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Increased risks in credit institutions' housing lending

Credit institutions are granting more housing loans to highly indebted homeowners

High loan-to-value ratios may cause vulnerabilities to a subsequent fall in house prices. A general requirement for higher down payments and instalments on loans to homeowners with a high loan-to-value ratio may contribute to a more resilient housing market.

Several institutions should consider whether their capital target is sufficient

The stress test of the institutions shows that several of them need the current excess capital relative to their capital target to be able to withstand stress.

Lending to vulnerable industries is limited

The institutions have limited lending to the industries that have been hardest hit by the pandemic. The institutions have made provisions to cover losses and are well equipped to grant loans to viable companies as the government loan schemes terminate.

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Summary and assessment

FINANCIAL MARKETS

Prospects of higher global economic growth
The global economy is recovering, and the International Monetary Fund (IMF) has raised its outlook for the growth rate for 2022 as vaccination continues in developed economies. In its latest projection for the Danish economy, Danmarks Nationalbank expects continued high growth rates, supported by very accommodative financial conditions and international recovery.

Inflation and interest rates have risen
Pressure on supply chains has contributed to higher inflation, and market participants also expect higher inflation in the longer term. Yields on long government bonds and mortgage bonds have risen since the summer, but are still at a low level.

Equity markets continue to rise, and credit premiums are low
Equity prices have increased in the western economies since April 2020. The financial markets are still characterised by high risk appetite: Credit spreads are low in the corporate bond market.

CREDIT

Increase in new housing loans to highly indebted homeowners
Lending to highly indebted homeowners constitutes an increasing share of mortgage credit institutions' new loans. Especially in Greater Copenhagen and Aarhus, they make up a large share. At the same time, half of new loans to these homeowners are with deferred amortisation. There are thus signs of increased risk-taking in housing lending.

Credit institutions grant more loans with deferred amortisation
The share of new loans with deferred amortisation has increased throughout Denmark, and these loans constitute more than half of new loans to homeowners in 2021. The increase in loans with deferred amortisation is particularly widespread among homeowners who refinance or modify their loans. Loans with deferred amortisation are also granted to homeowners with a high loan-to-value ratio at the time of the loan disbursement: Almost half of loans with deferred amortisation have been granted to homeowners with a high loan-to-value ratio. A general requirement for higher down payments and instalments on loans to homeowners with a high loan-to-value ratio may limit vulnerabilities to a subsequent fall in house prices. A reduction of the tax value of the interest deduction will reduce the incentive to raise debt and will also contribute to strengthen the structures on the housing market.

Some homeowners have a significant exposure to interest rate increases
Among homeowners who spend a large share of their income on servicing their loans, some have a significant exposure to interest rate increases. This applies, in particular, to homeowners with a high loan-to-value ratio who have chosen variable rate loans. Overall, homeowners' interest rate sensitivity is limited and, seen in isolation, it does not pose a threat to financial stability. Homeowners' interest rate sensitivity fell in the period from 2009 to 2019, as homeowners reduced their bank debt and increasingly opted for fixed rate mortgage loans.

Credit institutions' lending to vulnerable industries is limited
Lending to the industries that have been hardest hit by the pandemic only makes up a small part of corporate lending. However, the credit quality of these loans has deteriorated. The probability of default has thus increased on lending to vulnerable industries. The credit quality of the rest of the institutions' corporate lending has improved on average.

Falling pork prices may result in losses
Pork prices have fallen markedly since the summer after a period with high prices. If the current price level continues, it may result in losses being incurred on part of the institutions' lending to pig farmers. Although pig farmers have reduced their debt to some extent in recent years, a large proportion of bank lending to pig farmers is still characterised by impaired credit quality. The credit institutions should continue to focus on their customers in the pork industry improving their solvency during periods with favourable earnings opportunities.

EARNINGS

Banks have raised their earnings expectations for 2021
Several systemic credit institutions have raised their expectations for their profit for the year several

times during 2021. The principal reason for this is that the expected losses in the wake of the covid-19 restrictions have still not materialised. Another reason given by the institutions for their upward adjustments is that customer activity in the housing market and the financial markets in the 1st half of 2021 had a more positive effect than expected going into the year.

Rising costs may put pressure on earnings
Costs for the systemic institutions have increased in recent years. The rising costs are primarily due to higher staff costs. At the same time, revenues from traditional banking operations have been at a stable level. In view of the increasing costs, it is important that the institutions continue to focus on streamlining their operations.

CAPITAL

Stagnant capital ratios after implementation of new regulation
The systemic institutions' excess capital adequacy has been virtually unchanged during 2021. Risk exposure amounts have increased, primarily due to more rigorous regulations.

The countercyclical capital buffer is re-established at 1 per cent from September 2022 following a recommendation from the Systemic Risk Council. In December 2021, the Council expects to recommend increasing the buffer further to 2 per cent. With their current excess capital adequacy, the systemic institutions can meet both already announced and further expected increases.

Some systemic institutions are close to buffer requirements under stress
The latest stress test conducted by Danmarks Nationalbank shows that the systemic institutions have sufficient capital to withstand a severe recession scenario, but a few of the systemic banks are close to their buffer requirements.

Several banks should consider whether their capital adequacy target is sufficient
The large institutions currently hold more capital than their capital adequacy target warrants. But some institutions need their current excess capital adequacy to be able to withstand stress. The stress test shows that several systemic institutions would be in breach of the capital buffer requirements if the stress test had been conducted based on the institutions' capital adequacy targets instead of their current capitalisation.

Declining excess capital adequacy relative to MREL and debt buffer requirements
The total minimum requirement for eligible liabilities (MREL) and debt buffer requirements as well as the subordination requirement for the systemic institutions have increased since the turn of the year due to the increases in the risk-weighted exposures resulting from new regulation. However, the institutions still meet both the total MREL and debt buffer requirements as well as the coming group requirement.

LIQUIDITY AND FUNDING

Banks have increased their liquidity
The systemic banks have increased their liquidity reserves, and this is reflected in a high Liquidity Coverage Ratio (LCR). The increased liquidity is partly due to the central government's liquidity support measures for the corporate sector during the pandemic. The banks' liquidity can handle extra draws as the measures are phased out. Danmarks Nationalbank's latest sensitivity analysis shows that the systemic banks can handle severe liquidity stress for at least six months.

Net Stable Funding Ratio (NSFR) is a new funding requirement and aims to ensure a stable funding of the balance sheet
A new funding requirement, Net Stable Funding Ratio (NSFR), entered into force for the credit institutions in June 2021. The purpose of NSFR is to ensure that the banks have sufficiently stable funding available. The institutions should stress test the funding requirement to understand the factors that affect the requirement. NSFR is sensitive to withdrawals of deposits and lack of access to markets.

Now is a good time to secure a robust maturity profile on non-preferred senior debt
The current market situation is a good time for the banks to ensure a more robust maturity profile for compliance with NSFR and MREL requirements and adequacy buffers to these requirements. The reason for this is that the risk premium for non-preferred senior debt has fallen to a lower level than in the run-up to the pandemic. The lower risk premiums reflect that there is generally large risk appetite among investors in the debt issuance markets.

Interest rate rises will increase the need for liquidity in the financial sector

It is important that pension companies, life insurance companies and banks take potential interest rate rises into account in their risk management, as this may increase their liquidity needs. If interest rates rise, companies which use interest rate derivatives may need liquidity to meet variation margin calls.

Rising inflation affects the markets

Prospects of higher global economic growth

The global economy is recovering, and the expected growth rate for 2022 has increased since the spring. The International Monetary Fund (IMF) expects global economic growth of 4.7 per cent in 2022, see chart 1. Growth of 4.3 per cent is expected in the euro area in 2022 against a previous growth rate of 3.8 per cent. One of the reasons for the adjustments is advanced vaccination programmes in developed economies. In its latest projection for the Danish economy, Danmarks Nationalbank expects continued high growth rates for the Danish economy supported by very accommodative financial conditions and international recovery. However, the course of the pandemic is still a risk factor for the growth prospects.

Inflation and interest rates have risen

During 2021, yields on, for example, long government bonds and mortgage bonds have increased, but moderately. Pressure on supply chains has contributed to higher transport, energy and commodity prices, which has contributed to rising inflation, see chart 2. Market participants' long-term inflation expectations have likewise increased.

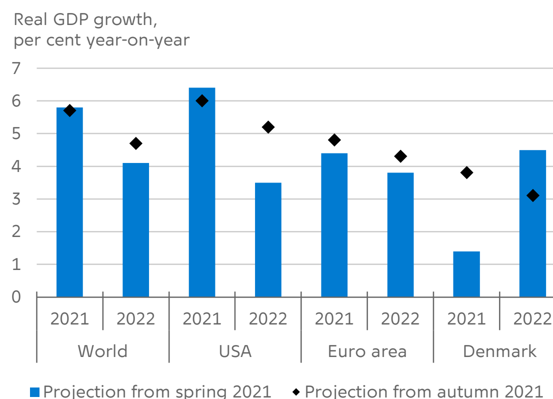
If an inflation rate above 2 per cent turns out to be of a more permanent nature, it may result in rising interest rates. Interest rate increases may pose a risk if interest rates rise suddenly and unexpectedly because of changing market expectations without a concurrent improvement in the economy. This may affect the value of a number of financial assets and, for example, lead to a great need for liquidity in the event of value fluctuations in derivatives contracts, see the section on liquidity and funding.

Rising long-term mortgage rates

Mortgage rates remain low, although there have been increases in the past couple of months. Danish borrowers thus still have access to home financing at low interest costs. Long-term bond yields have risen, whereas yields on short-term bonds have remained virtually unchanged since the beginning of 2021, see chart 3. An increased spread between long and short interest rates may incentivise some borrowers to choose variable rate loans over fixed rate 30-year loans, as it will be less attractive to hedge the interest rate.

Expectations of higher growth in global economy

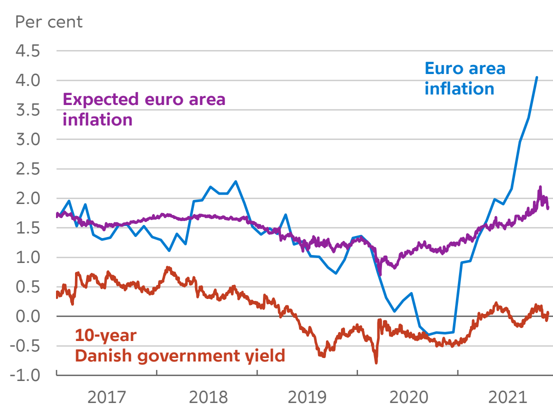
Chart 1



Note: IMF estimates for the world, based on exchange rates, and IMF estimates for the USA and the euro area from April 2021 and October 2021, respectively. GDP growth in Denmark is based on Danmarks Nationalbank's projections from March 2021 and September 2021, respectively.
Source: IMF and Danmarks Nationalbank.

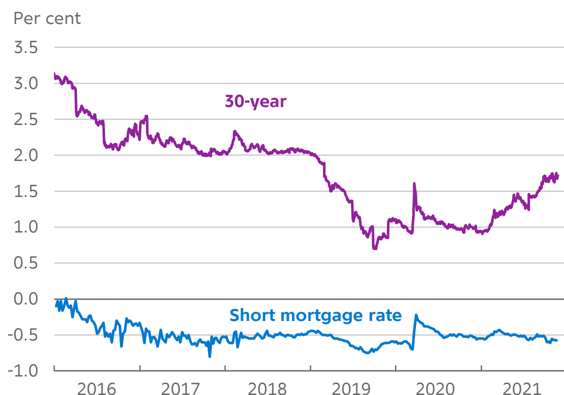
Inflation and inflation expectations have risen

Chart 2



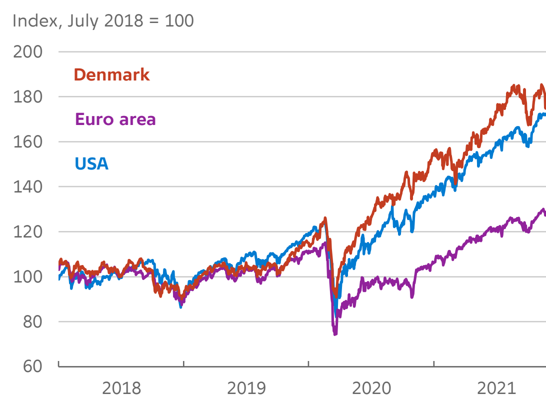
Note: *Inflation* indicates realised inflation figures based on the EU Harmonised Index of Consumer Prices (HICP) for the euro area. *Expected inflation* indicates five-year market-based inflation expectations starting five years from now. For example, the value in October 2021 indicates the expected inflation from October 2026 and five years onwards.
Source: Refinitiv Eikon and own calculations.

Rise in long-term mortgage rates Chart 3



Note: *30-year* shows the yield to maturity for a series of 30-year mortgage bonds based on the leading bond at the end of the month. Average effective bond yield for short-term mortgage bonds.
Source: Finance Denmark, Refinitiv Eikon and own calculations.

Equity markets continue to rise Chart 4



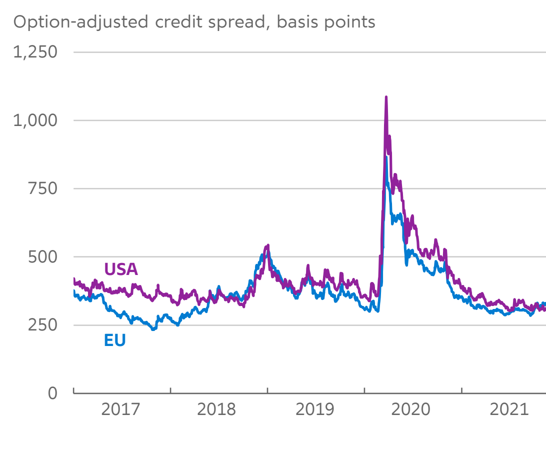
Note: The C25 Index is shown for Denmark, Eurostoxx 600 for the euro area and S&P 500 for the USA. The most recent update is from 25 November 2021.
Source: Refinitiv Eikon.

Equity prices continue to rise and credit premiums are low

Equity prices have increased in the western economies since April 2020, see chart 4. For Danish equities, prospects of economic recovery and increasing earnings expectations in the short term have caused prices to rise during 2021.[1] Despite a minor price fall for Danish equities after the summer period, the leading Danish index, the C25 Index, has risen by a total of 13 per cent during the first 11 months of 2021. European and American equities have risen by 20 and 27 per cent, respectively. since the beginning of 2021.

The financial markets are still characterised by high risk appetite among investors and low credit premiums. The credit premium reflects investors' willingness to take on the risks of a given debt instrument relative to a risk-free investment. Credit premiums are low in the corporate bond market, see chart 5. The credit premium for risky corporate bonds remains below the average level in 2018 and 2019: just under 25 basis points for euro-denominated issuances.

Still low credit premiums for corporate bonds Chart 5



Note: High-yield corporate bonds. The most recent observations are from 25 November 2021.
Source: Refinitiv Eikon.

1 See Danmarks Nationalbank, Accommodative financial conditions strengthen the upswing, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, no. 23, September 2021.

Increase in new housing loans to highly indebted homeowners

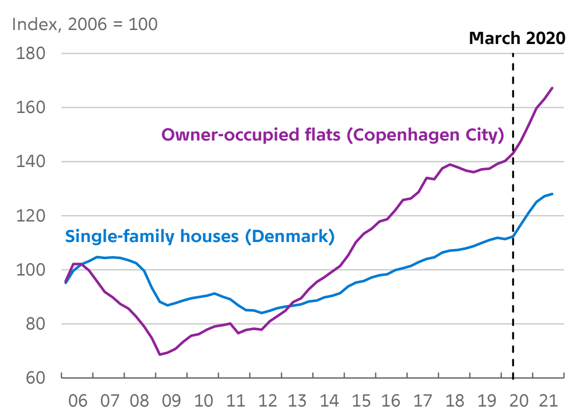
House prices have risen rapidly in the past year
Mortgage lending for owner-occupied homes and holiday homes increased by approx. 5 per cent year-on-year in October 2021. Conversely, total bank lending for housing purposes has decreased. Growth is roughly at the same level as before the outbreak of the covid-19 pandemic. However, the growth rate is moderate relative to the rise in house prices.

House prices have risen rapidly since the outbreak of covid-19, see chart 6. In the 3rd quarter of 2021, the prices of single-family houses and owner-occupied flats were thus 10 per cent and 13 per cent, respectively, higher than in the previous year. However, price increases have abated in recent months. Households' increased appreciation of their homes may help explain the rise in house prices during the pandemic.[2]

The low interest rate level currently supports house prices. However, a large sudden increase in interest rate levels may give a drop in house prices, which will increase homeowners' loan-to-value ratio.

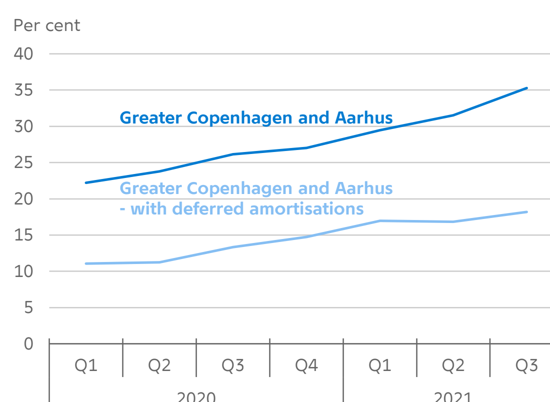
Increase in new housing loans to highly indebted homeowners
New loans to highly indebted homeowners constitute an increasing share of mortgage credit institutions' new loans, see chart 7.[3] About 35 per cent of new loans in Greater Copenhagen and Aarhus in the 3rd quarter of 2021 were thus granted to homeowners with a loan-to-value ratio above 60 per cent and a debt-to-income ratio above 4. This is an increase of 13 percentage points on the 1st quarter of 2020. In the rest of Denmark, more new loans have also been granted to highly indebted homeowners. In the 3rd quarter of 2021, they accounted for 17 per cent of new loans from mortgage credit institutions. At the same time, half of the new loans to highly indebted homeowners are with deferred amortisation. There are thus signs of increased risk-taking in lending.

Significant rise in house prices in the past year — Chart 6



Note: Seasonally adjusted house prices. The most recent observations are from the 3rd quarter of 2021.
Source: Statistics Denmark and own calculations.

More new loans to highly indebted homeowners in Greater Copenhagen and Aarhus — Chart 7



Note: Share of new mortgage loans to highly indebted owners. New loans have been calculated net, see box 1. Highly indebted homeowners are defined by having a debt-to-income ratio above 4 and a loan-to-value ratio above 60 per cent. The loan-to-value ratio is for the total mortgage and bank debt secured by mortgage on the home.
Source: Danmarks Nationalbank and own calculations.

2 See Adrian Michael Bay Schmith, Jesper Pedersen, Simon Juul Hviid and Simon Thinggaard Hetland, Housing market robustness should be strengthened, *Danmarks Nationalbank Analysis*, no. 16, June 2021.

3 New loans have been calculated as net new loans, see box 1.

New loans from mortgage credit institutions – what we have done

Box 1

Danmarks Nationalbank and the Danish Financial Supervisory Authority collects data on all Danish borrowers' credit conditions from mortgage credit institutions and banks on a quarterly basis. The data collection goes back to the 4th quarter of 2019. The credit data includes information about loans such as outstanding debt, interest rate, loan type, mortgage and collateral for loans, including value of mortgage, location etc.

In the analysis, we have zoomed in on information regarding Danish private individuals' mortgage loans secured on owner-occupied homes in Denmark. Based on a number of assumptions and using the homeowners' mortgage and loan data, we have categorised the lending by loan type (new loans or existing loans) and type of borrower (first-time buyer, other buyers as well as refinancing and top-up loans (existing homeowners)).

- **First-time buyers** are homeowners with a new mortgage loan in the current quarter who have neither had a bank loan nor a mortgage loan with collateral in real properties since October 2019. The statement thus also includes buyers who have returned to the housing market since October 2019 after a break.
- **Other buyers** are all other home buyers who have either changed homes or acquired an extra home and raised a new loan.
- **Existing homeowners** are when the homeowner takes out a new mortgage loan without a concurrent change in home ownership.
- **New loans** have been calculated net in the analysis. New loans are thus equal to the mortgage debt in the current period less the mortgage debt in the previous period. For first-time buyers, the lending will be identical to gross new lending, as, by definition, this buyer segment did not have a housing loan in the previous period.

The calculations are subject to uncertainty due to the short data-collection period and time lags in mortgage ownership.

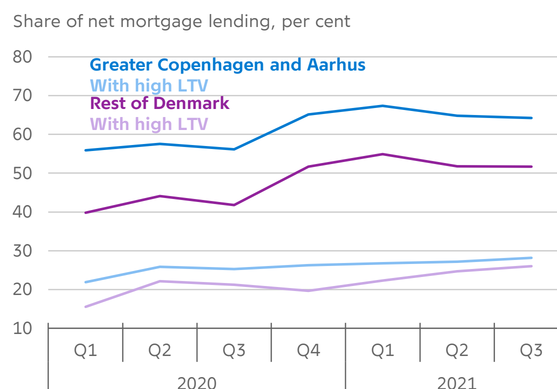
Credit institutions grant more loans with deferred amortisation

Since the end of 2020, the share of mortgage loans with deferred amortisation has increased after having decreased for a number of years. Part of the increase at the end of 2020 is due to some of the homeowners who refinanced or modified their loans having chosen to switch to loans with deferred amortisation.[4] Just under half of the homeowners' mortgage debt was with deferred amortisation at the end of October 2021.

New loans with deferred amortisation are most widely used in Greater Copenhagen and Aarhus, where they constituted 66 per cent of new loans in the first three quarters of 2021, whereas the share was 53 per cent for the rest of Denmark, see chart 8. This corresponds to an increase of about 10 percentage points relative to the first three quarters of 2020. The increase in loans with deferred amortisation primarily occurred in the 4th quarter of 2020, in which the share increased by 9 percentage points in Greater Copenhagen

Share of new loans with deferred amortisation has increased

Chart 8



Note: Share of new mortgage loans with deferred amortisation. New loans have been calculated net, see box 1. Deferred amortisation is defined by the homeowner having minimum one loan with deferred amortisation. *High loan-to-value ratio* includes lending with deferred amortisation and a loan-to-value ratio above 60 per cent. The loan-to-value ratio is for the total mortgage and bank debt secured by mortgage on the home.
Source: Danmarks Nationalbank and own calculations.

4 See Danmarks Nationalbank, Build-up of risks in credit institutions, *Danmarks Nationalbank Analysis (Financial stability)*, May 2021.

and Aarhus and by 10 percentage points in the rest of the Denmark.

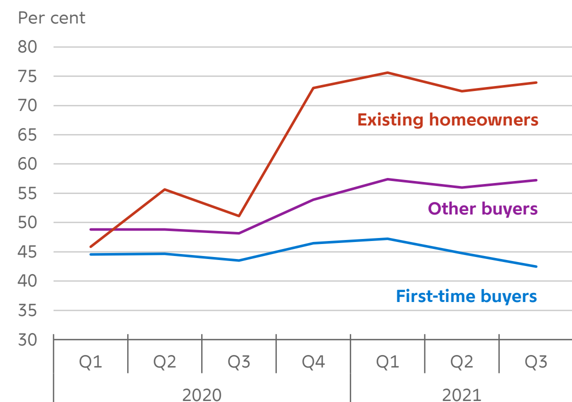
Loans with deferred amortisation are also granted to homeowners with a high loan-to-value ratio at the time of the loan disbursement. Both in Greater Copenhagen and Aarhus and in the rest of Denmark, slightly more than a quarter of the new loans in 2021 were granted to homeowners with deferred amortisation and a loan-to-value ratio above 60 per cent. However, the share of new loans with deferred amortisation is close to the same level as in 2020. The growth in loans with deferred amortisation at the end of 2020 was thus primarily driven by homeowners with a loan-to-value ratio below 60 per cent.

The increase in loans with deferred amortisation is particularly widespread among homeowners who refinance or modify the loans in their existing homes, see chart 9. Among these homeowners, loans with deferred amortisation constitute 74 per cent of their borrowing. First-time buyers have not raised loans with deferred amortisation to the same extent as existing homeowners and home buyers.

Deferred amortisation increases vulnerabilities to a subsequent drop in house prices. Use of deferred amortisation should be limited to the most resilient homeowners. This will strengthen the resilience of the Danish economy[5] and support financial stability. There are currently rules for the institutions' lending which limit the access to mortgage loans with deferred amortisation for some customers. For example, Danish lending rules (Executive Order on Good Practice (in Danish: God skik-bekendtgørelsen)) restricts access to variable rate mortgage loans with deferred amortisation for homeowners with a debt-to-income ratio above 4 and a loan-to-value ratio above 60 per cent. However, the rules do not restrict access to fixed rate mortgage loans with deferred amortisation for homeowners with high debt-to-income and loan-to-value ratios. For homeowners in Greater Copenhagen and Aarhus, the Growth Guidelines (in Danish: Vaekstvejledningen) limit, for example, access to

Growth in loans with deferred amortisation is especially widespread among existing homeowners

Chart 9



Note: Share of new mortgage loans with deferred amortisation. New loans have been calculated net, see box 1. Deferred amortisation is defined by the homeowner having minimum one loan with deferred amortisation.
Source: Danmarks Nationalbank and own calculations.

deferred amortisation for homeowners with negative wealth.[6]

The Danish down payment requirements in connection with real estate purchases are relatively low compared to many other countries, see chart 10. Danish home buyers can finance up to 95 per cent of their home purchase with bank and mortgage debt secured by mortgage on the home. The current loan rules with the option of deferred amortisation, combined with a low down payment requirement, make it possible for homeowners to raise debt with only very limited own financing and low debt service. Many home buyers who currently raise loans with deferred amortisation would have to use a high proportion of their disposable income on debt service payments if they were to pay instalments on the loan, see box 2. A general requirement for higher down payment and instalments on loans to homeowners with a high loan-to-value ratio may contribute to a more resilient housing market. A reduction of the tax value of the interest deduction will reduce

5 See Adrian Michael Bay Schmith, Jesper Pedersen, Simon Juul Hviid and Simon Thinggaard Hetland, Housing market robustness should be strengthened, *Danmarks Nationalbank Analysis*, no. 16, June 2021.

6 For a description of the Growth Guidelines, see Christian Sinding Bentzen, Henrik Yde Andersen and Simon Juul Hviid, Impacts of 2016 guidelines on mortgaging of homes, *Danmarks Nationalbank Analysis*, no. 18, November 2018.

Box 2

Many home buyers who are granted loans with deferred amortisation would have very high debt-service-to-income ratios if they were to pay instalments on the loans

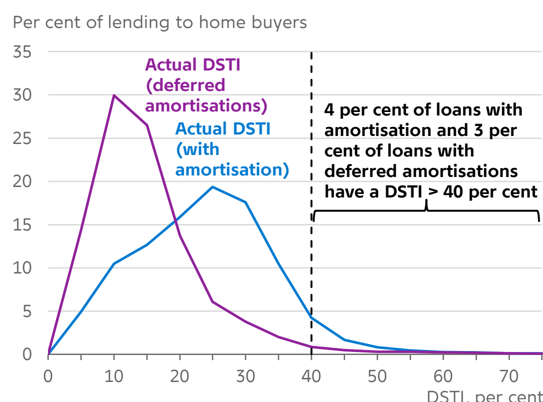
Danmarks Nationalbank and the Danish Financial Supervisory Authority's collection of data makes it possible to check how many home buyers with loans with deferred amortisation would have very high debt-service-to-income (DSTI) ratios if they were to pay instalments on the loans, see chart A. The left-hand part of the chart shows how the actual DSTI ratios are distributed on loans with amortisation and with deferred amortisation, respectively, for home purchases made from and including the 4th quarter of 2019 and up to and including the 1st quarter of 2021. The financing of the home purchase is only regarded as being with deferred amortisation if the total amortisation rate is 0. If instalments are paid on a bank loan or parts of the mortgage financing, the financing is therefore not categorised as deferred amortisation. The y axis shows the proportion of loans to home buyers that fall within each DSTI range (the area under the blue curve adds up to 100 per cent, and the same applies to the purple curve). For example, a DSTI ratio of 30 per cent means that the household spends 30 per cent of its income after tax on interest, administration fees and amortisation. An amortisation rate of 0 entails very low DSTI ratios (the purple curve). The vast majority of home purchases financed with deferred amortisation thus have a DSTI ratio of 15 per cent or less. Of those with amortisation, 4 per cent had a DSTI ratio above 40 per cent, while this was the case for 3 per cent of those with deferred amortisation. There are many factors that have an impact when a household experiences that a very high share of the household income is used for interest and instalments, but, in many countries, the regulation reflects that a DSTI ratio above 40 per cent must be regarded as very high.[1]

The right-hand chart shows the counterfactual example of what the debt-service-to-income ratio would look like if the home buyers with deferred amortisation were to pay instalments. The purple curve shows these counterfactual DSTI ratios. The counterfactual distribution lies further to the right and has a thicker tail than the distribution of actual DSTI ratios for the customers with amortisation. 21 per cent of home buyers with deferred amortisation would thus have a DSTI ratio above 40 per cent if they were to pay instalments on their debt.

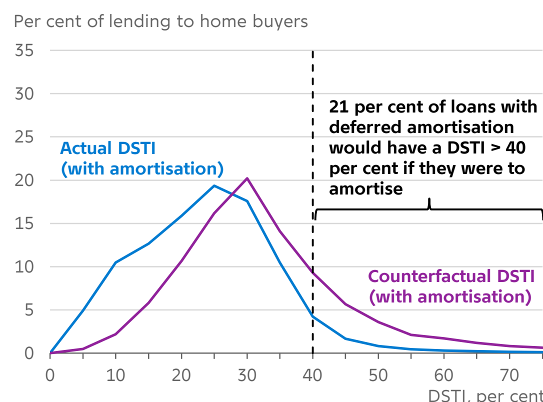
Chart A

Very high DSTI ratios if homes financed with deferred amortisation were instead financed with amortisation

Actual DSTI ratios for home buyers



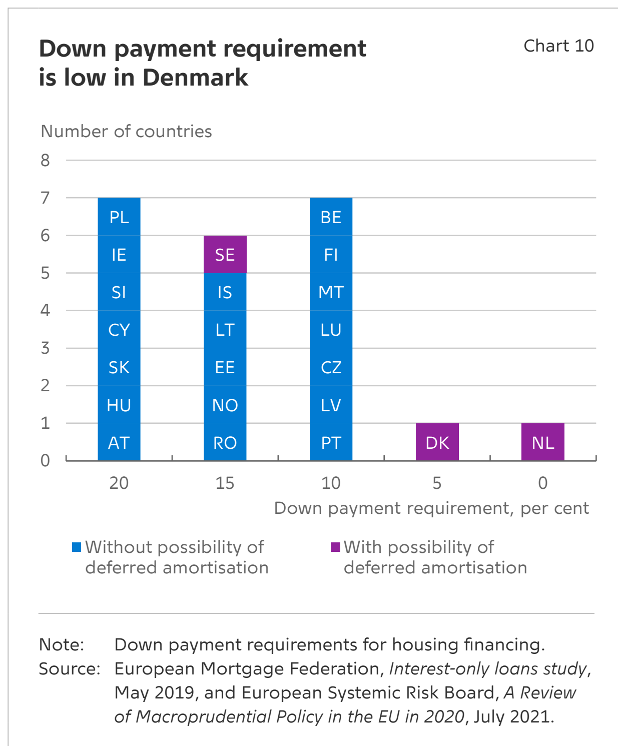
Counterfactual DSTI ratios if loans with deferred amortisation were instead with amortisation



Note: Debt-service-to-income (DSTI) ratios for home buyers from 4th quarter 2019 to 1st quarter 2021. A loan with deferred amortisation is defined across bank and mortgage lending. A customer with a mortgage loan with deferred amortisation, but with instalments on the bank part, will therefore count as a customer with amortisation. The area under each series adds up to 100 per cent. The DSTI ratio is calculated as the sum of interest, administration fees and instalments on bank and mortgage debt as a percentage of income after tax. The income has been estimated as the total housing debt divided by the reported debt-to-income ratio and subsequently adjusted with the average ratio between income before and after tax, calculated on the basis of data from Statistics Denmark's Research Service. In the counterfactual DSTI ratio, the debt service is calculated if the debt was to be repaid as an annuity loan with a maturity of 30 years on mortgage debt and 20 years on bank debt, interest deduction of 33 per cent and the same interest rates as on the actual debt with deferred amortisation. The DSTI ratio is calculated two quarters after the home purchase.
Source: Danmarks Nationalbank and own calculations.

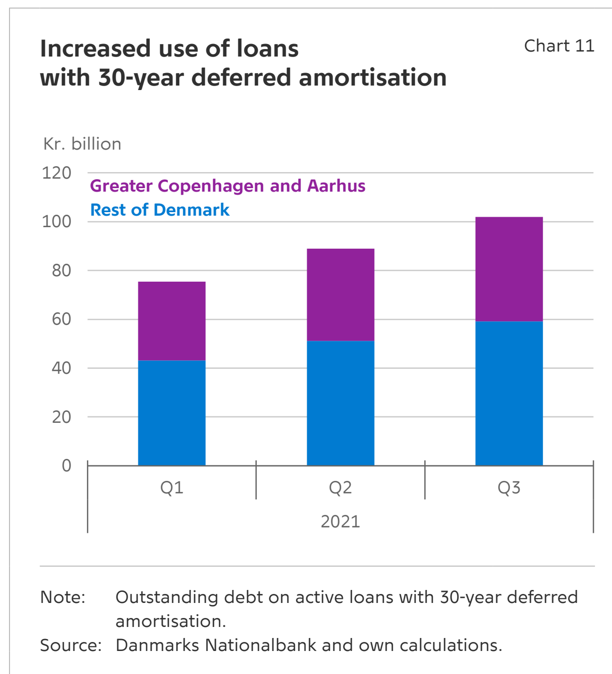
1. See, for example, the European Systemic Risk Board, A Review of Macroprudential Policy in the EU in 2020, July 2021.

Down payment requirement is low in Denmark Chart 10



Note: Down payment requirements for housing financing.
Source: European Mortgage Federation, *Interest-only loans study*, May 2019, and European Systemic Risk Board, *A Review of Macroprudential Policy in the EU in 2020*, July 2021.

Increased use of loans with 30-year deferred amortisation Chart 11



Note: Outstanding debt on active loans with 30-year deferred amortisation.
Source: Danmarks Nationalbank and own calculations.

the incentive to raise debt and will also contribute to strengthen the structures on the housing market.

Increasing use of 30-year deferred amortisation
Mortgage loans with deferred amortisation throughout the maturity of the loan, which were introduced in 2017, are becoming more widespread in the mortgage credit market, see chart 11. The loan types currently offered by the institutions contain terms on, for example, maximum loan-to-value ratio with deferred amortisation of 60 per cent of the value of the property, and there is generally no access to post-financing against another mortgage in the same property.[7] More than one third of the growth in loans with deferred amortisation in 2021 stems from loans with deferred amortisation of up to 30 years.

Mortgage loans with deferred amortisation throughout the maturity of the loan may be a relevant product for a limited customer group. However, as no current instalments are made on the loan, it is essential that the mortgaged property maintains its value throughout the loan period. This may be a problem in areas with declining housing demand and in cases in which the home is not adequately maintained.

Some homeowners have a significant exposure to interest rate increases
Homeowners' interest rate sensitivity on their debt service payments fell in the period from 2009 to 2019, as homeowners reduced their bank debt and increasingly opted for fixed rate mortgage loans.[8] Overall, homeowners' interest rate sensitivity is limited and, seen in isolation, it does not pose a threat to financial stability. At the end of 2019, the typical homeowner would have to use 0.5 per cent more of his or her net income and debt service to pay instalment and interest on their debt in connection with an interest rate increase of one percentage point. However, interest rate sensitivity varies greatly among homeowners: 10 per cent of

7 The loans were offered as variable rate loans in 2017 and have also been offered as fixed rate loans since the end of 2020. These loans may be offered to customers with a loan-to-value ratio of up to 75 per cent, but deferred amortisation is only available with a loan-to-value ratio below 60 per cent.

8 Stine Ludvig Bech, Simon Juul Hviid and Jakob Guldbæk Mikkelsen, Measuring household interest-rate sensitivity in Denmark, *Danmarks Nationalbank Working Paper*, no. 183, November 2021.

homeowners have an interest rate sensitivity that is more than seven times higher than the typical homeowner.

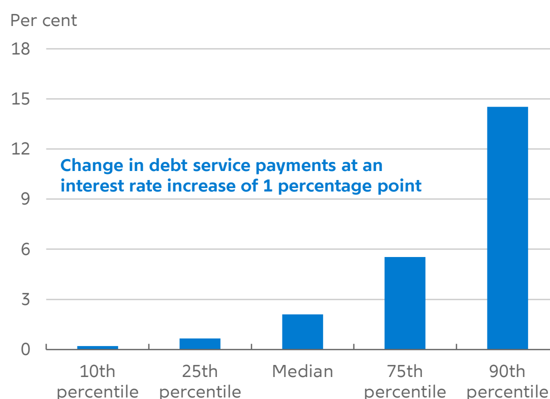
Among homeowners who spend a large share of their income on servicing their loans, some have a significant exposure to interest rate increases. These are homeowners who already have a high debt-service-to-income ratio, which is the debt service as a percentage of net income. Higher debt servicing may thus be a challenge for these homeowners, as they already spend a large proportion of their income on servicing their loans. In connection with an interest rate increase of 1 percentage point, a quarter of homeowners with a high debt-service-to-income ratio will have to spend an additional 5.5 per cent or more of their income after tax and debt service on servicing their loans. 10 pct. will have to spend an additional 14.5 per cent or more of their income after tax and debt service, see chart 12. Homeowners with a high debt-service-to-income ratio – which means that they spend more than a third of their income after tax on servicing their debt – make up 10 per cent of all homeowners with debt, but have raised 18 per cent of the homeowners' total debt, equal to kr. 324 billion.

Homeowners with variable rate mortgage loans have the highest interest rate sensitivity, as an interest rate increase will affect their entire debt, as opposed to homeowners with fixed rate mortgage loans, who would only have to pay higher interest rates on their bank debt. Lending to homeowners with variable rate mortgage loans constituted just under half of total lending to homeowners at the end of October 2021. The share has been declining since 2014, which reflects the low interest rates on fixed rate loans. The Danish Financial Supervisory Authority's "Supervisory Diamond" for mortgage credit institutions may also have contributed to the decrease in variable rate loans.

However, the interest rate on fixed rate mortgage loans has increased slightly in 2021. An increased spread between long and short interest rates may make more borrowers choose variable rate loans over fixed rate 30-year loans, as it will be less attractive to hedge against interest rate increases.

Some homeowners with a high debt-service-to-income ratio are exposed to interest rate increases

Chart 12



Note: Percentiles for debt-service-to-income ratios. A high debt-service-to-income ratio is defined as a debt service ratio above 33 per cent. The debt-service-to-income ratio is measured as the homeowners' interest, contribution and instalment payments as a percentage of income after tax. Change in debt servicing is the change in interest and instalment payments on bank and mortgage debt as a percentage of income after tax and debt service at an interest rate increase of one percentage point. The latest data is from the end of 2019.

Source: Statistics Denmark and own calculations.

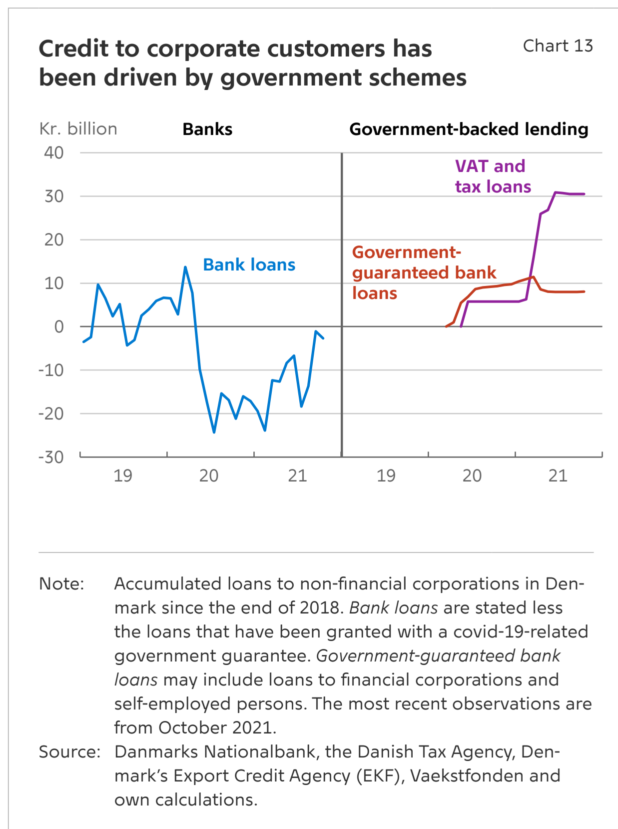
Lending to vulnerable industries is limited

Government covid-19 schemes still limit lending demand with banks

The growth in the credit institutions' lending to Danish corporate customers has increased during the past six months, and the annual lending growth rate was 5.9 per cent in October. However, bank lending has decreased during the pandemic and has only begun to return to the level from the pre-covid-19 years during the 2nd half of 2021, see chart 13.

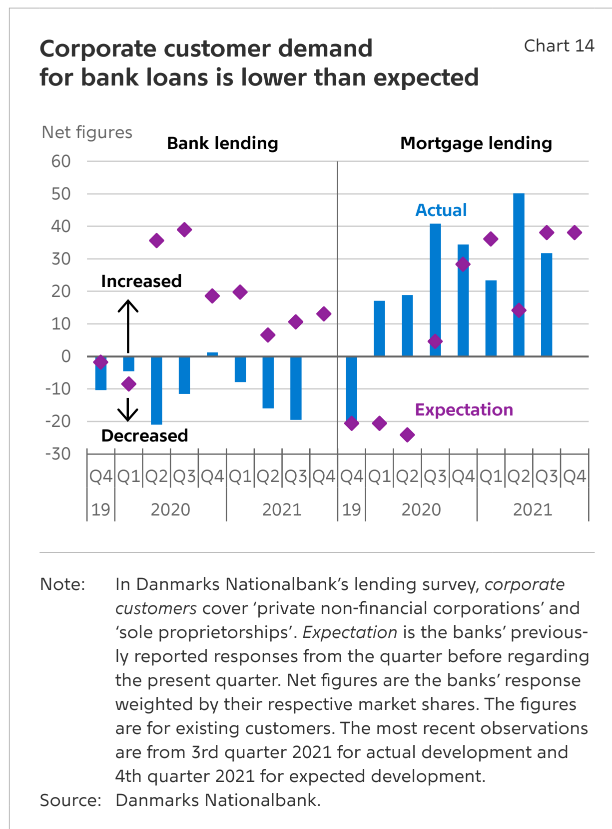
While the banks' lending has been limited, the central government has provided significant credit to the corporate sector during the pandemic.[9] If the central government credits are included, total bank lending has increased.

9 See Danmarks Nationalbank, Banks ready for expiry of government liquidity support, *Danmarks Nationalbank Analysis*, no. 10, April 2021.



Credit to corporate customers has been driven by government schemes Chart 13

Note: Accumulated loans to non-financial corporations in Denmark since the end of 2018. *Bank loans* are stated less the loans that have been granted with a covid-19-related government guarantee. *Government-guaranteed bank loans* may include loans to financial corporations and self-employed persons. The most recent observations are from October 2021.
Source: Danmarks Nationalbank, the Danish Tax Agency, Denmark's Export Credit Agency (EKF), Vaekstfonden and own calculations.



Corporate customer demand for bank loans is lower than expected Chart 14

Note: In Danmarks Nationalbank's lending survey, *corporate customers* cover 'private non-financial corporations' and 'sole proprietorships'. *Expectation* is the banks' previously reported responses from the quarter before regarding the present quarter. Net figures are the banks' response weighted by their respective market shares. The figures are for existing customers. The most recent observations are from 3rd quarter 2021 for actual development and 4th quarter 2021 for expected development.
Source: Danmarks Nationalbank.

Central government liquidity support measures and loan schemes have limited corporate demand with the banks.[10] Following the outbreak of covid-19, the banks expected an increased demand for loans, but the demand turned out to be lower than expected, see chart 14. Demand for mortgage loans has, however, been at a higher level than in the years leading up to the pandemic, and growth in mortgage lending was 6.3 per cent year-on-year in October. Both banks and mortgage credit institutions expect increasing demand in the 4th quarter of 2021. Demand for bank loans may increase as government liquidity support schemes expire.

Important to maintain phasing out of government credit allocation to companies

During the pandemic, the Danish parliament (Folketinget) adopted extensive relief packages for the Danish corporate sector. Since the beginning of the pandemic, the central government has granted credit to companies amounting to approx. kr. 35 billion in the form of a government guarantee obtainable for some loans by private banks as well as tax and VAT loans. In addition, the government supported corporate liquidity with deferred deadlines for payment of withholding tax (A-tax) and VAT for an estimated amount of kr. 165 billion in 2020. In 2021, the amount is approximately kr. 55 billion.[11]

The Danish Parliament has decided to phase out these measures. This is sensible and should not be postponed. The credit institutions are well equipped to make loans to viable companies as the deferred payment deadlines and loans fall due. The tax and VAT loans have been granted without a prior credit

10 See Ida Rommedahl Julin, Andreas Kuchler and Alexander Meldgaard Otte, Firm financing and public support measures during the pandemic, *Danmarks Nationalbank Working Paper*, no. 184, November 2021.

11 The companies were offered to take out interest-free government tax and VAT loans corresponding to their due ordinary tax and VAT payments. The companies had to apply actively for these loans. On the contrary, the deferred payment deadlines comprised all companies, and they did not have to apply for the deferral.

rating of the companies.[12] Credit rating of customers is a core task for the private banks and helps ensure that the financing is allocated to the most efficient parts of the economy.

In September, the government and the parliamentary parties entered into a political agreement to postpone the maturity of some tax and VAT loans until April 2022, see chart 15. A significant part of the total loans thus falls due in April 2022, while the remaining part falls due on an ongoing basis until April 2023. The remaining deferred tax payments fall due for payment at the end of 2021. The end of the year will see the phasing out of the scheme under which companies that have been hit hard during the pandemic have been offered bank loans with a government guarantee.

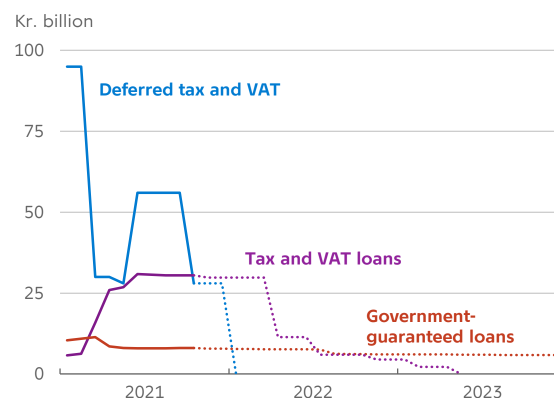
When VAT and tax loans fall due in April 2022, the companies can establish an instalment plan for repayment over a period of up to two years. During the repayment period, the companies must pay a monthly interest rate of 0.7 per cent.[13] The interest payments requirement will increase companies' incentive to seek financing in the private banking sector.

Credit institutions' lending to vulnerable industries is limited

Lending to the industries that have been hardest hit by the pandemic only makes up a small part of total corporate lending. However, the credit quality of lending to these industries has deteriorated. The probability of default has thus increased on lending to vulnerable industries. The credit quality of the rest of the institutions' corporate lending has improved on average.

Most large banks calculate a probability of default for each customer as part of their risk and capital management. The probability of default is a quantitative assessment of the risk of non-payment from and/or loss on a given customer within the subsequent 12 months.

Government liquidity schemes are set to expire in the coming years Chart 15



Note: Dotted lines indicate estimates based on the most recently available maturity profile. *Deferred tax and VAT* is an estimated amount for the total volume of deferred payments of withholding tax (A-tax), tax not collected at source (B-tax), labour market contributions and VAT. The actual amount will depend on the level of activity and employment. *Tax and VAT loans* are outstanding amounts for loan schemes for VAT and payroll tax, A-tax and labour market contributions for non-financial corporations. *Government-guaranteed loans* are loans guaranteed by Vaekstfonden and Denmark's Export Credit Agency (EKF) from and including March 2020.
Source: The Danish Tax Agency, the Danish Ministry of Taxation, Danmarks Nationalbank and own calculations.

During the pandemic, the probability of default has increased for vulnerable industries, and the development has continued after the reopening of society, see chart 16. In the 3rd quarter of 2021, the institutions estimated that approximately 15 per cent of the lending to vulnerable industries has a probability of default of above 5 per cent. The lending to these industries is, however, limited and only constitutes 1 per cent of total lending to non-financial corporations.

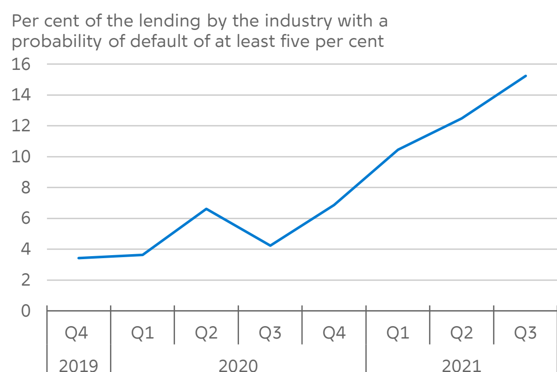
The credit quality is significantly lower among the companies that have used government loan schemes than for the rest of the institutions' corporate cus-

12 Government-guaranteed bank loans are guaranteed by the central government for up to 80 per cent of the loan. The remaining part of the loan is without a government guarantee.

13 Unlike interest payments to credit institutions, interest payments to the central government are not deductible. Therefore, a monthly interest rate of 0.7 per cent to the central government corresponds to an interest rate to the bank of approximately 11 per cent p.a. before tax.

An increasing share of lending to vulnerable industries has a high probability of default

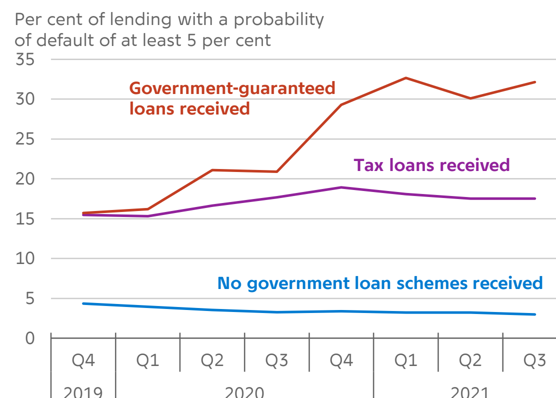
Chart 16



Note: *Vulnerable industries* include hotels, course properties, travel agencies, tour operators and fitness centres. The figures include lending to non-financial corporations from banks and mortgage credit institutions authorised to use internal ratings-based (IRB) models to calculate their capital adequacy requirements. The remaining lending has a probability of default of up to 4.9 per cent.
Source: Danmarks Nationalbank and own calculations.

Higher probability of default on customers using government loan schemes

Chart 17



Note: Share of bank and mortgage credit lending to non-financial corporations with a probability of default of minimum 5 per cent for mortgage credit institutions authorised to use internal ratings-based (IRB) models to calculate their capital adequacy requirements. The remaining lending has a probability of default of up to 4.9 per cent.
Source: Danmarks Nationalbank, the Danish Business Authority and own calculations.

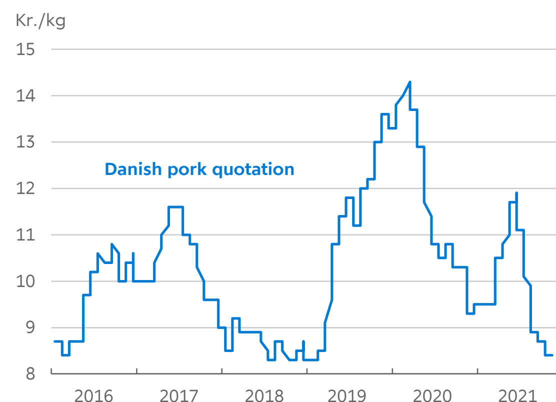
tomers, see chart 17. This also applied before the coronavirus downturn. In the 4th quarter of 2019, 15 per cent of the lending to these companies thus had a probability of default of 5 per cent or more.[14] Correspondingly, the share was less than 5 per cent for companies that have not made use of government loan schemes. After the 4th quarter of 2019, the credit quality has deteriorated for the companies that have used the government loan schemes, while it has improved slightly for the rest of the institutions' corporate customers. Lending to companies that have used the government loan schemes constitutes 10 per cent of total lending to non-financial corporations.

Falling pork prices may result in losses for institutions

Pork prices have fallen markedly since the summer of 2021, see chart 18. If the current price level continues, it may result in losses being incurred on part of the institutions' lending to pig farmers.

Large drop in pork prices

Chart 18



Note: Danish pork quotation for slaughter pigs. The most recent observation is from 25 November 2021.
Source: Danish Crown.

14 There are signs that companies that were already weak before the pandemic have made special use of the government loan schemes, see Ida Rommedahl Julin, Andreas Kuchler and Alexander Meldgaard Otte, Firm financing and public support measures during the pandemic, *Danmarks Nationalbank Working Paper*, no. 184, November 2021.

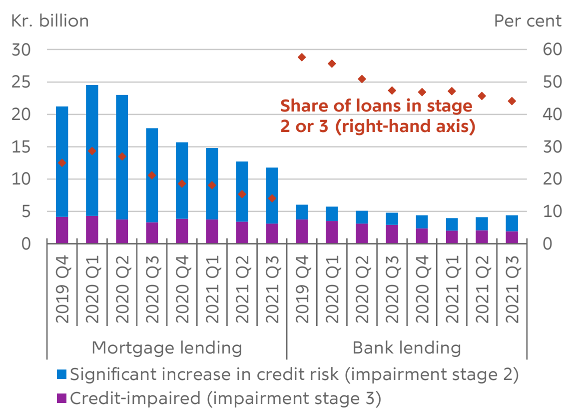
The high prices seen in recent years have resulted in a debt reduction among pig famers. Since the 4th quarter of 2019, total mortgage lending to the pork industry has been reduced by 1.4 per cent to kr. 84 billion, while the bank debt has been reduced by 4 per cent to kr. 10 billion.

In the 3rd quarter of 2021, medium-sized banks' lending to the pork industry amounted to 4.2 per cent of their corporate lending. However, there is great variation in the exposures among medium-sized banks. The exposure is lower for large banks. In the 3rd quarter of 2021, their lending to the pork industry amounted to 1.8 per cent of their corporate lending. In the 3rd quarter of 2021, the pork industry constituted approx. 7 per cent of total mortgage lending and 2 per cent of total corporate lending by the banks.

The quality of the loans to pig farmers has improved since the 4th quarter of 2019, and the proportion of lending with an increase in credit risk (stage 2) or credit deterioration (stage 3) has thus fallen by approximately 10 percentage points for both bank and mortgage lending, see chart 19.

Increased resilience in the pork industry, but continued high proportion of bank lending with impaired credit quality

Chart 19



Note: Mortgage credit institutions as well as large and medium-sized banks' loans to Danish corporate customers (including self-employed persons) secured by mortgage on pig production properties.
Source: Danmarks Nationalbank.

However, bank lending, where the institutions report credit deterioration or a significant increase in credit risk, still accounts for nearly half of total bank lending to pig farmers. There is considerable variation in how much the individual credit institutions have reduced credit-impaired lending and lending with a significant increase in the credit risk to the pork industry. Especially for a number of medium-sized banks, these loans constitute a considerable proportion of their total lending to the pork industry. The credit institutions should thus continue to focus on their customers in the pork industry improving their solvency during periods in which their earnings opportunities are favourable.

Credit institutions expect rising earnings in 2021

Credit institutions have raised their earnings expectations for 2021

Several systemic credit institutions have raised their expectations for their profit for the year several times during 2021. The principal reason for the raised expectations is that the expected losses in the wake of the covid-19 restrictions have still not materialised. Another reason given by the institutions for their adjustments is that customer activity in the housing market and the financial markets in the 1st half of 2021 had a more positive effect than expected going into the year. The systemic credit institutions, with the exception of Danske Bank and DLR Kredit, thus expect a higher profit after tax than the average for the years before covid-19, see chart 20.

Management judgement for expected credit losses from the pandemic are largely intact

In the 1st half of 2020, the credit institutions made provisions for expected losses resulting from the coronavirus restrictions. So far, the customers' financial situation has proved to be better than the banks feared, and the management estimates are largely intact. During 2021, the banks have reported financial improvements in that part of their customer portfolio which has not been hardest hit by the coronavirus lockdowns.

The banks' corporate customers have, for example, had the opportunity to take out tax and VAT loans, see the above section on government liquidity schemes. The majority of these loans fall due in April 2022, and a possible deterioration in the credit qual-

ity of these customers can be expected to manifest itself after April. However, the credit institutions only have limited exposure to companies that have raised tax loans.[15]

Credit institutions' earnings are supported by low loan impairment charges

After having fallen from a high level in 2017, the systemic credit institutions' profit relative to their lending and guarantees has been at a stable level, see chart 21. Their current earnings constitute a reasonable initial protection against losses. However, increased costs may weaken credit institution resilience in the long term.

With the exception of the 1st half of 2020, since 2015 earnings have been supported by low impairment charges, which have periodically also been negative due to large reversals. As at the 1st half of 2021, current earnings could cover periodic impairment charges in the systemic credit institutions corresponding to just under 0.4 per cent of total loans and guarantees. In comparison, total periodic impairment charges amounted to 0.005 per cent of total loans and guarantees, and there is only minor variation among the systemic institutions. In the years 2010-2014, average periodic impairment charges constituted more than 0.2 per cent of the lending. It is consequently not many years ago that impairment charges constituted a significant proportion of the profit before impairment charges.

Rising costs may put pressure on earnings

Costs for the systemic institutions have increased in recent years. The rising costs consist primarily of higher staff costs, which are, for example, due to increased costs for implementation of regulatory and compliance requirements. New requirements usually mean that investments must be made in IT solutions.

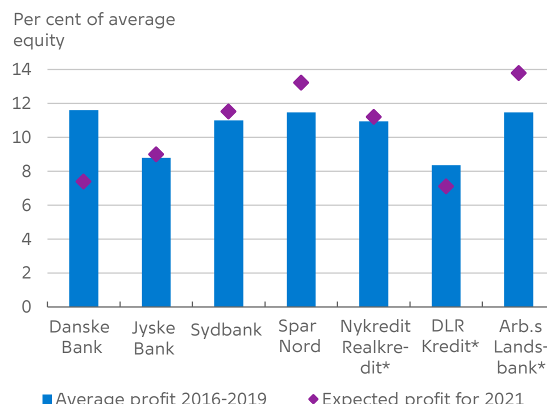
If the development in operating costs is compared with Nordic and European banks, which have similar compliance requirements, the costs have increased significantly since 2018, see chart 22.

In recent years, the systemic credit institutions have had increased focus on their costs. Several of

15 See Danmarks Nationalbank, Banks ready for expiry of government liquidity support, *Danmarks Nationalbank Analysis*, no. 10, April 2021.

Several credit institutions expect higher earnings in 2021

Chart 20

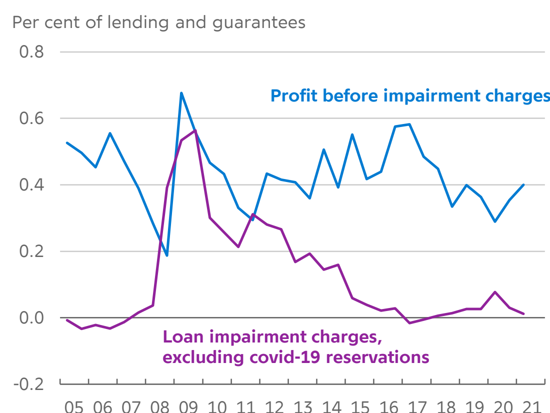


Note: The systemic credit institutions, with the exception of Nordea Kredit, which does not publish a quantitative target for the expected profit for 2021. Arbejdernes Landsbank has been designated as a systemically important institution as from 21 June 2021, as the bank has acquired a majority shareholding in Vestjysk Bank. Vestjysk Bank is consequently included in Arbejdernes Landsbank. Net profit for the year and the average of the latest announced expectations for the profit for 2021 is stated as a percentage of the shareholders' average equity for the respective periods. For 2021, the average from the end of 2020 to the 1st half of 2021 has been used. Profit and profit expectations for the credit institutions marked with an * are calculated before tax.

Source: Financial statements and own calculations.

Systemic credit institutions' earnings have decreased since 2017

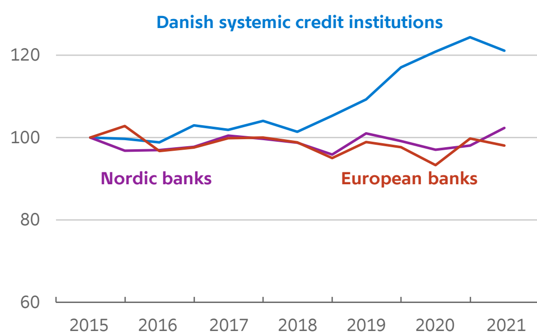
Chart 21



Note: Six-month data for systemic credit institutions. Corrections have been made for goodwill impairment charges and, in as far as possible, covid-19 provisions according to information in the published financial statements.

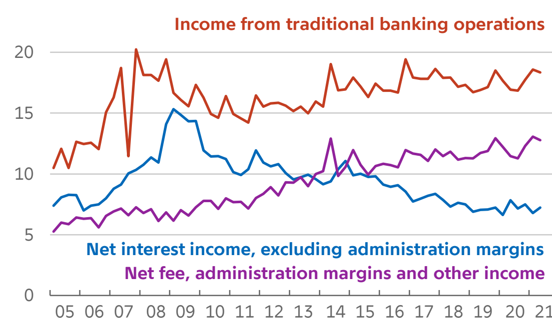
Source: The Danish Financial Supervisory Authority, published financial statements and own calculations.

Higher increase in costs than in Nordic and European banks Chart 22



Note: Half-yearly operating costs for banking, insurance and asset management activities. *European banks* comprise 15 out of 22 banks in the Euro Stoxx Banks index (SX7E), compiled as at 31 October 2021. *Nordic banks* comprise Nordea, DNB, Skandinaviska Enskilda Banken, Svenska Handelsbanken and Swedbank. For the foreign banks, the costs have been converted into Danish kroner. The most recent observations are from the 1st half of 2021.
Source: S&P Global Market Intelligence and own calculations.

Net interest income constitutes a lower part of credit institutions' earnings Chart 23



Note: Selected income items for the systemic institutions with quarterly observations. Conventional banking activities have been calculated as net interest income on lending-related items, net fee income and other income.
Source: The Danish Financial Supervisory Authority and own calculations.

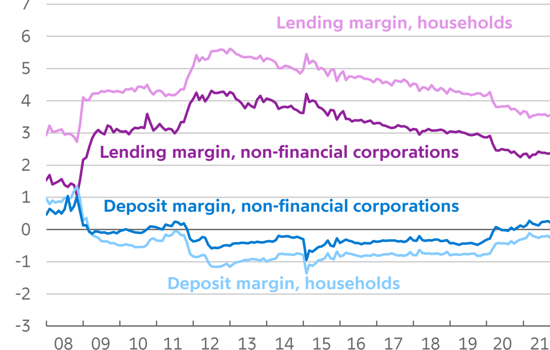
the Danish systemic credit institutions have closed branches and made staff cuts. Despite increased focus on costs, this has not resulted in a decrease in costs. In view of the increasing costs, it is important that the institutions continue to focus on streamlining their operations.

Revenues from conventional banking operations are stable

The institutions' revenues from conventional banking operations have been at a stable level since 2014, see chart 23. Net interest income has decreased over the period, but income from fees and administration margins as well as other revenues have compensated for the decrease in net interest income.

The decrease in net interest income can partly be attributed to competition for customers on the lending side, resulting in declining lending margins, see chart 24. At the same time, the banks were reluctant to introduce negative deposit rates for households. Since 2019, however, the banks have introduced negative interest rates on deposits from private customers above a certain amount, and net interest payments on deposits have thus fallen. Net interest income has thus been at a stable level since 2019.

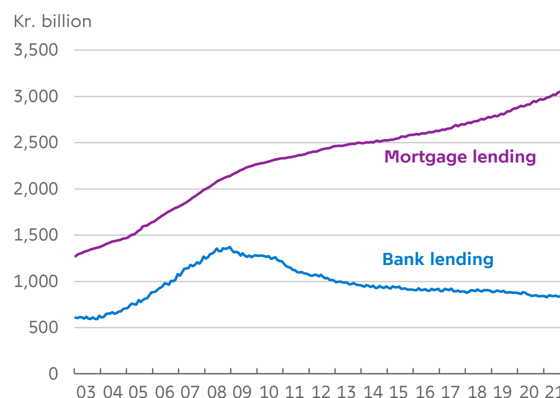
Lending margins have decreased more than deposit margins have increased Chart 24



Note: Systemic banks' margins on bank loans and deposits to Danish counterparties excluding repo loans and deposits. The margins have been calculated in relation to the T/N rate. The most recent observations are from October 2021.
Source: Danmarks Nationalbank, Bloomberg and own calculations.

The composition of loans helps explain the development in the contributions to earnings from the conventional part of banking operations. Lending consists increasingly of mortgage loans, and bank loans constitute a significantly smaller part of the systemic institutions' total balance sheet compared to before, see chart 25. Revenues from mortgage loans thus constitute a higher proportion of the institutions' earnings than before, one reason being that the mortgage credit institutions raised their administration margins in 2016.

Lending consists increasingly of mortgage loans Chart 25



Note: Lending to households and non-financial corporations by banks and mortgage credit institutions. The most recent observations are from October 2021.
Source: Danmarks Nationalbank.

Several banks should consider whether their capital target is sufficient

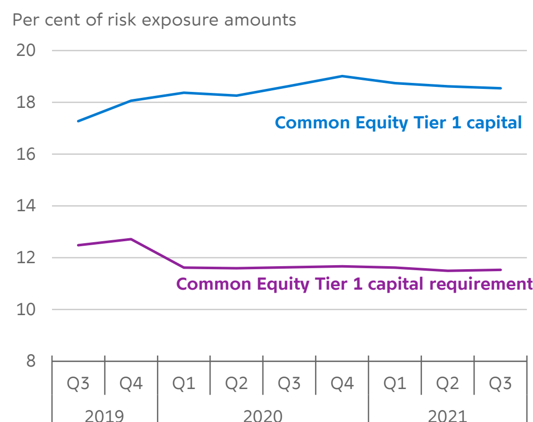
Capital ratios stagnate after implementation of new regulation

The systemic institutions' excess capital has been virtually unchanged during 2021, see chart 26. After 2020, when a number of capital requirements were eased due to the pandemic and dividends for 2019 were withheld, the capital development in 2021 has especially been driven by increases in the institutions' risk exposure amount. In addition, a few credit institutions have proposed extraordinary dividends.

The increase in risk-weighted exposures means that the Common Equity Tier 1 (CET1) capital ratio for the systemic institutions falls marginally overall. The risk-weighted exposures are especially being driven up by guidelines from the European Banking Authority (EBA) on a new default definition[16] and a new standard method for counterparty risk[17].

The reduction in excess CET1 capital has been seen broadly across the systemic institutions, see chart 27. Seven of eight institutions have thus seen stagnant or declining excess capital adequacy during 2021. This also applies to Arbejdernes Landsbank, which was designated as a systemic institution in the 2nd quarter of 2021 following its acquisition of the majority shareholding in Vestjysk Bank.[18]

Gap between systemic institutions' Common Equity Tier 1 capital and capital adequacy requirements virtually unchanged since the end of 2020 Chart 26



Note: Common Equity Tier 1 capital and Common Equity Tier 1 capital requirements have been calculated as a weighted average. The capital adequacy requirement consists of the share of the solvency need that is to be met with Common Equity Tier 1 capital (minimum capital adequacy requirement and Pillar II add-on) and the combined buffer requirement (SIFI buffer, capital conservation buffer and countercyclical buffer). Arbejdernes Landsbank was designated as a systemic institution in the 2nd quarter of 2021 and is included from then with an expected SIFI buffer of 1 per cent.
Source: The Danish Financial Supervisory Authority and own calculations.

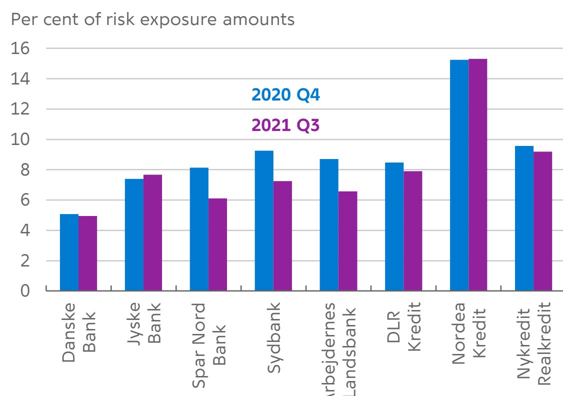
16 See European Banking Authority, *Guidelines on the application of the definition of default (compliance table) (link).*

17 See Regulation (EU) 2019/876 (CRR II) *(link).*

18 See Ministry of Industry, Business and Financial Affairs, *Arbejdernes Landsbank udpeges som SIFI* (Arbejdernes Landsbank designated as SIFI), June 2021 *(link).*

Reduction in excess capital adequacy is seen broadly across systemic institutions

Chart 27



Note: The excess capital adequacy has been calculated on the basis of Common Equity Tier 1 capital. The capital adequacy requirement consists of the share of the solvency need that is to be met with Common Equity Tier 1 capital (minimum capital adequacy requirement and Pillar II add-on) and the combined buffer requirement (SIFI buffer, capital conservation buffer and countercyclical buffer). An expected SIFI buffer of 1 per cent is included for Arbejdernes Landsbank.
Source: The Danish Financial Supervisory Authority and own calculations.

Reintroduction of the countercyclical capital buffer in 2022

The countercyclical capital buffer is reestablished at 1 per cent from September 2022 following a recommendation from the Systemic Risk Council. The buffer was released in March 2020 as an initiative due to the pandemic, see box 3.

The Systemic Risk Council has a strategy that the buffer is gradually to be increased to 2.5 per cent, as long as there is no significant slowdown in risk build-up in the financial sector. As part of this strategy, the Council expects to recommend an increase in the buffer to 2 per cent already in December 2021 – potentially with effect from the end of 2022.[19]

All Danish systemic institutions can meet both the announced increases and further expected increases with their current excess capital adequacy.

Countercyclical capital buffer in Scandinavia

Box 3

Denmark: The Minister for Industry, Business and Financial Affairs sets the buffer following a recommendation from the Systemic Risk Council. At the end of 2019, the buffer rate was 1 per cent – with planned increases to 2 per cent during 2020. Due to the pandemic, planned increases were cancelled, and the existing buffer was released. In September 2021, the buffer was reactivated at 1 per cent with effect from 30 September 2022.

The Systemic Risk Council has signalled further increases.

Sweden: The Swedish Financial Supervisory Authority sets the buffer. At the end of 2019, the buffer rate was 2.5 per cent. The rate was reduced to 0 per cent in March 2020 due to the pandemic. In September 2021, the rate was increased to 1 per cent with effect from 29 September 2022.

The Swedish Financial Supervisory Authority has signalled that it will gradually increase the countercyclical capital buffer to 2 per cent during 2022.

Norway: The Norwegian Ministry of Finance has historically set the buffer following a recommendation from Norges Bank, the Norwegian central bank. From September 2021, Norges Bank has the authority to set the buffer. At the end of 2019, the buffer rate was 2.5 per cent. The pandemic resulted in a reduction to 1 per cent. In June 2021, the rate was increased to 1.5 per cent with effect from 30 June 2022.

Norges Bank expects that the countercyclical capital buffer increases to 2 per cent with effect from 31 December 2022.

Source: European Systemic Risk Board, *Countercyclical capital buffer* (*link*), Ministry of Industry, Business and Financial Affairs, *Fastsættelse af den kontracykliske kapitalbuffer* (Setting of countercyclical capital buffer), September 2021 *(link)*, Swedish Financial Supervisory Authority, *FI raises the countercyclical buffer rate to 1 per cent*, 29 September 2021 *(link)* and Norges Bank, *Decision on the countercyclical capital buffer 2021 Q3 (link).*

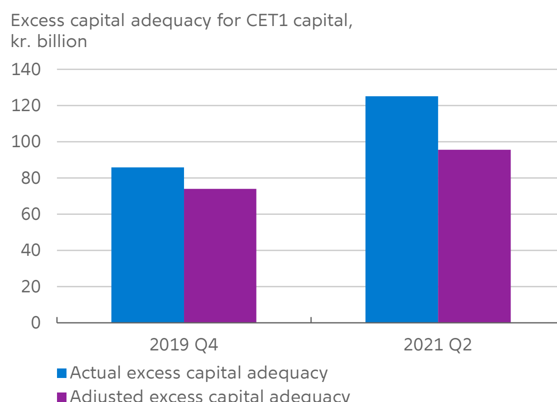
19 See press release from the 34th meeting of the Systemic Risk Council *(link)*.

Based on the risk-weighted exposures at the end of June 2021, a buffer rate of 1 per cent in Denmark will increase the total requirement for Common Equity Tier 1 capital by approx. kr. 14 billion for the systemic institutions. In comparison, the excess CET1 capital requirement is approx. kr. 125 billion.

The set countercyclical capital buffers in, in particular, Sweden and Norway are also important for the Danish systemic institutions' total excess capital adequacy – primarily due to Danske Bank's exposure in these countries. If the announced increases in Sweden and Norway are included in combination with a Danish buffer rate of 2 per cent, the excess capital adequacy relative to Common Equity Tier 1 capital will fall by just under kr. 30 billion during 2022, see chart 28.

If the countercyclical capital buffer is increased to 2.5 per cent in all three countries during 2023, this will result in an increase in the combined buffer requirement of just under kr. 40 billion in relation to the actual requirement as at the 2nd quarter of 2021. Even in this case, the excess CET1 capital for the systemic institutions will be higher than the adjusted excess capital adequacy at the end of 2019.

Systemic institutions well equipped for rapid build-up of countercyclical capital buffer Chart 28



Note: *Actual excess capital adequacy* is based on the current countercyclical buffer rate as at the reporting date. *Adjusted excess capital adequacy* takes into account announced, but not yet applicable, increases in the buffer requirement. To illustrate the ability to meet a rapid build-up of the buffer, the *adjusted excess capital adequacy* is based on an expected buffer rate of 2 per cent in Denmark as well as the announced increases in Sweden and Norway.
Source: Danmarks Nationalbank, own calculations and Pillar III reporting.

Some systemic institutions are close to buffer requirements under stress

Danmarks Nationalbank's latest stress test shows that the systemic institutions all have sufficient capital to withstand a severe recession scenario. However, some systemic institutions are close to breaching their combined buffer requirements, see chart 29.

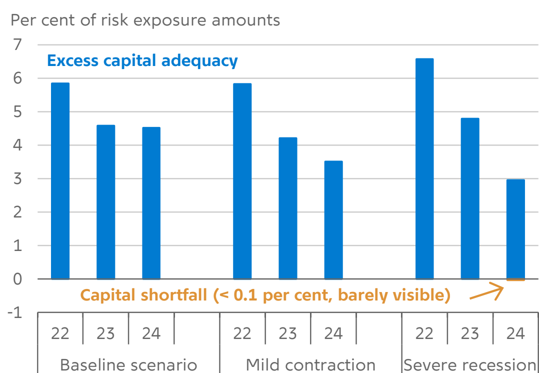
A joint feature of the large institutions is that they currently hold more capital than their capital adequacy target warrants. However, the results of the stress test show that some institutions need their current excess capital adequacy to withstand stress.

Several banks should consider whether their capital adequacy target is sufficient

The systemic institutions all meet their capital adequacy targets for the first half of 2021, even excluding withheld capital from 2019, see chart 30. However, several banks should show restraint in reducing their capitalisation simply because it is above their current target.

The stress test shows that several systemic institutions would be in breach of the capital buffer requirements if the stress test had been conducted

Some systemic institutions get close to buffer requirements in severe recession scenario Chart 29



Note: The chart shows the excess capital adequacy or capital shortfall of the systemic banks that either have excess capital adequacy or a capital shortfall as percentages of the total risk exposure amounts of the systemic banks. The reduction of the banks' excess capital adequacy in the baseline scenario and in the scenario with a moderate downturn is due to a number of factors, including that the stress test takes into account expectations for the build-up of the countercyclical capital buffer.
Source: The Danish Financial Supervisory Authority and own calculations.

based on the institutions' capital adequacy targets instead of their current capitalisation. In this case, the systemic institutions will have a total capital adequacy shortfall relative to the buffer requirement of just over kr. 13 billion in 2024.[20]

Following a recommendation from the Danish Financial Supervisory Authority, several systemic institutions chose to retain dividend payments and cancel share buy-backs following the outbreak of the pandemic in spring 2020. The retained capital in the systemic institutions totals approx. kr. 12.4 billion in the first half of 2021.

The credit institutions are facing a number of adjustments in relation to the regulatory framework for capitalisation of financial institutions, which generally increases their capital adequacy requirements: Guidelines from the EBA for estimation of risk parameters for use in internal credit models must be complied with from the beginning of 2022,[21] and the newly presented EU implementation of completed Basel III standards is also expected to have a significant impact on the capitalisation of the Danish institutions.[22]

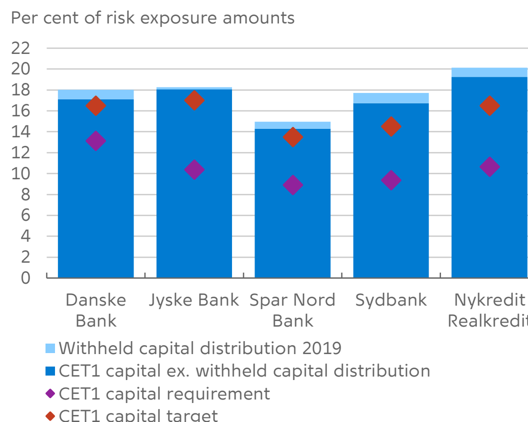
Declining excess capital adequacy relative to existing MREL and debt buffer requirements

The current MREL and debt buffer requirements for the systemic institutions have increased markedly during the 1st half of 2021. The total MREL and debt buffer requirements as well as the subordination requirement have increased since the turn of the year due to the increases in risk-weighted exposures. Despite increased capital, excess funds have decreased to kr. 82 billion against just under kr. 97 billion at the end of 2020. However, the institutions still meet both the total MREL and debt buffer requirements as well as the coming group requirement of 8 per cent of total liabilities, see chart 31.

The combined minimum requirement for groups including mortgage credit institutions will enter into

Systemic institutions all meet their current capital adequacy targets Chart 30

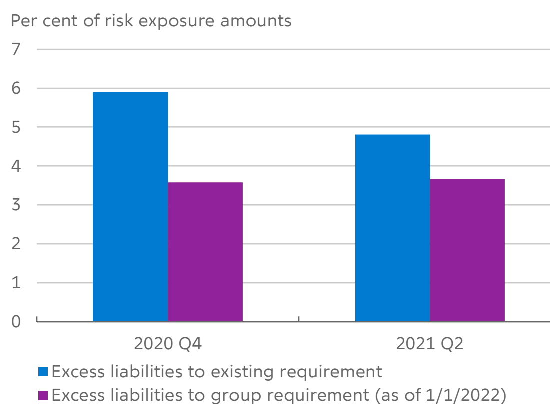
Per cent of risk exposure amounts



Note: Systemic institutions that retained planned dividend for 2019. Jyske Bank is included, as it stopped its ongoing share buy-back programme. For announced capital adequacy target in a range, the highest value has been chosen. 16.5 per cent has been used for Danske Bank.
Source: Danmarks Nationalbank, interim reports and investor material.

Declining excess capital adequacy relative to current MREL and debt buffer requirements Chart 31

Per cent of risk exposure amounts



Note: MREL and debt buffer requirements are the sum total of the MREL requirement and combined buffer requirement for the bank as well as (where relevant) the total capital adequacy requirement and debt buffer requirement for the mortgage credit institution. For Spar Nord, a fully phased-in MREL requirement has been included. Arbejdernes Landsbank has been omitted, as, being a newly designated SIFI institution, it has not yet had its new MREL requirement set.
Source: Danmarks Nationalbank and own calculations.

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20 See Danmarks Nationalbank, Enkelte af de største banker er tæt på bufferkrav under stress, *Danmarks Nationalbank Analyse (Stress test)*, nr. 29, December 2021 (*link*).

21 See European Banking Authority, *Guidelines on PD estimation, LGD estimation and treatment of defaulted assets (compliance table) (link)*.

22 See European Banking Autority, *EBA updates its Basel III impact study following the EU Commission's call for advice (link)*.

force as at 1 January 2022. The affected institutions already meet the coming requirements, and their excess funds are approx. kr. 62 billion. However, there will be a considerable outflow of capital and non-preferred senior debt at the end of 2022 and in the first half of 2023. Combined with continued increases in capital adequacy requirements, this may potentially lead to an undesirably large issuance requirement under adverse conditions in the event of an economic crisis. Therefore, some institutions should seek continuously to build up their excess funds further over the next 12 months.

EU implementation of new rules on capital adequacy requirements is in accordance with Basel standards

On 27 October 2021, the European Commission published its proposed revision of the EU Capital Requirements Regulation (CRR) and the Capital Requirements Directive (CRD) – collectively known as the EU banking package.

The proposal aims to implement the final Basel III Standards adopted by the Basel Committee and published in December 2017[23]. The proposal also contains revised rules on market risk – also called FRTB (fundamental review of the trading book), which the Basel Committee completed in 2019[24]. Finally, the proposal contains a number of adjustments that do not directly follow from Basel recommendations on, for example, supervisory powers and ESG[25] risk.

The proposed Banking package contains a large number of adjustments to current legislation. However, there has especially been focus on the introduction of a new overall output floor for risk-weighted exposures. If lower risks can be documented for use of internal models, a reduction of capital adequacy requirements in relation to standard methods is achieved. The output floor may limit this reduction. In Denmark, there has been focus on the risk that the capital adequacy requirement for mortgage/housing loans and loans to corporate customers would increase significantly without an external rating.[26] Under certain conditions, the proposed output floor permits a temporary lower weighting of housing loans within 80 per cent of the real property value and of corporate loans to companies with high creditworthiness.

The new rules are scheduled to enter into force on 1 January 2025, which postpones the EU implementation by two years compared to the Basel Committee's timeline.[27] Combined with long transitional arrangements, the revised rules will only become fully applicable in up to 10 years.

Danmarks Nationalbank assesses that the presented amendment proposals will ensure a sensible implementation of the Basel standards. The proposal is in accordance with the overall framework in Basel III, but it also contains meaningful adjustments to EU-specific conditions.

Banks should stress test the new funding requirement, Net Stable Funding Ratio (NSFR)

High liquidity in society gives high liquidity coverage ratios in banks

The banks have good liquidity. This means that Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) are met by a certain margin, see chart 32 and chart 34.

LCR must ensure that credit institutions have a sufficient amount of liquid assets to handle a 30-day severe liquidity stress scenario. LCR has increased since the beginning of 2021, and the systemic banks have a considerable distance to the minimum LCR requirement of 100 per cent, see chart 32. There are large variations between the banks in terms of their excess liquidity buffers to LCR.

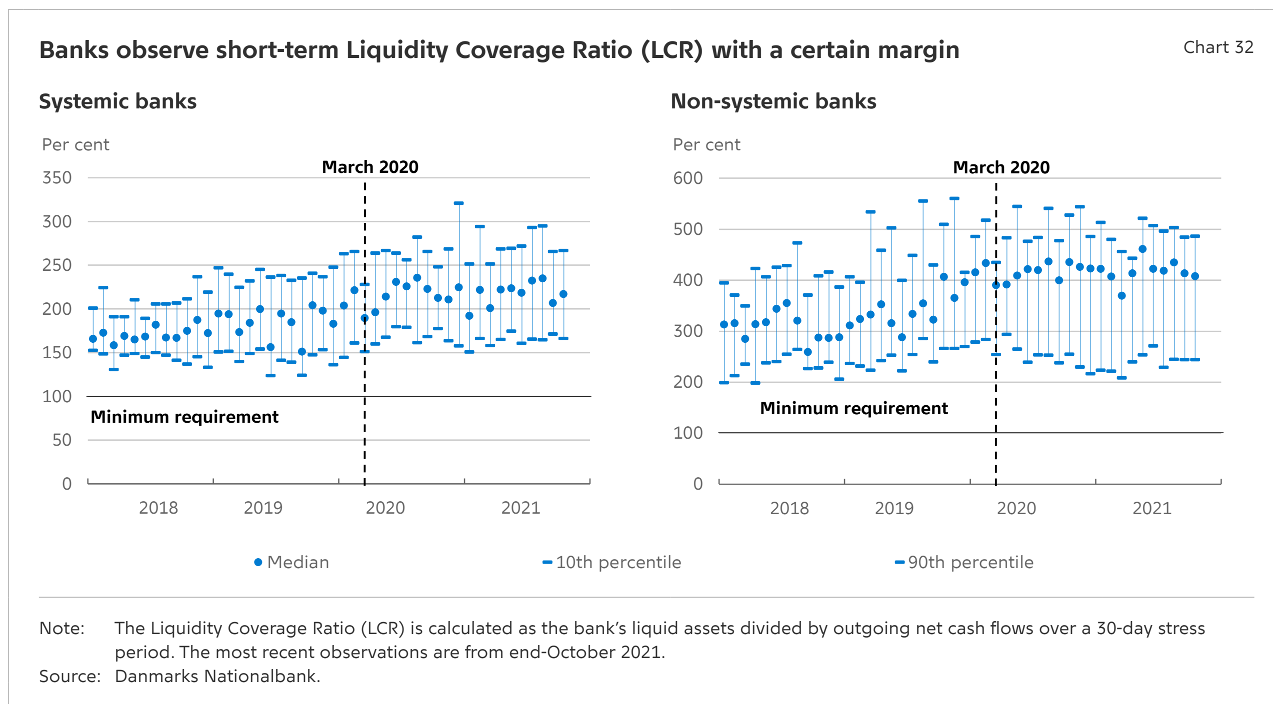
23 See Bank for International Settlements, *Basel III: Finalising post-crisis reforms (link).*

24 See Bank for International Settlements, *Minimum capital requirements for market risk (link).*

25 Environmental, Social and Governance.

26 See Ministry of Industry, Business and Financial Affairs, *Effekter af Baselkomitéens anbefalinger om kapitalkrav til kreditinstitutter* (Effects of the Basel Committee's recommendations on capital adequacy requirements for credit institutions), February 2018 *(link).*

27 *Basel Committee on Banking Supervision, Governors and Heads of Supervision announce deferral of Basel III implementation to increase operational capacity of banks and supervisors to respond to Covid-19 (link).*



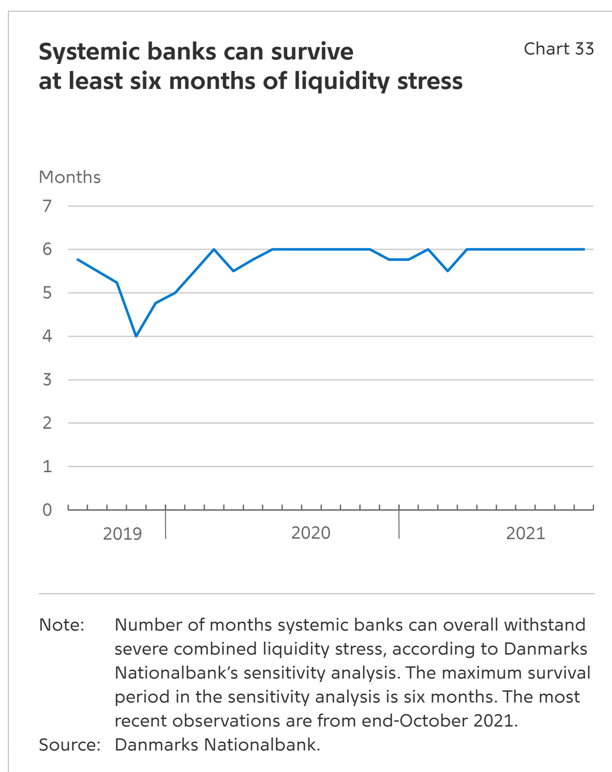
Banks observe short-term Liquidity Coverage Ratio (LCR) with a certain margin — Chart 32

Note: The Liquidity Coverage Ratio (LCR) is calculated as the bank's liquid assets divided by outgoing net cash flows over a 30-day stress period. The most recent observations are from end-October 2021.
Source: Danmarks Nationalbank.

The banks' liquidity buffers were already relatively large before the coronavirus outbreak in March 2020, due to a large deposit surplus. Deposits have increased further, partly as a result of the central government's liquidity support measures for the corporate sector and disbursement of frozen holiday pay.

It can be expected that LCR will fall back to the pre-pandemic level as the liquidity supporting measures are phased out. The banks' liquidity is robust and can handle customers' extra payments for taxes and VAT that fall due in the coming period. Danmarks Nationalbank's sensitivity analysis thus shows that the banks can handle severe liquidity stress for at least six months, see chart 33[28], which indicates that the banks have robust liquidity buffers.

The new funding requirement, NSFR, aims to ensure a stable funding of the balance sheet
The new funding requirement, NSFR, entered into force for credit institutions in June 2021. The purpose of NSFR is to reduce the refunding risk by ensuring



Systemic banks can survive at least six months of liquidity stress — Chart 33

Note: Number of months systemic banks can overall withstand severe combined liquidity stress, according to Danmarks Nationalbank's sensitivity analysis. The maximum survival period in the sensitivity analysis is six months. The most recent observations are from end-October 2021.
Source: Danmarks Nationalbank.

28 The method for Danmarks Nationalbank's sensitivity analysis is described on page 26 of Danmarks Nationalbank, Lower excess capital adequacy for the banks, *Danmarks Nationalbank Analysis (Financial stability)*, no. 25, November 2019 (*link*).

Key elements of the European Commission's proposal for the Capital Requirements Regulation and Directive

Box 4

New standard methods: The proposal presents new standard methods for credit risk, market risk, operational risk and credit value adjustments (CVA). For credit risk, additional risk sensitivity is introduced through an adjustment of the rules for the individual exposure classes. For market risk, a new standard method is introduced as described in the Basel Committee's 'Fundamental review of the trading book'. For operational risk, a standard method is introduced, which replaces all existing methods. This will make the calculation simpler, and it will be based on the individual institution's business volume For credit value adjustments (CVA), a new standard method and a simpler basic approach are introduced. Existing exemptions for CVA capital requirements are maintained.

Adjustment of internal models and advanced methods: For credit risk, the possibilities of using internal models (IRB models) have been reduced for exposures to institutions and large corporate customers, just as parameter floors for the probability of default have been raised, and new parameter floors are being introduced for loss given default. Furthermore, it is no longer possible to use IRB models for equity exposures. For market risk, the existing approach is replaced by the method described in the Basel Committee's 'Fundamental review of the trading book'. For operational risk, the option of using an advanced method for calculating the capital adequacy requirement is removed. For credit value adjustments, the option of using an advanced method is also removed.

Output floor: For institutions that use internal models, a floor is introduced corresponding to 72.5 per cent of the total risk-weighted exposures calculated under the standard methods. The output floor will be phased in from 2025 and will be fully phased in by 2030. The EU implementation introduces preferential risk weighting of housing loans secured by a mortgage within 80 per cent of the real property value as well as for loans to non-rated corporate customers if a number of conditions have been met. The preferential risk weighting is a temporary provision that will expire in the period 2029-2032, but with the possibility of an extension. Risk-weighted exposures calculated under the output floor are used to determine the minimum capital requirement and all buffer requirements.

Pillar II and buffer requirements: The institutions' individual Pillar II add-on and the systemic risk buffer (not currently used in Denmark) are frozen in absolute terms and must be reassessed to avoid double-counting of risks, if bound by the output floor. The size of the systemic institutions' SIFI buffer must also be reassessed.

1. The European Commission, *Banking package (link)*.

that the banks have sufficiently stable funding available. NSFR must be minimum 100 per cent, see also box 5.

The banks comply with the NSFR by a certain margin, and the level has not changed much from the 2nd quarter to the 3rd quarter of 2021, see chart 34.

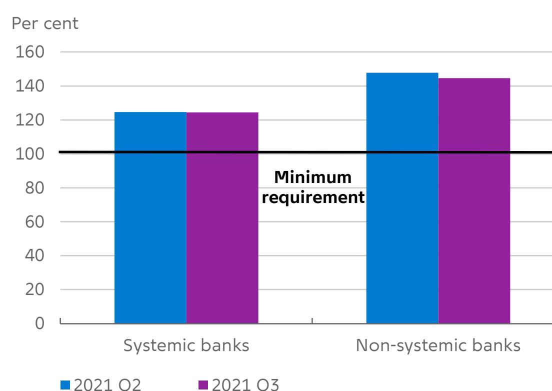
The non-systemic banks have a higher NSFR level overall than the systemic banks. The reason for this is that the deposit surplus is higher and that the non-systemic banks' customers are mainly households and SMEs. In NSFR, sight deposits from households and SME customers are considered as being among the most stable funding sources that a bank can have.

NSFR is sensitive to withdrawals of deposits and lack of access to markets

It is important that the banks have a good understanding of the factors that may affect their NSFR. The understanding can, for example, be obtained

Banks comply with the new funding requirement, Net Stable Funding Ratio (NSFR)

Chart 34



Note: The NSFR is calculated as the banks' stable financing divided by the need for stable financing. The NSFR level for systemic banks and non-systemic banks is a weighted average.

Source: Danmarks Nationalbank.

by the banks using stress tests actively in their risk management. NSFR stress tests can contribute to an assessment of a suitable buffer to the requirement. Stress tests based on the scenarios from Danmarks Nationalbank's liquidity sensitivity analyses[29] show that NSFR is sensitive to withdrawal of deposits.

The banks are particularly sensitive to withdrawals of sight deposits from households and SME customers. These deposits may, for example, decrease if a bank is hit by institution-specific stress, for example due to negative publicity.

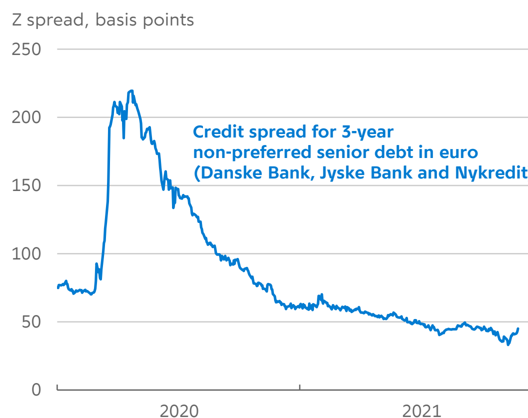
If deposits decrease, the bank will have less stable funding available to meet NSFR. Thus, the bank may need to issue non-preferred senior debt or capital to meet NSFR. Hence, the banks can be sensitive to periods with limited market access.

The banks' need for stable funding stems mainly from their lending activities. When lending increases, the banks' NSFR requirement will thus increase. In the event of lending growth, the banks must ensure that they have sufficient stable funding to continue to meet NSFR.

If non-systemic banks lose deposits and have problems meeting NSFR, they do not have the same access to the financial markets as the systemic banks in terms of obtaining long-term stable funding. The non-systemic banks are therefore more dependent on their deposits to meet NSFR.

Credit premium for non-preferred senior debt is lower than pre-pandemic level

Chart 35



Note: Average z spread for non-preferred senior debt in euro with a remaining maturity of between 2.5 and 3.5 years for Danske Bank, Jyske Bank and Nykredit. The *z spread* is an expression of the additional cost of financing using a debt instrument, where the additional cost is calculated by parallel-shifting a risk-free zero coupon rate structure. The most recent observations are from 25 November 2021.
Source: Refinitiv Eikon.

Good time to secure a robust maturity profile on non-preferred senior debt

The current market situation is a good time for the banks to ensure a suitable maturity profile and adequacy buffer to their NSFR, MREL and debt buffer requirements by issuing more long-term non-preferred senior debt.

During 2021, the risk premium for non-preferred senior debt has fallen and is now at a lower level than before the pandemic, see chart 35. Risk premiums increased in March 2020 and were at a high level in the following months due to great uncertainty. Flexibility in terms of the time of issuance may thus have a great impact on the cost of issuing non-preferred senior debt to meet the NSFR and MREL requirements.

Interest rate rises will increase the need for liquidity in the financial sector

It is important that pension companies, life insurance companies and banks take potential interest rate increases into account in their risk management, as this may increase their liquidity needs. If interest rates rise, companies that use interest rate derivatives have to meet variation margin calls[30] in the form of cash, as the value of the derivatives contract is changed.

Calculating the change in market values based on pension and life insurance companies' open

29 See Danmarks Nationalbank, Lower excess capital adequacy for the banks, *Danmarks Nationalbanks Analysis (Financial stability)*, no. 25, November 2019 (*link*).

30 Movements in the value of derivatives contracts result in the company having to receive or put up a variation margin every day, i.e. put up liquidity corresponding to the market change of the derivatives contract.

interest rate derivatives, a rise in interest rates of 100 basis points will require these companies to post variation margin corresponding to approximately kr. 140 billion, see chart 36. Approximately kr. 30 billion must be in Danish kroner and kr. 110 billion in euros, where approximately half of the euro liquidity and approximately one third of the Danish kroner liquidity having to be in cash.[31] The most recent period with large interest rate changes was in March 2020 as a result of the coronavirus pandemic. There have previously been even larger interest rate changes.

Pension and life insurance companies use derivatives to hedge risks, including interest rate risks on their long-term liabilities. Movements in the value of derivatives contracts require variation margin on an ongoing basis. An interest rate increase will therefore result in a decrease in the value of the derivatives contracts for the companies and require variation margin. In the event of an interest rate increase, the companies must transfer the market value change of the derivatives contract to the counterparty on a day-to-day basis in the form of cash to reduce counterparty risk.[32]

Net Stable Funding Ratio (NSFR)

Box 5

In the wake of the financial crisis, the Basel Committee recommended the introduction of a Liquidity Coverage Ratio (LCR) to ensure that credit institutions have a sufficient amount of liquid assets to handle a 30-day severe liquidity stress scenario. In addition, the Basel Committee recommended the introduction of Net Stable Funding Ratio (NSFR). The purpose of NSFR is to ensure that the credit institutions have a reasonable balance sheet composition. Hence, it is a requirement for how the credit institutions fund their operations.

NSFR is defined as the ratio between the available stable funding and the need for stable funding in a credit institution:

$$\text{NSFR} = \frac{\text{(Available amount of stable funding)}}{\text{(Required amount of stable funding)}} \geq 100 \text{ pct.}$$

Available stable funding stems from the credit institution's liabilities and is the funding that a credit institution can fund their operations with. Deposits are an example of available stable funding. Required stable funding stems from the credit institution's assets, i.e. the operations that a credit institution needs to fund. This is, for example, lending activities. A bank that solely makes loans to household customers and has a deposit funding surplus will have an NSFR above 100 per cent, as deposits from household customers are considered as being among the most stable funding sources that a bank can have when these deposits are covered by the deposit guarantee scheme.

The purpose of NSFR is to ensure that the credit institutions have a sufficient amount of stable funding to reduce their refunding risk. A number of Danish banks had a deposit deficit up to and during the financial crisis, and they thus had more loans than deposits. If NSFR had been in force at the time, the banks would have been forced to secure long-term market funding with a maturity of more than one year or have a sufficiently large equity to make up for the deposit deficit.

The structure of the requirement
NSFR distinguishes between three different maturities for required and available funding:

- Under six months
- Between six months and up to a year
- Over a year.

Each asset and liability are weighted based on maturity and counterparty, where the counterparty can be a household customer, SME, large company, central bank or another financial institution (e.g. other banks, pension funds, insurance companies).

- The lower the weight of an asset, the less stable funding is required, and the higher the NSFR will be.
- The higher the weight of a liability, the more stable funding it contributes, and the higher the NSFR will be.

An example of a bank balance sheet with a large deposit surplus is shown below, illustrated with the given NSFR weights. This bank's balance sheet will result in an NSFR of 180 per cent.

Continues

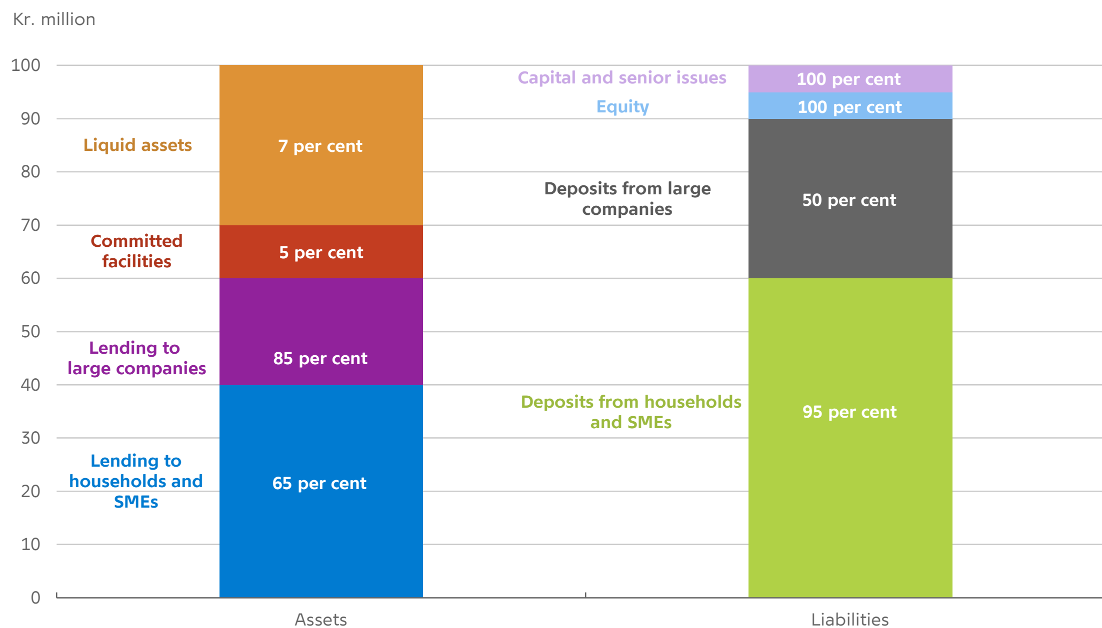
31 Pension companies are exempt from having to meet the whole amount of variation margin call with cash as a part of the implementation of the EMIR Regulation. The exemption will expire in June 2023 at the latest, after which the full collateral in euros will have to be in cash. Some bilateral agreements allow that variation margin can be in the form of government or covered bonds, but the general requirement is cash, see the EMIR Regulation (*link*).

32 See the European Commission, *Baseline report on solutions for the posting of non-cash collateral to central counterparties by pension scheme arrangements, A report for the European Commission prepared by Europe Economics and Bourse Consult,* The European Union, 2014 (*link*).

Net Stable Funding Ratio (NSFR)

Continued

Box 5



$$\text{NSFR} = \frac{((60*95\text{ pct.})+(30*50\text{ pct.})+(5*100\text{ pct.})+(5*100\text{ pct.}))}{((40*65\text{ pct.})+(20*85\text{ pct.})+(10*5\text{ pct.})+(30*7\text{ pct.}))} = \frac{82}{45.6} = 180\text{ pct.}$$

Source: Danmarks Nationalbank.

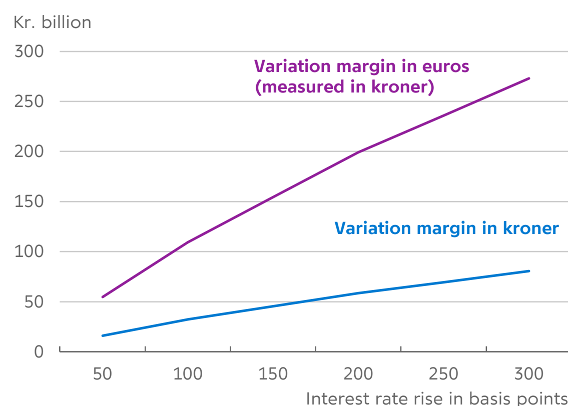
There are large variations between the companies in relation to both the size of their liquidity needs in connection with interest rate increases and the distribution of the need between Danish kroner and euros.

Pension and life insurance companies have practically no bank deposits. An interest rate increase therefore places heavy demands on the companies' ability to obtain liquidity in the market on a day-to-day basis in the form of cash, either through the sale of an asset or through the repo market. A large part of the variation margin must be in euros. It is generally not possible to obtain euro via the Danish krone market.

It is important that the companies have established liquidity reserves, including access to repo connections with both Danish and international banks, and that they have access to centrally cleared repo markets, if necessary, so that they are able to obtain

The need for liquidity increases when interest rates rise

Chart 36



Note: Changes in the value of derivatives contracts as interest rate swaps for selected pension and life insurance companies, and thus the need for variation margin based on data from the end of 2020.

Source: Danmarks Nationalbank.

the necessary liquidity in the event of interest rate increases.[33]

If it is not possible for pension and life insurance companies to obtain reasonable access to liquidity, it may be necessary to reduce the use of interest rate derivatives.

The banks also use interest rate derivatives. They may therefore also need day-to-day liquidity as variation margin in the event of interest rate changes.

It is important that the banks in their liquidity risk management are aware of how large their own liquidity needs may become in the event of interest rate changes. In their risk management, the banks must also assess their willingness and ability to meet the increased demand for liquidity from pension and life insurance companies.

The banks must know the sensitivities in NSFR, LCR and Leverage Ratio requirements in the event of an increased demand for liquidity, as supporting the increasing liquidity needs for pension and life insurance companies may affect the banks' balance sheet composition and thus their compliance with NSFR, LCR and Leverage Ratio requirements.

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33 For a further understanding of the pension companies' liquidity need and use of interest rate derivatives, see Danmarks Nationalbank, Pension companies will have large liquidity needs if interest rates rise, *Danmarks Nationalbank Analysis,* no. 23, November 2019 (*link*). There is a difference in the method used for the calculation of liquidity needs in this analysis and in the analysis from November 2019. The big difference between the methods is better data quality, more data sources and the inclusion of more pension companies and life insurance companies.

Appendix: Analysis data

The analysis applies the term 'credit institutions' when referring to the activities of both banks and mortgage credit institutions. The term 'bank' refers specifically to entities carrying out banking activities. These institutions are listed in table 1.

The analysis of Danish credit institutions' earnings, liquidity and own funds comprises eight systemic credit institutions designated by the Danish Financial Supervisory Authority in 2021. In June 2021, Arbejdernes Landsbank was designated as a systemic credit institution by the Danish Financial Supervisory Authority after it had acquired a majority shareholding in Vestjysk Bank. Vestjysk Bank is thus included under Arbejdernes Landsbank in the analysis. The analysis also includes the non-systemic banks. This group consists of the institutions in group 2 defined by the Danish Financial Supervisory Authority for 2021, with the exception of Saxo Bank and Arbejdernes Landsbank. Saxo Bank has been omitted due to the bank's business model. Arbejdernes Landsbank has been omitted due to its designation as systemically important. The grouping applies retrospectively.

In the analysis and assessment of lending activity, focus is on the grouping of large and medium-sized banks in Danmarks Nationalbank's lending survey. Large banks consist of Group 1 of the Danish Financial Supervisory Authority and Nordea Danmark, while medium-sized banks consist of group 2 of the Danish Financial Supervisory Authority and Handelsbanken and Santander Consumer Bank.

Institutions in the analysis by total assets as at 30 June 2021, kr. million

Table 1

Systemic credit institutions	Amount
Danske Bank	3,975,032
Nykredit Realkredit	1,654,673
Jyske Bank	656,500
Nordea Kredit	467,399
DLR Kredit	182,524
Sydbank	169,848
Spar Nord	114,562
Arbejdernes Landsbank	105,400
Systemic credit institutions, total	7,325,938

Systemic banks	
Danske Bank	2,437,914
Jyske Bank	327,501
Nykredit Bank	206,805
Sydbank	171,904
Spar Nord	114,645
Arbejdernes Landsbank	105,400
Systemic banks, total	3,364,169

Non-systemic banks	
Ringkjøbing Landbobank	57,123
Sparekassen Kronjylland	35,393
Sparekassen Vendsyssel	33,164
Lån & Spar Bank	29,252
Sparekassen Sjælland-Fyn A/S	28,546
Jutlander Bank	21,662
Middelfart Sparekasse	15,695
Non-systemic banks, total	220,836

Mortgage credit institutions	
Nykredit Realkredit	1,571,084
Realkredit Danmark	868,664
Nordea Kredit	467,399
Jyske Realkredit	366,581
DLR Kredit	182,524
Mortgage credit institutions, total	3,456,253

Note: The balance sheet total for the systemic credit institutions is stated at group level. The credit institutions have thus been stated inclusive of assets in their subsidiaries in the form of, for example, mortgage credit institutions. The balance sheet total for systemic banks, non-systemic banks and mortgage credit institutions is stated at institution level. Exceptionally, Arbejdernes Landsbank has been included at group level to reflect the consolidation with Vestjysk Bank. The assets in the financial statements of the mortgage credit institution Nykredit Realkredit also reflect the Nykredit Group's funding of the subsidiary Totalkredit and funding of the most recent lending in the subsidiary LR Realkredit.
Source: Danmarks Nationalbank.

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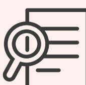

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