

DANMARKS NATIONALBANK

27 MAY 2020 — NO. 7

STRESS TEST – 1ST HALF 2020

A prolonged recession could squeeze banks



Banks are more resilient to stress than before the financial crisis

A stress test of the banking sector shows that the banks can withstand a severe, but temporary, economic downturn. Banks are better capitalised than before the financial crisis and can withstand losses at financial crisis levels or higher.



Some mid-sized banks are at risk of failing

In the most adverse scenarios of the stress test, some mid-sized banks fall short of their minimum capital requirements, but this does not pose a threat to financial stability. A number of the largest banks breach their capital buffer requirements.



MREL compliance could be the first challenge

For most banks, the MREL is the requirement they are closest to breaching. It is important for banks to have sufficient surplus relative to the MREL and MREL-issues with a smooth and long-dated maturity profile.

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Danmarks Nationalbank performs a semi-annual stress test of the Danish banking sector. The stress test comprises the largest Danish banks.¹

Due to the abrupt economic slowdown caused by the coronavirus, the scenarios are substantially different from the scenarios on which Danmarks Nationalbank's stress tests are usually based. In the stress test, banks' capital ratios are compared with the current capital requirements in three scenarios: a prolonged recession, a deep 'V' scenario and a combination scenario. Both the prolonged recession scenario and the combination scenario are considerably more severe than the financial crisis. Chart 1 illustrates the change in GDP under the three scenarios.

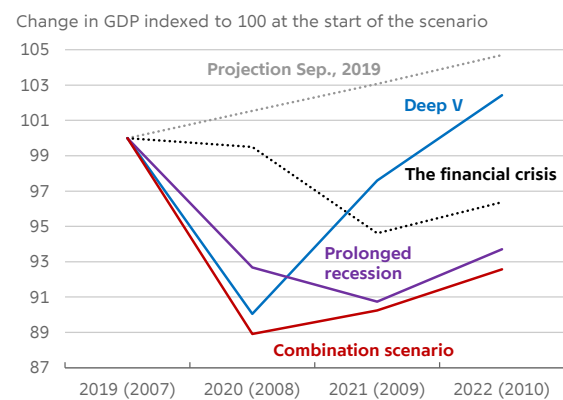
In the first scenario, the prolonged recession, 2020 will see a sharp economic downturn which turns into a prolonged recession similar to the typical recession scenario in Danmarks Nationalbank's stress test. In the second scenario, the deep V scenario, GDP will contract by 10 per cent in 2020, but will expand significantly in both 2021 and 2022. In the third scenario, the combination scenario, the sharp decline from the second scenario is combined with the prolonged recession from the first scenario. The scenarios are described in detail in the final section of the analysis.

It should be emphasised that the scenarios are just scenarios and will undoubtedly deviate from the actual path ahead. The stress test model is also based on historical relations between, for instance, impairment charge levels and macroeconomic variables, and it is uncertain to which extent these relations continue to hold in a scenario so fundamentally different from earlier recessions. Moreover, a number of political measures have been adopted, with the specific aim of reducing the economic impact of the crisis. Incorporating these into the stress test model is difficult, so the estimates of bank losses under stress are likely at the high end of the range.

Bearing in mind the uncertainties surrounding the calculations, the stress test model shows the following: The systemic banks perform reasonably well in the prolonged recession scenario, considering the severity of the scenario. A few banks fall moderately short of their buffer requirements. In the deep V scenario,

GDP profiles vary across scenarios

Chart 1



Note.: The chart shows the change in GDP normalised to 100 for the first observation. The projection is from Danmarks Nationalbank's latest projection before the outbreak of COVID-19. The financial crisis covers the period from 2007 to 2010, and observations correspond to years in brackets on the x-axis.

Source: Own calculations.

none of the systemic banks fall short of their buffer requirements. But in the combination scenario, several banks fail to meet their capital buffer requirements. Moreover, some banks are close to the minimum leverage ratio requirement of 3 per cent, which will be implemented as a minimum requirement in mid-2021. Some non-systemic banks breach their minimum capital requirements in both the prolonged recession scenario and the combination scenario.

However, before falling short of their buffer requirements, banks could fall short of the Minimum Requirement for Own Funds and Eligible Liabilities, MREL. Over the coming years, several systemic banks will need to issue new MREL-eligible debt instruments to continue to meet the requirements.

Due to the limitations of the model, the calculations are supplemented by a sensitivity analysis in which we 'reverse' the calculations to try to illustrate the impairment losses the banking sector is actually able to withstand. Banks can withstand losses at financial crisis levels or somewhat higher – but could face difficulties if losses prove to be considerably higher.

¹ See Appendix 1 for an overview of the stress test population.

Banks fall short of the capital requirement in the most severe scenario

The stress test shows that banks are able to withstand a prolonged recession and also a very severe, but temporary, economic downturn, see Chart 2, without falling significantly short of the buffer requirements. But a combination of these scenarios could cause problems, and in this scenario several systemic banks may fall short of the capital buffer requirements.

If a bank's capital ratio 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 could further weaken banks' access to external funding in the financial markets and, for instance, make it difficult to meet the MREL set for them.

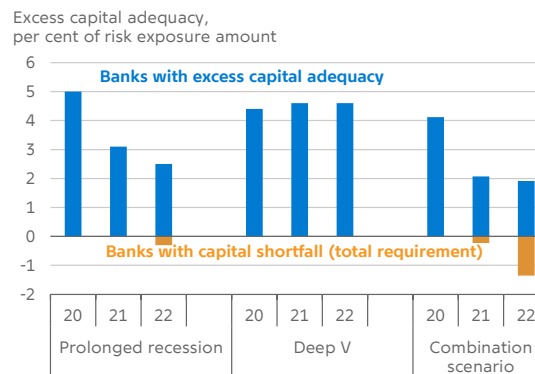
Banks are required to meet both minimum capital and buffer requirements, see chart 3. Before the spread of the coronavirus, the countercyclical capital buffer had gradually been increased to 1.0 per cent, and it had been decided to increase the buffer further in future. This helped strengthen banks' current capitalisation. In March, the Minister for Industry, Business and Financial Affairs decided to release the buffer to boost banks' lending capacity.

All systemic banks satisfy their risk-based minimum requirements in the stress test, i.e. capital as a percentage of the risk exposure amount. However, in the 2nd quarter of 2021, a 3 per cent leverage ratio requirement will be implemented, and several systemic banks are close to this requirement in the combination scenario.

As described in the introduction, the stress test does not take into account the impact of relief packages. In practice, these packages may have a significant positive impact on bank capitalisation. In the combination scenario, banks will suffer considerable losses already in 2020, and the relief packages can make a substantial difference in this regard. For instance, if the relief packages could halve the projected losses in 2020 (but have no impact in 2021 and 2022), systemic banks will experience no major capital shortfall relative to the buffer requirements, and no systemic banks will be close to the leverage ratio requirement.

Some systemic banks fall short of their buffer requirements

Chart 2

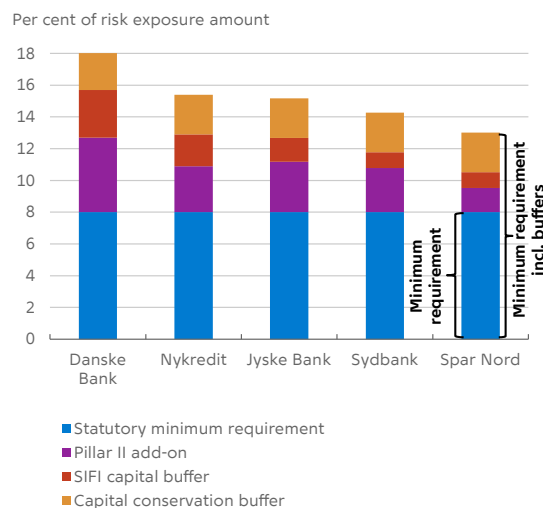


Note: The chart shows the excess capital adequacy or capital shortfall of the systemic banks that either have excess capital adequacy or a capital shortfall as percentages of the total risk exposure amounts of the systemic banks.

Source: The Danish Financial Supervisory Authority and own calculations.

Composition of capital requirements for selected systemic banks

Chart 3



Note: Capital requirements at year-end 2019.

Banks are better capitalised than they were before the financial crisis

Banks are much better capitalised and able to withstand an economic downturn than they were before the financial crisis. None of the systemic banks will fall short of their capital requirements in a scenario with impairment charges at financial crisis level, and they all maintain a distance to the risk-based

minimum requirements in the stress test, even in the most severe scenario.

Banks' decision to suspend dividend payments for 2020 has helped strengthen their capitalisation. In Danmarks Nationalbank's most recent stress test from autumn 2019, a few systemic banks fell short of their buffer requirements. Today, none of them would fall short of the requirements in the same scenario. And the combination scenario has several examples of banks that are able to satisfy the capital requirements due to the suspension of dividends.

But when it comes to earnings, banks are in a slightly weaker position now than they were a few years ago. Net interest income has been declining for years, while costs have increased. This is partly, but not fully, offset by higher fee income. As a result, banks have less capital to cushion the effects of a downturn. And they will be hit harder when impairment charges increase in a stress scenario. However, they may be able to increase core earnings by raising prices in the recession scenario. The stress test does not allow for this option.

In Danmarks Nationalbank's stress model, banks' net interest earnings decline further due to higher funding costs, especially for banks that are heavily reliant on market funding. In the model, the increase in interest costs reflects banks' market value and equity volatility. And, given that the market value has been dropping recently, while volatility has increased, some banks will be hit hard.

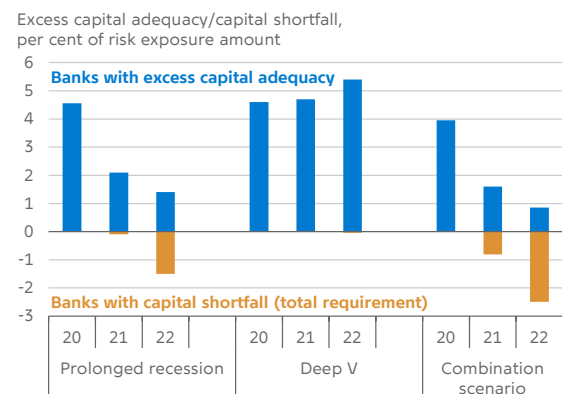
Excess capital adequacy could shrink quickly if the outlook changes

Credit risk, reflected in both higher impairment charges and increased risk weights, is the major risk faced by banks. Comparisons of Danmarks Nationalbank's stress test model and the banks' own stress tests tend to show higher impairment charges but more limited increases in risk weights in Danmarks Nationalbank's model.

The corona scenarios are characterised both by substantial contractions in GDP and increases in unemployment. Historically, there has been a weak correlation between changes in GDP and the impairment charges of Danish banks. High impairment charges in the banking sector have tended to mirror changes in unemployment to a much greater extent. In the scenarios – particularly in the combination scenario – there is a rapid increase in unemployment,

Some non-systemic banks fall short of their buffer requirements in the most adverse scenarios

Chart 4



Note: The chart shows the excess capital adequacy or capital shortfall of the non-systemic banks that either have excess capital adequacy or a capital shortfall as percentages of the total risk exposure amounts of the non-systemic banks.

Source: The Danish Financial Supervisory Authority and own calculations.

and therefore also in impairment charges, during the first year of the stress test.

Higher risk weights may also contribute to a rapid reduction of banks' excess capital adequacy, but play a smaller part in Danmarks Nationalbank's model. Risk weights depend on banks' estimated default probabilities for their customers. As the future outlook becomes bleaker and default probabilities go up, risk weights may increase and the excess capital adequacy may shrink.

Small banks face difficulties in a stress scenario

The stress test shows that several non-systemic banks could face difficulties in case of a prolonged downturn, see Chart 4. For instance, more than half of the non-systemic banks will fall short of the buffer requirements in the prolonged recession scenario, and overall they will be just under kr. 3 billion short of satisfying the buffer requirements. Breaches of the buffer requirements of this magnitude are not assessed to pose a threat to financial stability.

Chart 4 masks considerable variation among banks. Losses are mainly concentrated among some of the banks, which are at risk of failing. They fall short of the minimum capital requirement in both the pro-

longed recession scenario and the combination scenario. Should they fall short of the buffer requirements and come close to the minimum requirements, the authorities may intervene. If the authorities deem recovery or resolution necessary, they have the tools required to address the situation, but the owners and creditors of the banks in question may suffer losses.

When will systemic banks suffer a capital shortfall?

Due to the uncertainty surrounding both scenarios and models, we have also tried to perform a simple sensitivity calculation in which we ‘reverse’ the calculation to illustrate the impairment losses banks are actually able to withstand before falling short of their capital requirements.

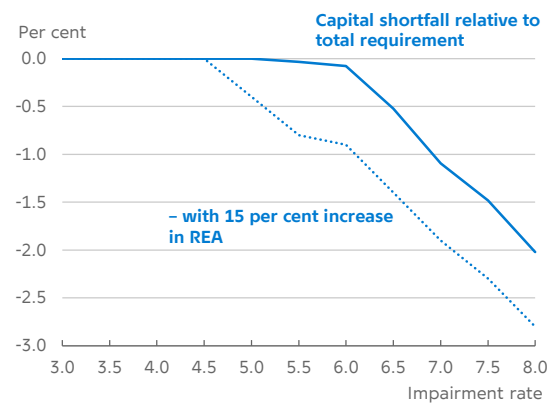
The calculation is based on the first scenario, the prolonged recession scenario, but varies banks’ impairment charge levels (over a three-year horizon).² It is assumed that mortgage credit institutions’ impairment charge ratios are one-fifth those of banks. In the stress test model, a number of other variables, including bank funding costs, depend on the banks’ earnings, so they also change as impairment charges change.

A few systemic banks start to fall short of the buffer requirements at an impairment charge ratio of between 5 and 6 per cent, see Chart 5. By way of comparison, the impairment charge level of Danish banks in 2008-2010 was 4.4 per cent. However, the (current) systemic banks generally had lower impairment charges, as most heavy losses during the financial crisis were suffered by small and medium-sized banks.

However, if the increase in impairment charges coincides with a substantial rise in risk weights – in the chart illustrated by a 15 per cent increase – banks will fall short of the buffer requirements earlier.

Only large losses will cause systemic banks to fall short of buffer requirements

Chart 5

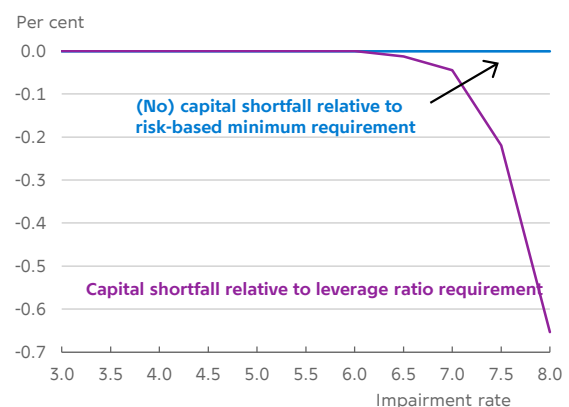


Note: The impairment charge ratio (impairment charges divided by loans and guarantees) is the cumulative impairment charge ratio for banks over a three-year period. Mortgage credit institutions’ impairment charge ratio is assumed to be one-fifth that of banks. Capital shortfall is defined as systemic banks’ total capital shortfall relative to their buffer requirements divided by their total risk exposure amounts. The broken line indicates the capital shortfall assuming that the risk exposure amount (REA) increases by 15 per cent.

Source: Own calculations.

Leverage ratio requirement becomes the effective minimum requirement

Chart 6



Note: The impairment charge ratio for banks covers a three-year period. Mortgage credit institutions’ impairment charge ratio is assumed to be one-fifth that of banks. Capital shortfall is defined as systemic banks’ total capital shortfall divided by their total risk exposure amounts.

Source: Own calculations.

² The impairment charge level indicates a weighted average. This level varies among institutions, depending on the sector composition of their exposures and their historical impairment charge levels within sectors.

The calculation also illustrates that the leverage ratio requirement becomes the effective minimum requirement for systemic banks, see Chart 6. Due to their low risk weights, large Danish banks will generally fall short of this requirement before falling short of the risk-based minimum requirement.

When the impairment charge ratio reaches about 6.5 per cent, the first banks begin to fall short of the leverage ratio requirement. However, losses of that magnitude are not unprecedented. For instance, banks suffered such losses in the early 1990s.

Banks may struggle to satisfy the MREL in a stress scenario

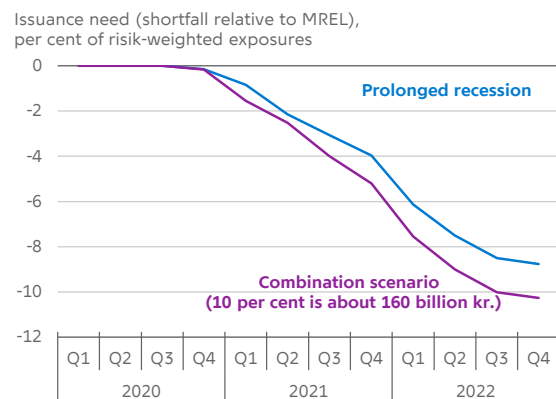
For systemic banks, the MREL has been set at a level equivalent to twice their risk-based capital requirement.³ However, the countercyclical capital buffer is included only once. This also means that the release of the buffer has reduced banks' MREL to a limited extent only.

Banks may satisfy this requirement by means of the capital used to meet the capital requirements and by means of further eligible liabilities.

In a stress scenario, banks suffer losses and their equity is eroded. Moreover, some of the banks' eligible liabilities will no longer count towards MREL when their remaining maturity falls below one year. If banks are to satisfy the MREL, they must issue new MREL-eligible instruments, both in order to compensate for the loss of capital and to replace old issuances. It is important for banks to ensure that they have an adequate surplus relative to MREL, and that their issues have a smooth maturity profile and are of long maturity.⁴

Systemic banks will have large issuance requirements

Chart 7



Note: The MREL shortfall is defined as the amount the systemic banks are short of in order to satisfy the MREL divided by their total risk exposure amounts. Banks' MREL resources and maturity profiles have been estimated on the basis of data provided by the Danish Financial Supervisory Authority, Bloomberg and the banks' risk reports.

Source: The Danish Financial Supervisory Authority, Bloomberg and own calculations.

The systemic banks will have a substantial need to issue new MREL-eligible instruments, see Chart 7. The chart shows an estimate of the issuance requirement (or shortfall) of the systemic banks relative to the MREL in a stress scenario if they do not issue new MREL-eligible instruments in the last two and a half years of the stress test. In the combination scenario, it is estimated that banks will have an issuance requirement of more than kr. 160 billion until 2022. Even in a no-stress scenario, banks will have a considerable regular issuance requirement as debt issuances cease to count towards MREL resources. The chart shows the total issuance requirement which includes both the effect of debt issues ceasing to count towards MREL and the effect of equity losses.

³ Today, mortgage credit institutions are subject to a debt buffer requirement, but from 2022 a requirement for a minimum of 8 per cent of the group's total liabilities and own funds will apply.

⁴ Danmarks Nationalbank, Credit institutions are facing hard times, *Danmarks Nationalbank Analysis*, no. 8, May 2020, shows that Danish banks' MREL-eligible instruments are generally of shorter maturity than those of other European banks.

The Danish Financial Supervisory Authority has decided to allow for an upcoming change of the rules already at this stage, implying that a larger part of the MREL can be satisfied using ordinary senior debt. This will make it less expensive for banks to satisfy the requirement.

Unlike the systemic banks, the non-systemic banks primarily satisfy the MREL using own funds. Since the MREL consists of the general capital requirement plus an add-on, the MREL is generally the most binding requirement on the non-systemic banks.

Several of the non-systemic banks will have difficulty satisfying the MREL in the most severe scenarios. For the non-systemic banks, the MREL was scheduled to be phased in gradually until 2023. However, the Danish Financial Supervisory Authority has made the phasing-in conditional on assumptions of the level of earnings and impairment charges in the phasing-in period and should these assumptions fail, the phasing-in period may be extended by one to two years. The Danish Financial Supervisory Authority has extended the phasing-in by six months. But an extension of the phasing-in of the MREL, even for a long period of time, does not change the conclusion that non-systemic banks will find it difficult to satisfy the requirement in a severe scenario.

Stress test scenarios

Danmarks Nationalbank's stress test is based on three scenarios: a deep 'V' scenario, a prolonged recession scenario and a combination scenario. These scenarios are based on Danmarks Nationalbank's macroeconomic analysis from April 2020.⁵

Both the prolonged recession scenario and the combination scenario are considerably more severe than the scenarios of the analysis referred to above. Continued economic uncertainty in light of the COVID-19 pandemic means that the scenarios vary in length and severity. Key variables for the scenarios are set out in Appendix 2.

The deep V scenario is based on the severe COVID-19 scenario in Danmarks Nationalbank's macroeconomic analysis. In this scenario, the Danish economy is hit by a brief, but sharp downturn, leading to a decline in domestic consumption, foreign demand, investment and house prices. GDP contracts by 10 per cent in 2020 in this scenario. But in the scenario, the impact of the pandemic is temporary, and the economy shows substantial recovery in 2021 and 2022.

The prolonged recession scenario is based on the central COVID-19 scenario of the macroeconomic analysis. This scenario assumes a sharp reduction in economic activity in 2020, although less sharp than in the deep V scenario. Unlike the deep V scenario, the prolonged recession scenario assumes that the economy will remain in a prolonged downturn over the stress test period, leading to a sharp contraction in GDP, rising unemployment and falling house prices throughout the period.

Change in key variables

Table 1

| Variable | Rule | Adjustment |
|--|-----------------------|------------|
| Increase in unemployment | 6.3 percentage points | 0.0 |
| Decline in real GDP | -6.3 per cent | 0.0 |
| Decline in house prices over disposable income | -25 per cent | 0.0 |

Note: See Danmarks Nationalbank, The largest banks satisfy capital requirements in stress test, *Danmarks Nationalbank Analysis*, No. 21, November 2018, for a technical description of the rules underlying the development of the three key variables.

When preparing the prolonged recession scenario, Danmarks Nationalbank emphasised developments in unemployment, real GDP and house prices. For each of these variables, a systematic approach is applied to determine changes.⁶ We specifically seek to hit specific targets for developments in unemployment, real GDP and house prices deflated by disposable income, based on a fixed method, see Table 1.⁷

Finally, the most severe scenario, the combination scenario, combines a sharp reduction in economic activity in 2020 from the deep V scenario with the subsequent prolonged downturn from the prolonged recession scenario. Unemployment is rising throughout the scenario, while house prices are falling. This scenario is considerably more severe than both the financial crisis and the recession scenarios usually included in Danmarks Nationalbank's stress tests.

⁵ Danmarks Nationalbank, Danish and international economy hit by pandemic, *Danmarks Nationalbank Analysis*, nr. 4, April 2020.

⁶ The scenarios are developed in cooperation with the Danish Financial Supervisory Authority. The approach used to generate the scenarios is described in detail in Danmarks Nationalbank's most recent stress test (Danmarks Nationalbank, The largest banks satisfy capital requirements in stress test, *Danmarks Nationalbank Analysis*, no. 21, November 2018).

⁷ Shocks are calibrated using data until and including year-end 2019. The aggregate shock is calculated relative to 2019, meaning that declines in 2020 are already factored into overall declines.

Appendix 1: Stress test population

Systemic banks (credit institutions)

Danske Bank

Nykredit Realkredit

Jyske Bank

Nordea Kredit

Sydbank

DLR Kredit

Spar Nord

Non-systemic banks (credit institutions)

Arbejdernes Landsbank

Ringkjøbing Landbobank

Sparekassen Kronjylland

Vestjysk Bank

Lån & Spar Bank

Jutlander Bank

Sparekassen Sjælland-Fyn

Den Jyske Sparekasse

Sparekassen Vendsyssel

Alm. Brand Bank

Appendix 2: Stress test scenarios

| Key variables | Table | | |
|--|---------------------|----------|----------------------|
| | Prolonged recession | 'Deep V' | Combination scenario |
| 2020 | | | |
| GDP, per cent year-on-year | -7.3 | -10.0 | -11.1 |
| Private consumption, per cent year-on-year | -10.9 | -16.8 | -17.1 |
| Export market growth, per cent year-on-year | -12.0 | -14.1 | -18.0 |
| House prices, per cent year-on-year | -7.4 | -10.8 | -11.0 |
| Gross unemployment, per cent of labour force | 5.7 | 6.5 | 6.8 |
| Bond yields | 0.3 | 0.3 | 0.3 |
| 2021 | | | |
| GDP, per cent year-on-year | -2.1 | 8.4 | 1.5 |
| Private consumption, per cent year-on-year | -0.8 | 14.0 | 9.1 |
| Export market growth, per cent year-on-year | -3.5 | 12.4 | 0.8 |
| House prices, per cent year-on-year | -12.3 | 7.1 | -11.1 |
| Gross unemployment, per cent of labour force | 10.4 | 8.2 | 11.5 |
| Bond yields | 0.5 | 0.5 | 0.5 |
| 2022 | | | |
| GDP, per cent year-on-year | 3.3 | 4.9 | 2.6 |
| Private consumption, per cent year-on-year | 3.3 | 7.1 | 2.3 |
| Export market growth, per cent year-on-year | 4.6 | 8.6 | 7.7 |
| House prices, per cent year-on-year | 1.3 | 8.7 | -3.2 |
| Gross unemployment, per cent of labour force | 11.8 | 6.5 | 12.9 |
| Bond yields | 0.7 | 0.7 | 0.7 |
| Note: Annual averages. House prices are cash prices of single-family houses. | | | |

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The analysis consists of a Danish and an English version. In case of doubt regarding the correctness of the translation the Danish version is considered to be binding.

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This edition closed for
contributions on 19. may 2020



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