim is to be repaid to FIH Erhvervsbank in step with the bank's redemption of outstanding bonds with individual government guarantees. The Financial Stability Company is to ensure that the acquired exposures are settled as quickly as possible in a financially sound and fit and proper way. Basically, the settlement is to be concluded by the end of 2016 at the latest, but with a possibility of extension for up to three years. Any profit in the new company is to be divided between the Financial Stability Company and FIH Erhvervsbank, the former being entitled to full compensation from the latter in the event of financial losses.

As a result of the ongoing adjustment of FIH Erhvervsbank's business model, FIH Erhvervsbank has not been included in the stress test in Chapter 5.

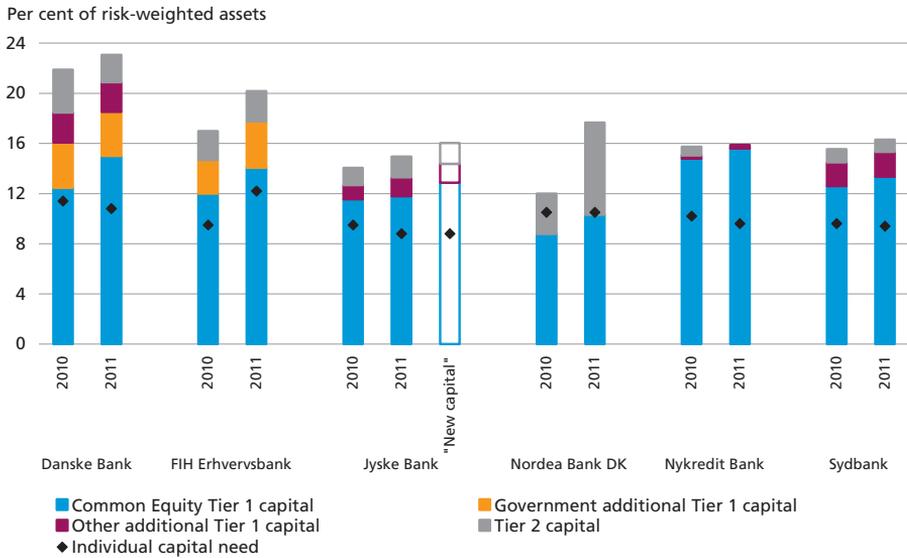
### Continued focus on strengthening the capital base

The banks in group 1 generally strengthened their capital bases in 2011, cf. Chart 10. Danske Bank increased its Common Equity Tier 1 capital via a share issue, while Nordea Bank Danmark increased its Tier 2 capital via a capital injection from the Swedish parent company of the Nordea group. Due to the low earnings in 2011, the profit for the year made only a minor contribution to the general improvement of the capital base in group 1, cf. Chart 11. None of the banks in group 1 implemented share buyback programmes in 2011, and none of the banks have subsequently paid dividend for the year.

Jyske Bank and Spar Nord both launched share issues in the spring of 2012 in order to strengthen their capital bases. Jyske Bank's share issue was targeted at a number of Danish and foreign institutional investors, while Spar Nord's share issue involved pre-emptive rights for existing

COMPOSITION OF TOTAL CAPITAL, BANKS IN GROUP 1

Chart 10



Note: New capital for Jyske Bank is calculated on the basis of the bank's capital composition at the end of 2011 with the addition of gross proceeds from a share issue in March 2012.

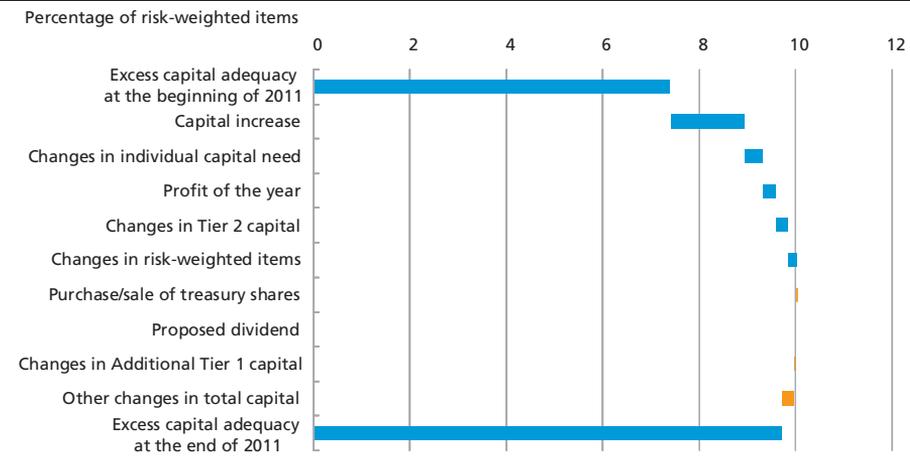
Source: Danish Financial Supervisory Authority, Jyske Bank's company announcement of 1 March 2012 and own calculations.

shareholders. According to the two banks, the capital increases should be viewed in light of future stricter capital requirements, and they are also expected to improve the opportunities of growth and acquisition of activities.

In group 2\* the Tier 1 capital of several banks was reduced as a result of negative results in 2011, cf. Charts 12 and 13. Due to the decline in

CHANGES IN EXCESS CAPITAL ADEQUACY, GROUP 1 (AGGREGATED)

Chart 11

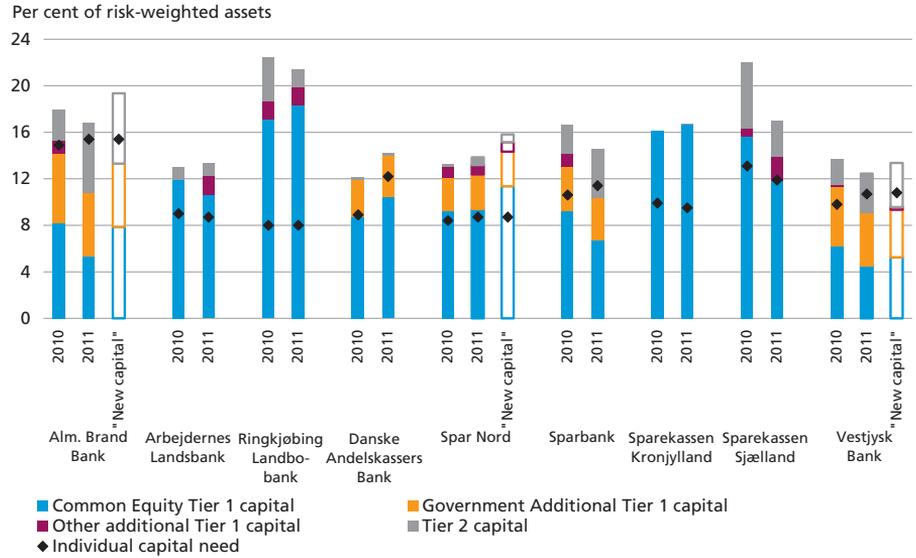


Note: "Other changes in total capital" includes other comprehensive income, and changes to regulatory deductions from total capital.

Source: Danish Financial Supervisory Authority and own calculations.

COMPOSITION OF TOTAL CAPITAL, BANKS IN GROUP 2\*

Chart 12

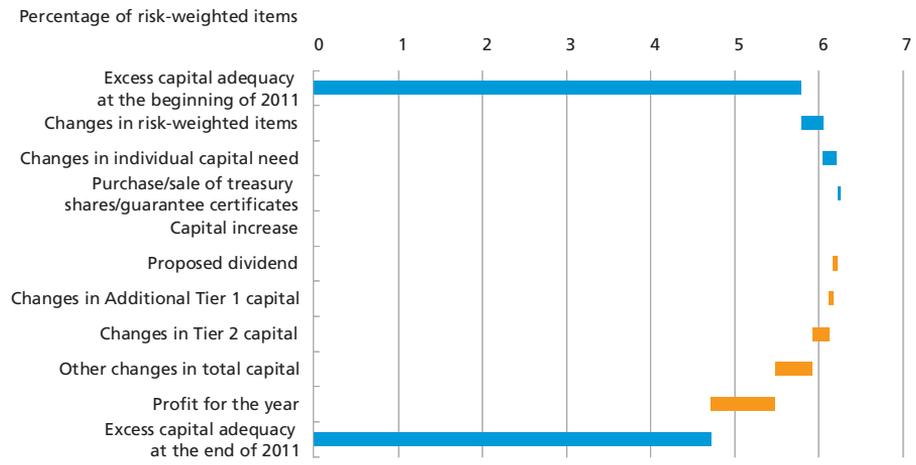


Note: For Danske Andelskassers Bank, figures for Sammenslutningen af Danske Andelskasser group in 2010 are used. New capital for Spar Nord is calculated on the basis of the bank's capital base at the end of 2011 with the addition of net proceeds from a share issue in March 2012. New capital for Vestjysk Bank is calculated on the basis of the bank's capital base at the end of 2011 with the addition of the capital base of Aarhus Lokalbank at the end of 2011. The figures are adjusted in accordance with the pro forma statement in the banks' merger plan of 28 February 2012. The figures also allow for the conversion of government Additional Tier 1 capital carried out in February 2012. On 23 May 2012 Vestjysk Bank announced that the bank's share issue was fully subscribed and gross proceeds were kr. 319 million. The share issue, which is part of the bank's capital plan, is not included in the Chart.

Source: Danish Financial Supervisory Authority, Alm. Brand's company announcement of 28 February 2012, Spar Nord's company announcement of 27 March 2012, Vestjysk Bank's press release of 20 February 2012 and company announcement of 23 May 2012, Vestjysk Bank/Aarhus Lokalbank's merger plan of 28 February 2012 and own calculations.

CHANGES IN EXCESS CAPITAL ADEQUACY, GROUP 2\* (AGGREGATED)

Chart 13



Note: "Other changes in total capital" includes other comprehensive income, and changes to regulatory deductions from total capital.

Source: Danish Financial Supervisory Authority and own calculations.

Common Equity Tier 1 capital, three banks could no longer fully include Additional Tier 1 capital from the government under Bank Rescue Package 2 in their calculation of Tier 1. The reason is regulatory restrictions on the share of Additional Tier 1 capital relative to Tier 1. It is important for banks with low excess capital adequacy to continue their efforts to strengthen their capitalisation.

The future capital adequacy rules will entail stricter requirements on capital size and quality. It will no longer be possible to include parts of the present capital base. If the rules had been fully implemented today, the Danish banks overall would need fresh capital of almost kr. 6 billion.<sup>1</sup> If the banks' individual capital needs are taken into account at the same time, the need for fresh capital would be almost kr. 19 billion. Also assuming that the individual bank should, as a minimum, have excess capital adequacy of 2 percentage points, the total need for fresh capital can be estimated at almost kr. 39 billion.

For many banks, a key task in the coming years will be to prepare for the stricter future capital requirements. Higher earnings are an important element in this context since they boost the banks' resilience to losses and can contribute directly to increasing the capital base via retained profits. In addition, higher earnings make it easier to raise fresh capital in the market.

## **NORDIC BANKING GROUPS**

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The Danske Bank group and Nordea Bank Danmark together account for almost half of bank lending in Denmark. Both groups have considerable activities in the Nordic countries, offering a wide range of financial products. The groups' activities outside Denmark have direct and indirect effects on the earnings and capitalisation of both Danske Bank and Nordea Bank Danmark. A comparison with major Nordic groups at group level is therefore expedient.

An expert committee under the Danish Ministry of Business and Growth will present, during 2012, recommendations for selection criteria for systemically important financial institutions in Denmark and stricter requirements on such institutions. The committee's mandate also includes making recommendations for management of systemically important institutions in difficulties, cf. Chapter 7.

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<sup>1</sup> The calculations are a repetition of the calculations in Danmarks Nationalbank, *Financial stability*, 2011 with the difference that the calculations here include the effect of the individual capital needs and excess capital adequacy. With the 2011 financial statements as the point of departure, the calculations are based on a capital requirement of 10.5 per cent, including a capital conservation buffer of 2.5 per cent, but excluding the countercyclical capital buffer and the systemic risk buffer. All present deductions are assumed to be constant and are made in Common Equity Tier 1 capital. Neither Additional Tier 1 nor Tier 2 capital has been included.

In Sweden, Nordea, SEB, Handelsbanken and Swedbank were selected as systemically important institutions by the Swedish authorities already in November 2011. The authorities have announced increased capital requirements for the groups of 3 per cent in 2013 and 5 per cent in 2015, aiming at a Common Equity Tier 1 ratio of at least 12 per cent by 2015, excluding the countercyclical capital buffer.<sup>1</sup> The Swedish authorities have not announced how any difficulties in one of the groups would be managed. The credit rating agencies attach positive weight to the probability of systemic government support by up to two notches more for the Swedish groups compared with the current credit rating of Danske Bank. As a result of the higher credit rating, among other factors, the Swedish banks have generally had better funding access and lower funding costs compared with other European banks. DNB also has extra credit rating notches due to its dominant position in Norway.

Moreover, Nordea is one of the banks selected, in November 2011, as globally systemically important banks, G-SIBs, by the Financial Stability Board and the Basel Committee on Banking Supervision<sup>2</sup>.

### **Development in balance sheet and earnings**

The Nordic groups generally recorded modest balance-sheet growth in 2011. Nordea was the exception, in that increasing derivatives activity, among other factors, made a substantial contribution to balance-sheet growth of 23 per cent, cf. Chart 14. Danske Bank and Swedbank maintained an unchanged level of lending, while the other Nordic groups posted lending growth of 7-10 per cent. For DNB, SEB and Handelsbanken, deposits rose by more than 10 per cent.

In 2011 the development in earnings varied considerably across the Nordic groups, as reflected in return on equity before tax, cf. Chart 15. One significant explanation is differences in the pattern of loan impairment charges, but developments in capitalisation and costs may also have played a role. Key factors for Danske Bank were loan impairment charges and a lower profit in the subsidiary Danica. Return on equity excluding loan impairment charges shows a more uniform level across the groups.

### **Generally declining loan impairment charges**

In general, the loan impairment charges of the Nordic groups in Denmark declined in 2011, but continued to be relatively high. In Sweden and Norway, loan impairment charges were still at a low level, but several of the groups reported increases.

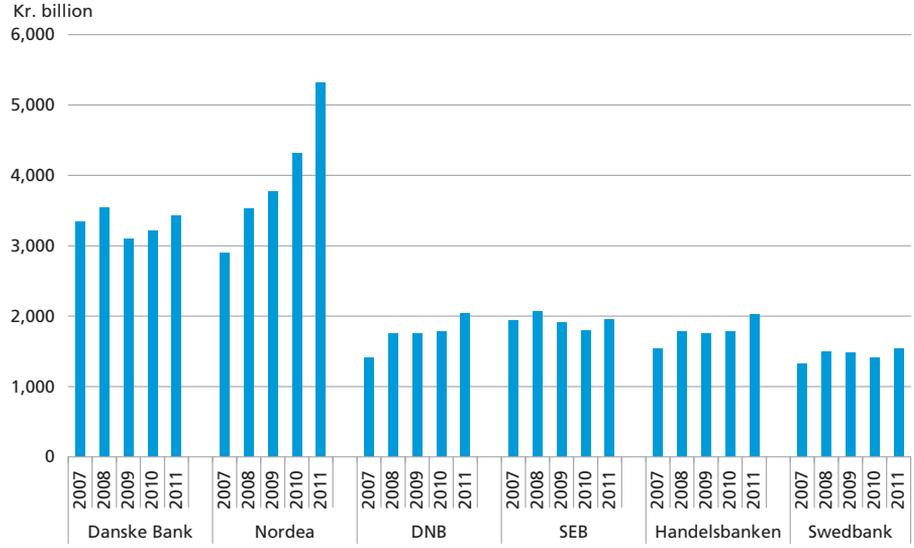
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<sup>1</sup> The countercyclical capital buffer makes it possible to impose further requirements in periods when systemic risks are building up, e.g. when lending growth is high.

<sup>2</sup> The Committee has 27 members. Denmark is not a member.

DEVELOPMENT IN TOTAL ASSETS

Chart 14



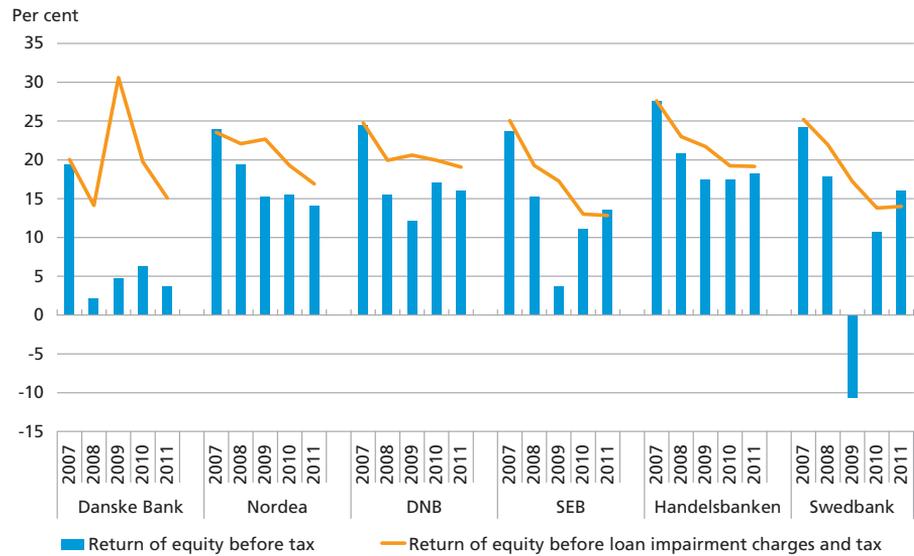
Note: Total assets are converted into Danish kroner at the exchange rate at the end of 2011 applying throughout the review period.

Source: Annual reports and own calculations.

On a net basis, SEB and Swedbank booked loan impairment charges as income in 2011 as a result of improved conditions primarily in the Baltic States, while DNB reported increasing loan impairment charges in Latvia.

RETURN ON EQUITY BEFORE TAX FOR THE NORDIC BANKING GROUPS

Chart 15



Note: Return on equity before tax calculated on the basis of the average equity at the beginning and end of the year. In 2009, Danske Bank's earnings were affected by considerable trading income and substantial impairment charges on loans and guarantees.

Source: Annual reports and own calculations.

Danske Bank's loan impairment charges were unchanged at a high level compared to the other Nordic groups, cf. Chart 16. Danske Bank's loan impairment charges were still influenced by the economic conditions in Northern Ireland and Ireland as well as high loan impairment charges in Denmark, primarily on commercial properties, agriculture and private customers. Among other exposed segments, the banks themselves point out small and medium-sized enterprises. Especially in the 4th quarter of 2011, the shipping industry also came under pressure with excess capacity and declining freight rates. Danske Bank, Nordea and DNB reported increasing loan impairment charges as a consequence. The groups expect the shipping industry to remain under pressure from excess capacity in 2012. DNB's exposure to the shipping industry amounts to more than 10 per cent of the credit portfolio, while the exposures of the other groups to this industry is a maximum of 3 per cent.

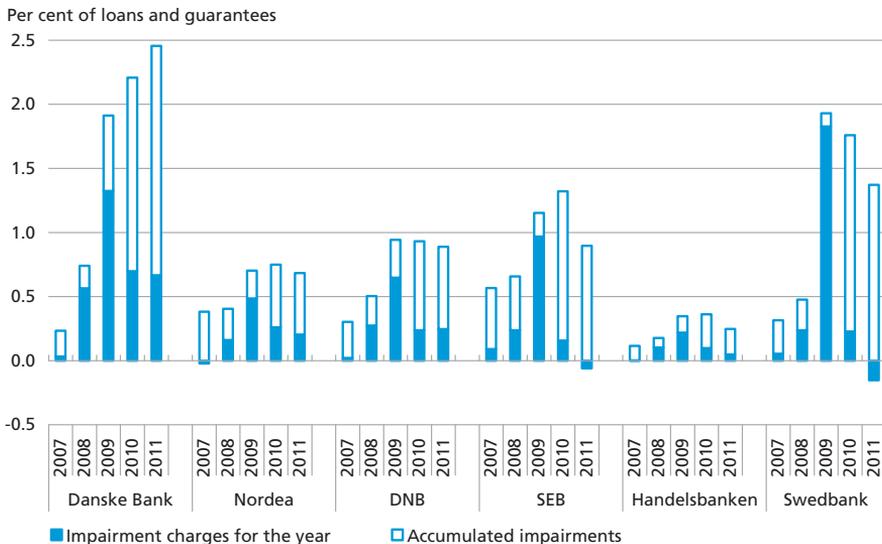
The size of accumulated loan impairment charges (the corrective account) varied substantially across the Nordic groups from 0.2 per cent of loans and guarantees for Handelsbanken to 2.5 per cent for Danske Bank.

### Considerable variation in capitalisation and resilience

All six groups participated in the European Banking Authority's, EBA's, stress test in the summer of 2011 and the subsequent capital test in the

IMPAIRMENT CHARGES ON LOANS AND GUARANTEES

Chart 16

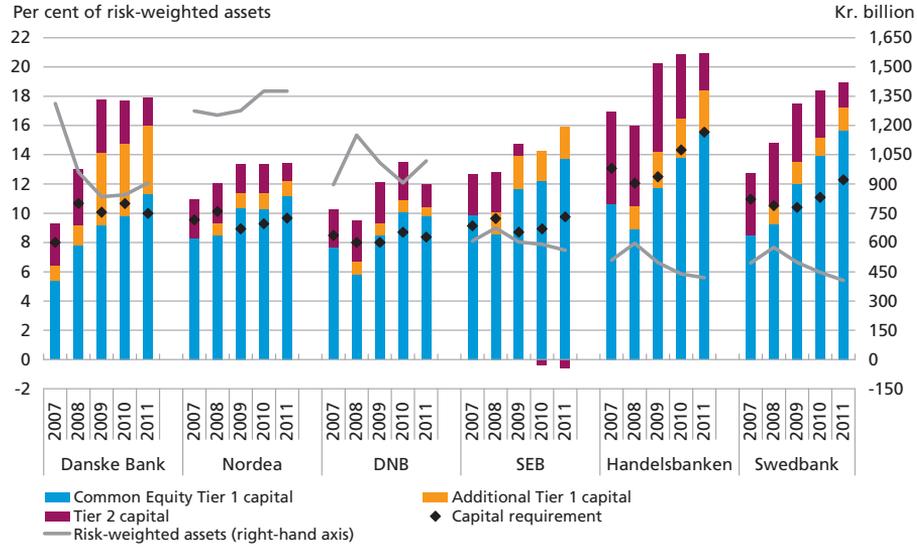


Note: Loan impairment charges for the year and accumulated loan impairment charges are calculated as a ratio of loans and guarantees before impairment charges. The size of the accumulated loan impairment charges is illustrated by the sum of the two bars. Loan impairment charges for the year are the net sum of new loan impairment charges during the year and the reversal of previous loan impairment charges. Accumulated loan impairment charges are the total loan impairment charges/provisions on loans and guarantees as at the balance-sheet date.

Source: Annual reports and own calculations.

CAPITAL ADEQUACY IN THE NORDIC BANKING GROUPS

Chart 17



Note: Calculated on the basis of risk-weighted items that are compiled under the Basel II rules, i.e. excluding adjustment for transitions rules. Capital requirements include transition rules, but as a ratio of risk-weighted items before transitional rules. Only Danske Bank has published its individual capital need. It is assumed that capital requirements, including transitional rules, cover the individual capital need of the other groups. Risk-weighted items (right-hand axis) are converted into Danish kroner based on the exchange rate at the end of 2011 applying throughout the review period.

Source: Financial statements, risk reports and own calculations.

autumn. Danske Bank and the four Swedish groups met the capital requirements in both tests, while the DNB banking group was 1.52 billion euro short as regards Common Equity Tier 1 capital in the capital test.<sup>1</sup> In December 2011, the Financial Supervisory Authority of Norway announced that it supports the EBA capital test and intends to follow up particularly on banks whose Common Equity Tier 1 ratio is lower than or just above 9 per cent at the end of June 2012.

In general, the Nordic groups have improved their capital bases in recent years in terms of a rising Common Equity Tier 1 ratio, cf. Chart 17. Besides real capital injections and accumulated profits, the considerable decline in risk-weighted items since 2008 has played an important role in the improvement of the capital base.

The groups' excess capital adequacy varies markedly from 3.6 per cent of loans and guarantees for Danske Bank to 1.6 per cent for Handelsbanken. Only Danske Bank saw an increase in excess capital adequacy as a ratio of loans and guarantees in 2011.

<sup>1</sup> As opposed to the Danish and Swedish participants in the EBA capital test, DNB's risk-weighted items were calculated according to the transitional rules between Basel I and Basel II. Consequently, the risk-weighted items should correspond to at least 80 per cent of risk-weighted items under Basel I. As a result of the transitional rules, the risk-weighted items will be higher than under Basel II/III for banks with many low-risk assets. In the 4th quarter of 2011, DNB's banking group received a capital injection from the rest of the group, enabling it to meet the minimum requirement of 9 per cent as regards Common Equity Tier 1 capital.

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### 3. The Banks' Liquidity and Funding

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*The large banks' use of short-term debt issuance has been reduced considerably in recent years. In an unstable market situation it is important that large banks with access to the international capital markets use periods of more favourable market conditions to refinance their debt well in advance, whenever possible.*

*Most of the small and medium-sized banks with customer funding gaps at the start of the crisis have narrowed these gaps in recent years or turned them into surpluses. This is positive since these banks generally have limited market access.*

*The banks' outstanding debt with government guarantees has decreased by kr. 22 billion over the last year, to kr. 118 billion at the end of the 1st quarter of 2012. Of this, debt issued by small and medium-sized banks amounts to kr. 44 billion. This debt matures in 2012 and 2013. For a few small and medium-sized banks, government-guaranteed issuances still make up a substantial share of the balance-sheet total. It is important for the small and medium-sized banks to continue their adjustment to a business model that is viable in the longer run. The opportunities to borrow from Danmarks Nationalbank have been increased, which will provide flexibility in this respect.*

*Work is underway, cf. Bank Rescue Package 5, to find a special solution to the funding challenge faced by one of the large banks, FIH Erhvervsbank.*

#### **THE BANKS' SOURCES OF FUNDING**

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As they are more internationally oriented, have access to more counterparties and, thanks to their size, find it easier to maintain access to issuing debt in the market, large banks typically have access to a wider range of funding sources than small banks. This is reflected in the composition of the banks' liabilities side, cf. Chart 18.<sup>1</sup> However, the business models applied by the individual banks and within the groups vary considerably.

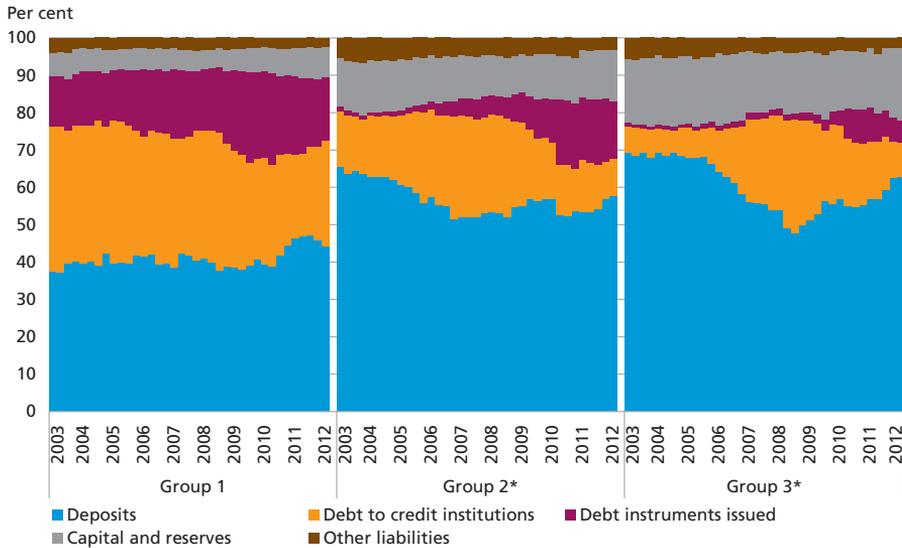
Developments in the banks' various sources of funding are analysed below and the related risks are described.

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<sup>1</sup> The analysis of the banks' liquidity conditions includes foreign branches.

COMPOSITION OF THE BANKS' LIABILITIES SIDE

Chart 18



Note: Balance-sheet figures are shown excluding derivatives. The most recent observations are from the 1st quarter of 2012.

Source: Danmarks Nationalbank.

## CUSTOMER FUNDING GAPS

The difference between deposits and loans, the customer funding gap, plays a key role in the banks' need for market-based funding. A large customer funding gap renders the individual bank more vulnerable to periods of financial market uncertainty during which access to market funding may be very limited.

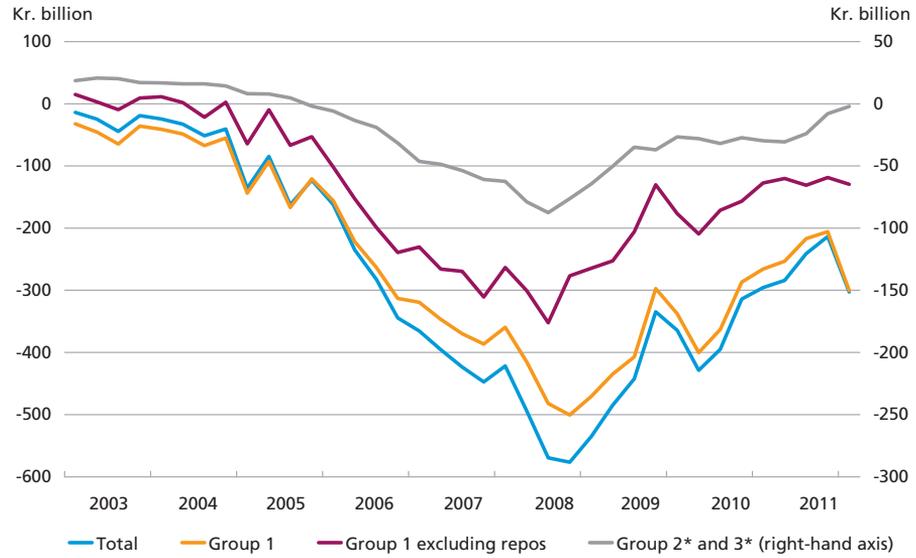
The customer funding gaps of Danish banks have narrowed considerably in recent years, cf. Chart 19. The aggregate customer funding gap of small and medium-sized banks is very small and is back at the level at end-2005.

The number of banks with customer funding gaps has dropped significantly in recent years, and at the end of the 1st quarter of 2012, 68 per cent had a customer funding surplus, cf. Chart 20, compared with 38 per cent at the end of the 1st quarter of 2008.

The small and medium-sized banks that still have customer funding gaps have narrowed their aggregate gap since mid-2011, cf. Chart 21. This development is attributable mainly to lower lending volumes. Banks with customer funding surpluses have increased their surplus through deposits. Most of the small and medium-sized banks have either narrowed their customer funding gaps or turned them into surpluses. This is in itself positive since they generally have limited market access.

CUSTOMER FUNDING SURPLUS

Chart 19

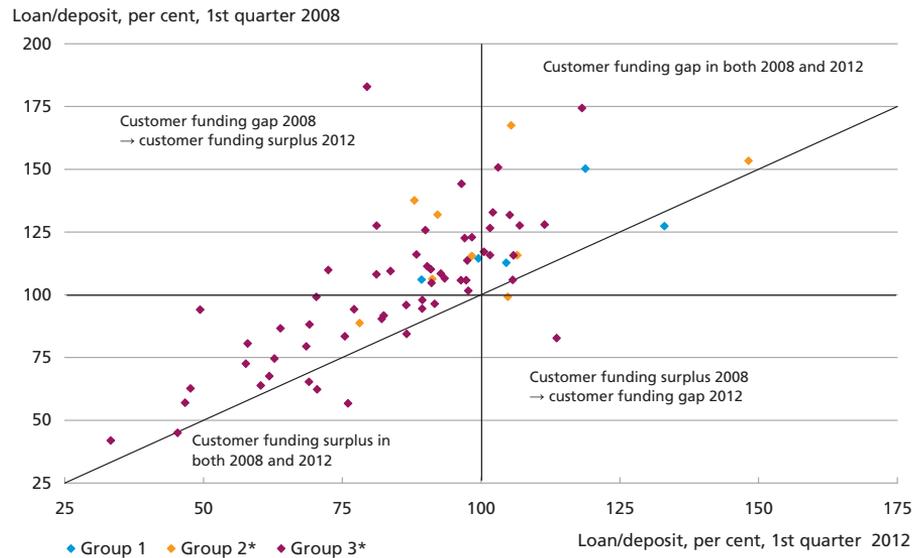


Note: The most recent observations are from the 1st quarter of 2012.  
 Source: Danmarks Nationalbank.

Banks that have yet to make this transition should continue their adjustment to a business model that is viable in the longer run. Danmarks Nationalbank's measures to support liquidity, including the access to longer-term funding, will provide flexibility in this respect.

ADJUSTMENT OF THE BANKS' CUSTOMER FUNDING GAP

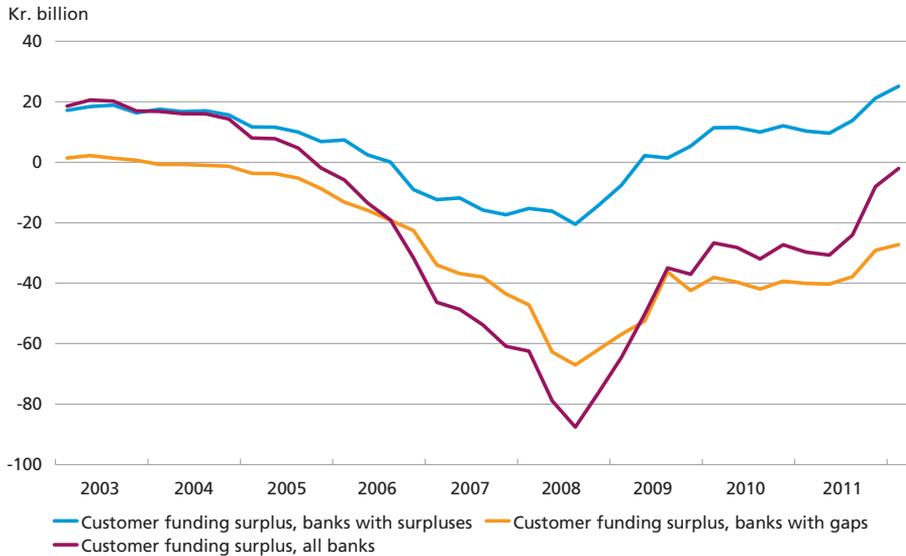
Chart 20



Note: The most recent observations are from the 1st quarter of 2012. Banks with limited or no deposits are not included in the Chart.  
 Source: Danmarks Nationalbank.

CUSTOMER FUNDING SURPLUS, SMALL AND MEDIUM-SIZED BANKS

Chart 21



Note: The most recent observations are from the 1st quarter of 2012. The breakdown into banks with customer funding gaps and surpluses is based on the customer funding surplus for the 1st quarter of 2012. The data covers groups 2\* and 3\*.

Source: Danmarks Nationalbank.

A sound funding structure is based on stable sources of funding. Hence, a customer funding surplus is not an end in itself for large banks with market access. Market-based funding with longer maturities could be a more stable source of funding than some types of deposits.

The customer funding gap of the large banks has narrowed by about kr. 200 billion since end-2008 when the gap was widest, and now totals approximately kr. 300 billion.

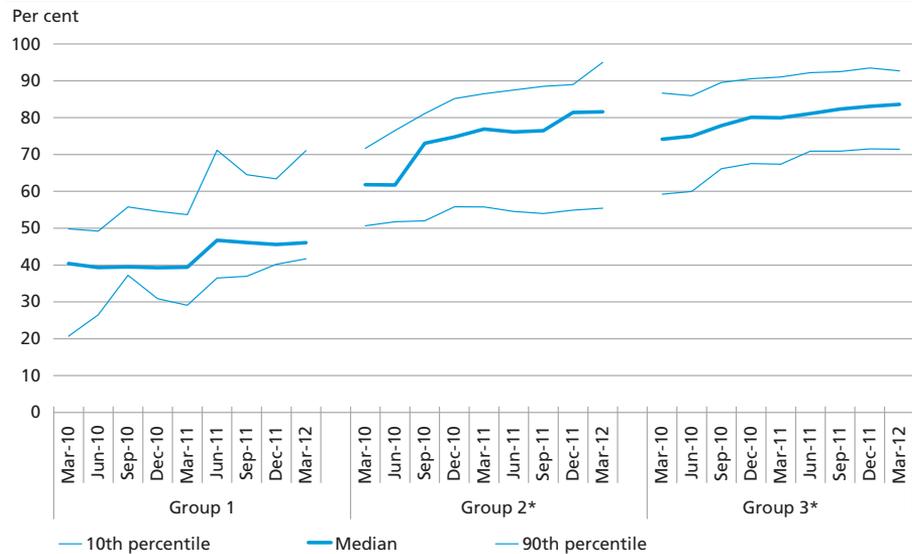
Repos<sup>1</sup> make up a large proportion of the customer funding gap of large banks. Repos vary in volume and generally fluctuate more than ordinary deposits and loans. Consequently, the customer funding gap may narrow or widen significantly over short periods of time. Adjustment for repos provides a better picture of the structural development in the customer funding gap. Excluding repos, the aggregate customer funding gap of the large banks has been unchanged at about kr. 130 billion over the past year.

Data on interest rates offered by large and medium-sized banks for term deposits from corporate customers indicates that competition for depositors has sharpened between some banks. In the banks offering the highest interest rates, rates for most maturities have been rising in 2011

<sup>1</sup> In connection with a repo deposit, the bank sells a security for repurchase at a later date. The amount received on the sale of the security is booked as a repo deposit. A repo loan is a loan whereby the bank purchases a security for later resale. In this case, the payment for the security is booked as a loan against the security as collateral.

DEPOSITS COVERED BY THE DEPOSIT GUARANTEE

Chart 22



Note: The most recent observations are from March 2012. The general government guarantee expired 30 September 2010.  
Source: Liquidity reports to the Danish Financial Supervisory Authority and Danmarks Nationalbank.

and early 2012, but most of the interest rates offered on term deposits from corporate customers track the uncollateralised money-market rate.

The proportion of deposits covered by the deposit guarantee scheme has increased over the last year, cf. Chart 22, indicating that depositors have become more aware of the scheme and have spread their deposits among several banks or moved deposits not covered from small to large banks. Traditionally, deposits covered by the deposit guarantee scheme are considered to be more stable than deposits not covered, which is reflected in the upcoming European liquidity regulation. In general, the proportion of covered deposits is higher in small and medium-sized banks than in large banks, but the spread between banks is considerable, indicating that depositors perform risk assessment of the banks.

## MARKET FUNDING

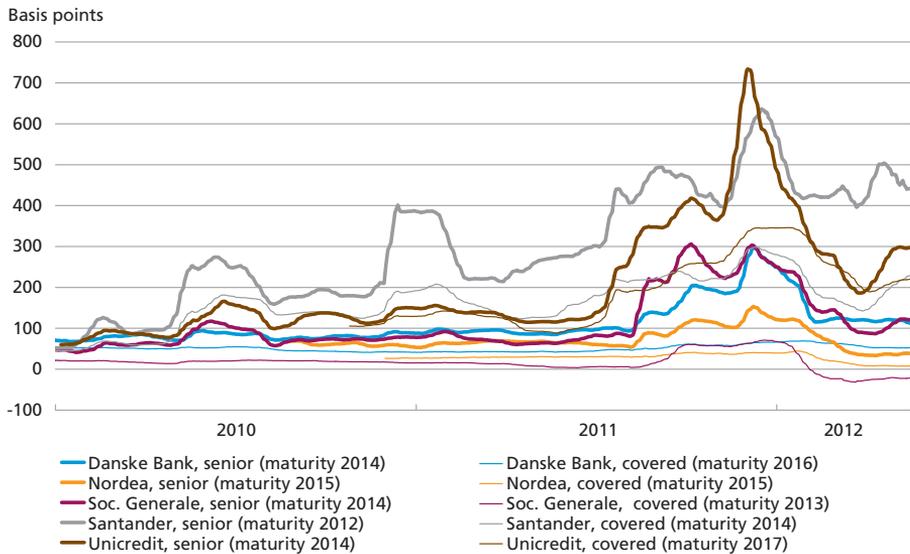
In addition to deposits, banks may rely *inter alia* on short- and long-term debt issuances and loans from other credit institutions for funding. The use of the various sources of funding varies significantly, depending e.g. on the size of the bank.

### Refinancing of long-term market debt remains a risk factor

In early 2012, several large Danish banks, like many of their European counterparts, were able to issue long-term senior debt. In general, the

CREDIT SPREADS FOR EUROPEAN BANK BONDS

Chart 23



Note: The Chart shows the asset swap spread on uncollateralised senior debt and covered bonds denominated in euro. When entering into an asset swap, the bond holder provides payments equivalent to the bond coupon and instalment payments in exchange for variable interest based on Euribor and a credit spread. The Chart shows a 10-day moving average. The most recent observations are from 14 May 2012.

Source: Bloomberg.

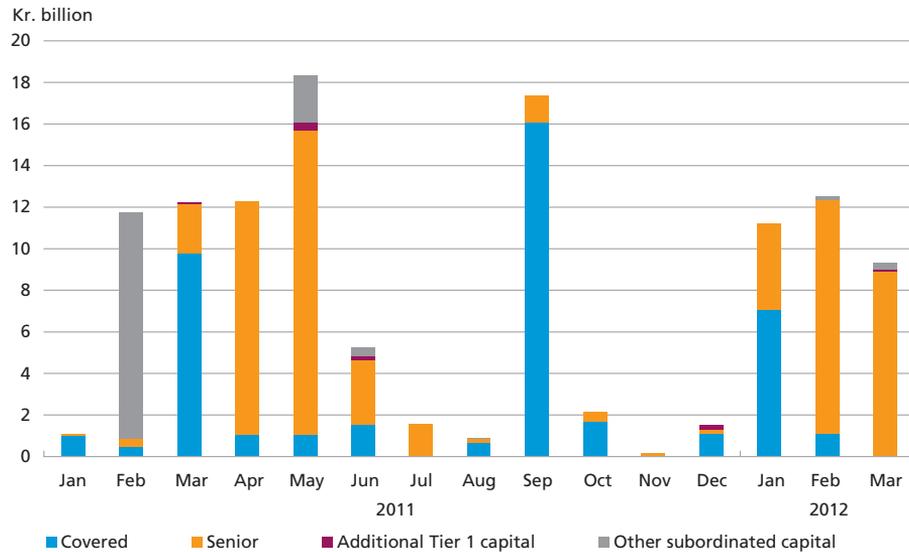
issuances have taken place at higher credit spreads than before the turmoil in the financial markets in the autumn. In the past two months, issuances by European banks have declined, possibly because of renewed uncertainty in the financial markets caused by the economic situation in Southern Europe.

As seen in the autumn of 2011, liquidity in the primary markets can dry up very quickly. In the 2nd half of 2011, issuances of senior debt by European banks were significantly lower than in the 1st half. The reduced risk appetite also left its mark on the secondary markets, where credit spreads on European bank bonds surged to very high levels, cf. Chart 23.

Due to the limited access to issue senior debt, many banks have instead resorted to issuance of covered bonds, which are easier to sell on account of the greater security of the bonds. Danske Bank, which has so far been the only Danish bank with a programme for issuance of covered bonds, SDOs, also made several major SDO issuances during the autumn of 2011, cf. Chart 24. In February 2012, BRFKredit announced a partnership with Jyske Bank and Sydbank on joint issuance of SDOs, cf. Box 5, entailing that Jyske Bank and Sydbank have obtained an additional source of funding.

## ISSUANCE OF LONG-TERM FUNDING FROM 2011 ONWARDS

Chart 24



Note: The most recent observations are from March 2012.

Source: Liquidity reports to the Danish Financial Supervisory Authority and Danmarks Nationalbank.

The continued instability in the financial markets emphasises how important it is for large banks with access to the European debt markets to take advantage of more favourable market conditions to refinance debt well in advance, which was possible for instance in the 1st quarter of

## BRFKREDIT'S AGREEMENTS ON JOINT FUNDING

Box 5

On 7 February 2012, BRFkredit announced a partnership with Jyske Bank and Sydbank, respectively, on joint issuance of covered bonds, SDOs. These agreements relate to the funding of housing loans for private customers against registration of owner-occupied housing and summer cottages as collateral. The agreements enable BRFkredit to increase its total business activities and give the banks involved access to SDO funding.

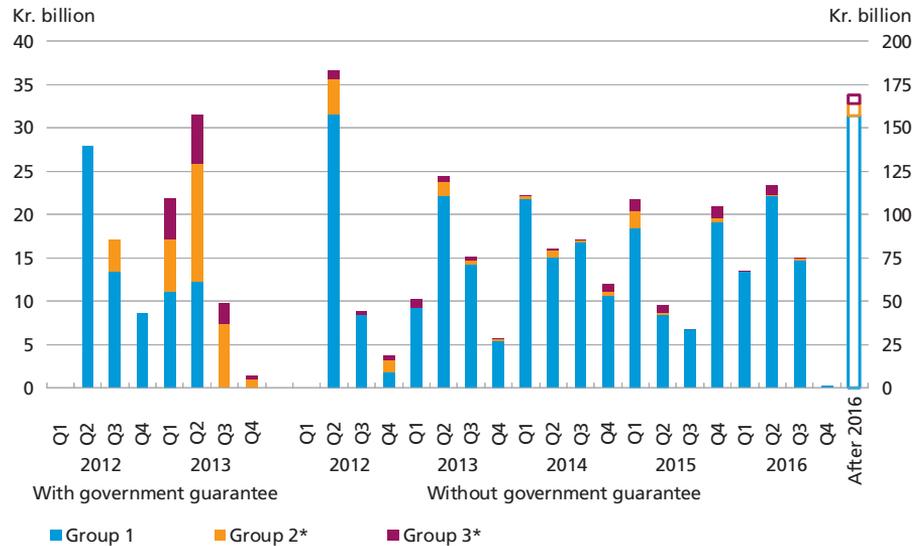
In 2007, the Danish Financial Business Act was amended to enable joint funding. As a result, a bank or a mortgage bank may fund loans against real property as collateral, using SDOs issued by another bank or mortgage bank. The Act allows banks to cooperate to achieve sufficient volumes to benefit from funding using SDOs.

The Act establishes a number of requirements for joint funding. To protect the interests of creditors in case of compulsory liquidation, ownership of both the loan and the collateral must be transferred to the issuer. Furthermore, it is possible to transfer loan agreements only if the loan directly stipulates that collateral may be transferred to another bank or mortgage bank. SDOs issued as part of joint funding arrangements are subject to the same requirements in terms of loan-to-value ratios and ongoing monitoring of collateral values as other SDOs.

BRFkredit's agreements are the first example of joint funding between banks that are not part of the same group.

DEBT MATURING, WITH AND WITHOUT GOVERNMENT GUARANTEES

Chart 25



Note: Compiled as at the end of March 2012 maturing from April 2012 onwards. Redemptions after 2016 are calculated on the right-hand axis.

Source: Liquidity reports to the Danish Financial Supervisory Authority and Danmarks Nationalbank.

2012. As part of risk management, it is also essential to ensure even distribution of the debt, so that maturities are not concentrated in short periods of time, or to otherwise ensure that alternative sources of funding are available if the debt markets freeze up.

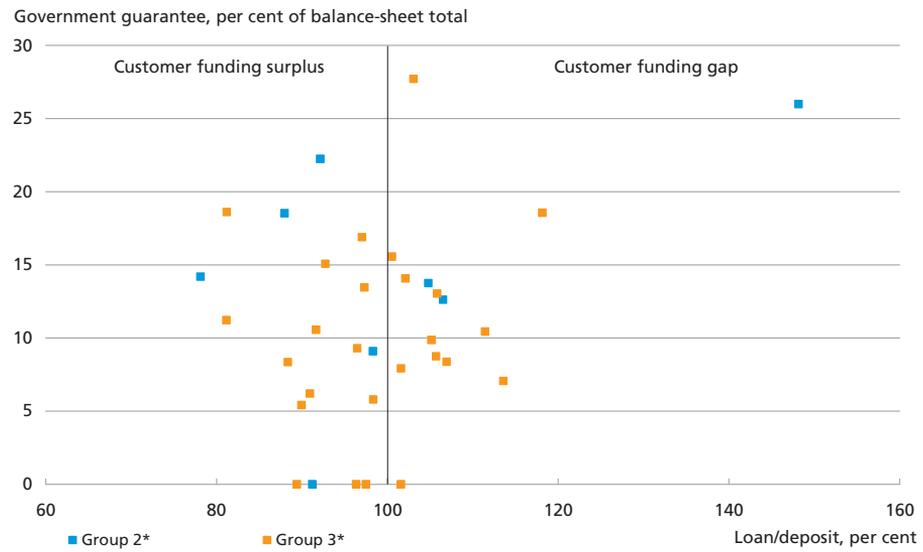
Access to the international bond markets places requirements on the banks' size and capacity. Investor relations must be managed and nursed on an ongoing basis and regular issuances must be made in order to maintain visibility. Moreover, international investors usually demand that issuances have been rated by a credit rating agency. With the individual government guarantee under Bank Rescue Package 2, small banks gained temporary access to the international bond markets on the basis of the Danish government's credit rating.

Over the past year, government-guaranteed debt issued by groups 1-3\* has declined by kr. 22 billion, to kr. 118 billion at the end of the 1st quarter of 2012. Debt issued by groups 2\* and 3\* accounted for a total of kr. 44 billion, cf. Chart 25.<sup>1</sup> The government-guaranteed debt matures in 2012 and 2013. At the end of the 1st quarter of 2012, half of the small and medium-sized banks with individual government guarantees had

<sup>1</sup> In February 2012, FIH Erhvervsbank, having outstanding government guarantees worth kr. 38 billion at end-March 2012, entered into a conditional agreement with the Financial Stability Company for the acquisition of the bank's property financing activities, cf. Box 4. Under the agreement, FIH Erhvervsbank will be provided with liquidity from the Financial Stability Company on an ongoing basis, as part of the government-guaranteed issuances mature.

LENDING RATIO AND GOVERNMENT-GUARANTEED ISSUANCES AS A PERCENTAGE OF THE BALANCE-SHEET TOTAL, END OF 1ST QUARTER 2012, GROUP 2\* AND 3\*

Chart 26



Note: The Chart shows banks in groups 2\* and 3\* with individual government guarantees at the end of the 1st quarter of 2011.

Source: Liquidity reports to the Danish Financial Supervisory Authority and Danmarks Nationalbank.

customer funding surpluses and, other things being equal, are better equipped to handle the expiry of the government guarantee than banks with customer funding gaps. For a few small and medium-sized banks, government-guaranteed issuances still make up a substantial share of the balance-sheet total, cf. Chart 26.

### Short-term market debt continues to fall

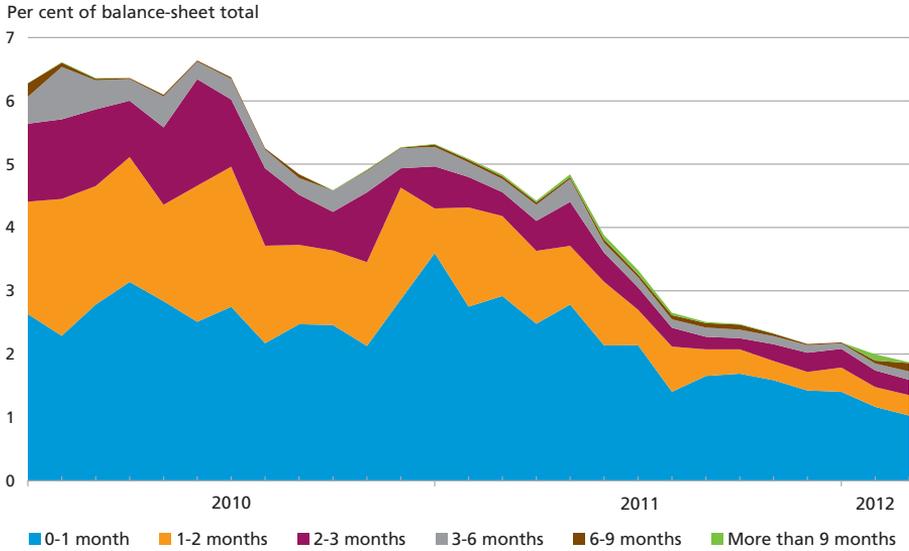
As short-term debt needs to be refinanced more frequently than long-term debt, short-term funding involves higher refinancing risk for banks. Access to short-term funding, e.g. through issuance of Commercial Paper, CP, may be an inexpensive and appropriate element in a bank's liquidity procurement, provided that the refinancing risk can be managed reasonably.

A small number of Danish banks issue CP and other short-term debt securities. Throughout the crisis, access to funding, especially in the US CP market, has proved unstable. During periods of great uncertainty, large US money-market funds, which are among the top investors in CP issued by European banks, have significantly reduced their exposures.

The large banks' use of CP and other short-term debt issuances has dropped sharply over the last few years. CP now accounts for less than 2 per cent of their aggregate balance-sheet total, cf. Chart 27.

OUTSTANDING SHORT-TERM DEBT AS A PERCENTAGE OF THE BALANCE-SHEET TOTAL, GROUP 1

Chart 27

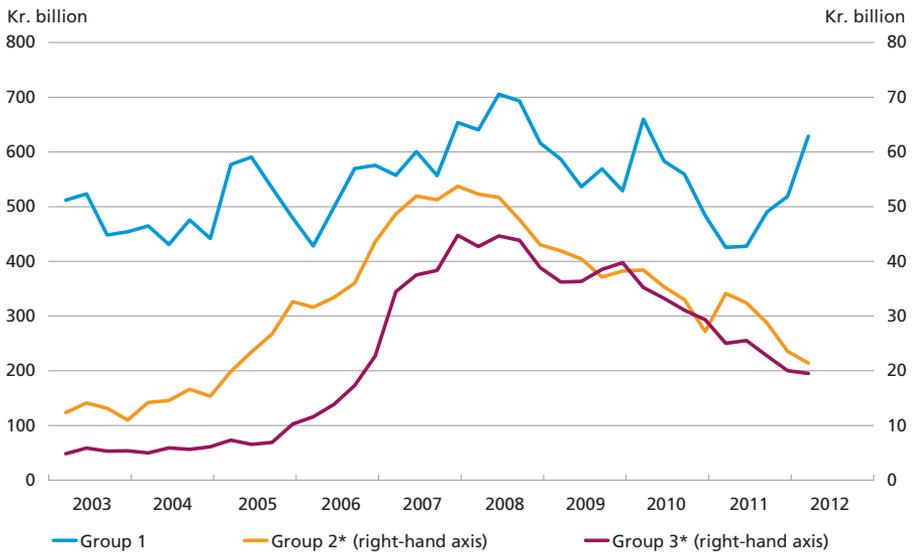


Note: The most recent observations are from March 2012.

Source: Liquidity reports to the Danish Financial Supervisory Authority and Danmarks Nationalbank.

DEBT TO CREDIT INSTITUTIONS

Chart 28



Note: Excluding outstanding balances with foreign parent banks and banking subsidiaries and outstanding balances with central banks. The most recent observations are from the 1st quarter of 2012.

Source: Danmarks Nationalbank.

### **Debt to credit institutions has been reduced for small and medium-sized banks**

Interbank lending is part of a normal and well-functioning money market in which banks with short-term excess liquidity lend to banks in need of liquidity. Since many banks act both as borrower and lender, lack of access to funding in one part of the system may spread to other banks. This was the case when the money markets froze up in the autumn of 2008. In other words, there is a fine line between a well-functioning money market and the risk of contagion in periods of stress.

The debt of small and medium-sized banks to other credit institutions has decreased substantially since 2008, while the debt of large banks remains broadly unchanged, cf. Chart 28.

The largest banks still have significant debt to other credit institutions, especially foreign credit institutions, and consequently they are exposed to liquidity stress in foreign banking sectors. However, more and more borrowing tends to take place on a collateralised basis via repos, increasing the probability that the loan can be refinanced at expiry.

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### **DANMARKS NATIONALBANK'S MEASURES TO SUPPORT LIQUIDITY**

Since 2008, Danmarks Nationalbank, like other central banks, has launched a number of measures to support bank liquidity. In 2011, Danmarks Nationalbank expanded the collateral basis to include the banks' credit claims of good quality. In addition, the option of pledging as collateral shares in the companies jointly owned by the banks was temporarily reopened.<sup>1</sup> Moreover, Danmarks Nationalbank has introduced 6-month monetary-policy loans and announced two allotments of 3-year loans. These facilities have been made available to ensure that banks have sufficient flexibility in their adjustment to a business model that is viable in the long run, and they may be used by all banks following a commercial assessment.

So far, the 6-month facility has only been drawn on in February 2012, when a total amount of kr. 0.1 billion was borrowed. The facility is offered on a monthly basis. The 3-year loans were first offered on 30 March 2012, when the banks borrowed kr. 18.9 billion; on 28 September 2012, they will be offered again.

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### **LIQUIDITY REQUIREMENTS AND STRESS TESTS**

To ensure sufficient liquidity, banks are subject to a quantitative requirement, defined in section 152 of the Danish Financial Business Act.

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<sup>1</sup> E.g. shares in data centres, Nets and jointly-owned mortgage banks.

## SECTION 152 LIQUIDITY REQUIREMENTS AND FUNDING RATIO

Box 6

Pursuant to section 152 of the Danish Financial Business Act, a bank shall have appropriate liquidity. The bank's holdings of liquid assets shall amount to no less than:

- 15 per cent of the debt exposures that, irrespective of possible payment reservations, shall be payable by the bank on demand or are redeemable at less than one month's notice, and
- 10 per cent of the total debt and guarantee exposures of the bank, less subordinated debt that may be included in calculations of the base capital.

From end-2012, banks will be required to observe the Supervisory Diamond limit values when the current liquidity requirement is supplemented with two benchmarks for liquidity and funding structure: a limit value for excess liquidity cover of 50 per cent relative to the section 152 requirement, and a measure for stable funding, the funding ratio, which is introduced to ensure a more long-term bank funding structure, comprising funding sources with longer maturities. The funding ratio reflects the relationship between lending, on the one hand, and working capital<sup>1</sup> less bonds maturing within one year, on the other. Loans raised from Danmarks Nationalbank with a remaining term to maturity of more than one year are included on a par with other long-term funding. The Supervisory Diamond was introduced in 2010, and from the end of 2012 non-observance of the Supervisory Diamond limit values may result in a supervisory response, cf. Chapter 2.

<sup>1</sup> Working capital is defined as the sum of deposits, bonds issued, subordinated capital and equity .

From end-2012, banks will usually also be required to observe the Supervisory Diamond limit values for excess liquidity cover and funding structure, cf. Box 6. In the longer term, banks will be required to meet the liquidity requirements of the upcoming Capital Requirements Directive, cf. Box 7.

## EUROPEAN LIQUIDITY REGULATION

Box 7

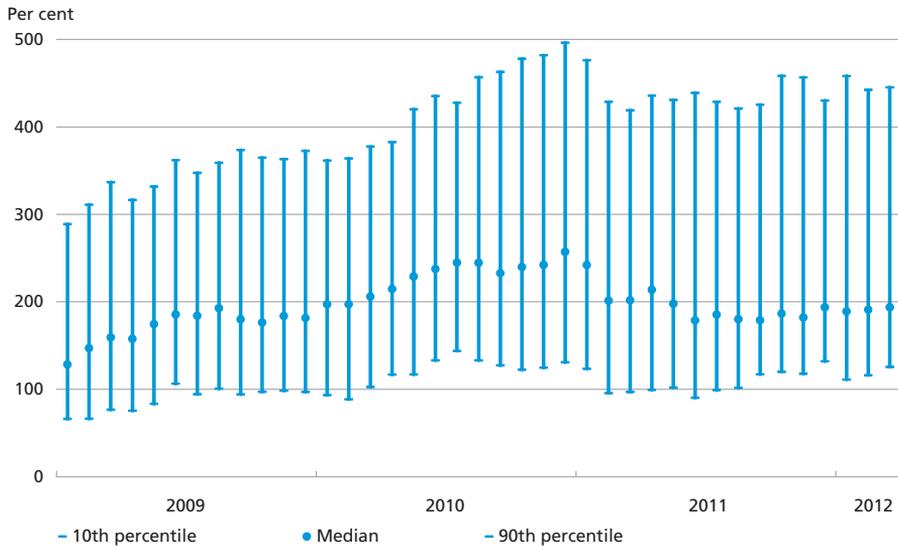
So far, liquidity regulation has been a national concern, but as part of the upcoming Capital Requirements Directive, CRD IV, a new liquidity requirement, the Liquidity Coverage Ratio, LCR, will be introduced. This requirement specifies the volume of liquid assets a bank must hold to cover the net cash outflows in a 30-day liquidity stress scenario. The final calibration of the LCR is still pending. The European Banking Authority, EBA, is currently analysing the liquidity of various asset classes and the stability of various sources of funding with a view to establishing final definitions. The EBA is looking into the possibilities of using market-based indicators for defining the liquidity of assets. The LCR is expected to be fully implemented by 2015.

Looking ahead, a requirement for banks' long-term funding structure, equivalent to the Net Stable Funding Ratio, NSFR<sup>1</sup>, is also expected to become part of the European liquidity regulation.

<sup>1</sup> As recommended by the Basel Committee on Banking Supervision, cf. Box 15 of Danmarks Nationalbank, *Financial stability*, 2011.

EXCESS LIQUIDITY COVER, SECTION 152

Chart 29



Note: The most recent observations are from March 2012.

Source: Liquidity reports to the Danish Financial Supervisory Authority and Danmarks Nationalbank.

The excess liquidity cover of Danish banks remains well above the Supervisory Diamond limit value of 50 per cent, cf. Chart 29, but there is still a considerable spread between the individual banks.

The composition of liquid holdings varies significantly between banks and also between groups. In general, banks have a large proportion of mortgage bonds in their liquidity buffers, while government bonds account for a relatively small proportion. This reflects the size of the two markets in Denmark. Banks have been able to include the credit facility at Danmarks Nationalbank against shares in corporations owned jointly by financial institutions as collateral since August 2011 and against credit claims of good quality as collateral since October 2011. So far, banks have only to a limited extent included the new credit facilities in their section 152 liquidity.

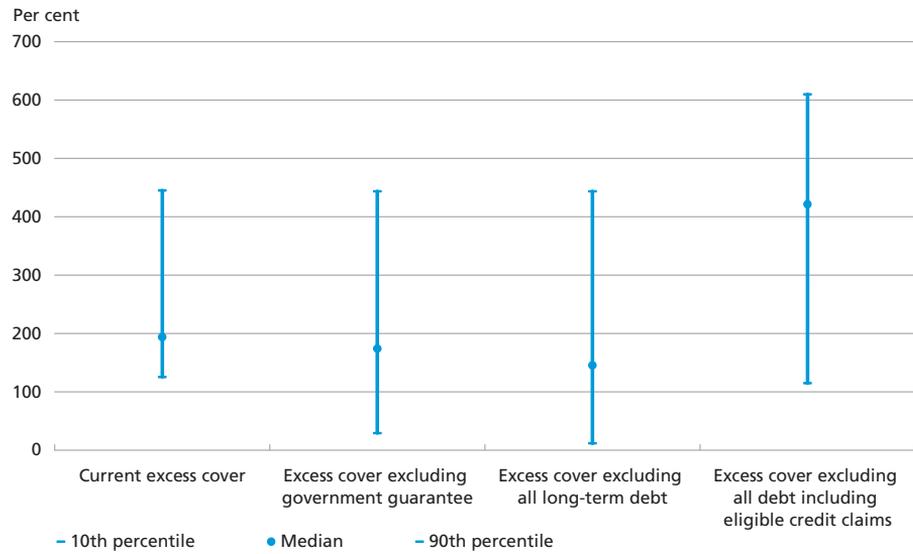
### **Stress tests of banks' liquidity, maturity of long-term debt**

To assess the sustainability of the banks' liquidity situation, the development in the liquidity requirement is analysed under various scenarios for refinancing of maturing long-term debt. Other sources of funding, such as short-term debt, deposits, etc., are assumed to remain unchanged.

In a stress scenario in which it is assumed that the banks cannot refinance the government-guaranteed debt when it matures and cannot reduce their balance sheets, the excess liquidity cover for the median bank will decline to 174 per cent, down from 194 per cent at end-March

**EXCESS LIQUIDITY COVER IF LONG-TERM DEBT IS NOT REFINANCED UNTIL  
END-2013 AND THE EFFECTS OF ELIGIBLE CREDIT CLAIMS**

Chart 30



Note: The calculation is based on a number of estimates. The Danish Financial Supervisory Authority's guideline limits are not included.

Source: Liquidity reports to the Danish Financial Supervisory Authority and Danmarks Nationalbank, Danmarks Nationalbank and own calculations.

2012, cf. Chart 30. About 6 per cent of the banks will have negative excess liquidity cover. These banks' outstanding government guarantees account for 44 per cent of the total government guarantees in groups 1-3\*. One bank accounts for 32 per cent.

If neither long-term debt with nor without government guarantees can be refinanced until end-2013, 8 banks will have negative excess liquidity cover at end-2013 and 11 banks will have excess cover below the Supervisory Diamond limit value of 50 per cent. Compared with a similar analysis conducted last year, the situation has improved. Last year, the Danish Financial Supervisory Authority asked selected banks to set out their specific plans for refinancing of individual government's guarantees and has noted a positive trend among these banks in 2011.<sup>1</sup>

If the banks fully exploit the expansion of the collateral basis at Danmarks Nationalbank, the liquidity contribution from this facility may, for most banks, make up for a situation in which long-term debt cannot be refinanced. Based on data from end-2011, the collateral value of the banks' credit claims is still estimated to be about kr. 400 billion.<sup>2</sup> The ac-

<sup>1</sup> Cf. Danish Financial Supervisory Authority, *Markedsudvikling i 2011 for pengeinstitutter (Market development for banks in 2011 – in Danish only)*, 2012.

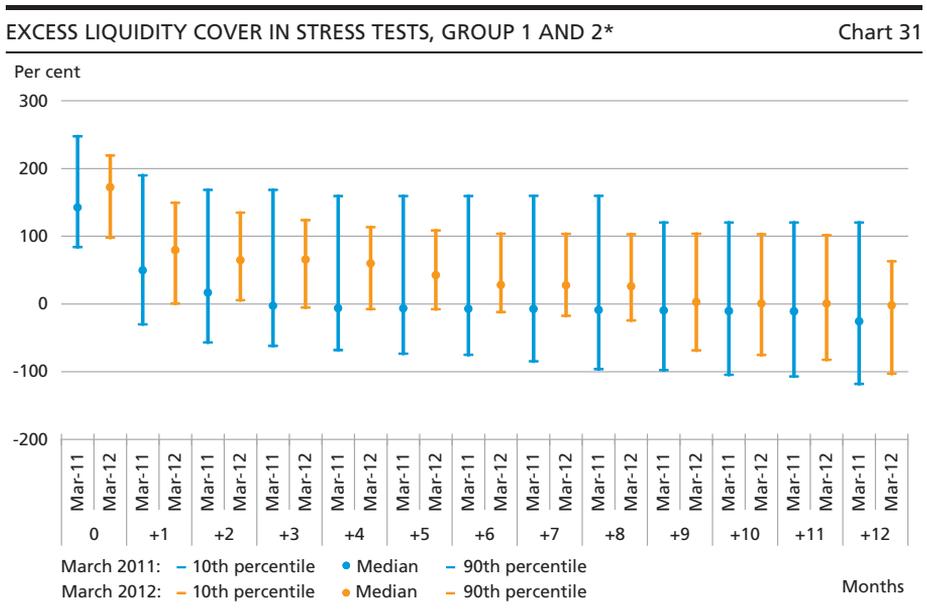
<sup>2</sup> The assumptions behind the calculated effect are described in more detail in Box 2 of Danmarks Nationalbank, *Stress Tests, 2nd Half 2011*. As from 1 May 2012, it has been possible to pledge credit claims in currencies other than Danish kroner and euro as collateral at Danmarks Nationalbank.

tual value is lower. This is partly because some of the credit claims have been pledged to other creditors or are subject to contractual terms preventing them from being pledged to Danmarks Nationalbank. Moreover, the collateral value should be adjusted for the debtor's full entitlement to offset claims.

**Results of the banks' own liquidity stress tests**

The banks' observation of the liquidity requirement depends on a number of other factors besides the maturing of long-term debt, e.g. maturing of short-term debt and development in deposits.

The banks report results of liquidity stress tests to the Danish Financial Supervisory Authority and Danmarks Nationalbank on a monthly basis. These tests show developments in excess liquidity cover for the next 12 months based on a number of severe assumptions regarding the run-off of various sources of funding. Different assumptions are used for stress tests of large and medium-sized banks and of small banks, cf. Box 8. Compared with the stress test conducted in March 2011, the results for the large and medium-sized banks had improved in March 2012, and the spread between the banks' excess cover narrowed. The median bank maintains positive excess liquidity cover until the last period of the stress test (+12 months) compared with just 2 months in the liquidity stress test conducted in March 2011, cf. Chart 31.



Note: Based on results of the Danish Financial Supervisory Authority's and Danmarks Nationalbank's liquidity stress tests.  
 Source: Liquidity reports to the Danish Financial Supervisory Authority and Danmarks Nationalbank.

**ASSUMPTIONS BEHIND THE RESULTS OF LIQUIDITY STRESS TEST FOR DANISH BANKS**

Box 8

Large and medium-sized banks submit results of own liquidity stress test models based on a number of assumptions specified by the Danish Financial Supervisory Authority and Danmarks Nationalbank. The assumptions behind the stress tests of large and medium-sized banks are:

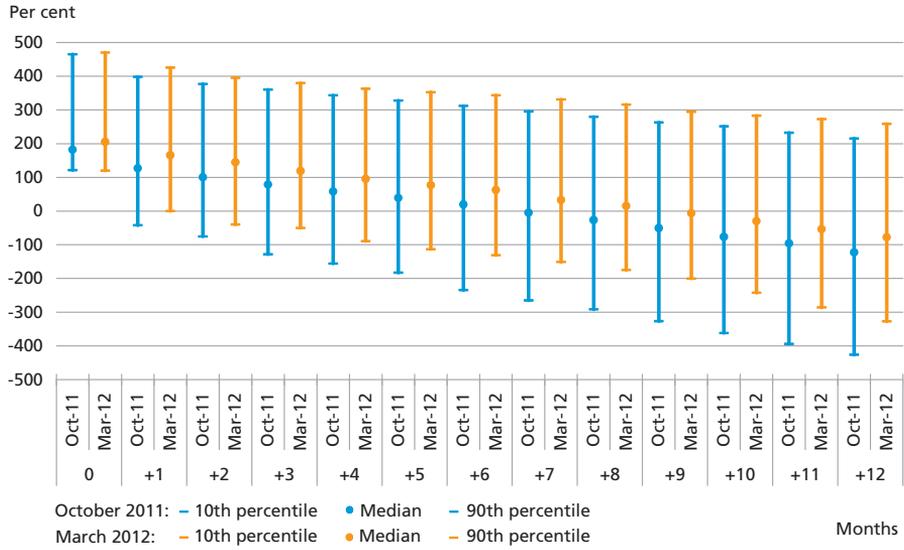
- All capital market funding matures contractually and is not renewable upon expiry.
- All debt to credit institutions matures contractually and is not renewable.
- Debt to central banks may be renewed to the extent that this option is available under normal market conditions.
- Funding by way of repos or lending of assets defined as liquid under section 152 will still be possible. A similar assumption is made for reverse repos.
- Stable deposits from retail and corporate customers decline by 6 per cent over the first month and are constant over the remaining months.
- Less stable deposits from retail and corporate customers decline by 12 per cent over the first month and are constant over the remaining months.
- If the bank has a credit rating, the calculation includes the consequences of downgrading by two notches during the first month to the collateral to be pledged by the bank in connection with derivatives positions concluded. It is assumed that the rating is not improved over the rest of the 12-month stress period.
- Additional collateral requirement corresponding to 10 per cent of the collateral currently pledged (net amounts) during the first month. In the subsequent 11 months, the collateral is assumed to stabilise at the higher level.
- Drawings on committed credit and liquidity facilities granted but not utilised of 5 per cent for private customers during the first month, 10 per cent for corporate customers and 100 per cent for credit institutions. Amounts drawn during the first month will not be repaid within the remaining 11 months.
- Possibility of utilising 50 per cent of committed facilities received but not utilised.
- Cash, central-bank deposits, certificates of deposits, Danish government and mortgage bonds are liquidated at 100 per cent of their market value.
- Unencumbered liquid assets in the form of European government bonds and European covered bonds including euro-denominated mortgage bonds are liquidated with a haircut of 7.5 per cent.
- Other liquid assets included in the definition of liquid assets in section 152 are included with a haircut of 10 per cent.
- Loans to credit institutions mature contractually and are not renewed.
- 0 per cent lending growth to retail and corporate customers, excluding credit institutions.

Assumptions behind the model for small banks:

- No debt with a maturity exceeding 1 month is renewed upon expiry.
- New bonds cannot be issued.
- The 10 largest time deposits are not renewed upon expiry.
- Short-term debt (<1 month) to credit institutions elapses after the first month.
- Deposits excluding the 10 largest time deposits decrease by 1 per cent a month.
- 0.1 per cent of financing guarantees and loss guarantees are activated every month.
- Lending and guarantees increase by 1 per cent per month.
- 5 per cent higher drawing every month on credit facilities granted but not exercised.
- Haircuts for equities and bonds of 10 per cent and 7.5 per cent, respectively.

EXCESS LIQUIDITY COVER IN STRESS TESTS, GROUP 3\*

Chart 32



Note: Based on results of the Danish Financial Supervisory Authority's and Danmarks Nationalbank's liquidity stress tests.

Source: Liquidity reports to the Danish Financial Supervisory Authority and Danmarks Nationalbank.

The results for the small banks also show an improvement. In the stress test conducted in October 2011, the median bank had negative excess liquidity cover after 7 months, while this was not the case until after 9 months in the stress test conducted in March 2012, cf. Chart 32.



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## 4. The Corporate Sector and the Households

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*Since 2008, financing of commercial properties has led to heavy loan impairment charges and been the reason why a number of small banks have failed. Enforced sales of commercial properties remained high in 2011.*

*For most business sectors, impairment charges on loans and guarantees fell from 2010 to 2011, but they rose sharply for agriculture. One of the underlying factors was a fall in the price of agricultural land. Agricultural earnings improved in 2011, but debt ratios and interest-rate sensitivity remain high in this sector.*

*In 2012, estimated failure rates are still expected to be higher than in the pre-crisis years. Overall, credit quality will also be a major issue in 2012.*

*The housing market damped considerably in 2011. The fall in house prices means that the collateral pledged for the households' loans from banks and mortgage banks has declined in value. In the current recession, the structure of housing taxes contributes to the drop in house prices. More appropriate housing taxes and gradual phasing-out of access to deferred-amortisation mortgage loans would help to curb the undesirable fluctuations in the housing market – for the benefit of financial stability, the real economy and homeowners.*

### **CREDIT EXPOSURES**

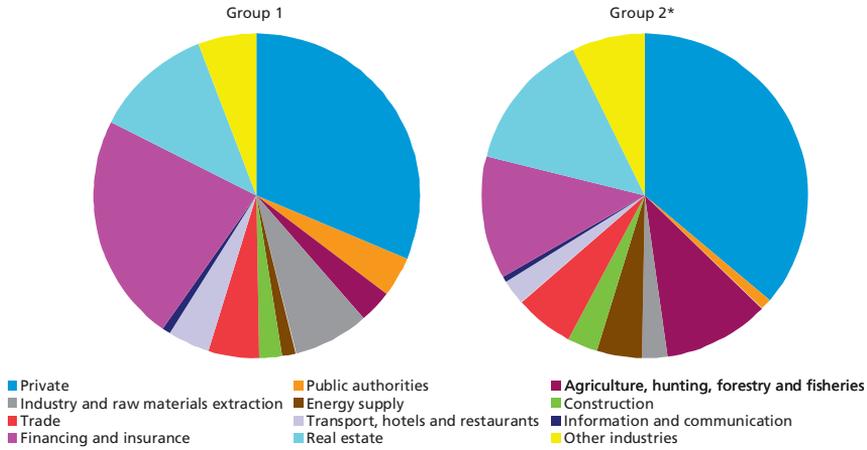
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Banks incur credit risks when granting loans or providing guarantees. Credit risk is the risk of loss as a consequence of a debtor's default on its payment obligations. The size of a potential loss will depend *inter alia* on the value of the assets pledged by the debtor as collateral. Hence, banks are indirectly exposed to price developments for e.g. owner-occupied housing and commercial properties.

Private customers account for about one third of total loans and guarantees granted by banks, while corporate customers account for approximately two thirds. Group 1 is more exposed than group 2\* to financing and insurance and industry and raw materials extraction, while group 2\* is more exposed than group 1 to agriculture, hunting, forestry and fisheries, cf. Chart 33. Around 50 per cent of the lending by group 1

LOANS AND GUARANTEES BROKEN DOWN BY INDUSTRIES AND SECTORS

Chart 33



Note: End-2011.  
Source: Danish Financial Supervisory Authority.

BREAKDOWN BY INDUSTRIES, END-2011, GROUPS 1 AND 2\*

Table 1

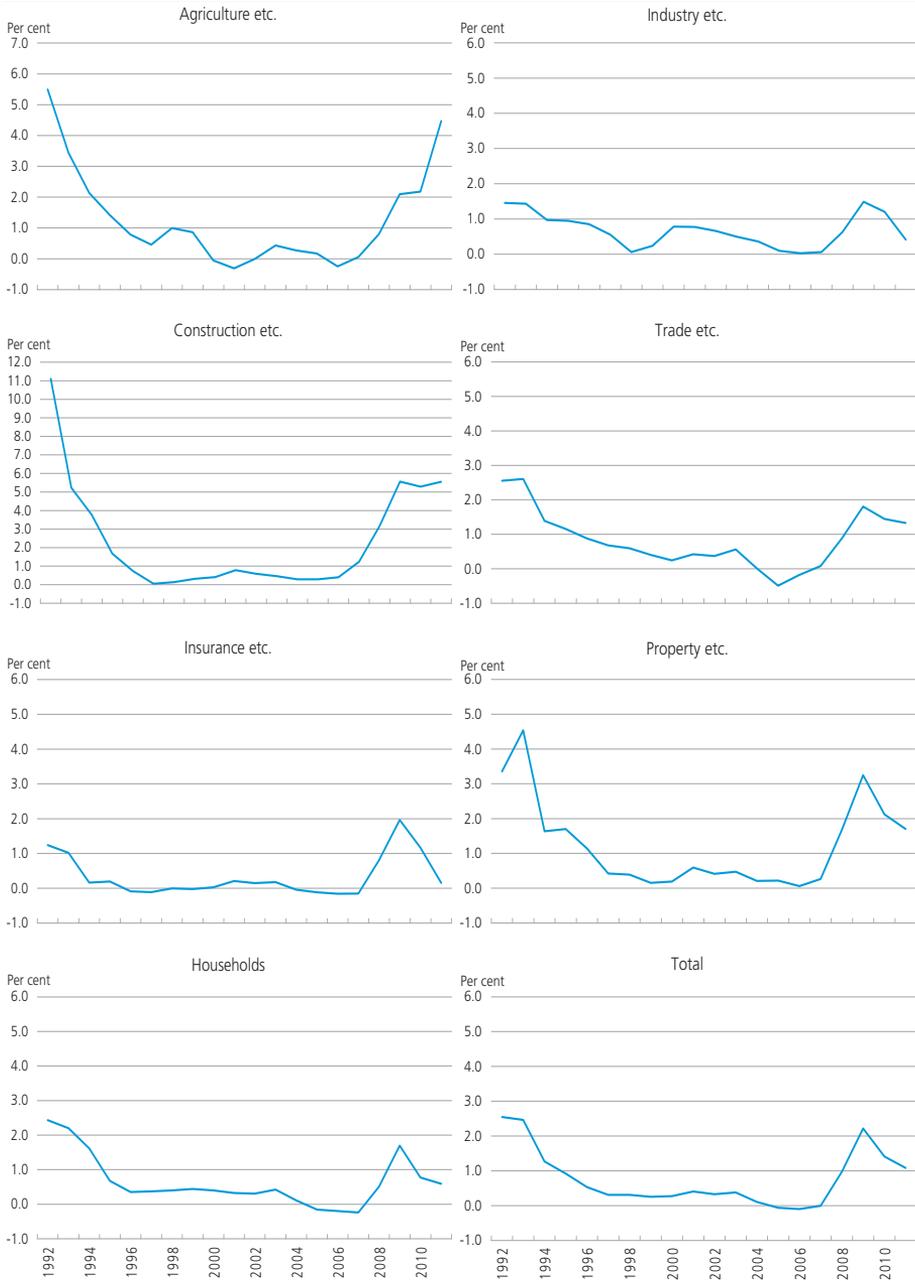
	Break-down of loans and guarantees, per cent	Impaired, per cent of loans and guarantees	Accum. loan impairment charges, per cent of loans and guarantees	Breakdown of loans and guarantees, per cent	Impaired, per cent of loans and guarantees	Accum. loan impairment charges, per cent of loans and guarantees
	Group 1			Group 2*		
<i>Public authorities</i> .....	4	...	...	1	...	...
Agriculture, hunting, forestry and fisheries .....	3	16	9	10	22	12
Industry and raw materials extraction .....	8	5	3	3	7	5
Energy supply .....	2	2	1	4	1	0
Construction .....	2	40	19	3	14	9
Trade .....	5	10	5	6	5	5
Transport, hotels and restaurants .....	4	11	4	3	8	5
Information and communication .....	1	9	3	0	34	4
Financing and insurance ..	23	4	2	12	12	7
Real estate .....	12	12	6	14	22	7
Other industries .....	6	6	4	7	10	5
<i>Corporates, total</i> .....	65	8	4	63	14	7
<i>Private</i> .....	31	3	2	36	6	3
<i>Total</i> .....	100	6	3	100	11	6

Note: "Impaired, per cent" is calculated as loans and guarantees with objective evidence of impairment (before loan impairment charges) as a ratio of loans and guarantees (before loan impairment charges). "Accum. loan impairment charges, per cent" is calculated as accumulated loan impairment charges/provisions as a ratio of loans and guarantees (before loan impairment charges).

Source: Danish Financial Supervisory Authority.

ANNUAL LOAN IMPAIRMENT CHARGE RATIOS BY INDUSTRIES

Chart 34



Note: The chart shows the sector's loan impairment charges as a ratio of loans and guarantees before loan impairment charges. The sector's total loan impairment charges have been achieved by weighting together the loan impairment charges broken down by industries and sectors with loans and guarantees as the weight basis. Agriculture, etc. comprises agriculture, hunting, forestry and fisheries. Industry, etc. comprises industry, raw materials extraction and energy supply. Construction, etc. comprises building and construction. Trade, etc. comprises trade, transport, hotels and restaurants as well as information and communication. Insurance, etc. comprises financing (excluding credit institutions) and insurance. Real estate, etc. comprises real estate, other private sectors and the public sector. Households comprise employees and pensioners, etc., but not self-employed persons. Lending to private individuals with real property as collateral is included under Households and not under Real estate, etc.

Source: Danish Financial Supervisory Authority and own calculations.

is granted to non-residents, primarily customers in the other Nordic countries, the UK and Ireland. In group 2\*, lending to non-residents accounts for 4 per cent of the group's total lending.

The breakdown of credit exposures by industries and sectors has a major impact on the size of the individual bank's loan impairment charges. The percentage of impaired loans and guarantees is particularly high in agriculture, hunting, forestry and fisheries, construction and real estate, cf. Table 1. However, the credit policy of the individual bank plays a key role and, consequently, there are major differences between the banks.

Since 2008, financing of commercial properties has led to heavy loan impairment charges and been the direct reason why a number of small banks have failed. However, loan impairment charges on commercial properties were lower in 2011 than in the two preceding years, cf. Chart 34.

## THE CORPORATE SECTOR

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In Denmark, the corporate sector has reduced its funding by banks and mortgage banks since end-2009 and is increasingly using equity in the form of retained profits for funding. The slowdown in corporate borrowing should be seen in the context of a surge in borrowing in the pre-crisis years.

The number of compulsory liquidations dropped from 2010 to 2011, but remained at a very high level, cf. Chart 35. Data from the Employees' Guarantee Fund shows that the relative increase in the number of wage earners affected by compulsory liquidations in 2008-10 was significantly lower than the rise in the number of compulsory liquidations, reflecting that many failing enterprises had few or no employees. About 95 per cent of the enterprises failing in 2011 had turnover of less than kr. 15 million.

The number of enforced sales of commercial properties remained high in 2011, and commercial property prices in Greater Copenhagen continued to show a declining trend, cf. Box 9.

Danmarks Nationalbank's failure-rate model has been used to estimate failure rates for Danish public and private limited liability companies. The model describes the probability that an enterprise will fail based on information about its return on assets, debt, size, capital base, form of ownership, age, industry, geographical location and real GDP growth in the Danish economy.

The model assesses the time of failure based on an average, while, in reality, there is significant variation between enterprises. Hence, the estimated failure rates for a single year should be interpreted with cau-

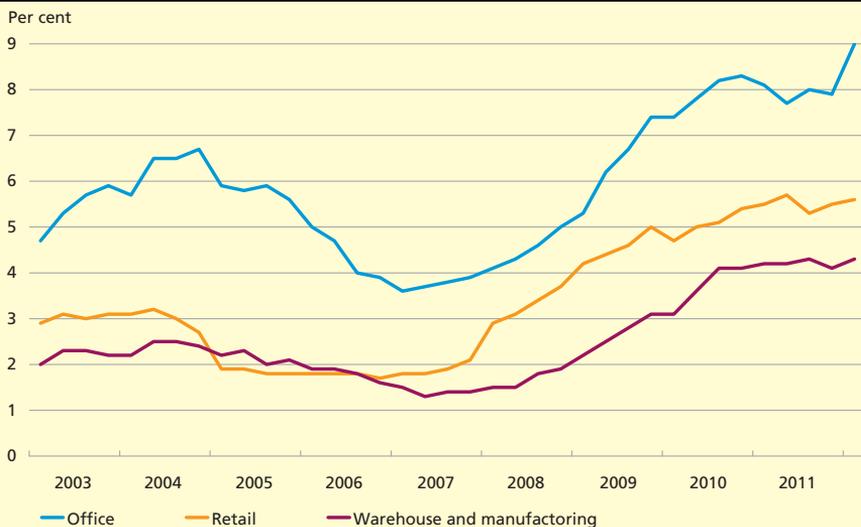
## COMMERCIAL PROPERTIES

Box 9

Activity in the market for commercial properties remained sluggish in 2011. According to data from Statistics Denmark, the number of ordinary commercial property sales, including offices and shops, had halved compared with the period from 2005 to 2007. The same applies to the number of ordinary sales of factory and warehouse properties. The level of enforced sales was high. In 2011, 287 enforced sales of commercial properties were announced, down slightly on the 2010 figure, but significantly above the level of 2007, when the number of announced enforced sales was as low as 57.

According to the Sadolin & Albæk price index of commercial properties in Greater Copenhagen, prices of commercial and investment properties decreased by an average of 1.1 per cent from 2010 to 2011. Relative to the peak in 2007, this represents a 15-per cent fall over a four-year period. The price fall was most pronounced for secondary locations, while prices of prime locations were more stable. The price fall for secondary locations should be seen in the context e.g. of slower demand for commercial properties. Hence, vacancy rates are significantly higher than previously, not least for office properties, cf. the chart.

## VACANCY RATES FOR COMMERCIAL PROPERTIES



Note: Quarterly observations. The most recent observations are from the 1st quarter of 2012.

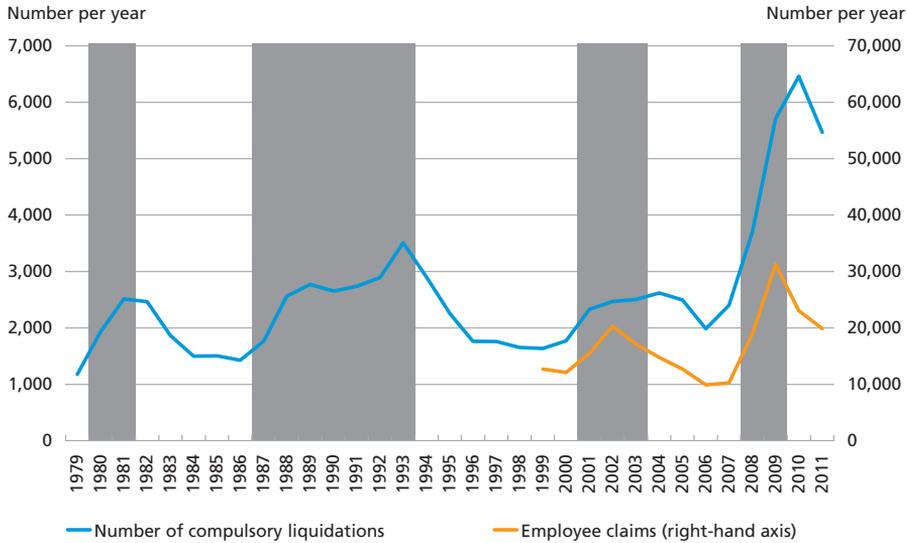
Source: The Danish Property Federation (Ejendomsforeningen Danmark)/Oline-ED Statistikken/Oline-Lokalebørs Statistikken.

Since 2008, a number of banks with large exposures to commercial properties have failed and have had to transfer their activities to the Financial Stability Company. At end-2011, property exposures of around kr. 14 billion (before loan impairment charges) were being wound up by the Financial Stability Company. Until end-2016, the Financial Stability Company will be winding up property exposures worth an additional kr. 17 billion, which will be acquired by the Financial Stability Company from FIH Erhvervsbank as part of Bank Rescue Package 5, cf. Box 4.

Through its subsidiary FS Ejendomsselskab A/S, the Financial Stability Company may refurbish, complete, let and sell properties acquired as part of the resolution of customer exposures. At end-2011, the property portfolio of FS Ejendomsselskab A/S had an estimated fair value of about kr. 1.4 billion.

**COMPULSORY LIQUIDATIONS AND CLAIMS TO THE EMPLOYEES' GUARANTEE FUND**

Chart 35



Note: Data up to and including 2008 comprises all compulsory liquidations announced in the Danish Official Gazette, including compulsory liquidations of financial institutions and personal bankruptcies. The number of personal bankruptcies is modest, however. As from 2009, personal bankruptcies have been omitted from the statistics. The grey markings indicate periods of economic downturn, cf. Kim Abildgren, Birgitte Vølund Buchholst, Atef Qureshi and Jonas Staghøj, Real economic consequences of financial crises, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 2011, Part 2.

Source: Statistics Denmark and annual reports for the Employees' Guarantee Fund.

tion. For example, the estimated failure rates in 2010 are also attributable to compulsory liquidations in 2009 and 2011.<sup>1</sup>

Calculations show that in 2012 estimated failure rates are expected to remain above the pre-crisis level, cf. Chart 36. This especially applies to enterprises with high estimated failure rates.

### Increased risks within agriculture

For most business sectors, impairment charges on loans and guarantees fell from 2010 to 2011, but they rose sharply for agriculture. One of the underlying factors was a fall in the price of agricultural land. Agricultural earnings improved in 2011, but debt ratios and interest-rate sensitivity remain high in this sector, cf. Box 10.

In December 2011, the Danish Financial Supervisory Authority notified the banks and mortgage banks of the valuation of agricultural land to be applied to capital needs and loan impairment charges. The assess-

<sup>1</sup> In the model, all compulsory liquidations have been accrued to two years after the end of the last year in which the enterprise presented financial statements as a going concern. Thus, the estimated failure rate of an enterprise in 2010 is based on data from its financial statements in 2008 and real GDP growth in 2009. An average of about 19 months passes from the presentation of the last financial statements as a going concern until the compulsory liquidation has been officially recorded, albeit with significant variation between enterprises.

ment of loan impairment charges in the banks' financial statements for 2011 was based on these prices.

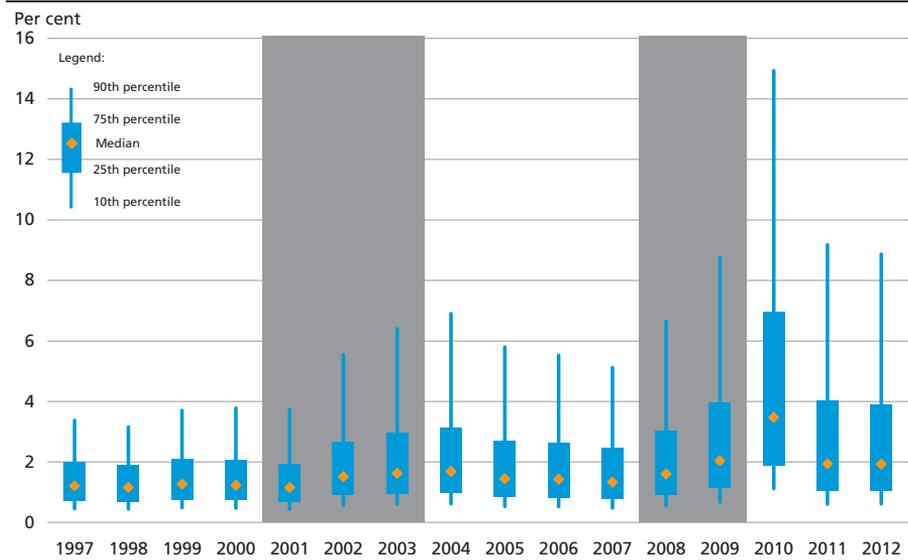
As part of Bank Rescue Package 5, in March 2012, the parties to the political accord supporting the bank rescue packages decided to establish an institution for funding the agricultural sector. The new institution, Landbrugets Finansieringsbank (financing bank for agriculture) will provide funding for plant in farms run by efficient entrepreneurs and new, young farmers. The institution will acquire viable agricultural exposures from the Financial Stability Company and other banks. However, exposures will be transferred only if the farmer in question and his bank agree. Operating finance will still be provided by banks.

Landbrugets Finansieringsbank will be established as an independent bank with a capital base of kr. 300 million. The bank is expected to be able to provide loans of up to approximately kr. 2 billion. Competent and efficient farmers will be able to raise loans for the reconstruction of debt, financing of profitable investments for which they are unable to obtain finance from their current bank and for the purchase of a farm or for succession purposes.

Based on inspections of the agricultural departments in the five largest Danish banks, in April 2012 the Danish Financial Supervisory Authority announced that a number of agricultural exposures are still subject to increased risk. This is attributable to factors such as poor earnings and liquidity for a number of farms and high debts.

ESTIMATED CORPORATE FAILURE RATES

Chart 36



Note: The grey markings indicate periods of economic downturn, cf. the note to Chart 35.

Source: Experian A/S, Statistics Denmark and own calculations.

## AGRICULTURE – TO BE CONTINUED

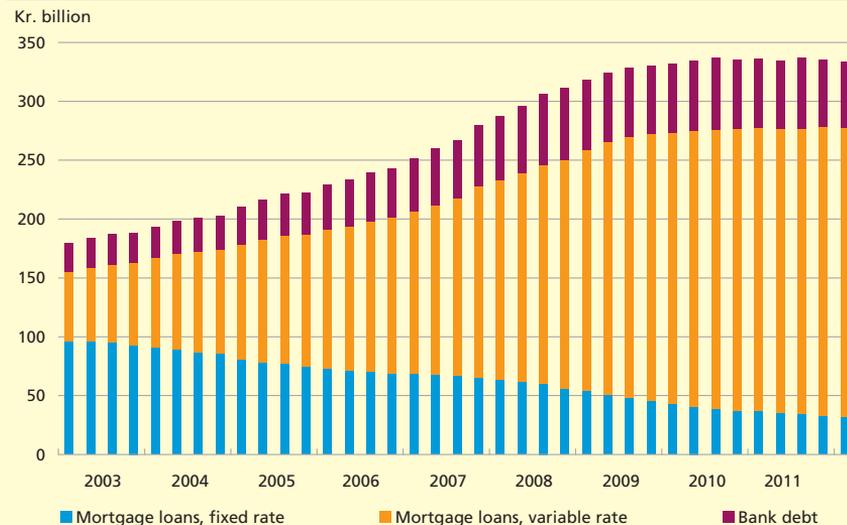
Box 10

Agricultural earnings improved in 2011, but the sector is still plagued by high debt levels. Global food prices rose in 2011 – despite increased global production of agricultural goods. The key driver of the price increases was stronger demand, reflecting high growth rates in the BRIC countries – Brazil, Russia, India and China. Arable farmers, in particular, are benefiting from higher global food prices, while dairy and pig farmers are impacted by the pass-through of high grain prices to feed prices. Overall, the sector's earnings before financial items have risen, however, driven by higher prices and productivity gains.

The sector's debt has stagnated, cf. Chart B1. Net investment in machinery and equipment has turned negative, and agricultural sector productivity growth has declined. At end-2011, the agricultural sector's debt to Danish banks and mortgage banks amounted to kr. 335 billion. An analysis at farm level of the income and debt of full-time farmers shows that close to 4 per cent of the full-time farmers had negative equity at end-2010. The total debt of these farmers to banks and mortgage banks amounted to kr. 18 billion.<sup>1</sup>

## THE AGRICULTURAL SECTOR'S DEBT TO BANKS AND MORTGAGE BANKS

Chart B1



Source: Danmarks Nationalbank.

Most of the farmers who had negative equity at end-2010 are expected to have had higher expenses than income in 2011, cf. chart B2. Hence, this group must still be described as very vulnerable.

<sup>1</sup> The analysis of the agricultural sector's debt takes as its point of departure the sample of farm financial statements from 2010 on which Statistic Denmark's latest accounts statistics for agriculture is based. The focus is on full-time farmers and the sample results are scaled up to provide an estimate of the situation for all full-time farmers. The breakdown between negative and positive equity, respectively, has been calculated at end-2010. Projections of results for 2011 are based on the agricultural sector's price conditions 2011 from Statistics Denmark. Any gains and losses from financial contracts in 2011 have been disregarded. The calculation of sensitivity to interest-rate rises includes the farmers' debt to banks and variable-rate mortgage debt.

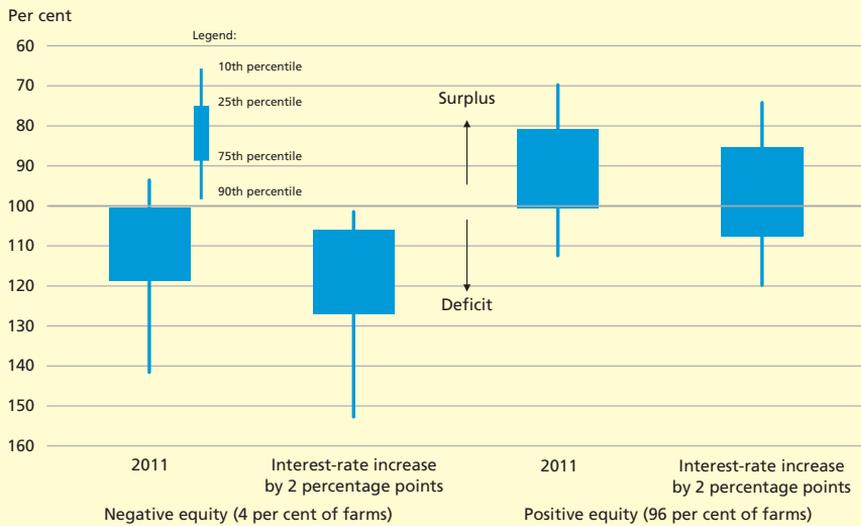
## AGRICULTURE – CONTINUED

Box 10

Most of the agricultural sector's debt is variable-rate loans, making the sector vulnerable to increases in interest rates. A sensitivity calculation shows that had interest rates been 2 percentage points higher in 2011, expenses would have exceeded income for 90 per cent of farmers with negative equity, cf. Chart B2. Similarly, expenses would have exceeded income for more than 25 per cent of farmers with positive equity.

**COSTS AS A RATIO OF INCOME WITH AND WITHOUT AN INCREASE IN INTEREST RATES, FULL-TIME FARMS**

Chart B2



Note: 2011 is based on a projection, since accounting data for 2011 are not yet available.

Source: Statistics Denmark and own calculations.

Like other sectors, the agricultural sector continues to benefit from low interest rates, curbing financial costs. The Food and Resource Economics Institute expects the agricultural sector's financial costs to have declined from kr. 15.7 billion in 2010 to kr. 11.5 billion in 2011. The fall reflects e.g. extraordinarily high losses on financial instruments in 2010, including exchange-rate losses on foreign-exchange loans, and a fall in interest rates. Overall, higher earnings before financial items and lower financial items have led to an improvement in the financial position of the agricultural sector.

Prices of farm properties<sup>2</sup> seem to have stabilised after declining by one third from the peak in the 2nd quarter of 2008 to the 1st quarter of 2010. The plunge seen in the preceding years caused the agricultural sector's debt as a ratio of total assets to grow. The number of enforced sales of farm properties is rising, but remains lower than in the 1980s and early 1990s.

<sup>2</sup> Farm properties are defined as properties listed as a farm property in the property register of the National Survey and Cadastre, KMS. A number of farm properties are not regarded as actual farms, which is the concept applied by Statistics Denmark in "Accounts statistics for agriculture". Most farm properties that are not actual farms are small properties from which agricultural land has been leased.

## HOUSEHOLDS

In 2011, households increased their borrowing using housing as collateral, while continuing to reduce consumer credit facilities and loans for other purposes. Part of this development is attributable to an ongoing shift in borrowing from banks to mortgage banks. At the same time, there is a tendency for banks to increase lending based on housing as collateral, while consumer credit facilities and other loans are reduced.

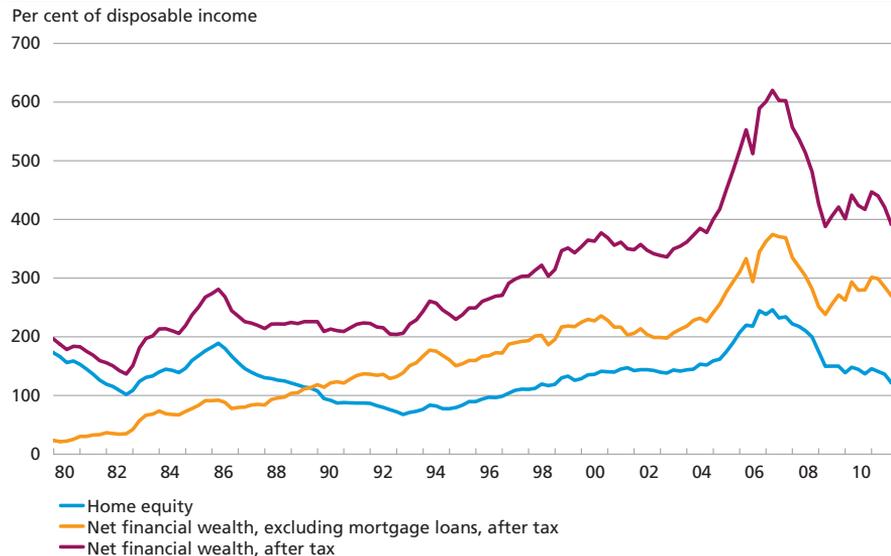
Overall, the savings ratio is high and households are still consolidating. However, home equity as a ratio of disposable income continues to decline and is back at the 1998 level, driven by falling house prices, cf. Chart 37. In 2011, total net wealth as a ratio of disposable income decreased from around 450 to 390 per cent. However, the accumulation of significant pension savings means that total household net wealth – in a longer-time perspective – remains high.

### Sharp slowdown in the housing market

The housing market suffered a sharp slowdown in 2011. According to data from Statistics Denmark, the nominal house price of single-family

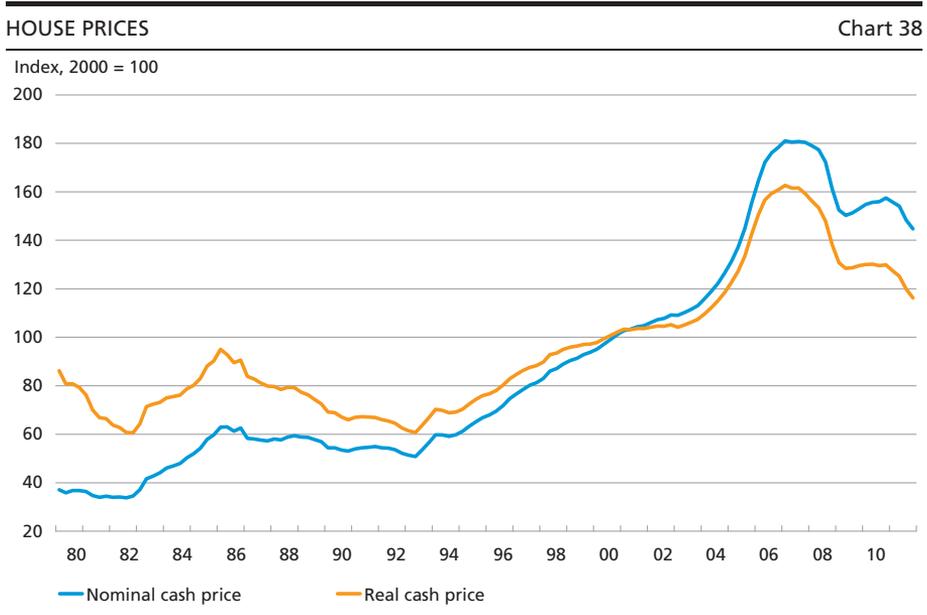
HOUSEHOLD WEALTH

Chart 37



Note: Households include self-employed persons and non-profit institutions. The calculation of housing wealth does not include the value of commercial properties, unbuilt sites and consumer durables. Net financial wealth is the value of financial assets, including pension assets after tax, less the value of financial liabilities, except mortgage loans. Pension assets after tax are defined as 60 per cent of pension assets (estimated value after taxation), including deposits in ATP (Labour Market Supplementary Pension Fund), LD (Employees' Capital Pension Fund) and SP (special pension scheme) and excluding non-savings-based pensions. The most recent observations are from the 4th quarter of 2011.

Source: Statistics Denmark and Danmarks Nationalbank.



Note: The most recent observations are from the 4th quarter 2011.  
Source: Statistics Denmark.

houses declined by about 8 per cent in 2011, cf. Chart 38. Since the autumn, the number of housing transactions has been flat at around two thirds of the average level during the last few decades, and the average time on market remains long. The fall in house prices means that the collateral pledged for household loans from banks and mortgage banks has declined in value. At the same time, sluggish activity in the housing market means that households may find it difficult to sell their homes. This could be a problem for households that have to sell due to e.g. unemployment or divorce.

The weakening of the housing market in 2011 cannot be attributed solely to developments in interest rates and income – it seems to be driven, in part, by expectations. Price falls may be self-reinforcing if buyers delay home purchases in the expectation that prices will come down even further. In the current recession, the structure of housing taxes also contributes to the drop in house prices. With the freeze on property value tax in nominal terms, effective taxation – i.e. tax as a ratio of the market value of the home – increases when house prices fall. Another factor with a similar effect is land tax. Here, a cap on the annual increase means that part of the taxation of the strong growth in land prices seen during the boom is only now being phased in.

One solution would be to restore the link between property value tax and the current property valuation. That way taxation in nominal terms would be reduced if house prices fall and rise if house prices increase.

More appropriate housing taxes would help to curb the economically undesirable fluctuations in the housing market. As Danmarks Nationalbank has previously pointed out, fluctuations may also be reduced by gradually phasing out access to deferred-amortisation mortgage loans. This would be for the benefit of financial stability, the real economy and homeowners.

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## 5. Stress Test of the Banks' Capitalisation

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*Danmarks Nationalbank's stress test shows that the largest banks are robust. For the four banks that in the autumn of 2011 participated in the capital test performed by the European Banking Authority, EBA, via Danish credit groups, excess capital adequacy remains positive in all Danmarks Nationalbank's stress test scenarios, and Common Equity Tier 1 capital remains above 9 per cent – even if government capital injections are not included.*

*Among the smaller banks included in the stress test, a few will need to strengthen their capitalisation, especially from 2014. The assessment is that any problems among small banks can be solved within the existing framework for mergers and resolution.*

*The stress test is supplemented by an analysis of the banks' funding costs. If the adverse macroeconomic developments in the stress scenarios are combined with rising funding costs, more banks will need to strengthen their capitalisation. Add to this that the future capital adequacy rules will gradually tighten the requirements for the banks' capitalisation towards 2019. The capital markets may expect the new tighter capital requirements to be fulfilled earlier than stipulated by the transitional provisions.*

### BACKGROUND

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Danmarks Nationalbank's stress test model provides the basis for a general assessment of the resilience of Danish banks in terms of capitalisation in various scenarios.<sup>1</sup> The 13 largest banks<sup>2</sup>, which account for a combined 88 per cent of the total loans and guarantees of Danish banks, are included in the stress test.

The banks' resilience is tested in a baseline scenario based on Danmarks Nationalbank's most recent macroeconomic forecast, and in three scenarios with a significantly more adverse economic development; a stress scenario with an isolated negative shock to the Danish economy, a stress scenario, in which the Danish economy, via export market growth,

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<sup>1</sup> For a description of Danmarks Nationalbank's stress test model, see *Financial stability*, 2008.

<sup>2</sup> Group 1 excluding FIH Erhvervsbank, which has entered into a conditional agreement with the Financial Stability Company to take over the bank's property finance exposures, cf. Box 4, and group 2\* excluding Vestjysk Bank, which is currently working on implementing a capital plan. On 23 May, Vestjysk Bank announced that the bank's share issue is fully subscribed with gross proceeds of kr. 319 million. The share issue forms part of the capital plan.

is hit by recession in the euro area, and a particularly severe stress scenario based on deep global recession.

The stress in the model does not entirely stem from macroeconomic stress scenarios, but also from a number of assumptions in the projection of the banks' capitalisation, cf. Box 11. Therefore, the results in the baseline scenario do not constitute a forecast of developments in the banks' capitalisation.

The model does not take into account the banks' liquidity risks, which are analysed in detail in Chapter 3. The banks are assumed to be able to refinance senior debt maturing in the stress test period, including debt issued with individual government guarantees.

Funding costs are basically assumed to reflect historical experience. A situation characterised by high uncertainty may lead to a rise in funding costs exceeding those observed historically. Moreover, uncertainty and

#### STRESS TEST ASSUMPTIONS

Box 11

The stress test is based on a number of assumptions for developments in the banks' profit and loss accounts and balance sheets. For example, profitable banks' capital adequacy ratios can never exceed the initial level, while the capitalisation of loss-making banks will decline. Furthermore, it is assumed that Tier 2 capital is not replaced on maturity. The model also assumes that there is no scope for management intervention in the form of cutbacks or extraordinary reductions of the business volume.

The stress test runs until 2014, while the most recent test, which was published in *Stress Tests*, 2nd Half 2011, ran until 2013. This means that the banks are measured against stricter requirements regarding the Common Equity Tier 1 ratio as a consequence of the gradual implementation of future capital adequacy rules. In 2013, the minimum requirement for the Common Equity Tier 1 ratio is 3.5 per cent, but it will be increased to 4 per cent in 2014. Furthermore, as from 2013 the future capital adequacy rules include stricter requirements for the quality of non-government Additional Tier 1 and Tier 2 capital. In the most recent stress test, this led to a 10 per cent deduction in these capital types in 2013. In the new stress test, another 10 per cent is deducted in 2014.

It also matters that the stress test runs for three years compared with just over two years in *Stress Tests*, 2nd Half 2011, as Tier 2 cannot be replaced on maturity. When the stress test period is extended, the banks will not only lose Tier 2 capital maturing in 2012-13, but also Tier 2 capital maturing in 2014. According to the capital adequacy rules, a deduction will moreover be made in Tier 2 capital when the remaining term to maturity is less than three years.

Finally, a new method has been introduced for the calculation of the banks' loan impairment charge ratios, cf. Chapter 8. The change in method involves e.g. differentiated loan impairment charge ratios for the banks, unlike previously when the sector's industry-related loan impairment charge ratios were used for all banks. As some banks have had higher loan impairment charges than the sector overall for several years, the loan impairment charge ratios for these banks will be higher than in previous stress tests.

risk aversion on the part of investors result in an elevated risk that the problems in one bank spill over to the funding costs of other banks. The stress test is therefore supplemented by an analysis, illustrating how the banks will be affected by funding stress.

## SCENARIOS

The capitalisation of the banks is assessed in four macroeconomic scenarios: a baseline scenario reflecting Danmarks Nationalbank's most recent forecast and three stress scenarios, reflecting various types and strengths of negative shocks to the economic development, cf. Table 2. The likelihood that the stress scenarios materialise is generally low. This particularly applies to scenario 3, which is established with a view to testing the capital strength of the banks in case of very negative economic performance. Appendix 2 comprises a detailed presentation of the development in all four scenarios.

### Scenario 0 (baseline scenario)

This scenario is based on Danmarks Nationalbank's most recent forecast as published in *Monetary Review*, 1st Quarter 2012. It reflects that the

SCENARIOS, SELECTED KEY VARIABLES Table 2

	Scenario 0	Scenario 1	Scenario 2	Scenario 3
<b>2012</b>				
GDP, per cent year-on-year .....	1.2	0.5	0.1	-0.7
Private consumption, per cent year-on-year .....	1.1	-0.2	0.1	-0.7
Export market growth, per cent year-on-year ...	3.4	3.4	-4.0	-5.8
Unemployment rate .....	3.8	4.0	4.1	4.3
House prices, per cent year-on-year .....	-3.3	-8.2	-8.9	-10.2
Bond yield, per cent per annum .....	2.5	2.5	2.5	3.0
<b>2013</b>				
GDP, per cent year-on-year .....	1.6	-0.2	-1.9	-3.9
Private consumption, per cent year-on-year .....	1.7	-1.0	-1.8	-3.5
Export market growth, per cent year-on-year ...	5.9	5.9	-3.3	-4.5
Unemployment rate .....	3.9	4.7	5.8	6.8
House prices, per cent year-on-year .....	3.2	-5.4	-7.3	-10.2
Bond yield, per cent per annum .....	2.9	2.9	2.9	4.2
<b>2014</b>				
GDP, per cent year-on-year .....	1.7	1.0	0.4	-0.3
Private consumption, per cent year-on-year .....	1.6	0.7	-0.3	-0.5
Export market growth, per cent year-on-year ...	6.9	6.9	6.3	6.3
Unemployment rate .....	3.7	5.0	7.2	8.8
House prices, per cent year-on-year .....	2.2	1.9	0.9	-1.4
Bond yield, per cent per annum .....	3.4	3.4	3.4	4.6

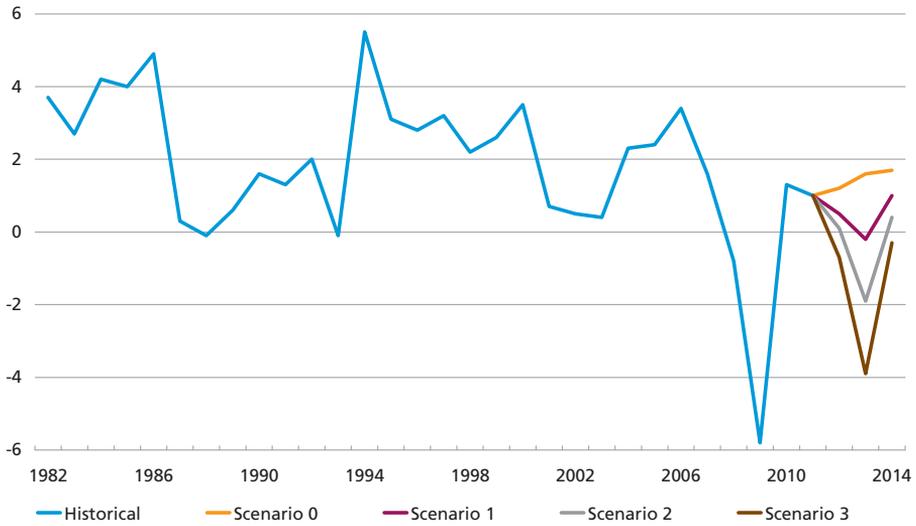
Note: Annual Average. Unemployment is expressed as a ratio of the labour force.

Source: Danmarks Nationalbank and own calculations.

## GROWTH IN REAL GDP

Chart 39

Per cent, year-on-year



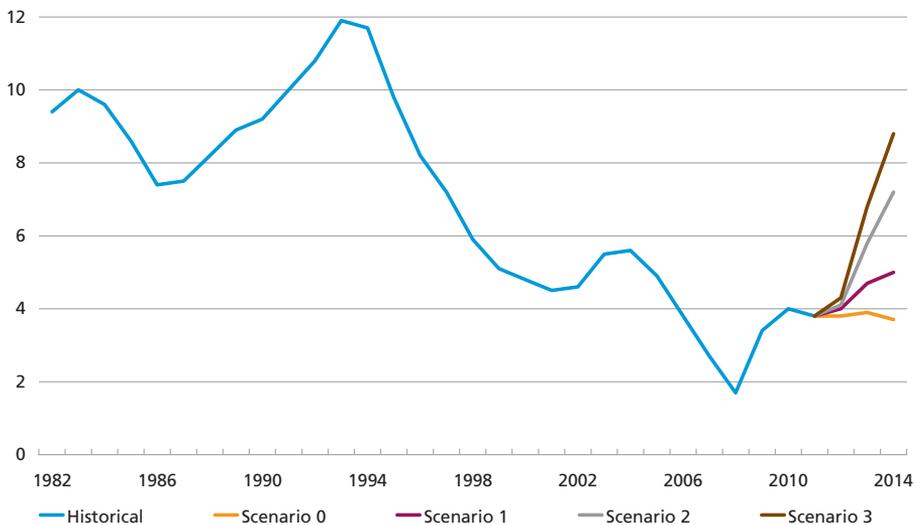
Source: Statistics Denmark and own calculations.

Danish economy has embarked on a moderate recovery in the wake of the strong setback in 2009, cf. Chart 39. GDP growth contributes to a decline in the spare capacity that arose after the crisis. After having risen during the crisis, unemployment has been practically unchanged close to its structural level over the past two years. Unemployment is expected to edge up until early 2013 followed by a modest decline into 2014, cf. Chart 40.

## UNEMPLOYMENT

Chart 40

Per cent



Source: Statistics Denmark and own calculations.

**Scenario 1 (temporary domestic recession)**

The scenario implies that the Danish economy is hit by a negative shock to private consumption, private investment and house prices. Since other countries are assumed to follow the baseline scenario, export market growth is not affected. Danish interest rates remain at a low level during the stress test period (unchanged compared with the baseline scenario). Viewed over the period, the accumulated GDP growth is 3.2 percentage points lower than in the baseline scenario.

**Scenario 2 (European crisis)**

The scenario describes an escalation of the euro area debt crisis resulting in contagion to economic activity in Denmark via exports. Export market growth is reduced by 7.4 percentage points in 2012, 9.2 percentage points in 2013 and 0.6 percentage point in 2014 relative to the baseline scenario. The escalation of the debt crisis in the euro area will also spill over to the Danish economy in the form of an erosion of confidence, leading to negative shocks to private consumption, residential investment and house prices. Danish interest rates will remain at a low level (unchanged compared with the baseline scenario), as Denmark retains its safe-haven status. The accumulated GDP growth in the period is 5.9 percentage points lower than in the baseline scenario.

**Scenario 3 (global crisis)**

The scenario implies a strong global shock to business and consumer confidence. This leads to an even sharper decline in export market growth, which is now reduced by 9.2 percentage points in 2012, 10.4 percentage points in 2013 and 0.6 percentage point in 2014 relative to the baseline scenario. As the crisis is of a global nature, the fall in exports of services exceeds the decline related to export market growth. To intensify the stress level, the average bond yield is assumed to rise. In 2012, this yield is 0.5 percentage point higher than in the baseline scenario, and the difference is widened to just over 1 percentage point in both 2013 and 2014. Accumulated GDP growth during the period is 9.4 percentage points lower than in the baseline scenario.

**RESULTS**

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The analysis is based on the banks' financial statements for 2011. The stress test model projects the profit and loss accounts and balance sheets in the scenarios and thus provides scope for assessing the development in the banks' capitalisation. The model applies relations for historical links between macroeconomic developments in Denmark on the one hand and

the banks' earnings and loan impairment charges on the other hand. The calculation of the banks' loan impairment charge ratios is based on new estimation methods, described in more detail in Chapter 8.

### Earnings

The banks' earnings before loan impairment charges and tax fell from 2010 to 2011, cf. Chapter 2. As a consequence of the rising interest rates, earnings rise in all scenarios during the stress test period, most notably in scenario 3. This should be viewed in light of the fact that the banks hold more interest-bearing assets than liabilities. Higher earnings mean that the banks can absorb higher loan impairment charges without drawing on their capital base.

### Loan impairment charges

In 2009, loan impairment charges reached their highest level since the early 1990s. They have subsequently declined, and this trend is expected to continue in scenario 0 on the back of recovery of the Danish economy, cf. Chart 41. The accumulated loan impairment charge ratio in 2012-14 is 2.3 per cent in scenario 0. The loan impairment charge ratios in this chapter are calculated on the basis of individual loan impairment charge ratios for the 13 banks included in the stress test and therefore

ANNUAL LOAN IMPAIRMENT CHARGE RATIOS Chart 41



Note: Loan impairment charges are calculated as a ratio of loans and guarantees before loan impairment charges. The historical series up to 2011 is based on banks in the Danish Financial Supervisory Authority's groups 1-3. The estimated loan impairment charge ratios in 2012-14 are calculated as a weighted average for the 13 banks in the stress test. The calculations use bank-specific loan impairment charge ratios, cf. Chapter 8.

Source: Cato Baldvinsson, Torben Bender, Kim Busch-Nielsen and Flemming Nytoft Rasmussen, *Dansk Bankvæsen* (The Danish banking system), 5th edition, Forlaget Thomson, 2005, Danish Financial Supervisory Authority and own calculations.

deviate from the loan impairment charge ratios in Chapter 8, which focuses on the sector overall.

In scenarios 1 and 2, the accumulated loan impairment charge ratio in the stress test period is expected to rise to 4.1 and 5.7 per cent, respectively. The increase is driven by lower growth, employment and exports, while the low interest rates, viewed in isolation, will help mitigate the loan impairment charges.

In scenario 3, the accumulated loan impairment charge ratio rises to 8.1 per cent due to the combination of a severe macroeconomic shock and rising interest rates. Both factors will have a negative effect on the finances of households and the corporate sector and hence their ability to service their debt, which will be reflected in the banks' loan impairment charges.

### **Common Equity Tier 1 capital**

In scenario 0, most banks post a profit after loan impairment charges and increase their equity capital in the stress test period. In the model, a profit does not lead to higher Common Equity Tier 1 ratios, as the risk-weighted assets of profitable banks are assumed to rise proportionally with Common Equity Tier 1 capital. In scenarios 1 and 2, more banks will report substantial losses, while all but one bank report losses in scenario 3.

The future capital adequacy rules entail higher minimum requirements for the banks' Common Equity Tier 1 capital of 4 per cent of risk-weighted assets in 2014.<sup>1</sup> Basically, the banks comfortably meet the Common Equity Tier 1 capital requirement, cf. Chart 42. Most of the banks, including all group 1 banks in the stress test, comply with the regulatory requirement regarding Common Equity Tier 1 capital (and total capital, see the next section) in scenario 0. A few of the smaller banks in the stress test will need to strengthen their capitalisation. The need for capital will not be evident until 2014, and therefore the banks will have time to make the necessary adjustments. In scenario 3, most banks see sharp declines in Common Equity Tier 1 capital.

The banks have various options to increase their capital, for instance by retaining dividends, raising capital, reducing balance sheets or risks, or improving cost efficiency. Furthermore, subsidiaries in strong groups have the option of receiving capital injections from the parent company. For some banks, a merger could also be a solution.

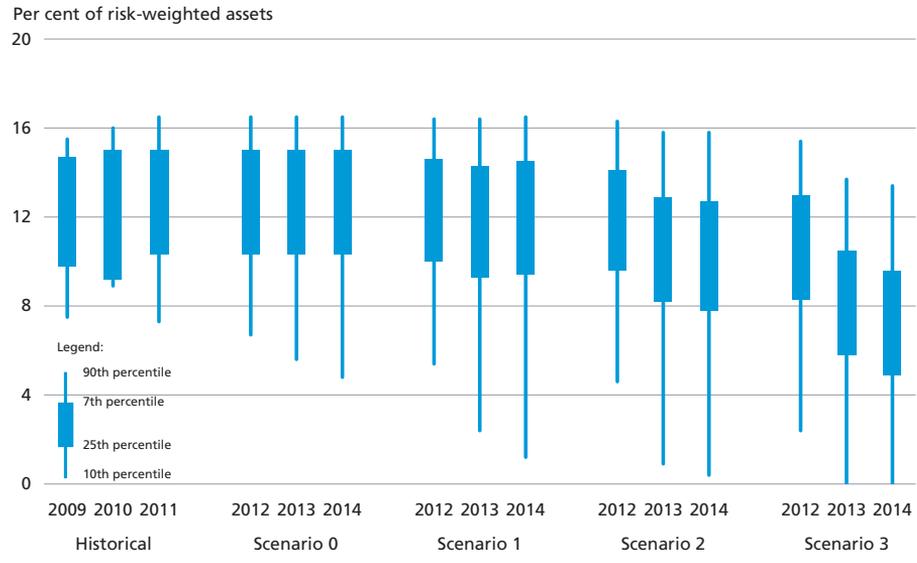
The full phasing-in of the future capital adequacy rules from 2019 at the latest, will involve a minimum Common Equity Tier 1 requirement of 7 per cent. The capital markets may expect the banks to meet the new requirements at an earlier stage.

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<sup>1</sup> The current and future capital requirements are described in Box 3 in *Stress Tests*, 2nd Half 2011, Danmarks Nationalbank.

## COMMON EQUITY TIER 1 CAPITAL

Chart 42



Source: Danish Financial Supervisory Authority and own calculations.

In the European capital test, the EBA has set a Common Equity Tier 1 requirement of 9 per cent for the largest European credit groups, and in the EBA's most recent stress test from July 2011, the threshold for Common Equity Tier 1 was 5 per cent. In both cases government capital injections can be included. For the four banks that, in the autumn of 2011, participated in the capital test performed by the EBA, via Danish credit groups, excess capital adequacy remains positive in all Danmarks Nationalbank's stress test scenarios, and Common Equity Tier 1 capital remains above 9 per cent – even if government capital injections are not included.

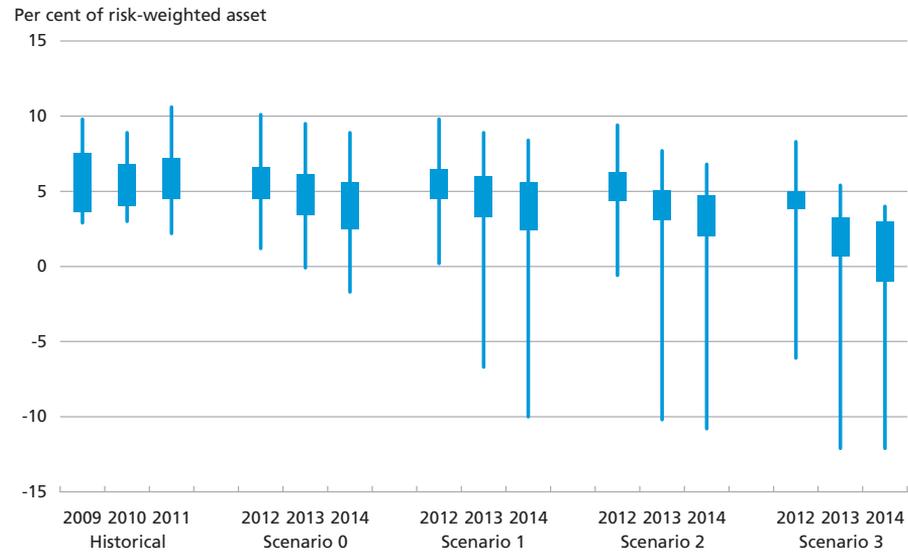
### Total capital and excess capital adequacy

Total capital comprises Common Equity Tier 1, Additional Tier 1 and Tier 2 capital and, according to the future capital-adequacy rules, total capital must still exceed a bank's individual capital need and constitute at least 8 per cent of risk-weighted assets. The stress test assumes that the individual capital need is unchanged during the stress test period.

Under all scenarios, the banks' excess capital adequacy, meaning the difference between the total capital and the individual capital need, declines, cf. Chart 43. This is to some extent attributable to losses in several banks during the stress test period. Furthermore, it is assumed that Tier 2 capital is not replaced on maturity. Moreover, 10 per cent is deducted from non-government Additional Tier 1 and Tier 2 capital in both

## EXCESS CAPITAL ADEQUACY

Chart 43



Note: The Chart indicates the 10th, 25th, 75th and 90th percentiles, cf. the key to Chart 42.

Source: Danish Financial Supervisory Authority and own calculations.

2013 and 2014 as a consequence of the implementation of new stricter requirements regarding the capital quality.<sup>1</sup> Assumptions concerning Additional Tier 1 and Tier 2 capital will affect the excess capital adequacy, but not Common Equity Tier 1.

## FUNDING STRESS

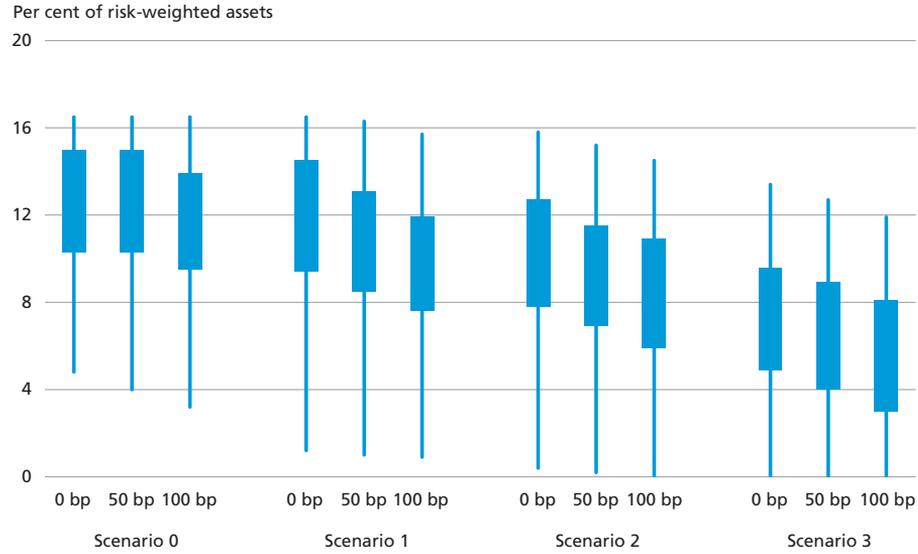
In the stress test model, the relationship between interest income and expenses and relevant balance-sheet items is calibrated for each bank based on observations in 2011. As the scenarios progress, rising interest rates for both assets and liabilities result in a gradual improvement of the banks' net interest income.

Further increases in the banks' funding costs will put pressure on earnings. To examine the resilience of the banks to such developments, an analysis is made, in which the interest rate for banks' funding (deposits, debt to credit institutions and bonds issued) rises from the 3rd quarter of 2012 by 50 and 100 basis points, respectively, relative to the scenarios. Like the EBA's 2011 stress test, it is assumed that 50 per cent of the in-

<sup>1</sup> The future capital-adequacy rules comprise stricter requirements for Additional Tier 1 and Tier 2 capital than previously. Additional Tier 1 and Tier 2 capital that does not meet the new criteria must be phased out over ten years from 2013. Government capital injections that do not fulfil the criteria including the Danish injections under Bank Rescue Package 2, can be included until January 2018. The model assumes that no parts of the current Additional Tier 1 and Tier 2 capital comply with the new requirements, and 10 per cent of this capital, except for government capital injections, is therefore excluded from the calculations for 2013, and another 10 per cent is excluded in 2014.

COMMON EQUITY TIER 1 CAPITAL IN 2014 WITH FUNDING STRESS

Chart 44



Note: The Chart shows the Common Equity Tier 1 ratios for each scenario at the point of departure and on addition of 50 and 100 basis points, respectively, to the calculated annual interest on debt to credit institutions, deposits and bonds issued. It is assumed that 50 per cent of the rising interest rates can be passed on to interest on claims on credit institutions and lending. The Chart indicates the 10th, 25th, 75th and 90th percentiles, cf. the key to Chart 42.

Source: Own calculations.

terest rate increase can be passed on to customers in the form of higher lending rates.

The rise in funding costs leads to lower net interest income and means that the loan impairment charges can, to a lesser degree, be absorbed in the banks' earnings. In scenario 0, the severe funding stress (100 basis points) and the resultant decline in the banks' earnings mean that most banks can no longer cover loan impairment charges via earnings alone, implying that the Common Equity Tier 1 ratio declines, cf. Chart 44. A few of the minor banks in the stress test will subsequently need to strengthen their capitalisation.

In scenarios 1 and 2, most banks' Common Equity Tier 1 ratios decline sharply at funding stress of 100 basis points. In scenario 3, practically all banks are hit by sharp declines in the Common Equity Tier 1 ratio at the high level of funding stress, and approximately half of the banks will need to strengthen their capitalisation.

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## 6. Mortgage Banks

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*The mortgage banks' income from administration margins have risen in recent years. Loan impairment charges in the period 2008-11 were largely offset by the rise in administration margins over the same period. Some administration margins have been increased with effect from 2012; this will further increase the mortgage banks' earnings and resilience.*

*The mortgage banks are adjusting their business models in several ways with the aim of reducing refinancing risk on adjustable-rate loans and the potential need for top-up collateral if property prices fall. There is no "silver bullet" solution, and each mortgage bank will have to weigh the costs and benefits before choosing which measures to implement.*

### **DEVELOPMENTS IN THE MORTGAGE-CREDIT SECTOR**

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Total lending by mortgage banks rose by approximately 2 per cent in 2011 to kr. 2,448 billion. Out of total lending, loans for owner-occupied dwellings and summer cottages accounted for 58 per cent, agriculture for 11 per cent, offices and shops for 10 per cent and private rental properties for 10 per cent.

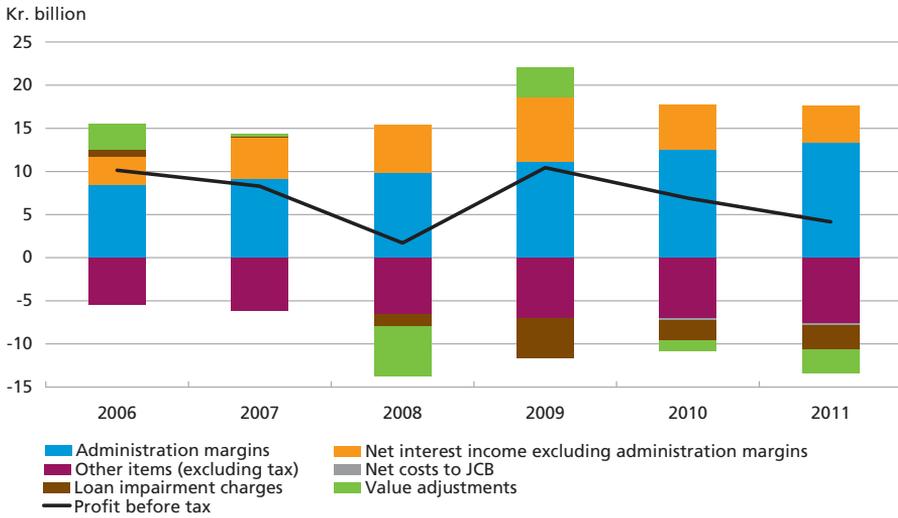
Overall, the mortgage banks posted profits before tax of kr. 4.2 billion in 2011, against kr. 6.9 billion in 2010. Administration margins on mortgage loans have risen steadily in recent years, cf. Chart 45. Loan impairment charges increased to kr. 2.8 billion in 2011 against kr. 2.4 billion in 2010. The contribution from value adjustments, one of the elements with the strongest year-on-year fluctuations, was negative by approximately kr. 2.8 billion.

From the beginning of 2008 to the end of 2011, the average administration margin for private customers rose from 50 to 55 basis points, while the average administration margin for corporate customers increased from 35 to 51 basis points. Since 2008, the increases in administration margins have contributed to accumulated additional income from administration margins of kr. 10.3 billion in total.

Several mortgage banks have announced that they will raise their administration margins for private customers as from 2012. Moreover, some banks have introduced brokerage fees, i.e. deductions in the bond price, on refinancing of adjustable-rate loans in the range of about 5 or 10 basis points for annual refinancing. The higher administration margins and the new brokerage fees are generally justified by higher costs e.g. relating to requirements concerning the collateral behind the loans.

EARNINGS BROKEN DOWN BY KEY ITEMS, MORTGAGE BANKS

Chart 45

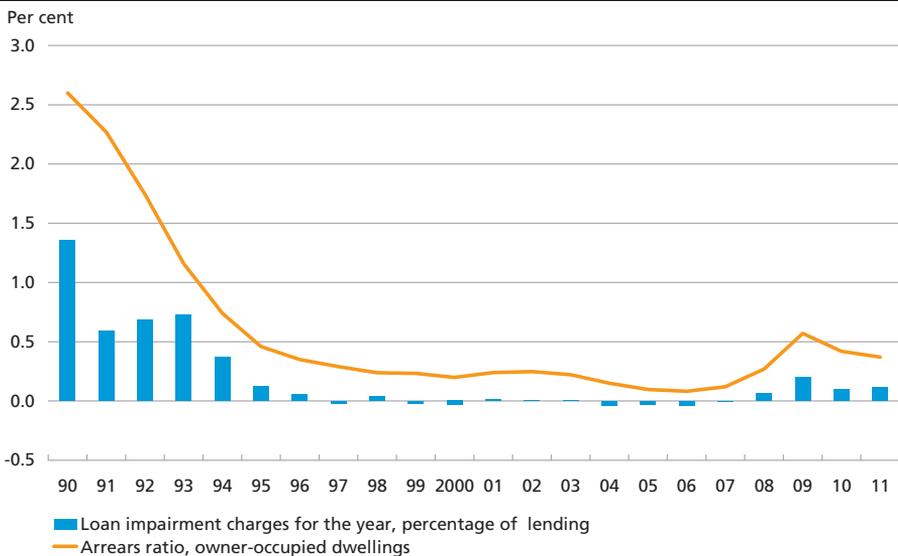


Note: "Other items" comprises staff and administration costs, net fee income, depreciation of assets, other operating costs and other ordinary income. Profit from equity investments in associates and group enterprises are not included.  
 Source: Danish Financial Supervisory Authority and own calculations.

For a prolonged period from the late 1990s until 2008, the mortgage banks posted very low loan impairment charges, cf. Chart 46. Since 2008, the mortgage banks have made loan impairment charges totalling kr.

LOAN IMPAIRMENT CHARGE AND ARREARS RATIO

Chart 46



Note: The arrears ratio indicates the proportion of the total instalments and interest that had not been paid 3½ months after the September settlement date at the latest. The negative loan impairment charges in 2004-06 can be attributed e.g. to changes in accounting practices leading to a reversal of prior loan impairment charges.  
 Source: Danish Financial Supervisory Authority, Association of Danish Mortgage Banks and Danish Mortgage Banks' Federation.

11.2 billion, which are virtually offset by the accumulated additional income from administration margins in the same period.

Loan impairment charges accounted for around 0.1 per cent of lending in both 2010 and 2011, entailing that they remained at the same level despite a drop in house prices of approximately 8 per cent in the same period.

Like loan impairment charges, the arrears ratio was almost unchanged in 2011 relative to 2010. The approximately 5,000 homeowners who had not paid due instalments 3½ months after the settlement date in December 2011 owed around kr. 10,000 on average.<sup>1</sup> Thus, 0.3 per cent of the amount that fell due on the December settlement date was still outstanding for the mortgage banks 3½ months after the settlement date.

The mortgage banks can sustain higher loan impairment charges than the current level solely on the basis of their current earnings. The general increases in administration margins – not least in 2012 – will strengthen the banks' resilience further.

Given their very large lending volumes, the mortgage banks as a whole play a key role in financial stability. During 2012, an expert committee under the Danish Ministry of Business and Growth will, among other things, make recommendations for selection criteria for systemically important financial institutions, SIFIs. Mortgage banks are already governed by special legislation aimed at ensuring confidence in the mortgage-credit system, but an assessment of the need for amendments to mortgage-credit legislation is expected to be included in the committee's work.

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## STATUS ON THE NEED FOR TOP-UP COLLATERAL

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Since 2007, when the legislation on SDOs took effect, the share of mortgage bonds with SDO status has risen gradually, to approximately 69 per cent of outstanding mortgage bonds at the end of March 2012.<sup>2</sup>

The legislation on SDOs entails that the value of an individual loan must never exceed a fixed percentage of the value of the collateral pledged by the borrower, unless the mortgage bank has pledged other collateral for the loan. If the market value of mortgaged properties falls, the mortgage bank may need to pledge top-up collateral.

At the end of 2011, the need for top-up collateral was kr. 122 billion, cf. Table 3. The increase of kr. 37 billion relative to the end of the 1st quarter of 2011 is mainly due to lower property prices. Overall, the mortgage banks have pledged top-up collateral for kr. 246 billion, and on average,

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<sup>1</sup> Danish Mortgage Banks' Federation, press release of 3 May 2012.

<sup>2</sup> In the following, SDO is used as a generic term for covered bonds, SDOs, and covered mortgage bonds, SDROs. Moreover, the term mortgage bonds is used for both conventional mortgage bonds and SDOs issued by mortgage banks.

NEED FOR TOP-UP COLLATERAL AND TOP-UP COLLATERAL ACTUALLY PLEDGED

Table 3

Kr. billion	End of 1st quarter 2011	End of 4th quarter 2011
Fair value of SDOs issued .....	1,697	1,972
Need for top-up collateral .....	85	122
Top-up collateral actually pledged .....	181	246
Of which total capital .....	76	89
Of which proceeds from JCB .....	35	41
Of which receivables and guarantees .....	29	37
Of which other approved asset types .....	41	79

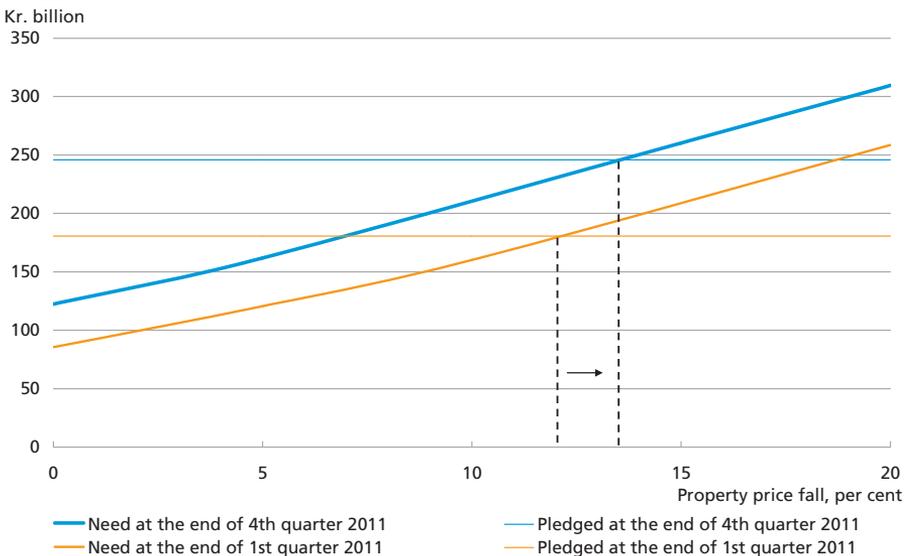
Note: The calculation includes the need for top-up collateral for Nykredit Realkredit, Realkredit Danmark, BRFKredit, Totalkredit, DLR Kredit, Nordea Kredit and Danske Bank. Government-guaranteed debt issued by DLR Kredit totalling approximately kr. 7 billion is included under "Top-up collateral actually pledged, of which proceeds from JCB". The fixed quarterly reporting requirement concerning top-up collateral came into force in 2011, and the first report concerned the 1st quarter of 2011.

Source: Danish Financial Supervisory Authority.

they are able to meet the top-up collateral requirement in the event of a further drop in property prices of around 13 per cent, cf. Chart 47. This is an improvement on the 1st quarter of 2011. However, the current difference between the top-up collateral pledged and the actual need var-

NEED FOR TOP-UP COLLATERAL ON GENERAL FALL IN PROPERTY PRICES

Chart 47



Note: The need in connection with a fall in property prices is estimated on the basis of the banks' own sensitivity calculations of loans as at the end of 2010 (however, the calculations for Realkredit Danmark and Danske Bank concern loans as at the end of the 1st quarter of 2011). The need for top-up collateral is calculated as at the end of the 1st quarter of 2011 and the end of the 4th quarter of 2011 and, hence, is staggered relative to the sensitivity calculation. Sensitivity for the 4th quarter of 2011 is adjusted equivalent to a fall in house prices of 5 per cent relative to the 1st quarter of 2011 and is also extrapolated on a straight-line basis. As the sensitivities are calculated on the basis of the banks' individual models, and because the calculations used are staggered, the data should be interpreted with some caution.

Source: Danish Financial Supervisory Authority.

ies across mortgage banks, just as the mortgage banks' immediate access to pledging more top-up collateral varies.

The calculation of top-up collateral may include total capital, proceeds from issued Junior Covered Bonds, JCB, as well as guarantees issued by credit institutions, provided they meet specific requirements. The securities recognised as top-up collateral must be sufficiently safe, and securities and guarantees issued by credit institutions may not exceed 15 per cent of the nominal volume of SDOs.

Total capital and claims and guarantees account for 51 per cent of the top-up collateral pledged. If further collateral is needed, the mortgage banks may issue JCB. The costs of such issuance depend on the spread between the JCB yield and the yield on the assets in which the proceeds are invested.

Up to end-2011, Nykredit Realkredit and BRFKredit had issued JCB, and at that time, the proceeds totalled kr. 34 billion. In addition, at end-April 2012, Realkredit Danmark had issued JCB worth approximately kr. 12 billion. The sector's net interest expenses on issuing JCB and reinvesting the proceeds under the rules for top-up collateral amounted to kr. 253 million in 2011 against kr. 153 million in 2010. Looking forward, the expenses for top-up collateral may increase considerably due to a growing need for issuance of JCB as well as a widening spread between issuance and investment yields.

In 2011, the credit rating agencies imposed stricter requirements on several mortgage banks as regards the collateral behind the bonds issued with the aim of maintaining a given rating. These requirements may have influenced the collateral pledged more than the statutory requirement for top-up collateral.

## **STATUS ON THE SPREADING OF ADJUSTABLE-RATE LOANS**

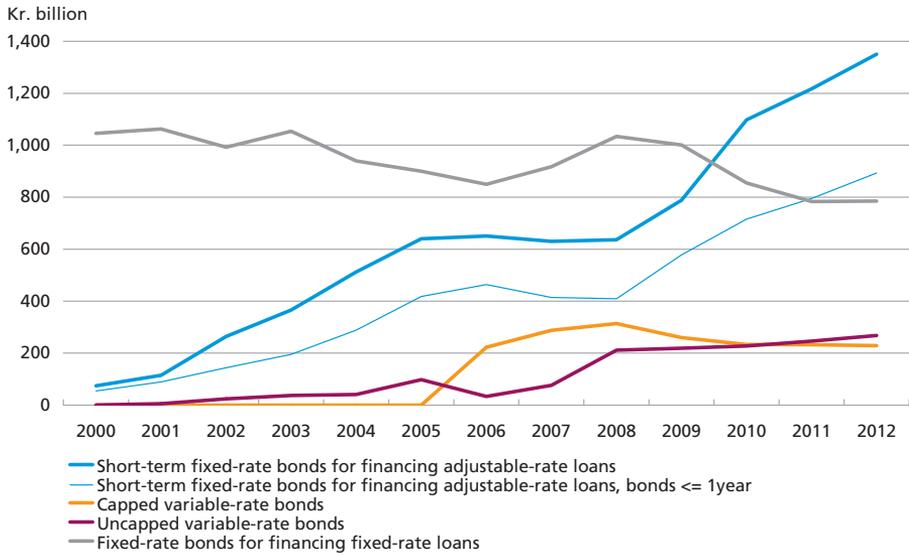
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Adjustable-rate loans entail a refinancing risk because the maturity of the bonds issued is shorter than that of the loan. The outstanding volume of bonds behind adjustable-rate loans totalled kr. 1,350 billion at end-February 2012, of which bonds totalling kr. 893 billion mature within one year, cf. Chart 48.

A large share of the adjustable-rate loans matures in January, cf. Chart 49. On the basis of discussions between Danmarks Nationalbank, the Association of Danish Mortgage Banks and the Danish Mortgage Banks' Federation in 2009, the volume of new adjustable-rate loans based on bonds maturing in January has been very limited since 2010. This entails gradual spreading of the refinancing need over the year and reduces the risk of many borrowers with adjustable-rate loans being affected at the same time by financial-market turmoil.

OUTSTANDING MORTGAGE BONDS BY LOAN TYPE

Chart 48

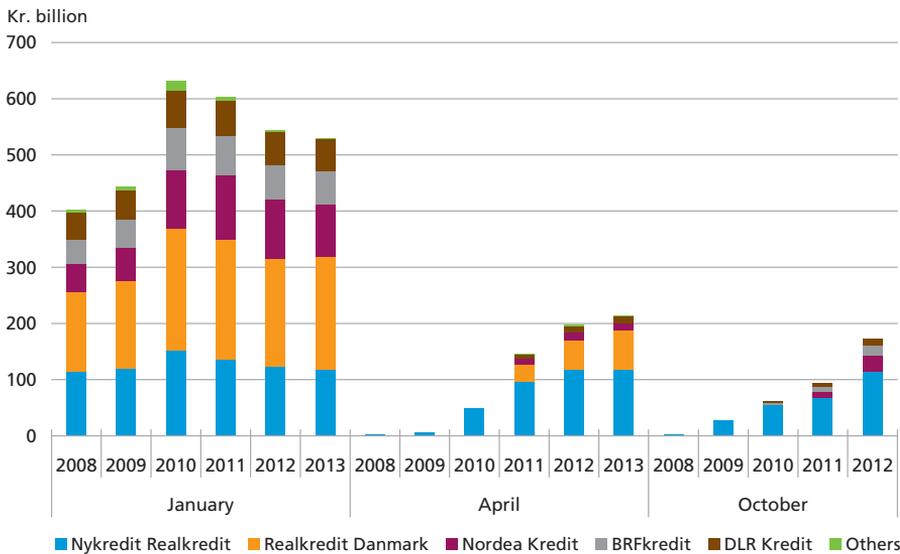


Note: The most recent observations are from February 2012. The outstanding volumes are calculated nominally. Prior to 2006, capped variable-rate bonds are included under uncapped variable-rate bonds.

Source: Danmarks Nationalbank.

MATURING BONDS FOR FINANCING ADJUSTABLE-RATE LOANS BY MONTH AND INSTITUTION

Chart 49



Note: Maturing bonds on the basis of the nominal outstanding volume at the end of the preceding month. Bonds maturing in October 2012, January 2013 and April 2013 are, however, based on the outstanding volume at end-March 2012. Owing to factors such as principal payments and prepayment the full amount will not be refinanced.

Source: Danmarks Nationalbank.

Nykredit Realkredit has spread its refinancing need almost equally on three settlement dates, while the spreading is less pronounced for the other mortgage banks. Overall, the mortgage banks reduced the share of bonds maturing in January from 72 to 60 per cent from 2011 to 2012.

In general, the mortgage banks have offered borrowers conversion of adjustable-rate loans maturing in January, waiving the conversion costs. Changing the time of refinancing typically requires the consent of the individual borrowers, and may also mean that already registered mortgage documents need to be replaced by new ones. If registration is required, the registration fee for the borrower under the current rules is kr. 1,400 per mortgage agreement, which could limit the number of conversions. The Danish government is currently looking into the possibilities for waiving the registration fees in connection with spreading of the refinancing risk.

## OPPORTUNITIES FOR RISK REDUCTION

There are several opportunities for reducing risks associated with refinancing and top-up collateral. The sector itself has presented a number of ideas and initiatives. No single measure accommodates all needs. The choice will depend on the balance between costs and benefits, cf. Table 4. Differences between mortgage banks, e.g. as regards the size of the total stock of loans and group structures, may prompt the mortgage banks to choose different solutions.

The individual measures can be assessed in terms of their impact on both the refinancing risk and the potential need for top-up collateral.

EFFECTS OF VARIOUS MEASURES

Table 4

	Refinancing risk	Need for top-up collateral	Borrowing/housing costs now	Reduced house price fluctuations
Two-tier mortgaging .....	(+)	++	-	+
Conservative fixing of lending limits .....	(+)	++	0	(+ +)
Dynamic two-tier mortgaging .....	(+)	++	0	+
Property taxation according to rate .....	(+)	+	0	++
Phasing-out of deferred amortisation ...	(+)	+	0	+
Further spread over the year .....	+	0	0	0
Longer-term financing .....	+	0	-	0
Bonds with different terms to maturity .....	++	0	0 / -	0

Note: The qualitative estimates are stated on a scale from "-" to "+ +". Appropriate effects are indicated by a plus sign (+). Inappropriate effects are indicated by a minus sign (-). If no direct effect of the measure is expected, this is indicated by "0". The entries in parentheses are associated with particular uncertainty. The measures are described in more detail below. The effect of financing loans with bonds with different terms to maturity depends on the maturity of the bonds used.

Source: Own estimates.

The macroeconomic effects of changes in repayments on mortgage loans and the impact on the bond market may also be included in the assessment. For example, increased issuance of bonds with longer maturities may affect relative pricing, and there may be a risk that some bond series fail to obtain a critical mass when it comes to maintaining liquidity. Measures involving a certain degree of standardisation on the bond side will make the market more transparent for the investors and contribute to preserving liquidity.

### **Top-up collateral and house-price fluctuations**

Nykredit Realkredit, including Totalkredit, has introduced two-tier mortgaging. For owner-occupied dwellings, this means that a mortgage loan is financed by issuance of SDOs in the mortgaging interval 0-60 per cent, while mortgage loans in the 60-80 per cent interval are financed by bonds without SDO status. The statutory requirements relating to top-up collateral for owner-occupied dwellings take effect only if the value of the SDO-financed portion of the loan exceeds 80 per cent of the market value of the home. Since conversion to two-tier mortgaging relates to new loans only, it is not likely to be able to accommodate the need for top-up collateral in the first instance. On the other hand, two-tier mortgaging will reduce the potential need for top-up collateral in the longer term.

Nykredit Realkredit has announced that mortgages in the second tier will be without deferred amortisation and without adjustable rate loans with a fixed-interest period of one year. Consequently, two-tier mortgaging may increase interest and instalments for borrowers with a maximum loan-to-value ratio. However, debt redemption and differentiation in interest payments according to the loan-specific risk are sound principles.

Realkredit Danmark has proposed a reduction of the potential future need for top-up collateral by means of fixing lower lending limits in the event of strong increases in house prices (conservative lending limits). This will reduce the potential need for top-up collateral via two channels. Firstly, more limited access to mortgage loans – particularly if all mortgage banks participate – may have a dampening effect on property-price fluctuations. Secondly, the need for top-up collateral is reduced if house prices subsequently fall, since the mortgaging ratio will be lower. As conservative lending limits have no effect on the current access to mortgage loans, it only has an impact in the longer term.

BRFkredit has proposed dynamic two-tier mortgaging, whereby only the SDO-financed part is limited in the event of strong increases in house prices. In the longer term, this approach may reduce the need for top-up collateral in the same way as conservative lending limits, while

enabling the extent of mortgage financing to be maintained. However, dynamic two-tier mortgaging may lead to a higher concentration of risks in the outermost tier.

Danmarks Nationalbank has previously pointed out that fluctuations in the housing market can be reduced by restoring the link between property value tax and current house prices and by gradually phasing out the access to deferred-amortisation mortgage loans. Furthermore, both measures will have a dampening effect on the need for top-up collateral in the future.

### **Refinancing risk**

The refinancing risk on adjustable-rate loans stems from the need to refinance a relatively large stock of loans at the same time, fixing a new interest rate on a large stock of loans. Spreading the refinancing need, resulting in a smaller loan stock to be refinanced within a given period, may make it easier for the market participants to cope with an unusual market situation.

In a worst-case scenario, the market for bonds may disappear entirely in connection with an auction. The situation is very unlikely, but may arise if the risk premium demanded by investors increase the burden on the borrowers and cause the mortgage banks to suffer material losses on their loans which in turn weakens confidence in future refinancing. It is important that a market shock does not give rise to doubts as to the mortgage banks' ability to meet their obligations towards the investors.

In 2011, the sector established a working group on refinancing risk and has presented a number of ideas, which fall in three broad categories: further spreading of refinancing, issuance of bonds with longer maturities and reduction of the credit risk for the investors.

#### *Further spreading*

It is possible to reduce the refinancing risk by spreading the financing need evenly across the year and by undertaking the refinancing well in advance. This will significantly reduce the consequences of a short-lived shock to the financial markets. The longer the period of financial turmoil, the smaller the effect of even refinancing. Further spreading of the refinancing does not need to involve higher costs for the borrowers.

#### *Financing with longer maturities*

Financing mortgage loans by issuing bonds with longer maturities may reduce the total volume of loans to be refinanced within a given period. This increases the resilience to shocks of longer duration in the financial markets. For example, it is possible to base adjustable-rate loans on 3-year

bonds or to base these loans on capped variable-interest bonds. These products are already on the market, but are used to a much smaller extent than adjustable-rate loans with a fixed-interest period of one year. Presumably, the reason is the typically higher instalments associated with these products.

#### *Reduction of credit risk*

The refinancing risk is reduced if the investors believe that they will still receive payment in full even after very unusual market conditions. One way to achieve this is for the mortgage banks to have enough resources to sustain many defaulting loans in the event of strong interest-rate increases. Another way is for the borrowers to be more robust to the interest-rate risk associated with refinancing under unusual market conditions.

For example, two-tier mortgaging limits the refinancing risk if only the innermost and safest part of the mortgage involves adjustable-rate loans.

The borrower's robustness to the interest-rate risk associated with refinancing under unusual market conditions may be considerably strengthened by financing the individual loan using several bonds with varying terms to maturity. This reduces the individual borrower's exposure to a single instance of refinancing. If, for a short period, interest rates rise to an abnormally high level, this would only affect a minor share of the individual borrower's total loans. Consequently, the risk of a situation of investors losing confidence in the borrowers' ability to pay and bonds becoming impossible to sell on market terms is also strongly reduced. This could break the expectation of negative interaction between weakening of the borrowers due to higher interest rates and poorer issuance conditions for the mortgage bank.

# Special Topic Section



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## 7. Macroprudential Policy

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*The financial crisis in Denmark has had a strong real economic impact. For example, economic activity in Denmark is still below the pre-crisis level. Crises that impede the credit intermediation are often very deep and have considerable consequences in terms of loss of output and employment.*

*Macroprudential policies should in future contribute to preventing and mitigating systemic risks in the financial sector, e.g. by making credit institutions build up capital buffers in good times. In other words, macroprudential policy should supplement other macroeconomic stabilisation policies, such as fiscal policy, so that the financial sector makes a sustainable contribution to economic developments.*

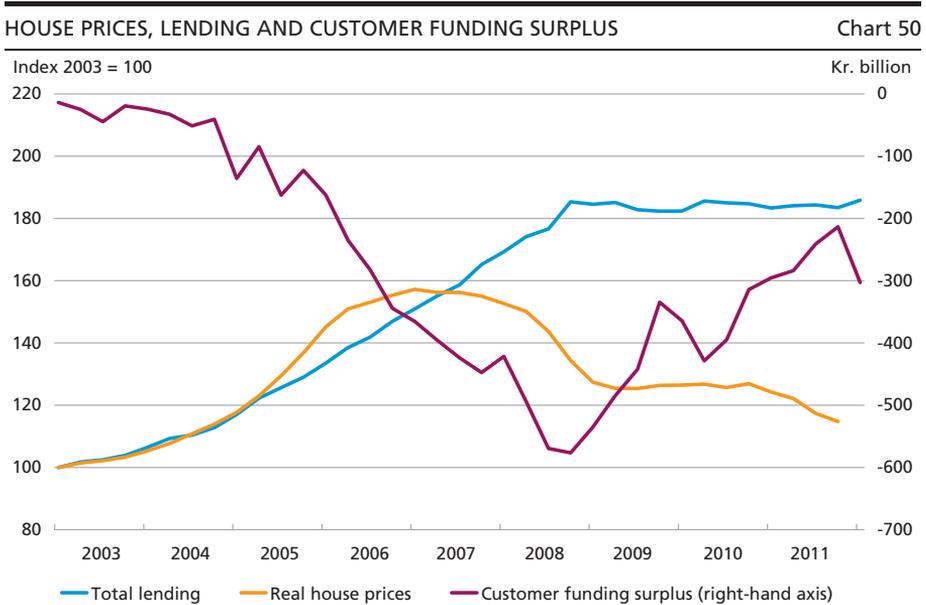
*At the EU level, the institutional framework for macroprudential policy was laid down with the establishment of the European Systemic Risk Board, ESRB. The task of the ESRB is to prevent and reduce systemic risks in the EU. Macroprudential policy will predominantly be conducted at the national level, and the ESRB has recommended that all member states establish institutional frameworks for macroprudential policy. In Denmark, the issue is being considered by the Committee on the Structure of Financial Supervision. Due to the integration of the financial markets, international coordination of national measures is important. In the EU, the ESRB should undertake such coordination.*

*The instruments available for implementation of macroprudential policy will to a large extent be laid down by the forthcoming Capital Requirements Directive, CRD IV, which is expected to be adopted by the EU this year. Since macroeconomic conditions vary considerably across the EU member states, there should be adequate flexibility for macroprudential policy at the national level. Macroprudential policies will evolve as experience is gained.*

### **BACKGROUND**

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The financial sector has a strong influence on economic developments. In periods of optimism, activity in the financial sector may lead to unsustainable build-up of financial risk, e.g. because private individuals and firms have too easy access to credit. Addressing imbalances may trigger a financial crisis, which is costly for the economy – it may lead to large



Note: Total lending is lending to non-MFIs for both banks and mortgage banks to residents. Customer funding surplus relates to banks and is calculated as deposits from non-MFIs less lending to non-MFIs. Banks comprise groups 1-3\*. Real house prices are seasonally adjusted. The most recent observations are from the 1st quarter of 2012 for lending and customer funding surplus, and from the 4th quarter of 2011 for real house prices. Quarterly data.

Source: Danmarks Nationalbank and Statistics Denmark.

fluctuations and have prolonged negative effects on economic activity.<sup>1</sup> In Denmark, economic activity is still below the pre-crisis level.

Financial crises arise for many reasons. One reason is that financial institutions<sup>2</sup> often display uniform behaviour, which may amplify cyclical patterns. Financial institutions react in the same way to changes in the economic outlook. For example, the access to raising a loan from a bank depends on the collateral that can be pledged, such as a house. In Denmark, the period leading up to the financial crisis was characterised by rapidly rising house prices and high credit growth in the financial sector, cf. Chart 50. When the economic outlook deteriorates, the value of collateral declines, as does the access to credit. For the individual financial institutions it may be appropriate to reduce lending and increase the collateral requirements. But if many financial institutions reduce lending at the same

<sup>1</sup> See e.g. Giovanni Dell'Ariccia, Enrica Detragiache and Raghuram Rajan, The real effect of banking crises, *Journal of Financial Intermediation*, Vol. 17, No. 1, 2008, Carmen Reinhart and Kenneth Rogoff, The aftermath of financial crises, *American Economic Review*, Vol. 99, No. 2, 2009, and Oscar Jordà, Moritz Schularick and Alan Taylor, When credit bites back: Leverage, business cycles, and crises, NBER Working Paper, No. 17621, 2011.

<sup>2</sup> This chapter deals with financial institutions, while the rest of the publication focuses on banks and mortgage banks. Financial institutions is a broader concept, comprising not only banks and mortgage banks, but also e.g. insurance and pension companies, central counterparties and the unregulated financial sector.

time, credit generally becomes harder to obtain and cyclical trends are amplified.<sup>1</sup>

A second reason is that the financial institutions are interlinked so that changes in one bank may affect the risk in other banks. For example, the financial institutions are linked through the money market. In Denmark, lending rose at a faster pace than deposits in the period leading up to the financial crisis. As a result, market-based funding became more common, and the financial sector became even more interlinked. When that happens, there is an increased risk that the difficulties of one institution may spread to the rest of the system. This could happen if the rest of the sector suffers losses when an institution becomes distressed. Or if the institutions reduce their exposures to each other after a shock, which may reduce liquidity.

A third reason is that the concentration of risk in individual financial institutions could mean that the whole economy is affected if one of these institutions becomes distressed. This could be because the credit granted by this institution is so extensive that it cannot immediately be taken over by other financial institutions and hence it will lead to significant credit reductions in the economy. Such institutions are called Systemically Important Financial Institutions, SIFIs.

Macroprudential policy should help to remedy these inexpediencies by reducing the build-up of risk in the financial sector and by mitigating the risk of periods during which financial instability impedes economic activity. Macroprudential policy is a new element of the regulatory framework, aimed at the financial system as a whole, and should contribute to financial sector behaviour overall being more in line with the interests of society.

It is necessary to identify and address systemic risks while they build up so as to prevent financial crises to the extent that this is possible. This means placing responsibility with relevant authorities and making sure they have the necessary instruments at their disposal. If action is not taken in good times, the scope for action is limited once the risks materialise. Conversely, taking action – e.g. increasing loss absorbency during upswings – will ensure a better point of departure, even if the crisis cannot be avoided.

The stability of the financial system is directly affected by macroeconomic policy and by regulation of the financial system. Interaction between macroeconomic policy and regulation also affects the stability of

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<sup>1</sup> See e.g. Nobuhiro Kiyotaki and John Moore, *Credit Cycles*, *Journal of Political Economy*, Vol. 105, No. 2, 1997, John Geanakoplos, *The Leverage Cycle*, in D. Acemoglu, K. Rogoff, and M. Woodford, (eds.), *NBER Macroeconomics Annual 2009*, Vol. 24, University of Chicago Press, 2010, and Kim Abildgren, Birgitte Vølund Buchholst, Atef Qureshi and Jonas Staghøj, *Real Economic Consequences of Financial Crises*, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 2011, Part 2.

the financial system. The roles of fiscal and monetary policy do not change with the introduction of macroprudential policy. The aim of monetary policy in Denmark will still be to keep a fixed exchange rate vis-à-vis the euro area, and fiscal policy should be designed not to reinforce but to dampen any threats of overheating. This cannot be replaced by macroprudential policy, but macroprudential policy can mitigate possible adverse impacts on financial stability. Coordination of policy initiatives is desirable in order to address specific systemic risks.

## INSTITUTIONAL FRAMEWORK FOR MACROPRUDENTIAL POLICY

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At the EU level, the institutional framework for macroprudential policy was laid down with the establishment of the ESRB. The objective of the ESRB is to prevent and mitigate systemic risks in the EU by identifying risks and – where appropriate – issuing warnings and recommendations for remedial action in response to the risks identified.<sup>1</sup>

National institutional frameworks for macroprudential policies are also required. Such frameworks should ensure that the responsibility for overseeing national systemic risks is firmly anchored, and specifying who can identify and implement measures to mitigate such risks.

In December 2011, the ESRB recommended that all EU member states establish national macroprudential mandates by the summer of 2013.<sup>2</sup> The recommendation comprises the following five areas<sup>3</sup>: objective; institutional arrangements; transparency and accountability; independence; and tasks, powers and instruments.

By 30 June 2012, Denmark and all other EU member states should submit an interim report stating how they intend to follow the ESRB's recommendation on national macroprudential mandates. By 30 June 2013, a final report must be communicated to the ESRB and the Ecofin. The ESRB recommends that the initiatives should be in force no later than 1 July 2013.

In Denmark, the topic is being considered by the Committee on the Structure of Financial Supervision, which is expected to publish a report with its recommendations before the summer 2012. According to the ESRB's recommendation, the ultimate objective of macroprudential pol-

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<sup>1</sup> See e.g. Frank Dierick, Petra Lennartsdotter and Paola del Favero, The ESRB at work its role, organization and functioning, *ESRB Macro-prudential Commentaries*, Issue No. 1, 2012.

<sup>2</sup> When the ESRB issues a recommendation, the addressee may choose to follow the recommendation or not to follow it. The addressee must inform the ESRB and the Ecofin of the status. If the addressee chooses not to follow a recommendation from the ESRB, an explanation must be provided.

<sup>3</sup> The full text of the recommendation, "Recommendation of the European Systemic Risk Board of 22 December 2011 on the macro-prudential mandate of national authorities, (ESRB/2011/3)" can be found at the ESRB's website: [www.esrb.europa.eu](http://www.esrb.europa.eu). For a description of the recommendation, see Michaela Posch and Remco Van der Molen, The macro-prudential mandate of national authorities, *ESRB Macro-prudential Commentaries*, Issue No. 2, 2012.

icy is to contribute to the stability of the financial system as a whole, and to ensure a sustainable contribution of the financial sector to economic growth. The ESRB suggests that the mandate could be pursued by a council comprising several authorities, and that central banks should have a key role because of their expertise in the area of macroanalysis and oversight of financial stability. This is in line with statements from the IMF.<sup>1</sup>

The ESRB recommends that macroprudential authorities should be operationally independent. They should be able to identify, monitor and assess systemic risk and to develop and implement the necessary measures. This requires access to – and possibly control of – a suitable range of macroprudential instruments so that action can be taken whenever necessary. In addition, the ESRB recommends that macroprudential authorities have access to relevant information, including institution-specific data when needed. Finally, the institutional framework should promote coordination with existing authorities that have a significant impact on financial stability, including authorities responsible for fiscal policy and microprudential regulation.

Since the results of macroprudential policy are not directly observable, the ESRB recommends that macroprudential institutions have a clear and transparent communication strategy. In practice, this means that the institutions' decisions and the underlying rationale should, whenever possible, be published. This will make the institutions publicly accountable for their decisions.

## MACROPRUDENTIAL INSTRUMENTS

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The purpose of using macroprudential instruments is to seek to contain risks within the overall financial system and the feedback to economic activity. Until now, regulation of the financial system has primarily focused on ensuring that the individual financial institution remains robust to the risks it takes on. This approach is known internationally as microprudential regulation. Microprudential regulation and macroprudential policy are, on the one hand, closely linked, but, on the other hand, they differ considerably. Macroprudential policy mainly uses microprudential instruments aimed at the individual institution's capitalisation and liquidity as macroprudential instruments. But macroprudential policy is aimed at the financial system as a whole.

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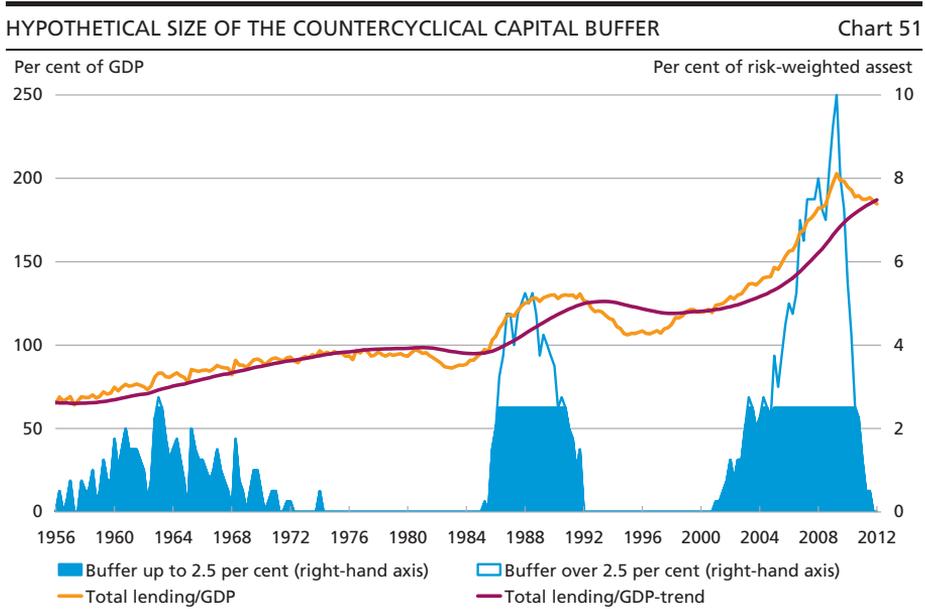
<sup>1</sup> See e.g. Erlend W. Nier, Jacek Osinski, Luis I. Jácome and Pamela Madrid, *Institutional Models for Macroprudential Policy*, *IMF Staff Discussion Note*, 2011, and FSB, IMF and BIS, *Macroprudential Policy Tools and Frameworks*, *Progress Report to G20*, October 2011.

EXAMPLES OF INSTRUMENTS	Box 12
<ul style="list-style-type: none"> <li>• <i>Countercyclical capital buffer</i>: Increased capitalisation requirements for financial institutions in periods of high credit growth.</li> <li>• <i>Additional requirements for SIFIs</i>: Increased ability to absorb losses through higher capital requirements, and increased supervision of SIFIs, including requirements for recovery and resolution plans.</li> <li>• <i>Large exposures</i>: Adjustment of requirements concerning intra financial sector exposures.</li> <li>• <i>Exposures to financial counterparties</i>: Stricter requirements concerning exposures to financial counterparties.</li> <li>• <i>Risk weights</i>: Higher risk weights for credit institutions' exposures.</li> <li>• <i>Loan-to-value limits</i>: Tightening of the limits for credit institutions' mortgaging of real property.</li> <li>• <i>Liquidity of financial institutions</i>: Setting liquidity requirements.</li> <li>• <i>Leverage</i>: Setting leverage requirements.</li> <li>• <i>Disclosure requirement</i>: Requirement for financial enterprises to publicly disclose selected exposures.</li> </ul>	

Since the financial markets are integrated, the effect of macroprudential policy depends on international coordination. Tightening of national measures cannot prevent developments in financial markets elsewhere from spreading across national borders. Furthermore, tightening may lead to arbitrage between rules in different countries, which may distort competition. Within the EU, the ESRB should coordinate macroprudential policies so as to ensure that national initiatives address specific national systemic risks.

The forthcoming Capital Requirements Directive, CRD IV, which is expected to be adopted by the EU during 2012, will introduce macroprudential instruments as part of the legislation. Since macroeconomic conditions vary considerably across the EU member states, there should be adequate flexibility for macroprudential policy at the national level. On the basis of preliminary proposals<sup>1</sup> a number of possible macroprudential instruments are expected, including a countercyclical capital buffer, an option to adjust requirements for the capitalisation of individual financial institutions, disclosure requirements, risk weights on exposures secured by residential property, the forthcoming liquidity requirements, and requirements concerning large exposures and exposures to other financial counterparties. It is envisaged that the European Commission, working with the ESRB and others, will reassess the macroprudential regulation in 2014. For example, it would be desirable to introduce instruments for handling SIFIs and instruments such as dynamic risk weights and leverage ratios.

<sup>1</sup> See e.g. the Danish EU Presidency's proposal for a compromise published at the website of the Council of the European Union, 11 May 2012 (documents 9715/12 and 9716/12).



Note: Total lending is based on lending to the non-financial sector by banks and mortgage banks (including lending by the banks' foreign units to residents from 1980). GDP is seasonally adjusted. The trend has been calculated using a recursive Hodrick-Prescott filter with a high smoothing parameter ( $\lambda=400,000$ ). The first 32 quarters in the time series are used to initialise the trend. The most recent observations are from the 1st quarter of 2012. The size of the countercyclical buffer has been calculated as 0.3125 (equivalent to 2.5/8) times the deviation from the trend level when the deviation exceeds 2 percentage points. When the deviation is less than 2 percentage points, the counter cyclical buffer equals 0. According to the latest compromise text of the Capital Requirements Directive, the buffer must be fixed at increments of 0.25 percentage points, which has also been incorporated into the calculation.

Source: Statistics Denmark, Danmarks Nationalbank and own calculations.

The area is being developed, and macroprudential policies will evolve as experience is gained. The examples given in the text and outlined in Box 12 are a start.

### Countercyclical capital buffer

The countercyclical capital buffer increases the capitalisation requirement for financial institutions in periods of high credit growth, when systemic risks typically build up.<sup>1</sup> The buffer should ensure that the institutions are better able to absorb losses in periods of stress. Higher capital requirements can in themselves help to curb credit growth. When systemic risks materialise or the business cycle reverses, the buffer requirements may be eased and the buffer used to absorb losses.

The buffer is an example of a macroprudential instrument which could be linked to an indicator-based rule. Lending to the non-financial sector as a ratio of GDP has proved to be a good indicator of the build-up of systemic risks in several countries, including Denmark, cf. Chart 51.<sup>2</sup> This

<sup>1</sup> See e.g. Mathias Drehmann, Claudio Borio, Leonardo Gambacorta, Gabriel Jimenez and Carlos Trucharte, Countercyclical Capital Buffers: Exploring Options, *BIS Working Paper*, No. 317, 2010.

<sup>2</sup> Mathias Drehmann, Claudio Borio and Kostas Tsatsaronis, Anchoring Countercyclical Capital Buffers: The Role of Credit Aggregates, *International Journal of Central Banking*, Vol. 7, No. 4, 2011.

indicator is expected to be the point of departure for determining the size of the countercyclical capital buffer. To find out whether the lending volume is above the normal level, lending is compared with a trend level. The buffer will be phased in when lending exceeds the trend level by, say, more than 2 percentage points. Applying a rule provides a high degree of predictability, and the probability of timely implementation increases. At the same time, a certain degree of flexibility is retained by permitting deviations from the rule in special circumstances.

When a country determines the level of the buffer, this level applies to the banks' exposures to the relevant country. Exposures to other countries are governed by the levels set by those countries. The most recent CRD compromise operates with a basic buffer of between 0 and 2.5 per cent of risk-weighted assets. If the national authority finds it relevant, the buffer may be set at more than 2.5 per cent, but in that case it will be voluntary for foreign authorities to acknowledge the part of the buffer that exceeds 2.5 per cent.

Chart 51 seeks to illustrate the size of such a buffer, had it existed back in time. The requirement for the countercyclical capital buffer would have increased both in the period up to the Nordic banking crisis in the late 1980s and in the period up to the financial crisis. Calculations show that, in theory, the buffer could have been 7.5 per cent at end-2007. In practice, however, increased capital requirements would presumably have dampened credit growth so that a lower buffer would have been required, especially if buffers had also been built up in other countries. Buffers would have increased the scope for manoeuvre during the crisis. In a best-case scenario this could have kept the leverage of banks, households and firms at a lower level and eliminated the need for Bank Rescue Packages 1 and 2, and the financial sector would have been in a better position to support the economic development during the crisis.

### **Additional requirements for SIFIs**

The probability that a systemically important financial institution, a SIFI, becomes distressed can be reduced by increasing its ability to absorb losses and strengthening supervision. The potential impact on the rest of the financial system from the resolution of a SIFI can be reduced by planning how the SIFI can be recovered or possibly wound up if that is necessary. This will also create better incentives for SIFIs. Structural initiatives can also reduce the impact on the rest of the financial system.

Work is underway to regulate SIFIs, both internationally and in Denmark. In late 2011, the Financial Stability Board and the Basel Committee on Banking Supervision published international standards for handling SIFIs in the form of guidelines for the resolution, identification of global

systemically important banks and tightening of the capital adequacy requirements for such banks, based on their systemic importance.<sup>1</sup>

In January 2012, the Danish Minister for Business and Growth set up an expert committee on SIFIs with representatives from the Ministry of Business and Growth, the Ministry of Finance, the Danish Financial Supervisory Authority, Danmarks Nationalbank and four external experts.<sup>2</sup> The committee is to report back to the Minister for Business and Growth by the end of 2012. Among other things, it is to present recommendations for identification of SIFIs in Denmark and prepare recommendations for the additional requirements to be imposed on Danish SIFIs. This could be in terms of higher capital requirements, corporate governance, risk management and liquidity. Furthermore, the committee is to recommend instruments that will help to ensure, as far as possible, that if a Danish SIFI becomes distressed, it can be wound up without the use of public funds, and in this context to consider whether recovery and resolution plans are required.

### **Loan-to-value limits and risk weights on exposures secured by residential property**

Loan-to-value limits and risk weights on exposures secured by residential property are sector-specific instruments which may limit systemic risks arising from an overheated property market. The loan-to-value limit is the statutory limit on the percentage of a defined property value that may be mortgaged. Higher risk weights mean that credit institutions must hold more capital on the exposures in question. This contributes to increasing the institutions' resilience to housing market developments.

Tighter lending rules will reduce borrowers' access to credit. This will, firstly, lower the risk that borrowers – and hence the financial sector – become distressed since their debts will be lower. Secondly, it will lower the risk that borrowers subsequently have to reduce their debt, thereby putting a damper on the economy.

### **Other macroprudential instruments**

Credit institutions' risk weights, and thus the capital requirement for certain types of exposures – such as exposures to financial counterparties – can be used to implement measures specifically targeted at the factors causing systemic risk. For example, a higher risk weight on exposures to financial counterparties may provide an incentive to reduce interlink-

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<sup>1</sup> Cf. Basel Committee on Banking Supervision, Global systemically important banks: assessment methodology and the additional loss absorbency requirement, *Rules Text*, 2011, and Financial Stability Board, *Key Attributes of Effective Resolution Regimes for Financial Institutions*, 2011.

<sup>2</sup> Cf. the terms of reference for the Committee on Systemically Important Financial Institutions in Denmark of 12 January 2012 (in Danish only).

ages in the system. Likewise, links within the financial system may be reduced by capping the financial institutions' exposures vis-à-vis individual counterparties.

Imposing liquidity requirements on financial institutions may also have a macroprudential impact. Varying liquidity requirements, which can be tightened by the authorities in good times when funding is easily accessible and inexpensive, would support the build-up of liquidity reserves that can be drawn on when the business cycle reverses. This may reduce the need and incentive for destabilising fire sales of assets and liquidity hoarding in periods when funding becomes harder to obtain. Tighter liquidity requirements during booms would also reduce credit growth based on short-term funding, which in turn would dampen cyclical fluctuations in the mismatch between the maturities of assets and liabilities.

A leverage cap could address systemic risks linked to procyclical leveraging in the financial sector. A leverage ratio is the relationship between a financial institution's capital on the one hand and its assets and off-balance-sheet items on the other hand; this ratio supplements the risk-based capital requirements. As a macroprudential instrument, the leverage ratio can be made dynamic along the lines of the countercyclical capital buffer, i.e. requirements are tightened in good times and correspondingly eased in bad times in order to curb the procyclical behaviour.

Tightening disclosure requirements for financial institutions may reduce systemic risks by increasing transparency. In the run-up to and during the financial crisis it might e.g. have been relevant to have had a clear overview of the financial enterprises' exposures to US subprime mortgages and subsequently to European government securities. In good times, increased transparency can contribute to more efficient markets by dampening procyclical behaviour due to underestimation of institutions' risks. In bad times, it may contribute to reducing uncertainty and resultant risk aversion. In Denmark, transparency is already high on the agenda; for example, Denmark, unlike other countries, requires disclosure of individual capital needs.

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## MACROPRUDENTIAL OVERSIGHT

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Macroprudential policy requires monitoring of systemic risk. Broad-based oversight of the financial system is important. Such oversight must comprise financial institutions, markets and the financial infrastructure. This also includes unregulated entities, known as the shadow banking sector, which may also cause systemic risks.<sup>1</sup>

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<sup>1</sup> This sector is, however, deemed to be of limited significance in Denmark. Introduction of tighter regulation of the ordinary banking system increases the risk that activities will relocate to the unregulated sector.

EXAMPLES OF INDICATORS	Box 13
<p>Indicators of cyclical systemic risks:</p> <ul style="list-style-type: none"> <li>• Credit to non-financial sector as a ratio of GDP</li> <li>• Loan-to-deposit ratio</li> <li>• Leverage in the financial sector, corporate sector and households</li> <li>• Credit institutions' interest margins</li> <li>• Credit institutions' collateral requirements</li> <li>• Credit institutions' loan impairment charges as a ratio of lending</li> <li>• Asset prices, e.g. house and equity prices</li> <li>• Credit spreads</li> </ul>	<p>Indicators of structural systemic risks:</p> <ul style="list-style-type: none"> <li>• Individual credit institutions' shares of total lending to and deposits from the non-financial sector</li> <li>• Credit institutions' lending to each other</li> <li>• Credit institutions' balance-sheet total as a ratio of GDP or the sector's aggregate balance-sheet total</li> <li>• The individual credit institutions' shares of total payments via payment systems</li> </ul>

Monitoring systemic risks should comprise both cyclical risks, which change with the credit cycle, and structural risks arising from the structure of the financial sector. To enable timely intervention, it would be desirable to have a set of indicators providing early warnings that systemic risks are building up so that financial crises can be avoided, if possible. Other indicators should pinpoint areas of stress within the system. These indicators will often be based on high-frequency data such as credit spreads.

The specific indicators to be used for oversight purposes are being developed. Box 13 provides examples of indicators of cyclical and structural risks, a few of which are elaborated on below.

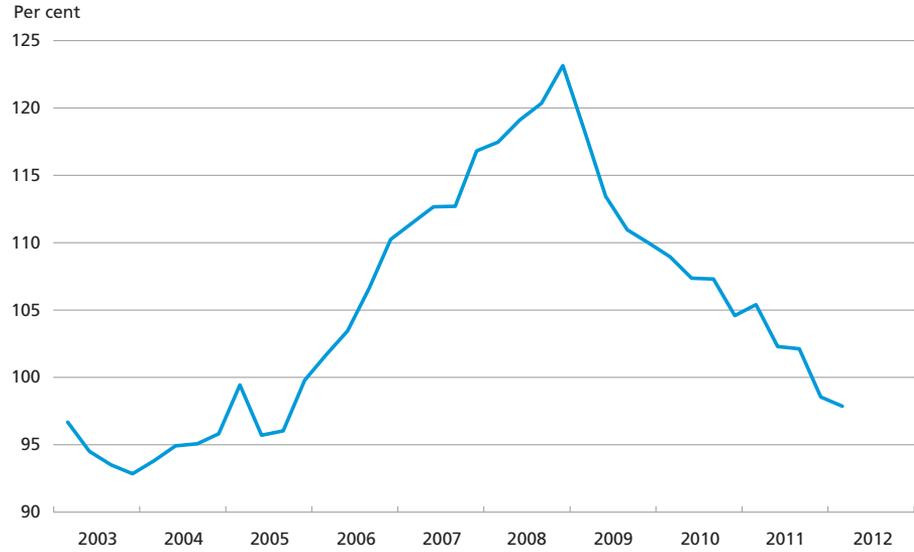
### Examples of indicators of cyclical risks

Cyclical systemic risks build up in the expansionary phase of the business cycle, mainly as a result of declining credit standards or increased maturity transformation<sup>1</sup>. An example of an indicator is credit to the non-financial sector as a ratio of GDP, which has been good at signalling the build-up of systemic risks, cf. Chart 51. Another example is the loan-to-deposit ratio, a "funding indicator". In the period up to the financial crisis, lending increased at a faster pace than deposits, cf. Chart 52. This development indicates changes in behaviour that should be kept under observation. During this period, the banks became more dependent on market-based funding. This is not in itself a problem, provided that the sources of funding are stable and diversified. But if banks rely on few

<sup>1</sup> Maturity transformation means that banks transform short-term deposits into long-term loans. This is because banks provide long-term loans which are funded by means of deposits and market-based funding with shorter maturities.

INDICATOR OF FINANCING RISKS – LOAN-TO-DEPOSIT RATIO

Chart 52



Note: Deposits and lending from banks in Denmark to households and the corporate sector, including deposits and lending from the foreign units of Danish banks to residents. The most recent observations are from the 1st quarter of 2012. Quarterly data.

Source: Danmarks Nationalbank.

sources of funding, such as short-term funding, they are vulnerable if these sources become unstable or dry up.

Other examples of indicators, signalling that systemic risks are building up, could be rising leverage in credit institutions, falling interest margins or reduced collateral requirements. Conversely, higher loan impairment charges and interest margins could indicate that risks are materialising.

### Examples of indicators of structural risks

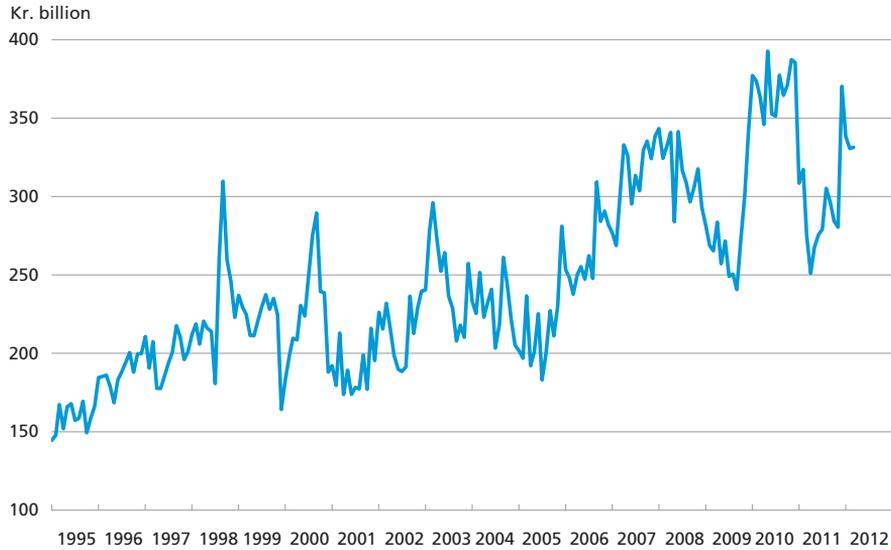
Structural systemic risks are high if the financial system is very concentrated or closely interlinked. Risk concentrations could e.g. result from financial institutions having exposures to the same assets, so that a price shock to these assets affects large parts of the system at the same time. The concentration of risk could also be attributable to the systemic importance of some financial institutions. An indicator of concentration could be the credit institutions' accumulated shares of total lending. In Denmark, the two largest credit groups account for around 60 per cent of lending.<sup>1</sup>

The behaviour and structures within the financial system can contribute to amplifying shocks to the system. The financial institutions are closely linked since they lend to each other. This has a strong impact on how a shock ripples through the system. If interlinkage increases in good

<sup>1</sup> Lending by credit groups to non-MFIs in Denmark.

INDICATOR OF INTERCONNECTION – INTERBANK LOANS

Chart 53



Note: Lending by banks in Denmark to MFIs (excluding central banks, including foreign MFIs). The most recent observations are from March 2012. Monthly data.

Source: Danmarks Nationalbank.

times, this entails a higher risk of losses on exposures to other institutions if they become distressed. Moreover, the institutions hesitate to lend to each other when uncertainty arises following a shock. This may create a pressure for institutions to reduce their balance-sheet totals.

One possible indicator is the banks' lending to each other. Until the crisis, the banks increased their mutual lending at the same time as their lending and balance-sheet totals grew. This led to a higher degree of interconnection, cf. Chart 53. The banks' interconnection also increased in the period from end-2009 to 2010, presumably reflecting the bank rescue packages.



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## 8. Modelling Loan Impairment Charges in the Stress Test Model

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*Internationally, the financial crisis has led to renewed focus on development of models for assessing financial stability, not least in relation to macro stress testing of banks' capitalisation. A core element of macro stress testing is the calculation of banks' loan impairment charges in macroeconomic scenarios in which the economy is hit by severe negative shocks. Danmarks Nationalbank has developed two new approaches to modelling of banks' loan impairment charges.<sup>1</sup> These approaches have been implemented in Danmarks Nationalbank's stress test model.*

### BACKGROUND

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A core element of macro stress testing is the calculation of banks' loan impairment charges in macroeconomic scenarios in which the economy is hit by severe negative shocks. Loan impairment charges are often a decisive factor in determining the banks' financial performance and excess capital adequacy in periods of unfavourable macroeconomic developments. This is because credit is at the core of banking activities, so naturally it is also the major source of potential losses.

The lessons learned from the financial crisis have led to increased focus on modelling of the development in the banks' balance sheets and income statements in stress tests.<sup>2</sup> Three areas are in particular focus. Firstly, the severity of the stress test scenarios plays a significant role. The financial crisis showed that in special circumstances the economy can suddenly deteriorate strongly. The macro stress test is an important tool for analysing the robustness of banks in such a situation, even though the probability that this scenario will materialise is deemed to be very low. Secondly, it is important to gain better understanding of the interaction between various risk factors and their feedback effects. Thirdly, there is focus on estimating structural models that are able to generate realistic loan impairment charge ratios in periods of stress. The financial crisis showed that many models were unable to describe the actual develop-

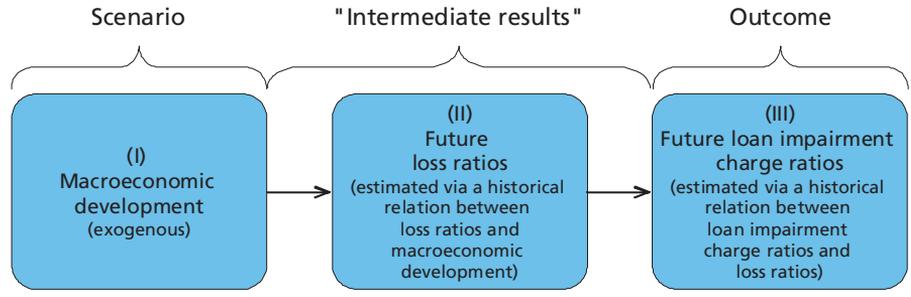
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<sup>1</sup> A detailed description of the methods can be found in Kim Abildgren and Jannick Damgaard, Models for Banks' Loan Impairment Charges in Stress Tests of the Financial System, Danmarks Nationalbank, *Monetary Review*, 1st Quarter 2012, Part 2.

<sup>2</sup> See e.g. Claudio Borio, Mathias Drehmann and Kostas Tsatsaronis, Stress-testing macro stress testing: does it live up to expectations?, *BIS Working Paper*, No. 369, January 2012.

THE APPROACH APPLIED BY DANMARKS NATIONALBANK SO FAR

Chart 54



ment in loan impairment charges during a crisis. Danmarks Nationalbank's two new approaches to modelling of banks' loan impairment charges relate to the third focus area.

### APPROACHES TO MODELLING OF LOAN IMPAIRMENT CHARGES

There are various approaches to modelling of the banks' loan impairment charges in connection with macro stress testing of the financial system. These approaches have different characteristics in terms of both degree of detail and methodology.

#### The approach applied by Danmarks Nationalbank so far

In the approach applied by Danmarks Nationalbank in its stress tests so far, the banks' loan impairment change ratios are estimated using a two-step procedure, cf. Chart 54.<sup>1</sup> In the first step, a link is estimated between loss ratios at industry/sector level and macroeconomic developments. In the second step, a number of macroeconomic variables are used to estimate a relation that can be used to convert loss ratios into loan impairment charge ratios. A logarithmic transformation is applied, whereby the model generates very high loan impairment charge ratios in scenarios that deviate significantly from historical trends. The two-step approach reflects a lack of historical data for the banks' loan impairment charges by industry and sector, while such data is available for losses.

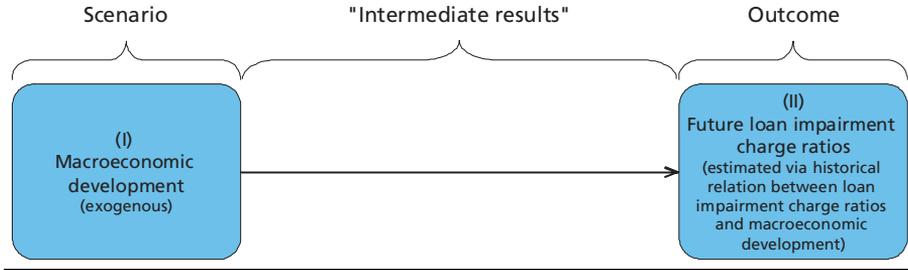
#### Danmarks Nationalbank's two new approaches

Danmarks Nationalbank has developed two new approaches to modelling of banks' loan impairment charges. The first approach is a macro factor model, modelling the loan impairment charge ratio for Danish banks' loans and guarantees as a direct function of a number of macroeconomic

<sup>1</sup> See Danmarks Nationalbank, *Financial stability*, 2008 and Danmarks Nationalbank, *Financial stability*, 1st Half 2009 for more detailed descriptions.

THE MACRO FACTOR MODEL

Chart 55



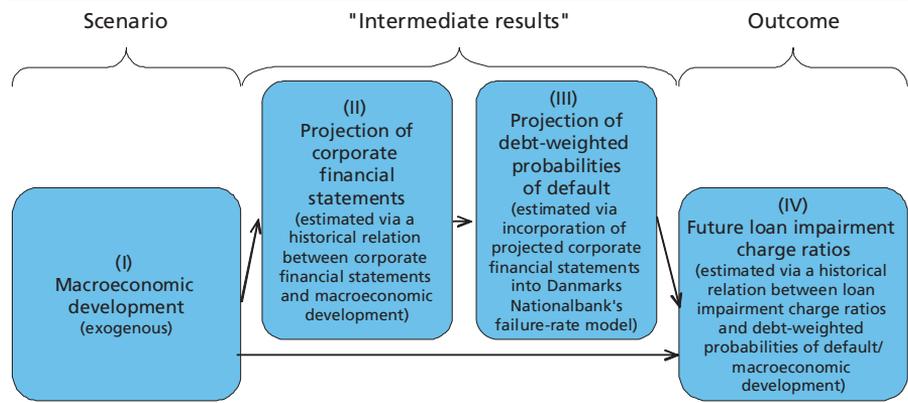
variables, cf. Chart 55. The second approach relies on an accounts-based failure-rate model at firm level and involves several steps, cf. Chart 56.

The macro factor model has the advantage over the accounts-based failure-rate model that it estimates loan impairment charges directly, thereby avoiding the potential extra sources of error that multi-step modelling involves. On the other hand, the firm-specific approach of the accounts-based failure-rate model means that the model would, in principle, be able to capture structural changes at the micro level before they can be detected in the macroeconomic variables. It is useful to apply different approaches to modelling of banks' loan impairment charges, as this provides a more robust picture of the risks arising in the various scenarios.

In connection with the development of the new approaches, a data set has been constructed for the banks' historical loan impairment charges broken down by industry and sector. This means that loan impairment charge ratios in the macro factor model can be estimated as a direct function of macroeconomic variables. For impairment charge ratios on loans and guarantees to households, the explanatory variables are the lagged loan impairment charge ratio, the unemployment rate and real growth in

FINANCIAL STATEMENTS-BASED FAILURE-RATE MODEL

Chart 56



house prices. For impairment charge ratios on loans and guarantees to the six industries, the explanatory variables are the lagged loan impairment charge ratio, real growth in demand for the output of the industry, short-term and long-term real interest rates and real growth in house prices. The latter can be seen as an indicator of real growth in the prices of commercial properties. With the estimated macro factor model, it is possible to calculate loan impairment charge ratios by industry and sector in the projection period for each scenario in a stress test.

Modelling of loan impairment charges using the accounts-based failure-rate model involves a number of steps. First, relations are estimated that describe the development in a firm's financial statements on the basis of a number of macroeconomic variables such as the development in the real gross domestic product, investments in building and construction and real interest rates. These relations are used to project the firms' annual financial statements in each of the stress test scenarios. By inserting the projected financial statements in Denmark's Nationalbank's accounts-based failure-rate model, it is possible to calculate debt-weighted probabilities of default, broken down by industry, over the projection period. Next, relations are estimated between the banks' loan impairment charge ratios by industry on the one hand and their debt-weighted probabilities of default by industry and the macroeconomic development on the other hand. Finally, these relations can be used to calculate loan impairment charge ratios by industry over the projection period for each of the stress test scenarios.

## **ESTIMATED LOAN IMPAIRMENT CHARGE RATIOS**

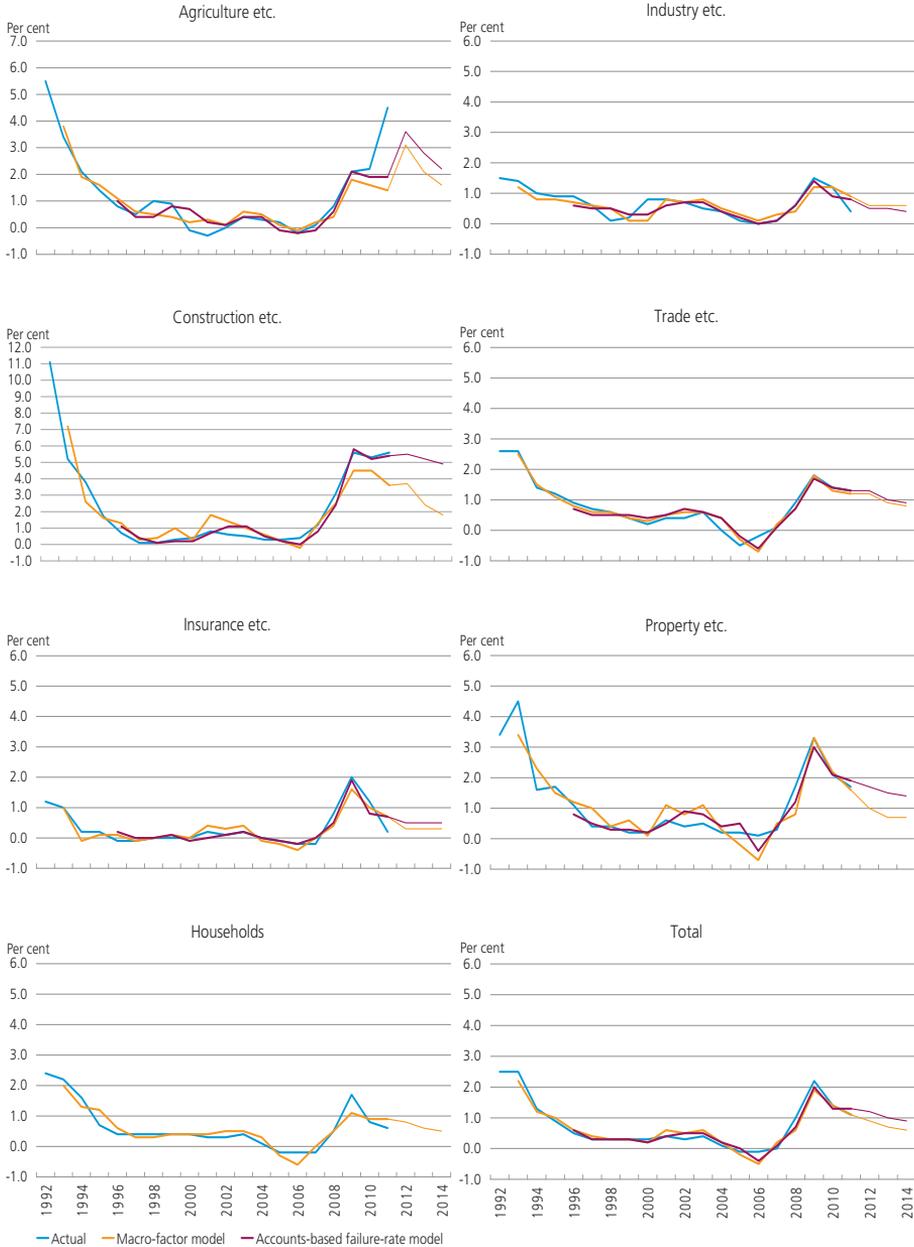
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Danmarks Nationalbank's two new approaches may be used to estimate banks' loan impairment charges in the stress test scenarios, cf. Chapter 5. Both the macro factor model and the accounts-based failure-rate model indicate that loan impairment charge ratios in the baseline scenario continue to fall from the high level seen during the financial crisis, cf. Chart 57. This is because the baseline scenario entails an improvement of the economy in 2012-14.

The models have difficulty in explaining the very high loan impairment charges for agriculture, etc. in 2011. This should be viewed in light of several banks having tightened their practices for making loan impairment charges for agricultural exposures. In December 2011, the Danish Financial Supervisory Authority informed the banks and mortgage banks about valuation of agricultural land in connection with the calculation of loan impairment charges and capital needs, cf. Chapter 4. This might have led to extraordinarily large loan impairment charges for a few banks in 2011.

LOAN IMPAIRMENT CHARGE RATIOS IN SCENARIO 0 (BASELINE SCENARIO)

Chart 57



Note: The Chart shows the sector's loan impairment charges as a ratio of loans and guarantees before loan impairment charges. Agriculture, etc. comprises agriculture, hunting, forestry and fisheries. Industry, etc. comprises industry, raw materials extraction and energy supply. Construction, etc. comprises building and construction. Trade, etc. comprises trade, transport, hotels and restaurants as well as information and communication. Insurance, etc. comprises financing (excluding credit institutions) and insurance. Real estate, etc. comprises real estate, other private sectors and the public sector. Households comprise employees and pensioners, etc., but not self-employed persons. Lending to private individuals with real property as collateral is included under Households and not under Real estate, etc. The estimated values of the total loan impairment charges are achieved by weighting together the loan impairment charges broken down by industries and sectors with loans and guarantees as the weight basis. In the calculation of the total for the failure-rate model, the macro factor model's loan impairment charge estimate for households is used.

Source: Danish Financial Supervisory Authority. and own calculations.

For most industries, the accounts-based failure-rate model generates slightly higher loan impairment charge ratios than the macro factor model over the projection period. An in-sample test shows that both models provide a good description of the historical development in loan impairment charges and are able to explain the high loan impairment charge ratios during the crisis from 2008 onwards. Both models are driven by developments in the macroeconomic scenarios and can supplement each other. Using different types of models to shed light on the banks' loan impairment charges provides a more robust picture of the risks associated with the various scenarios. Therefore, the averages of the two models are applied in calculations of loan impairment charge ratios in the stress test.

The macro factor model is estimated on the basis of data for the period 1992-2011. This period is characterised by a clear downward trend in both unemployment and short-term and long-term real interest rates. It is therefore uncertain whether the models' parameter estimates can be assumed to apply to periods of sharp increases in unemployment and interest rates over a short period of time. Similar issues apply to the accounts-based failure-rate model, which has been estimated on the basis of an even shorter data period than the macro factor model.

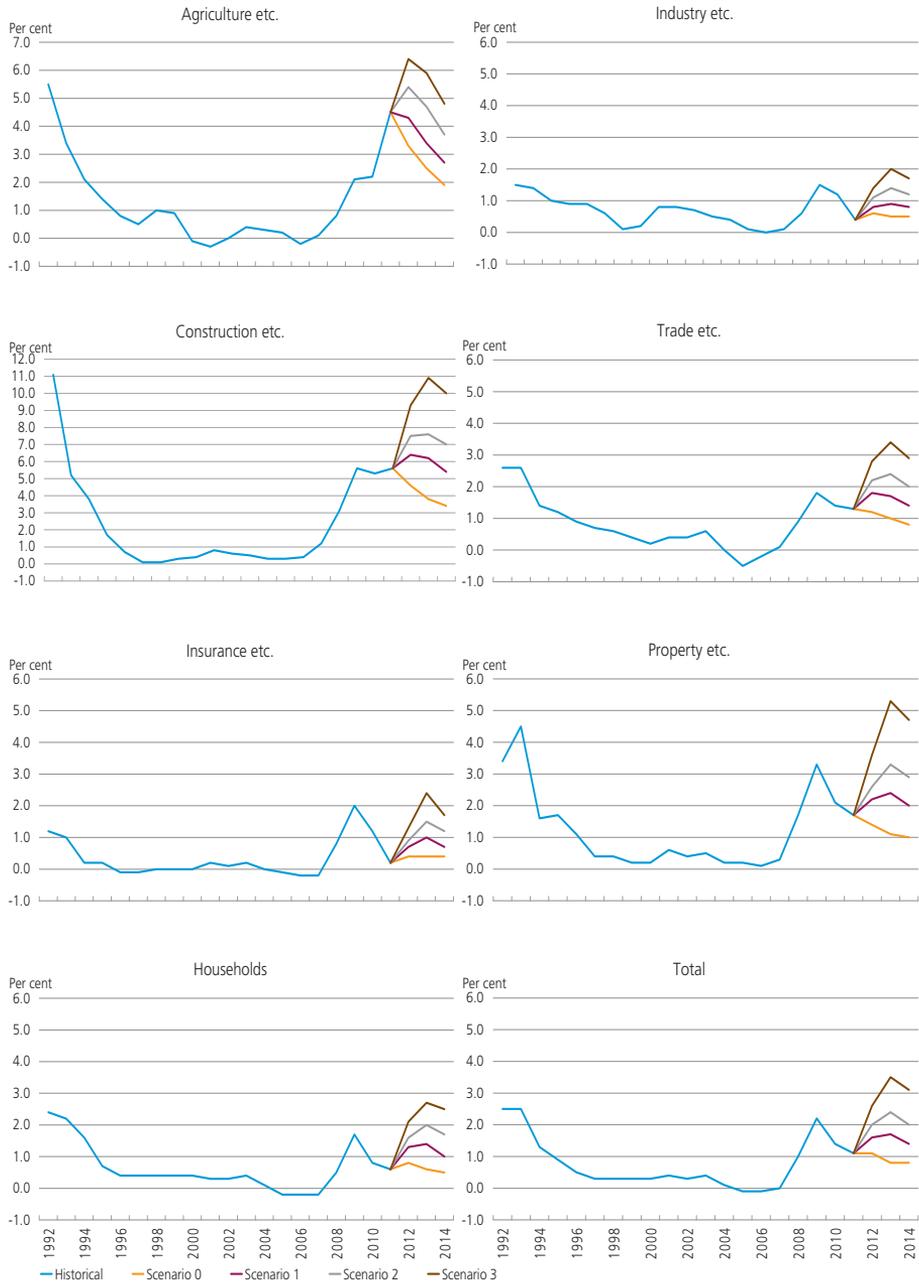
During the most recent financial crisis, the Danish government has implemented extensive support measures, e.g. Bank Rescue Package 1 (general government guarantee for the banks' depositors and unsecured creditors) and Bank Rescue Package 2 (government capital injections into banks and the option to purchase individual government guarantees for non-subordinated unsecured debt). Without these initiatives, the economic crisis would undoubtedly have been worse, and the banks' loan impairment charges would have been larger than they actually were. The stress test assumes that these support measures are not repeated.

It is also possible that the effects of banking crises on loan impairment charges depend on the duration of the period elapsed since the last crisis. For example, if one banking crisis follows immediately after another, the impact on loan impairment charges may be greater than if the banking crises are 15-20 years apart. The reason is that households and firms have less time to consolidate. Moreover, falling property prices in connection with a new crisis will further undermine the collateral behind the banks' lending, which is often property.

Consequently, adjustments are made to the modelled loan impairment charge ratios in scenarios 1-3. The extent of such adjustments is calibrated on the basis of, *inter alia*, experience from the most recent financial crisis, which led to a marked increase in the models' parameter estimates. In the most severe stress scenario, the overall loan impairment

LOAN IMPAIRMENT CHARGE RATIOS FOR THE SECTOR

Chart 58



Note: The Chart shows the sector's loan impairment charges as a ratio of loans and guarantees before loan impairment charges. The estimated values of the sector's total loan impairment charges are achieved by weighting together the loan impairment charges broken down by industries and sectors with loans and guarantees as the weight basis.

Source: Danish Financial Supervisory Authority and own calculations.

charge ratio is 3.5 per cent in 2013, but with considerable dispersion between industries and sectors, cf. Chart 58. The loan impairment charge ratios in this chapter have been calculated for the sector overall and deviate from those in Chapter 5, which focuses on loan impairment charges for the 13 banks included in the stress test.

## **BANK-SPECIFIC LOAN IMPAIRMENT CHARGE RATIOS**

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Danmarks Nationalbank's stress test model is based on a "top-down" approach, whereby developments in the banks' capitalisation are calculated on the basis of macroeconomic developments and data from the banks' financial statements. Other stress tests, such as the one performed by the European Banking Authority, EBA, operate with a "bottom-up" approach, i.e. the authorities set up scenarios and the banks themselves then calculate capital developments, based on the instructions received.<sup>1</sup> A "bottom-up" approach means that the banks have access to detailed information about each loan, while a "top-down" approach allows use of data at an aggregated level only.

So far, the estimated industry/sector-specific loan impairment charge ratios have been applied directly to all banks in Danmarks Nationalbank's stress test. The distribution of the individual banks' credit exposures to households and various industries has been taken into account, but not differences in the credit quality of the individual banks' loans and guarantees to a given industry. In the two most recent stress tests, special loan impairment charge ratios have, however, been applied to Danske Bank's exposures in Ireland.

There is considerable dispersion of the individual banks' loan impairment charges in the period 1992-2011, cf. Chart 59. These differences cannot be explained solely on the basis of the industry distribution of loans and guarantees.

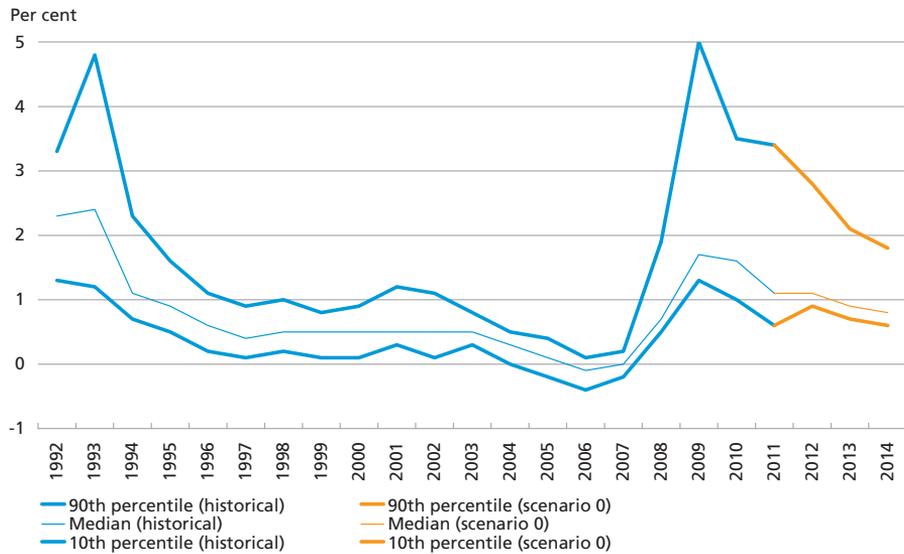
In connection with the development of the new loan impairment charge models, historical loan impairment charge ratios by industry/sector have been estimated. By multiplying these ratios by the banks' exposures broken down by industry, it is possible to analyse the relationship between total actual loan impairment charges and estimated loan impairment charges for each bank. Since the models have been estimated on the basis of data for the whole banking sector, banks which have provided loans and guarantees to customers with a fairly poor credit quality within the various industries will have higher loan impairment

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<sup>1</sup> A comparison of "top-down" and "bottom-up" stress tests for the largest Danish banks can be found in Danmarks Nationalbank, *Stress Tests*, 2nd Half 2009.

LOAN IMPAIRMENT CHARGE RATIOS FOR BANKS IN THE STRESS TEST

Chart 59



Note: Loan impairment charges are calculated as a ratio of loans and guarantees before loan impairment charges. The Chart shows the loan impairment charge ratios for the 13 banks included in Danmarks Nationalbank's stress test, cf. Chapter 5.

Source: Danish Financial Supervisory Authority and own calculations.

charges than the model shows, and vice versa. The analysis shows a tendency for certain banks to have had higher loan impairment charges than the model shows for several years. Consequently, the stress test operates with individual industry-specific loan impairment charge ratios for the 13 banks included in the test, cf. Chapter 5.



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## 9. Enforced Sales of Owner-Occupied Housing

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*Since the financial crisis hit Denmark in 2008, the number of enforced sales of owner-occupied housing has risen considerably, although it remains low compared with the level in the early 1990s. The number of enforced sales and the sales prices in these auctions have an impact on the banks' and mortgage banks' losses and loan impairment charges.*

*Enforced sales have been particularly high for homes bought in the years immediately before the crisis. For homes bought from 2009 onwards, the probability of enforced sale has been much lower than for homes bought just before the crisis. One reason could be that these homes have fallen less in value than homes bought immediately before the crisis. This also indicates that from 2009 onwards households have become more prudent when purchasing homes, and that the banks and mortgage banks have tightened their credit policies and enhanced the requirements for household finances.*

*The number of enforced sales varies substantially across Denmark. The most severely affected area is Western and Southern Zealand.*

### **BACKGROUND**

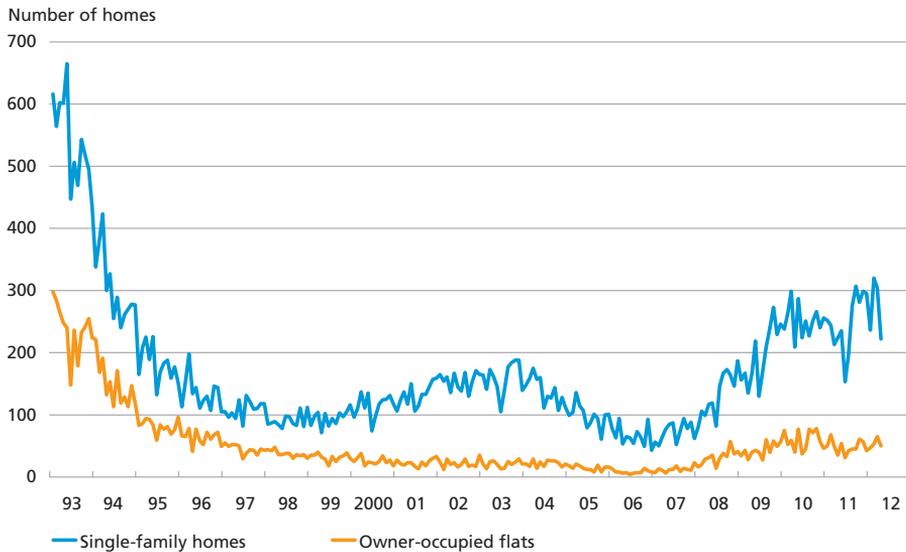
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An analysis of enforced sales gives an indication of the homes which have an increased risk of enforced sale, as well as the price at an enforced sale compared with the sales price for homes traded on the free market. Together with the finances of the individual household and the development in interest rates and unemployment, these factors have a major impact on the banks' and mortgage banks' losses and loan impairment charges on loans secured against owner-occupied housing as collateral.

Most household loans are raised by mortgaging the home. Hence, developments in the housing market influence both the value and tradability of the collateral behind a large proportion of the banks' loans. Since the financial crisis hit Denmark in 2008, the banks and mortgage banks have had considerably higher loan impairment charges on loans to households than in the pre-crisis years, cf. Chapters 4 and 6. At the same time, house prices have dived, time on market has increased and turnover has declined. The negative trend in the housing market is also reflected in an increasing number of enforced sales of single-family houses

## ENFORCED SALES OF OWNER-OCCUPIED HOUSING

Chart 60



Note: Monthly data that are not seasonally adjusted. The most recent observations are from April 2012.

Source: Statistics Denmark.

and owner-occupied flats, cf. Chart 60. According to Statistics Denmark, approximately 10,000 single-family houses and 2,200 owner-occupied flats were sold through enforced sale in the period 2008-11.

## VULNERABLE GROUPS IN THE HOUSING MARKET

Based on microdata from OIS, cf. Box 14, Danmarks Nationalbank has analysed the properties sold through enforced sale in the period from 2001 to 2011. The analysis shows that enforced sales have been particularly high for homes bought in the years immediately before the crisis. This applies especially to homes bought in 2006 and 2007, when house

### DATA FOR ENFORCED SALES

Box 14

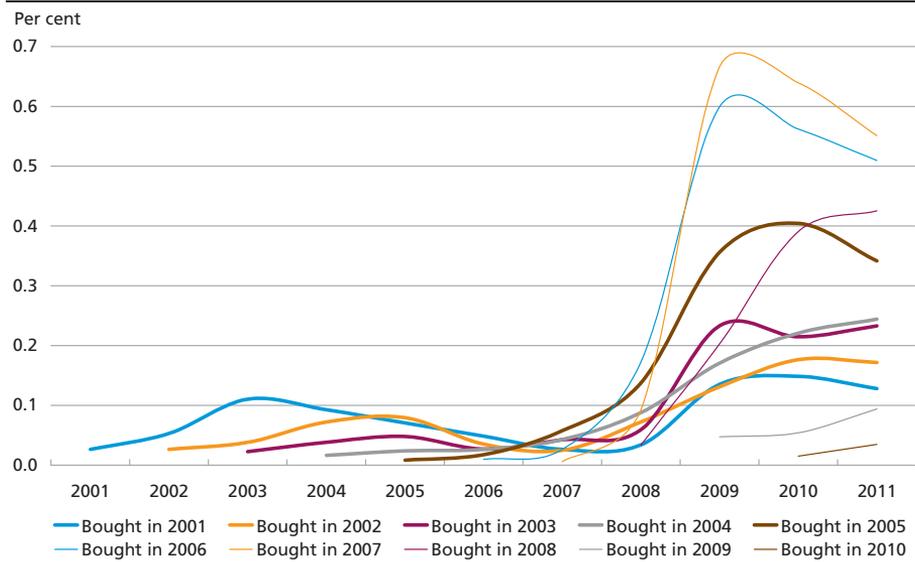
Data used in this analysis has been sourced from Den Offentlige Informationsserver, OIS, a government database of information on properties in Denmark. OIS sells property data through a number of distributors, including KMD A/S, who have provided data for this analysis. The data comprises a number of details on properties sold through enforced sale, including the date of and price at the enforced sale and the most recent trading date and price before the enforced sale. The analysis comprises data for residential properties and owner-occupied flats. This information is combined with regional property price statistics from the Danish Mortgage Banks' Federation and the Association of Danish Mortgage Banks, as well as Statistics Denmark's data for the development in the number of registered sales.

prices peaked. In 2009, enforced sales of these homes exceeded 0.5 per cent, cf. Chart 61. For homes bought in 2005 and 2008, the probability of enforced sale has also been relatively high.

There are several reasons why the number of enforced sales is particularly high for homes bought in the years just before the crisis. These homes were bought close to the time when house prices peaked. Consequently, the sharp decline in house prices meant that the loan in some cases exceeded the market value. This may prevent the owner from selling the home on the free market, unless a loan can be raised to bridge the gap between the amount owed and the market value. So if the owner needs to dispose of the home, e.g. because of unemployment or a divorce, this could result in an enforced sale. It is also possible that some buyers were too optimistic in the pre-crisis years and raised loans that stretched their finances a bit too far. Furthermore, it cannot be ruled out that, in the years when house prices just rose and rose, banks and mortgage banks were sometimes also too optimistic when granting loans. These effects may have been amplified by a bubble in the housing market in the pre-crisis years, i.e. some houses – particularly in the cities – were primarily bought in the expectation that prices would continue to rise. The widespread use of deferred-amortisation loans may also have led some homeowners to borrow too much.

ENFORCED SALES AFTER THE TIME OF PURCHASE AS A RATIO OF REGISTERED HOUSING TRANSACTIONS IN THE YEAR OF PURCHASE

Chart 61



Note: Annual observations. Enforced sales numbers in 2011 are partly estimated.

Source: Den Offentlige Informationsserver, KMD A/S, Statistics Denmark and own calculations.

Finally, the very low unemployment rate in the pre-crisis years has brought vulnerable groups of the population onto the labour market due to the shortage of labour; and hence these groups may also have gained access to the housing market. The subsequent rise in unemployment has hit these groups most severely, and consequently the probability of their homes being sold through enforced sale is high.

For homes bought from 2009 onwards, the probability of enforced sale has been much lower than for homes bought just before the crisis. One reason could be that these homes have fallen less in value than homes bought just before the crisis. This also indicates that from 2009 onwards households have become more prudent when purchasing homes, and that the banks and mortgage banks have tightened their credit policies and enhanced the requirements for household finances.

## **GEOGRAPHICAL DIFFERENCES**

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The number of enforced sales varies substantially across Denmark. The most severely affected area is Western and Southern Zealand. Almost a quarter of the homes bought in 2005-08 that were sold through enforced sale in 2008-11 were located in this area, while this applied to only 13 per cent of the total number of homes bought in 2005-08, cf. Chart 62.

At the peak in 2007, the price per square metre for single-family and terraced houses in Western and Southern Zealand was less than half the price in Greater Copenhagen, but prices in Western and Southern Zealand have since then dropped by around 10 percentage points more than those in Greater Copenhagen. The time on market is also longer in Western and Southern Zealand than in the rest of Denmark, cf. Chart 63. This could be one of the reasons for the high number of enforced sales, since it may be difficult to find buyers despite the plummeting prices. In contrast, the time on market is shorter in Greater Copenhagen than in the rest of Denmark. Finally, the high number of enforced sales in Western and Southern Zealand could also reflect that this is one of the areas in Denmark where unemployment has risen the most since the crisis set in.

For Denmark overall, the purchase prices in 2005-08 for homes subsequently sold through enforced sale in 2008-11 were concentrated in the interval from kr. 0.3 to 1.8 million, and approximately half of these homes were purchased for less than kr. 1.1 million, cf. Chart 64. The relatively low prices reflect the location outside the cities, i.e. in areas where house prices are generally lower. The high number of enforced sales in Western and Southern Zealand contributes to pushing purchase prices down. In Greater Copenhagen, on the other hand, purchase prices are generally higher, with nearly 15 per cent of the homes costing more than kr. 4.5 million.

**BREAKDOWN BY REGIONS – ENFORCED SALES IN 2008-11 FOR HOMES PURCHASED IN 2005-08 AND ALL HOUSING TRANSACTIONS IN 2005-08**

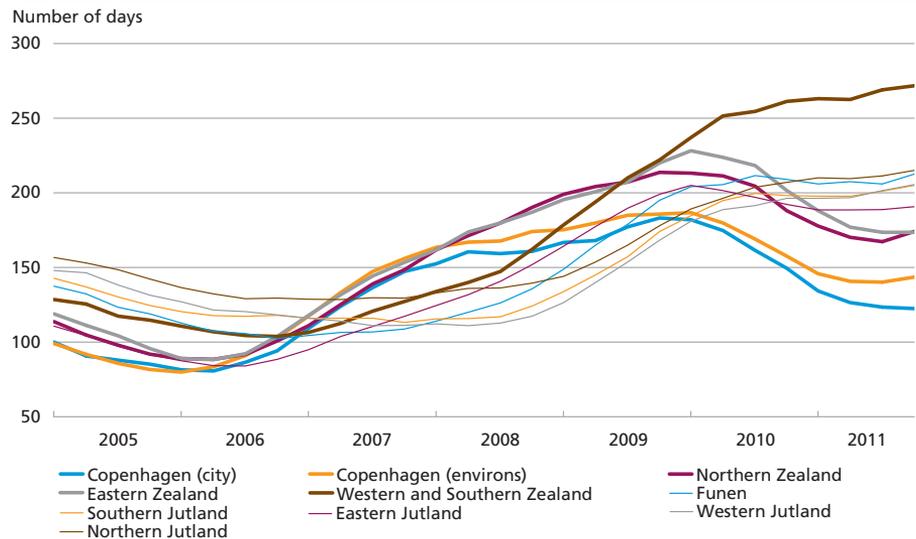
Chart 62



Note: Bornholm is not included, since the island differs from the other regions in terms of size.  
 Source: Den Offentlige Informationsserver, KMD A/S, Statistics Denmark and own calculations.

**AVERAGE TIME ON MARKET FOR SINGLE-FAMILY AND TERRACED HOUSES BROKEN DOWN BY REGIONS**

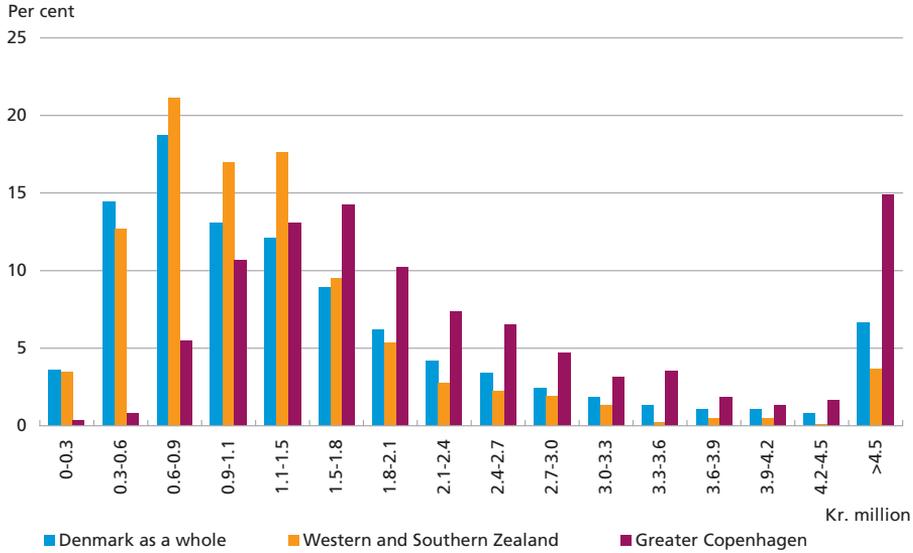
Chart 63



Note: 4-quarter moving average. The most recent observations are from the 4th quarter of 2011. Bornholm is not included, since the island differs from the other regions in terms of size.  
 Source: Danish Mortgage Banks' Federation and Association of Danish Mortgage Banks.

BREAKDOWN OF PURCHASE PRICES IN 2005-08 FOR HOMES  
SUBSEQUENTLY SOLD THROUGH ENFORCED SALE IN 2008-11

Chart 64



Source: Den Offentlige Informationsserver, KMD A/S and own calculations.

## PRICES OF HOMES SOLD THROUGH ENFORCED SALE

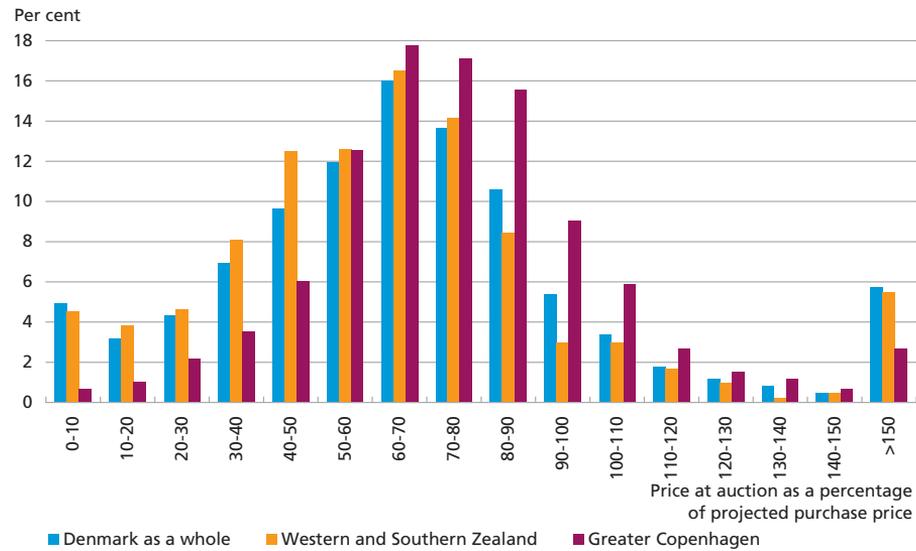
When a home is sold through enforced sale, the price is normally lower than for an equivalent home sold on the free market. One reason is that the buyer acquires the home "as is" and may be presented with more bills in connection with the takeover than would normally be the case. For Denmark as a whole, prices in enforced sales vary substantially relative to purchase prices projected according to house price developments, cf. Chart 65.<sup>1</sup> Most of the homes bought in 2005-08 and sold through enforced sale in 2008-11 were sold at between 40 and 90 per cent of the projected purchase price. In Western and Southern Zealand the ratio was generally a little lower than the national average. Conversely, prices in enforced sales in Greater Copenhagen are considerably closer to the projected purchase price. This could indicate that tradability is higher in the Copenhagen area, which is also reflected in the shorter time on market for homes sold on the free market.

In some cases, the bids in an enforced sale are so low that the mortgage bank chooses to submit its own bid. In 2011, the mortgage banks' portfolio of properties acquired was relatively stable at around 600 prop-

<sup>1</sup> The large dispersion is attributable to factors such as the condition of the home when it is purchased and sold. If a home is sold through enforced sale at a much higher price than the projected purchase price, the reason could be that the owner has e.g. made substantial improvements. Likewise, a very low price could indicate severe lack of maintenance.

BREAKDOWN OF PRICES OF ENFORCED SALES IN 2008-11 AS A RATIO OF THE PROJECTED PURCHASE PRICE FOR HOMES PURCHASED IN 2005-08

Chart 65



Note: The market value has been calculated by projecting the purchase price at regional level.

Source: Den Offentlige Informationsserver, KMD A/S, Danish Mortgage Banks' Federation, Association of Danish Mortgage Banks and own calculations.

erties. In early 2007, when the number of enforced sales was very low and tradability in the property market high, the figure was for a short time as low as around 10 properties.

How much a bank or mortgage bank loses in connection with an enforced sale mainly depends to the size of the loan relative to the sales price obtained. For Denmark as a whole, the price in enforced sales was between 40 and 80 per cent of the original purchase price for 54 per cent of the homes bought in 2005-08 and sold through enforced sale in 2008-11. If these homes were mortgaged up to the limit of 80 per cent at the time of purchase, there will be a shortfall of between 0 and 50 per cent of the amount borrowed from the mortgage bank. In addition, a bank loan may have been raised, which is not covered. But since the borrower, in addition to having mortgaged the home, is personally liable for the loan, the loss to the bank or mortgage bank will, in most cases by far, be less than the shortfall in the sales price. Firstly, the borrower may have other assets that can be realised, and secondly, the bank or mortgage bank may receive a part of the borrower's future income until the loan has been fully repaid.



# Appendices



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## Appendix 1: Population in the Report

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The analyses in this report are based on the banks included in the Danish Financial Supervisory Authority's groups 1 to 3 as at 31 December 2011. Group 1 comprises banks with working capital of at least kr. 65 billion, group 2\* comprises banks with working capital of kr. 12-65 billion and group 3\* comprises banks with working capital of between kr. 250 million and kr. 12 billion. In contrast to the Danish Financial Supervisory Authority's groups, Saxo Bank A/S, Skandinaviska Enskilda Banken A/S and Carnegie Bank A/S have been omitted from the population due to the special business foundation of those banks. Banks acquired by the Financial Stability Company have not been included in the calculations either. Nor have Sparekassen Østjylland and Sparekassen Salling, which failed in April 2012, been included in the population. An overview of the groups in the report is shown in Table 5.

The grouping also applies back in time. Banks that had been subject to mergers and acquisitions by the end of 2011 are included under the continuing company's group. The merger between Vestjysk Bank and Aarhus Lokalbanc is incorporated into the calculations unless otherwise indicated.

Lending in groups 1, 2\* and 3\* accounted for 85 per cent, 7 per cent and 7 per cent, respectively, of total lending by all Danish banks at the end of 2011. Other banks not included in the calculations of this report together account for 1 per cent of total bank lending.

Several of the banks are parent companies of other financial enterprises and therefore prepare both separate and consolidated financial statements. To provide the best possible overview of the development in the banks' banking activities, the analyses have primarily been based on separate financial statements, i.e. unconsolidated data. Similarly, separate financial statements have been used in the case of mortgage banks. Analyses of Nordic banking groups are, however, based on consolidated financial statements so that their various business structures abroad – subsidiaries or branches – do not affect the analyses.

**TOTAL ASSETS FOR THE BANKS AND MORTGAGE BANKS IN THE POPULATION  
AS AT 31 DECEMBER 2011, KR. MILLION**

Table 5

	Amount		Amount
<b>Group 1</b>			
Danske Bank .....	2,426,634	FIH Kapital Bank .....	9,784
Nordea Bank Danmark .....	603,932	Nørresundby Bank .....	9,359
Jyske Bank .....	270,021	Nordjyske Bank .....	8,374
Nykredit Bank .....	232,316	Sparekassen Faaborg .....	7,372
Sydbank .....	153,038	Østjydsk Bank .....	7,332
FIH Erhvervsbank .....	85,118	BRFkredit Bank .....	7,085
<i>Group 1, total</i>	<i>3,771,060</i>	Lægernes Pensionsbank .....	7,004
		Djurslands Bank .....	6,586
<b>Group 2*</b>			
Spar Nord Bank .....	68,822	Middelfart Sparekasse .....	5,893
Arbejdernes Landsbank .....	34,570	Sparekassen Thy .....	5,688
Vestjysk Bank .....	33,711	DiBa Bank .....	5,514
Alm. Brand Bank .....	20,895	Sparekassen Hobro .....	5,334
Sparekassen Sjælland .....	18,196	Skjern Bank .....	5,249
Ringkjøbing Landbobank .....	17,549	Frøs Herreds Sparekasse .....	5,179
Danske Andelskassers Bank .....	14,440	Grønlandsbanken .....	4,813
Sparbank .....	13,728	Saxo Privatbank .....	4,729
Sparekassen Kronjylland .....	13,656	Svendborg Sparekasse .....	3,005
<i>Group 2*, total</i>	<i>235,568</i>	Totalbanken .....	2,905
		Tønder Bank .....	2,843
<b>Group 3*</b>			
Den Jyske Sparekasse .....	16,749	Ekspres Bank .....	2,572
Sparekassen Lolland .....	13,729	Dronninglund Sparekasse .....	2,554
Bank DNB .....	12,595	Salling Bank .....	2,436
Sparekassen Vendsyssel .....	11,813	Sparekassen for	
Sparekassen Himmerland .....	10,255	Nørre Nebel og Omegn .....	2,418
Lån & Spar Bank .....	9,841	Kreditbanken .....	2,288
<i>Continues on next column</i>		PenSam Bank .....	2,148
		Nordfyns Bank .....	2,145
		<i>Continues on next column</i>	

**TOTAL ASSETS FOR THE BANKS AND MORTGAGE BANKS IN THE POPULATION  
AS AT 31 DECEMBER 2011, KR. MILLION**

Table 5

	Amount		Amount
Merkur, Den Almennyttige		Andelskassen J.A.K. Slagelse .....	322
Andelskasse .....	1,919	Fanefjord Sparekasse .....	315
Vestfyns Bank .....	1,817	Rønde og Omegns Sparekasse .....	300
Hvetbo Herreds Sparekasse .....	1,791	Sønderhå-Hørsted Sparekasse .....	298
Basisbank .....	1,783	Kongsted Sparekasse .....	264
Sparekassen i Skals .....	1,756	<i>Group 3*, total</i>	<i>234,837</i>
Lollands Bank .....	1,659	<b>Daish banks, total</b>	<b>4,241,464</b>
Dexia Bank Danmark .....	1,500		
Broager Sparekasse .....	1,479	<b>Mortgage banks</b>	
Møns Bank .....	1,468	Nykredit Realkredit .....	1,251,073
Vordingborg Bank .....	1,406	Realkredit Danmark .....	776,446
Vorbasse-Hejnsvig Sparekasse .....	1,275	Totalkredit .....	586,397
Sparekassen Bredebro .....	1,137	Nordea Kredit .....	387,392
Sparekassen Djursland .....	1,076	BRFkredit .....	215,652
Hvidbjerg Bank .....	946	DLR Kredit .....	154,946
Dragsholm Sparekasse .....	903	LR Realkredit .....	15,389
Frørup Andelskasse .....	717	FIH Realkredit .....	381
Langå Sparekasse .....	700	<i>Mortgage banks, total</i>	<i>3,387,676</i>
Frøslev-Møllerup Sparekasse .....	647		
Sparekassen Balling .....	603	<b>The Nordic groups (consolidated)</b>	
Hals Sparekasse .....	572	Nordea .....	5,324,404
Vinderup Bank .....	503	Danske Bank .....	3,424,403
Folkesparekasse .....	485	DNB .....	2,038,503
Rise Sparekasse .....	416	Handelsbanken .....	2,025,343
Andelskassen Fælleskassen .....	413	SEB .....	1,949,661
Fanø Sparekasse .....	408	Swedbank .....	1,532,450
Cantobank .....	367	<i>The Nordic groups, total</i> .....	<i>16,294,764</i>
<i>Continues on next column</i>			

Note: For banks merged in 2012, the total assets of the continuing bank are stated as either the published pro-forma balance sheet or as the sum of the assets of the two banks at end-2011. The total assets of Danish banks and mortgage banks are stated at bank-specific level, while the total assets of the Nordic banking groups are stated at group level.

Source: Danish Financial Supervisory Authority, company announcements and own calculations.

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## Appendix 2: Mergers and Failing Banks, 2008-May 2012

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### 2008

*Sydbank* and *bankTrelleborg* merged in March 2008 with *Sydbank* as the continuing company.

*Sparekassen Sjælland* and *Haarslev Sparekasse* merged in March 2008 with *Sparekassen Sjælland* as the continuing company.

*Sparekassen Himmerland* and *Store Brøndum Sparekasse* merged in April 2008 with *Sparekassen Himmerland* as the continuing company.

*Skovlunde-Øse Andelskasse* and *Billum Andelskasse* merged in May 2008 under the name *Andelskassen Varde*.

*Roskilde Bank* failed in August 2008. Initially, the bank's activities were transferred to Danmarks Nationalbank and the Danish Contingency Association, but in August 2009 they were transferred to the Financial Stability Company.

*Vestjysk Bank* and *Bonusbanken* merged in October 2008 with *Vestjysk Bank* as the continuing company.

*Frøslev-Møllerup Sparekasse* and *Sparekassen Nordmors* merged in October 2008 with *Frøslev-Møllerup Sparekasse* as the continuing company.

*Sparekassen Vendsyssel* and *Ulsted Sparekasse* merged in October 2008 with *Sparekassen Vendsyssel* as the continuing company.

*ebh bank* failed in November 2008. The bank's activities were transferred to the Financial Stability Company under Bank Rescue Package 1.

*Morsø Bank* and *Sparekassen Spar Mors* merged in November 2008 with *Morsø Bank* as the continuing company.

*Vestjysk Bank* and *Ringkjøbing Bank* merged in December 2008 with *Vestjysk Bank* as the continuing company.

**2009**

*Den Jyske Sparekasse* and *Sparekassen Løgumkloster* merged in March 2009 with *Den Jyske Sparekasse* as the continuing company.

*Løkken Sparekasse* failed in March 2009. The bank's activities were transferred to the Financial Stability Company under Bank Rescue Package 1.

*Sparekassen Hobro* and *Den Lille Sparekasse* merged in March 2009 with *Sparekassen Hobro* as the continuing company.

*Gudme Raaschou Bank* failed in April 2009. The bank's activities were transferred to the Financial Stability Company under Bank Rescue Package 1.

*Handelsbanken* and *Lokalbanken i Nordsjælland* merged in April 2009 with *Handelsbanken* as the continuing company.

*Andelskassen Himmerland* and *Andelskassen Vesthimmerland* merged in May 2009 with *Andelskassen Himmerland* as the continuing company.

*Andelskassen Varde* and *Thorstrup Andelskasse* merged in May 2009 with *Andelskassen Varde* as the continuing company.

*Fionia Bank* failed in May 2009. The bank's activities were transferred to the Financial Stability Company under Bank Rescue Package 1.

*Andelskassen J.A.K. Slagelse* and *J.A.K. Andelskassen Brenderup* merged in July 2009 with *Andelskassen J.A.K. Slagelse* as the continuing company.

**2010**

*Nordjyske Bank* and *Ø. Brønderslev Sparekasse* merged in January 2010 with *Nordjyske Bank* as the continuing company.

*Sparekassen Kronjylland* and *Tved Sparekasse* merged in January 2010 with *Sparekassen Kronjylland* as the continuing company.

*Capinordic Bank* failed in February 2010. The bank's activities were transferred to the Financial Stability Company under Bank Rescue Package 1.

*Sparekassen Lolland* and *Finansbanken* merged in March 2010 with *Sparekassen Lolland* as the continuing company.

*Nykredit Bank* and *Forstædernes Bank* merged in April 2010 with *Nykredit Bank* as the continuing company.

*Sparekassen Djursland* and *Agri-Egens Sparekasse* merged in April 2010 with *Sparekassen Djursland* as the continuing company.

*Eik Bank Danmark* failed in September 2010. The bank's activities were transferred to the Financial Stability Company under Bank Rescue Package 1.

*Max Bank* and *Skælskør Bank* merged in September 2010 with *Max Bank* as the continuing company.

*Morsø Sparekasse* and *Aktieselskabet Morsø Bank* merged in November 2010 and at the same time changed their name to *Fjordbank Mors*.

*Andelskassen MidtVest* and *Løgstrup Andelskasse* merged in December 2010 with *Andelskassen MidtVest* as the continuing company.

## 2011

*Amagerbanken* failed in February 2011. The bank's activities were transferred to the Financial Stability Company under Bank Rescue Package 3.

*Sparekassen Midtfjord* and *Sparekassen Himmerland* merged in February 2011 with *Sparekassen Himmerland* as the continuing company.

*Jernved-Rømø Andelskasse*, *Andelskassen Sydvestjylland* and *Andelskassen Sydjylland* merged in April 2011 with *Andelskassen Sydjylland* as the continuing company.

*Andelskassen Østjylland* and *Andelskassen Nordøstjylland* merged in April 2011 with *Andelskassen Østjylland* as the continuing company.

*Andelskassen Sønderjylland* and *Andelskassen Alssund* merged in April 2011 with *Andelskassen Sønderjylland* as the continuing company.

*Sammenslutningen Danske Andelskasser*, including its 16 cooperative banking members, and *Danske Andelskassers Bank* merged in May 2011 with *Danske Andelskassers Bank* as the continuing company.

*Lunde-Kvong Andelskasse* and *Sparekassen for Nr. Nebel og Omegn* merged in May 2011 with *Sparekassen for Nr. Nebel og Omegn* as the continuing company.

*Fjordbank Mors* failed in June 2011. The bank's activities were transferred to the Financial Stability Company under Bank Rescue Package 3.

*Fruering-Vitved Sparekasse* and *Østjyds Bank* merged in June 2011 with *Østjyds Bank* as the continuing company.

*Sparekassen Midtdjurs* and *Sparekassen Djursland* merged in June 2011 with *Sparekassen Djursland* as the continuing company.

*Ryslinge Andelskasse* and *Sparekassen Faaborg* merged in July 2011 with *Sparekassen Faaborg* as the continuing company.

*Max Bank* failed in October 2011. The bank's activities were transferred to *Sparekassen Sjælland* and the Financial Stability Company under Bank Rescue Package 4 (model 2).

## 2012

*Sparekassen Limfjorden* and *Sparekassen Vendsyssel* merged in February 2012 with *Sparekassen Vendsyssel* as the continuing company.

*Sparekassen Farsø* and *Den Jyske Sparekasse* merged in March 2012 with *Den Jyske Sparekasse* as the continuing company.

*Aarhus Lokalbanc* and *Vestjysk Bank* merged in March 2012 with *Vestjysk Bank* as the continuing company.

*Dragsholm Sparekasse* and *Sparekassen for Arts Herred* merged in April 2012 with *Dragsholm Sparekasse* as the continuing company.

*Sparekassen Østjylland* failed in April 2012. The bank's activities were transferred to *Sparekassen Kronjylland* and the Financial Stability Company under Bank Rescue Package 4 (model 2).

*Spar Salling Sparekasse* failed in April 2012. The bank's activities were transferred to *Den Jyske Sparekasse* with compensation from the Guarantee Fund for Depositors and Investors.

*Folkesparekassen* and *J.A.K. Andelskassen Varde* merged in May 2012 with *Folkesparekassen* as the continuing company.

## Appendix 3: Banks in Group 3\*

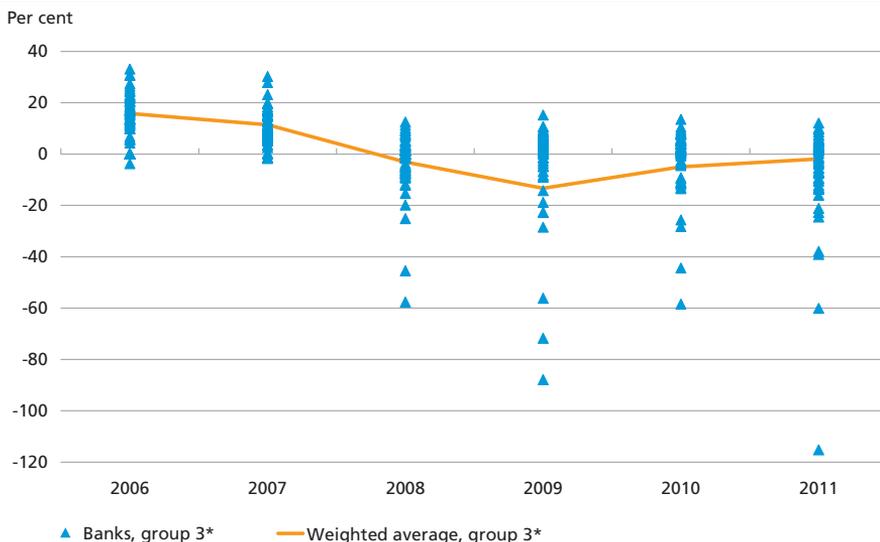
*This Appendix contains a number of charts to illustrate the earnings and capitalisation of the banks in group 3\*. The charts are to a great extent comparable to the charts for group 1 and group 2\* in Chapter 2 and Chapter 4. Moreover, a number of sensitivity calculations have been made to illustrate the banks' resilience to losses.*

### EARNINGS AND CAPITAL STRUCTURE

In group 3\*, 56 per cent of the banks were profitable in 2011 while the return on equity before tax varied much more, ranging from -115 per cent to 12 per cent. For the group as a whole, loan impairment charges were at the same level as in 2010 and were still not covered by other earnings. From 2010 to 2011, most banks reduced their large exposures. However, relative to excess capital adequacy, some banks had fairly large exposures. The vast majority of the banks complied with the limit values of the Danish Financial Supervisory Authority's Supervisory Diamond. The total capital ratios were higher on average among the banks in group 3\* than among the banks in group 1 and group 2\*. However, there were strong variations in group 3\*.

RETURN ON EQUITY BEFORE TAX, GROUP 3\*

Chart 66

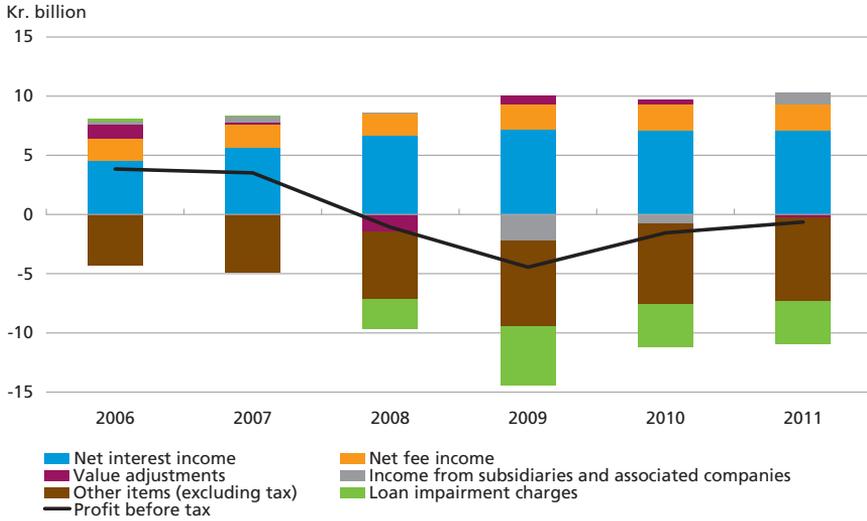


Note: Return on equity before tax is calculated as profit before tax as a percentage of average equity.

Source: Danish Financial Supervisory Authority and own calculations.

EARNINGS BROKEN DOWN BY KEY ITEMS, GROUP 3\*

Chart 67

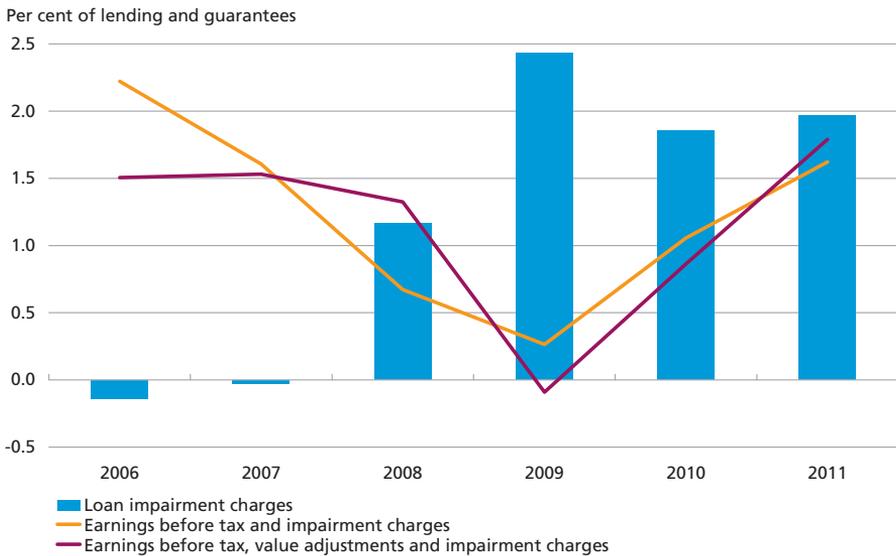


Note: "Other items" comprises dividend from shares, other operating income, other operating expenses, staff and administration expenses, depreciation and profit from assets held temporarily.

Source: Danish Financial Supervisory Authority and own calculations.

EARNINGS AND IMPAIRMENT CHARGES ON LOANS AND GUARANTEES, GROUP 3\*

Chart 68

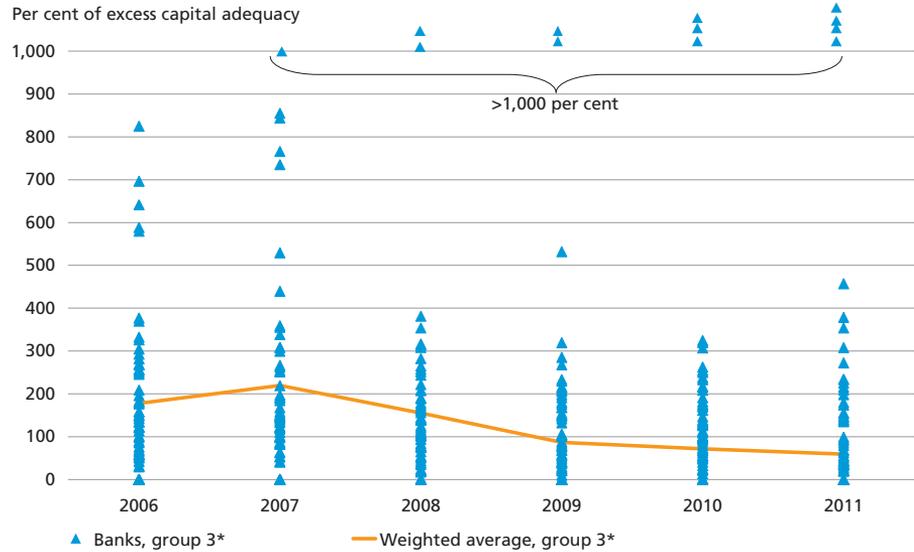


Note: Loan impairment charges and earnings are calculated as a ratio of loans and guarantees before loan impairment charges. Loan impairment charges and earnings in individual quarters are not annualised.

Source: Danish Financial Supervisory Authority and own calculations.

SUM OF LARGE EXPOSURES, GROUP 3\*

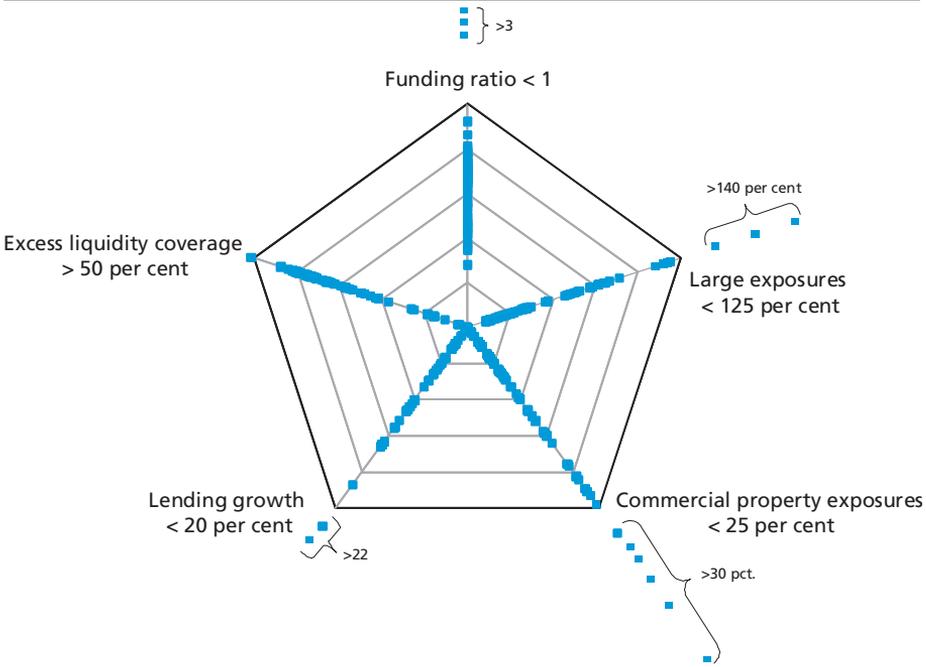
Chart 69



Note: Calculated on the basis of the Danish Financial Supervisory Authority's key ratio for total large exposures, the individual capital need and solvency ratio.  
 Source: Danish Financial Supervisory Authority and own calculations.

THE DANISH FINANCIAL SUPERVISORY AUTHORITY'S SUPERVISORY DIAMOND, GROUP 3\*

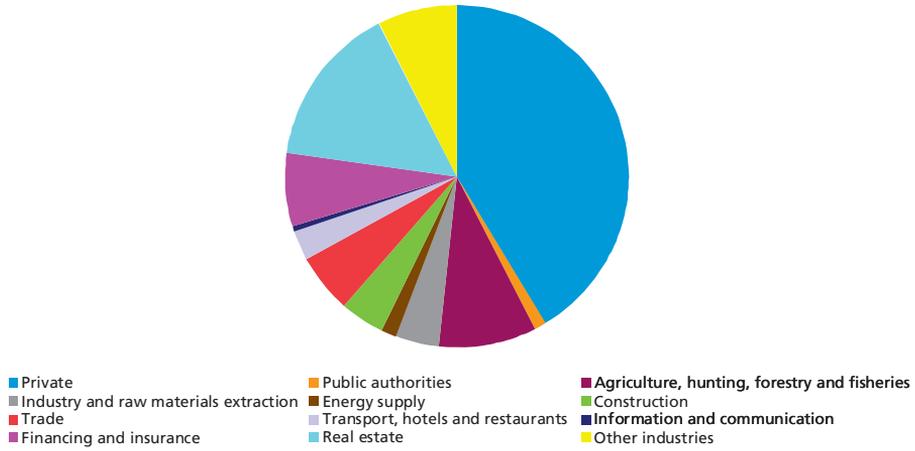
Chart 70



Note: Compiled as at the end of 2011. The excess liquidity cover is shown on an inverse scale with the edge of the diamond corresponding to excess cover of 50 per cent and the centre of the diamond corresponding to excess cover of 500 per cent. Mergers after 1 January 2012 are not incorporated.  
 Source: Danish Financial Supervisory Authority and own calculations.

LOANS AND GUARANTEES BROKEN DOWN BY INDUSTRIES AND SECTORS, GROUP 3\*

Chart 71



Note: End-2011.  
Source: Danish Financial Supervisory Authority.

BREAKDOWN BY INDUSTRIES, END-2011, GROUP 3\* Table 6

	Break-down of loans and guarantees, per cent	Impaired, per cent of loans and guarantees	Accum. loan impairment charges, per cent of loans and guarantees
<i>Public authorities</i> .....	1	...	...
Agriculture, hunting, forestry and fisheries ..	9	23	7
Industry and raw materials extraction .....	4	10	6
Energy supply .....	1	5	2
Construction .....	4	18	7
Trade .....	6	14	6
Transport, hotels and restaurants .....	3	17	8
Information and communication .....	0	6	4
Financing and insurance .....	7	14	7
Real estate .....	15	22	7
Other industries .....	8	11	6
<i>Corporates, total</i> .....	58	17	7
<i>Private</i> .....	41	4	4
<i>Total</i> .....	100	12	5

Note: "Impaired, per cent" is calculated as loans and guarantees with objective evidence of impairment (before loan impairment charges) as a ratio of loans and guarantees (before loan impairment charges). "Accum. loan impairment charges, per cent" is calculated as accumulated loan impairment charges/provisions as a ratio of loans and guarantees (before loan impairment charges).

Source: Danish Financial Supervisory Authority.

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**ADDITIONS TO LOAN IMPAIRMENT CHARGE RATIOS IN SENSITIVITY CALCULATION**

Table 7

Percentage points	Sector 2011	Calculation 1 Addition	Calculation 2 Addition	Calculation 3 and 4 Addition
Agriculture, etc. ....	4.47	-	0.20	1.42
Industry, etc. ....	0.42	0.50	0.97	1.56
Constructions, etc. ....	5.55	0.67	2.06	5.39
Trade, etc. ....	1.33	0.41	1.09	2.03
Insurance, etc. ....	0.15	0.80	1.33	2.20
Real estate, etc. ....	1.70	0.66	1.56	3.57
Housholds ....	0.59	0.80	1.36	2.13

Note: The additions are calculated as the estimated loan impairment charge ratios less the sector's loan impairment charge ratios in 2011. See Chapter 8 for a description of the calculations and the estimated loan impairment charge ratios.

Source: The Danish Financial Supervisory Authority and own calculations.

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**SENSITIVITY CALCULATIONS**

Sensitivity calculations are based on the group 3\* banks' financial statements for 2011 and are *ceteris paribus* assumptions.<sup>1</sup> The calculations show how large the individual bank's profit for 2011 would have been and how the excess capital adequacy would have developed under various simple assumptions. Any management measures that could have been taken or any provisions for losses resulting from stress included in the individual capital need are not allowed for.

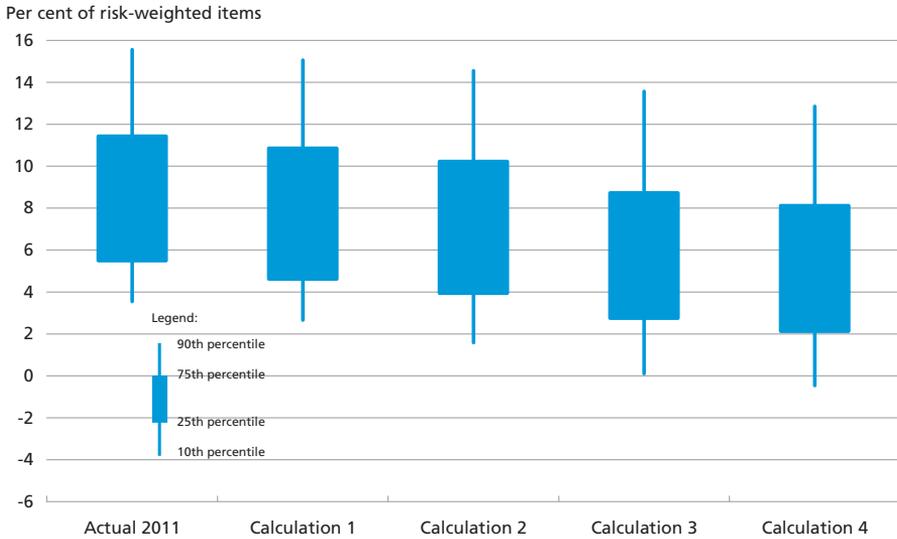
The sensitivity calculations are based on the loan impairment charge ratios estimated for the sector in general, cf. Chapter 8. The estimated loan impairment charge ratios for 2013, with the ratios in scenarios 1-3 being the highest on average, have been used. In the sensitivity calculations, each bank's loan impairment charges by industry are increased by an addition corresponding to the estimated loan impairment charge ratios for 2013 less the average loan impairment charge ratios for the banking sector in general in 2011, cf. Table 7. In the case of agricultural exposures, the sector's average loan impairment charges in 2011 exceed the estimated loan impairment charge ratio in scenario 1. The addition to loan impairment charges on agricultural exposures in sensitivity calculation 1 is therefore zero. In calculation 4 it is assumed that the loan impairment charges are similar to those used in calculation 3 and that earnings are under pressure from rising funding costs corresponding to 0.5 per cent of the banks' deposit by credit banks, deposits and bond issuance. The effect on profit is adjusted in the banks' capital adequacy at the end of 2011. The risk-weighted assets are assumed to be unchanged.

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<sup>1</sup> FIH Kapitalbank (subsidiary of FIH Erhvervsbank) is not included in the analysis.

EXCESS CAPITAL ADEQUACY, GROUP 3\*

Chart 72



Source: The Danish Financial Supervisory Authority and own calculations.

At the end of 2011, the individual banks' excess capital adequacy varied strongly, cf. Chart 72. For more than 10 per cent of the banks, the excess capital adequacy constituted more than 15 per cent of the risk-weighted assets while the figure was less than 3.5 per cent for the one-tenth of the banks with the lowest excess capital adequacy.

In calculations 1 and 2, the majority of the banks would still have had substantial excess capital adequacy, and the weighted average would have constituted 10.7 and 10.0 per cent, respectively. Some banks would have had to strengthen their capital bases.

In calculations 3 and 4, more than 10 per cent of the banks would have had to strengthen their capitalisation. Even in calculation 4, the weighted average of the group's excess capital adequacy constitutes 8.1 per cent of the risk-weighted assets, and the excess capital adequacy of the majority of the banks would have exceeded 4 per cent.

## Appendix 4: Stress test scenarios

The Appendix provides a detailed description of the macroeconomic scenarios used in the stress test in chapter 5.

SPECIFICATION OF SCENARIOS FOR THE DANISH ECONOMY, 2012 Table 8

	Scenario 0	Scenario 1	Scenario 2	Scenario 3
<i>Real growth, per cent, year-on-year</i>				
GDP .....	1.2	0.5	0.1	-0.7
Private consumption .....	1.1	-0.2	0.1	-0.7
Public consumption .....	0.9	0.9	0.9	0.9
Housing investment .....	0.3	-3.5	-3.6	-4.1
Business investment .....	5.5	-3.1	4.3	-4.5
Public-sector investments .....	10.6	10.6	10.6	10.6
Inventory investments (contribution to GDP growth) .....	0.2	0.2	0.3	0.3
Exports .....	1.9	1.9	-1.7	-2.5
- of which industrial exports .....	3.0	3.0	-2.6	-3.9
Imports .....	3.3	1.4	0.3	-1.7
Export market growth .....	3.4	3.4	-4.0	-5.8
<i>Nominal growth, per cent, year-on-year</i>				
Private sector disposable income .....	4.9	4.4	3.8	3.2
HICP .....	2.5	2.5	2.5	2.5
Hourly wages (industry) .....	2.3	2.3	2.3	2.3
House prices .....	-3.3	-8.2	-8.9	-10.2
<i>Average level for the year</i>				
Bond yield, per cent p.a. ....	2.5	2.5	2.5	3.0
3-month money market rate, per cent p.a. ....	0.3	0.3	0.3	0.8
Unemployment, thousands .....	109	114	117	122
Total employment, thousands .....	2,738	2,731	2,726	2,718
- of which private sector, thousands .....	1,739	1,732	1,727	1,719
Labour force, thousands .....	2,847	2,845	2,843	2,840
Unemployment rate, per cent .....	3.8	4.0	4.1	4.3
Net borrowing/net lending, private sector, kr. billion .....				
Government budget balance, kr. billion .....	197	221	196	211
B.o.p. current account, kr. billion .....	-93	-100	-100	-106
Crude oil, dollar/barrel .....	104	120	95	104
Crude oil, dollar/barrel .....	120	120	120	120

SPECIFICATION OF SCENARIOS FOR THE DANISH ECONOMY, 2013

Table 9

	Scenario 0	Scenario 1	Scenario 2	Scenario 3
<i>Real growth, per cent, year-on-year</i>				
GDP .....	1.6	-0.2	-1.9	-3.9
Private consumption .....	1.7	-1.0	-1.8	-3.5
Public consumption .....	0.5	0.5	0.5	0.5
Housing investment .....	3.0	-4.0	-5.1	-12.2
Business investment .....	7.2	-4.4	2.6	-11.8
Public-sector investments .....	-19.9	-19.9	-19.9	-19.9
Inventory investments (contribution to GDP growth) .....	0.0	-0.3	-0.7	-1.0
Exports .....	3.4	3.5	-2.1	-2.5
- of which industrial exports .....	5.5	5.6	0.6	1.0
Imports .....	3.5	0.8	-2.2	-4.7
Export market growth .....	5.9	5.9	-3.3	-4.5
<i>Nominal growth, per cent, year-on-year</i>				
Private sector disposable income .....	2.5	1.5	-0.3	-1.6
HICP .....	1.8	1.8	1.7	1.7
Hourly wages (industry) .....	2.5	2.2	1.9	1.6
House prices .....	3.2	-5.4	-7.3	-10.2
<i>Average level for the year</i>				
Bond yield, per cent p.a. ....	2.9	2.9	2.9	4.2
3-month money market rate, per cent p.a. ....	0.3	0.3	0.3	1.6
Unemployment, thousands .....	111	134	163	190
Total employment, thousands .....	2,746	2,712	2,668	2,626
- of which private sector, thousands .....	1,742	1,708	1,664	1,623
Labour force, thousands .....	2,857	2,846	2,831	2,817
Unemployment rate, per cent .....	3.9	4.7	5.8	6.8
<i>Net borrowing/net lending, private sector,</i>				
kr. billion .....	161	229	188	238
Government budget balance, kr. billion .....	-51	-75	-90	-113
B.o.p. current account, kr. billion .....	109	153	97	125
Crude oil, dollar/barrel .....	113	113	113	113

SPECIFICATION OF SCENARIOS FOR THE DANISH ECONOMY, 2014				Table 10
	Scenario 0	Scenario 1	Scenario 2	Scenario 3
<i>Real growth, per cent, year-on-year</i>				
GDP .....	1.7	1.0	0.4	-0.3
Private consumption .....	1.6	0.7	-0.3	-0.5
Public consumption .....	0.4	0.4	0.4	0.4
Housing investment .....	2.7	-0.8	-2.0	-4.4
Business investment .....	6.8	5.9	3.4	-0.6
Public-sector investments .....	0.7	0.7	0.7	0.7
Inventory investments (contribution to GDP growth) .....	-0.1	0.0	0.0	0.0
Exports .....	3.7	3.6	2.4	2.2
- of which industrial exports .....	5.7	5.6	6.6	6.8
Imports .....	4.0	3.9	2.3	2.5
Export market growth .....	6.9	6.9	6.3	6.3
<i>Nominal growth, per cent, year-on-year</i>				
Private sector disposable income .....	2.3	2.1	1.2	0.9
HICP .....	1.8	1.8	1.3	1.3
Hourly wages (industry) .....	2.7	2.1	1.1	0.4
House prices .....	2.2	1.9	0.9	-1.4
<i>Average level for the year</i>				
Bond yield, per cent p.a. ....	3.4	3.4	3.4	4.6
3-month money market rate, per cent p.a. ....	0.5	0.5	0.5	1.6
Unemployment, thousands .....	106	143	202	247
Total employment, thousands .....	2,761	2,709	2,625	2,561
- of which private sector, thousands .....	1,755	1,703	1,619	1,556
Labour force, thousands .....	2,867	2,852	2,827	2,808
Unemployment rate, per cent .....	3.7	5.0	7.2	8.8
<i>Net borrowing/net lending, private sector, kr. billion</i>				
Government budget balance, kr. billion .....	148	229	196	251
B.o.p. current account, kr. billion .....	-40	-74	-102	-132
Crude oil, dollar/barrel .....	108	154	93	119
Crude oil, dollar/barrel .....	105	105	105	105