DANMARKS NATIONALBANK

31 MAY 2018 — NO. 5

STRESS TEST

The largest banks are close to buffer requirements in stress test

- The systemically important banks have capital to withstand a severe recession scenario, but several are close to exceeding the capital buffer requirements. Several of the non-systemic banks exceed the buffer requirements, and a few fall short of their minimum capital requirements.
- In the stress test, it is assumed that the countercyclical capital buffer is released, providing relief for banks. Build-up of the buffer in good times strengthens banks' resilience in a crisis.
- The mortgage sector is now included in Danmarks Nationalbank's stress test. In the stress test, the sector contributes positively to banks' core earnings at group level, but risk-weighted assets increase due to higher risk weights.

Kr. 1.7 billion

is the amount of banks' capital shortfall in the severe recession scenario

Read more

6 banks

from the mortgage sector are now included in the stress test

Read more

9.8 per cent

is the level which unemployment reaches in the severe recession scenario

Read more

CONTENT

Danmarks Nationalbank performs a semi-annual stress test of the Danish banking sector. In the stress test, the banks' capitalisation under stress is compared with the current capital requirements.

Previously, the stress test comprised the banking activities of the largest Danish banks.[1] Now the mortgage sector has also been included, in the form of Nykredit Realkredit, Totalkredit, Realkredit Danmark, Nordea Kredit, BRFkredit and DLR Kredit. Several of them belong to financial groups. Our calculations are focused on capitalisation at group level.

Despite larger impairment charges than in previous stress tests, some banks perform better in terms of capital adequacy. The reason is that some of the banks that previously struggled to meet the capital requirements in the stress tests have strengthened their capital ratios over the last half year, making them more resilient to stress. However, a number of the other banks are now closer to the buffer requirements than earlier.

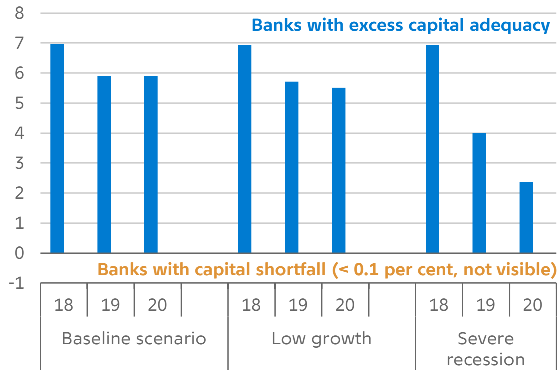
The stress test shows that the largest banks, i.e. the SIFIs (systemically important financial institutions), are resilient to even a considerable level of stress. No SIFIs are close to the minimum capital requirement for banks, but several are close to exceeding or marginally exceed the add-on buffer requirements, cf. Chart 1.

Although the SIFIs generally meet the capital requirements, the narrow margins by which they exceed the buffer requirements could be a cause for concern. If their capitalisation falls below the buffer requirement, a number of restrictions will be imposed, e.g. in relation to dividend payments and interest payments on hybrid capital instruments. This can weaken their access to external funding in the financial markets at a time when funding is already difficult to obtain.

As from 2019, the capital conservation buffer and the SIFI capital buffer will be fully phased in, cf. Chart 2. After that time, the capital requirements are assumed to be constant. The countercyclical capital buffer rate has been set at zero in the stress

SIFIs close to buffer requirements Chart 1

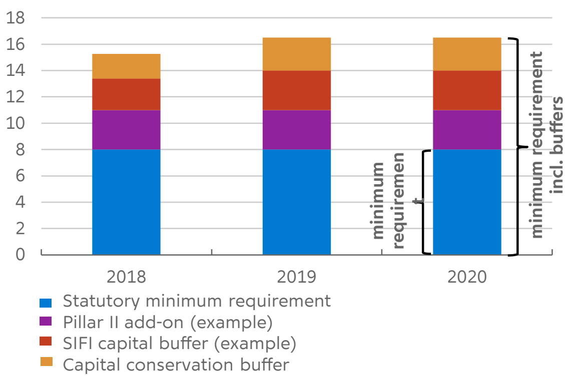
Per cent of risk-weighted exposures



Note: The chart shows the SIFIs' total excess capital adequacy or capital shortfall as percentages of total risk-weighted exposures relative to the capital requirement including buffers.
Source: Danish Financial Supervisory Authority and own calculations.

Banks face slightly increasing capital requirements Chart 2

Per cent of risk-weighted exposures



Note: The capital requirements vary from bank to bank. This is due to the Pillar II add-on which is set individually for each bank while the SIFI capital buffer affects only SIFIs and varies with the systemic importance of the SIFI.

1 Specifically banks in the Danish Financial Supervisory Authority's groups 1 and 2, i.e. banks with a working capital of more than kr. 12 billion.

test. The assumption is that the buffer will be released in a stress scenario, which will give the banks capital relief.[2]

In the stress test, the banks are assumed to finalise scheduled share repurchase programmes and continue to pay dividends as long as their net income is positive and they maintain a certain distance to the buffer requirements.[3]

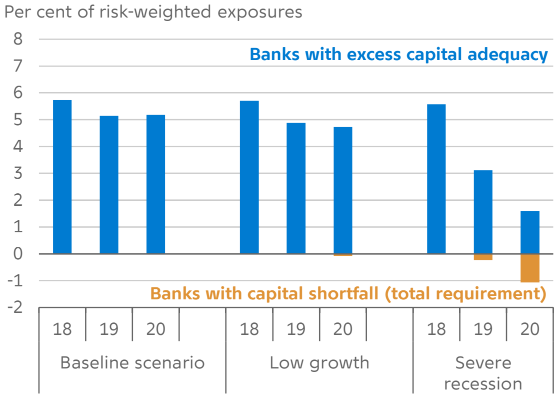
Several of the small, non-systemic banks are challenged in the stress test, and some fall short of the minimum capital requirement. In 2020, the banks' total shortfall will be kr. 200 million relative to the minimum requirement and kr. 1.6 billion relative to the minimum requirement including buffers. Chart 3 shows the development in capitalisation relative to the buffer requirement.

Before the non-systemic banks hit the minimum requirement, breach of the buffer requirements will allow the authorities to intervene. If the solution is recovery or resolution, the authorities have the tools required to address such a situation, but the owners and creditors of the banks in question may suffer losses.

The calculations include the full expected effect of the transition to the new IFRS9 accounting standards.[4]

Most non-systemic banks meet buffer requirements, but a few are struggling considerably

Chart 3



Note: The chart shows the non-systemic banks' excess capital adequacy or capital shortfall as percentages of total risk-weighted exposures relative to the capital requirement including buffers.
Source: Danish Financial Supervisory Authority and own calculations.

The severe scenario follows the economic cycle

The basis for Danmarks Nationalbank's stress test is three macroeconomic scenarios over three years: a baseline scenario, low growth and a severe recession.[5] The baseline scenario is based on Danmarks Nationalbank's macroeconomic projection. In the low growth scenario, the economy is hit by a minor domestic recession with weak GDP growth and a fall in house prices. The severe recession scenario envisages a global crisis. Export market growth is reduced, and declining confidence among consumers and firms leads to falling consumption and fewer investments. This causes GDP, house prices and equity prices to fall, while unemployment rises.

In the baseline scenario, the financial variables, such as interest rates, develop in line with market expectations, but in the stress scenarios they are affected

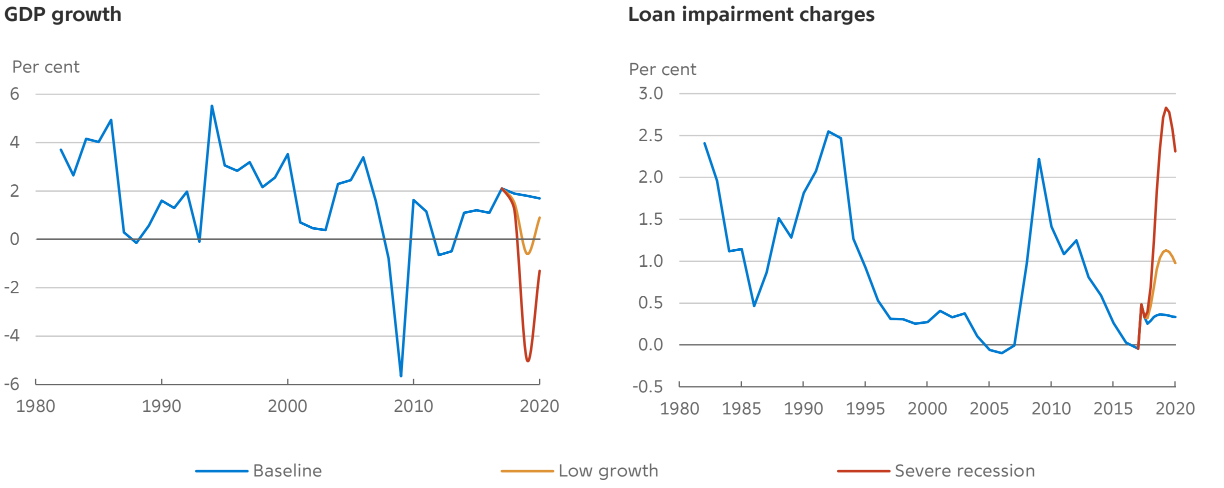
2 In addition to the existing capital requirements, the so-called output floor, part of a reform package introduced by the Basel Committee is intended to be phased in over the period 2022-27. This can increase capital requirements for Danish banks – and they might already now need to consider how to adapt to the requirement. However, the reform package must first be implemented in EU legislation before it applies to Danish banks.

3 The banks are assumed to fully stop paying dividends when their capital ratio is less than the buffer requirement plus 1 per cent. Before then there is a gradual reduction of dividend payments.

4 Actually, the banks are able to recognise the effect gradually over five years. Around half of them have chosen to do so, while the remaining banks recognise the effect immediately.

5 Scenarios have been prepared in collaboration with the Danish Financial Supervisory Authority.

GDP falls and loan impairment charges rise under stress Chart 4



Note: Right-hand chart: Loan impairment charges are calculated as a ratio of lending and guarantees before loan impairment charges. The historical series until and including 2015 is based on banks in the Danish Financial Supervisory Authority's groups 1-3. The loan impairment charges from 2016 onwards and the estimated loan impairment charge ratios for 2018-20 have been calculated as weighted averages of the 15 banks in the stress test.

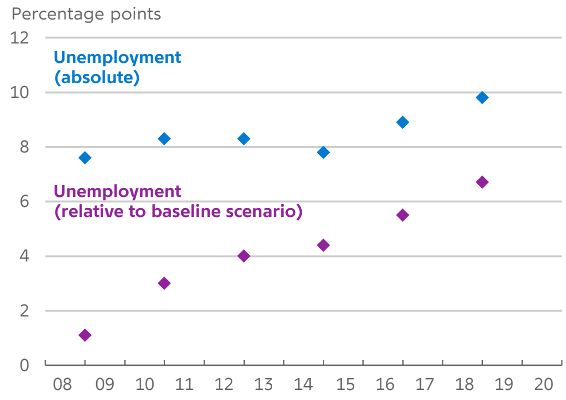
Source: Danish Financial Supervisory Authority and own calculations.

by the macroeconomic variables, resulting in falling equity prices, changed yield curves and widening credit spreads.

Most Danish banks' results are influenced primarily by loan impairment charges under stress. In the stress test, the loan impairment charges on the banks' banking activities rise to levels similar to those seen during previous crises, cf. Chart 4.

The Danish economy has been doing well for a number of years. Unemployment has fallen, while house prices have increased. Typically, risks build up in good times, and there is a risk that a strong upswing will be followed by a deeper fall. This is reflected in larger changes than previously in key variables such as unemployment.[6] Chart 5 shows the development in unemployment in different versions of Danmarks Nationalbank's stress test over time. The peak unemployment level has been almost constant across

The stress level follows the economic cycle Chart 5



Source: Various previous publications from Danmarks Nationalbank on financial stability and stress tests.

6 Danmarks Nationalbank is working on a more methodical approach to making the stress tests countercyclical. We expect this method to be applied to the stress test for the 2nd half of 2018.

the various stress tests. However, given the fall in unemployment over a number of years, the increase in unemployment has become gradually higher in Danmarks Nationalbank's stress tests in recent years. Has the stress been more severe for banks, then? In practice, yes, since loan impairment charges depend mainly on changes in variables such as unemployment, not only on levels.

The mortgage sector is now included in the stress test

Previously, Danmarks Nationalbank's stress test included only the largest Danish banks. Now it includes the mortgage sector too. Specifically, this means that we calculate the results for both the banking and the mortgage banking activities of the banking groups, aggregate the results and monitor capital ratios at group level.

Mortgage activities differ from banking in several respects. Lending by mortgage banks is generally less risky than lending by banks, which is reflected in lower loan impairment charges. But the risk weights of mortgage banks are more sensitive than those of banks. Moreover, the mortgage sector has special risks, such as the risk of having to provide top-up collateral in order to retain the SDO/SDRO status of mortgage bonds if house prices fall.

In the stress test, the mortgage banks' results are affected by four factors:

- Loan impairment charges: In our model, loan impairment charges depend on unemployment, house prices, changes in GDP and interest rate developments.
- Risk weights: The mortgage banks' risk weights depend on changes in both probability of default (PD) and loss given default (LGD).
- Top-up collateral: If the LTV limits are exceeded for a mortgage, the mortgage bank risks having to provide top-up collateral.[7] This is costly, since the mortgage bank has to issue debt and invest the funds in more secure assets with lower returns.
- Market risk: The mortgage banks risk losses on their bond portfolios due to e.g. widening credit spreads.

Other factors, such as administration margins, are assumed to be constant throughout the stress test scenario. Chart 6 shows the differences between mortgage sector and banking sector stress.

In the capital ratio, changes appear predominantly in the denominator (risk-weighted exposures), not the numerator (own funds). Risk weights increase by 11-25 per cent for the mortgage banks. Given their high earnings from administration margins, the mortgage banks post mostly positive results, even in a stress scenario, so for most mortgage banks own funds do not decrease.

It should be emphasised that the mortgage banks' relatively favourable results under stress do not imply an absence of risk in the sector. Danmarks Nationalbank's stress test is focused on capitalisation and solvency. Hence, the assumption is that banks and mortgage banks are able to raise funding, for mortgage banks e.g. by providing top-up collateral when house prices fall, against a sufficient interest premium. In practice, the institutions may not be able to raise the required liquidity in time – a risk which is not addressed in the stress test.

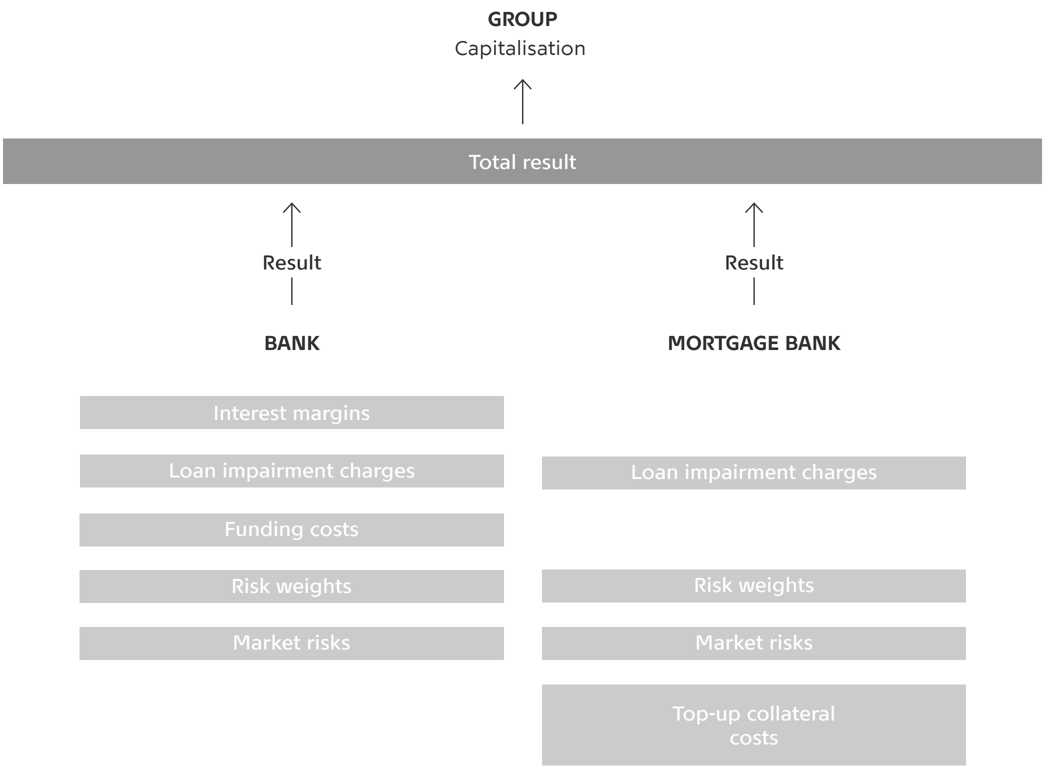
Larger impairments among mortgage banks may challenge the sector

In the stress test, loan impairment charges for the mortgage sector rise to levels that are higher than during the financial crisis, cf. Chart 7, but still low compared with the loan impairment charges of the banking sector.

7 In so far as there is no existing top-up collateral in a capital centre. The requirement for top-up collateral affects only the capital centres issuing covered bonds (SDOs) and covered mortgage bonds (SDROs).

How stress effects vary between banks and mortgage banks

Chart 6



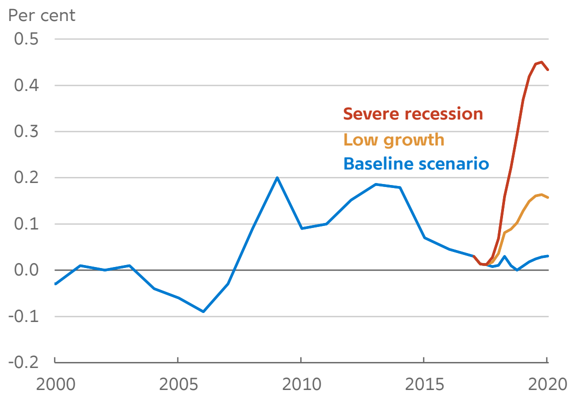
Anm.: The chart shows the earnings elements modelled for banks and mortgage banks, respectively, in the stress test. Other factors, such as administration margins, are assumed to be constant.

The projected loan impairment charges are on the high side compared with the levels during the financial crisis, but they are lower than the levels seen in the mortgage sector in the early 1990s, e.g. in 1991-93, when annual loan impairment charge ratios were around 0.70. The high loan impairment charges in the early 1990s were attributable to several factors.[8] Still, it is interesting to consider the stress test outcome if loan impairment charges were as high as in the early 1990s.

The stress test model shows that the financial groups are generally robust to even considerable loan impairment charges in the mortgage sector. In an

The mortgage sector is hit by higher loan impairment charges than during the financial crisis

Chart 7



Note: Loan impairment charges are calculated as a ratio of lending before loan impairment charges.
Source: Danish Financial Supervisory Authority and own calculations.

8 One reason is the concurrence of an economic downturn and policy measures that hit the housing market specifically. Also, the mortgage banks did not use the same credit assessment tools as they do today, which also contributed to large loan impairment charges.

otherwise unchanged stress test in the severe recession scenario, with the mortgage banks' loan impairment charges set at 0.70 per cent in each of the three years, most of the systemic banks still have excess capital adequacy relative to the buffer requirement at group level. A few banking groups cannot meet the buffer requirement in such a scenario, and the sector overall will fall around kr. 10 billion short of all buffer requirements, but none of the systemic banks are even close to the minimum requirement.

Appendix 1: Stress test population

Systemically important financial institutions, SIFIs
Danske Bank
Nykredit Realkredit
Jyske Bank
Nordea Kredit
Sydbank
DLR Kredit
Spar Nord

Non-systemic financial institutions
Arbejdernes Landsbank
Ringkjøbing Landbobank
Sparekassen Kronjylland
Vestjysk Bank
Nordjyske Bank
Lån & Spar Bank
Jutlander Bank
Sparekassen Sjælland-Fyn
Den Jyske Sparekasse
Sparekassen Vendsyssel

Appendix 2: Danmarks Nationalbank's stress test scenarios

Scenarios: Selected key variables

Tabel

	Baseline scenario	Low growth	Severe recession
2018			
GDP, per cent year-on-year	1.9	1.5	1.2
Private consumption, per cent year-on-year	2.2	1.7	1.6
Export market growth, per cent year-on-year	4.2	4.2	2.8
House prices, per cent year-on-year	3.2	2.5	1.2
Gross unemployment, per cent of labour force	3.5	3.6	3.7
Bond yields	0.9	0.9	0.9
2019			
GDP, per cent year-on-year	1.8	-0.6	-5.0
Private consumption, per cent year-on-year	2.3	-1.3	-3.7
Export market growth, per cent year-on-year	4.1	4.1	-8.4
House prices, per cent year-on-year	2.8	-4.5	-15.5
Gross unemployment, per cent of labour force	3.3	4.3	6.3
Bond yields	1.3	1.3	1.3
2020			
GDP, per cent year-on-year	1.7	0.9	-1.3
Private consumption, per cent year-on-year	2.2	-0.5	-2.2
Export market growth, per cent year-on-year	4.0	4.0	-0.4
House prices, per cent year-on-year	2.5	-1.5	-7.2
Gross unemployment, per cent of labour force	3.1	5.0	9.8
Bond yields	1.7	1.7	1.7

Note: Annual averages. House prices are cash prices of single-family houses.

DANMARKS NATIONALBANK
HAVNEGADE 5
1093 KØBENHAVN K
WWW.NATIONALBANKEN.DK

This edition closed for contributions on 10 May 2018

Søren Korsgaard
Principal Stress Test Expert

FINANCIAL STABILITY

DANMARKS NATIONALBANK