DANMARKS NATIONALBANK

23 SEPTEMBER 2020 — NO. 17

MONETARY AND FINANCIAL TRENDS – SEPTEMBER 2020

Stable financial markets support economy in recession

Calm in financial markets

Financial markets have been calm since late March, partly due to central banks' asset purchase programmes and liquidity measures. Financial conditions in Denmark are accommodative, which helps to boost economic activity in Denmark.

Moderate strengthening of the Danish krone

Since March, the Danish krone has seen a moderate strengthening. At end-August, Danmarks Nationalbank had not intervened in the foreign exchange market in the previous five months, and monetary policy interest rates are unchanged. Danmarks Nationalbank's extraordinary lending facility is still being used, but to a limited extent.

Low credit growth for Danish corporations

Credit growth for Danish corporations has fallen since March, while rising in the euro area. The difference can be attributed, among other factors, to the economic setback in Denmark being less severe, and to Danish corporations having built up liquidity buffers to a higher extent in the run-up to the covid-19 outbreak.

CONTENTS

Key trends in the financial markets

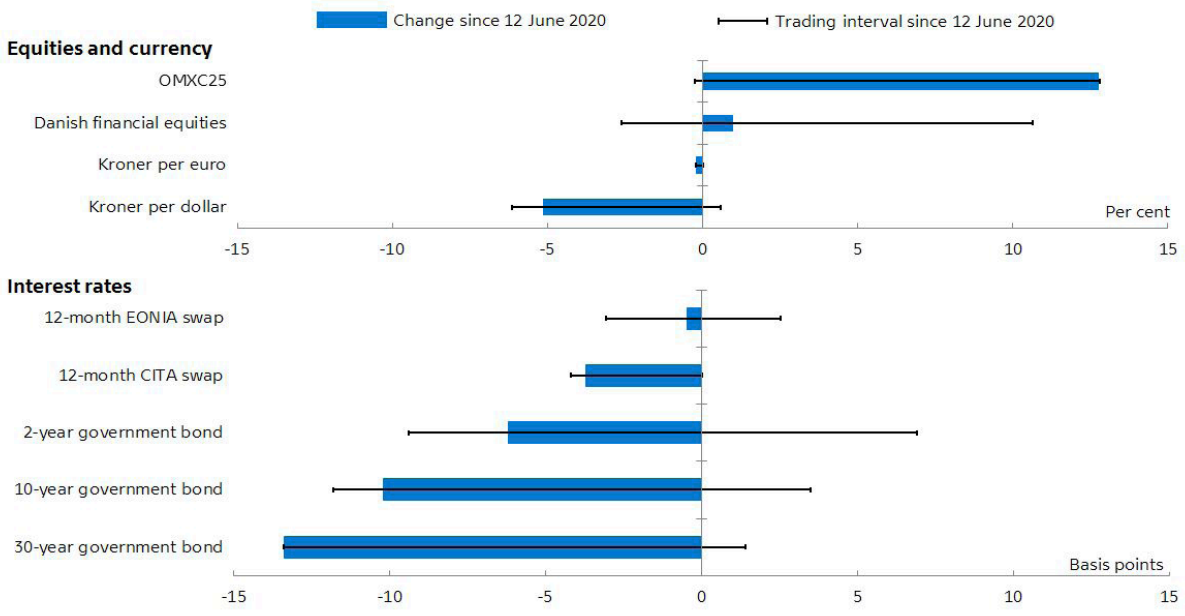
Since June, monetary policy interest rates in both Denmark and the euro area have remained unchanged, and the money market spread has remained relatively stable. Danish government bond and mortgage bond yields have decreased, whereas the euro, and thus the Danish krone, has appreciated against the US dollar.

The Danish C25 index has gone up significantly since June and generated a return of 20 per cent since the start of the year. This is high compared to other countries. This should be seen in light of the fact that the Danish equity market is characterised by a large proportion of pharmaceuticals, which are generally less affected by the crisis, and that the Danish economy is less severely affected than other countries.

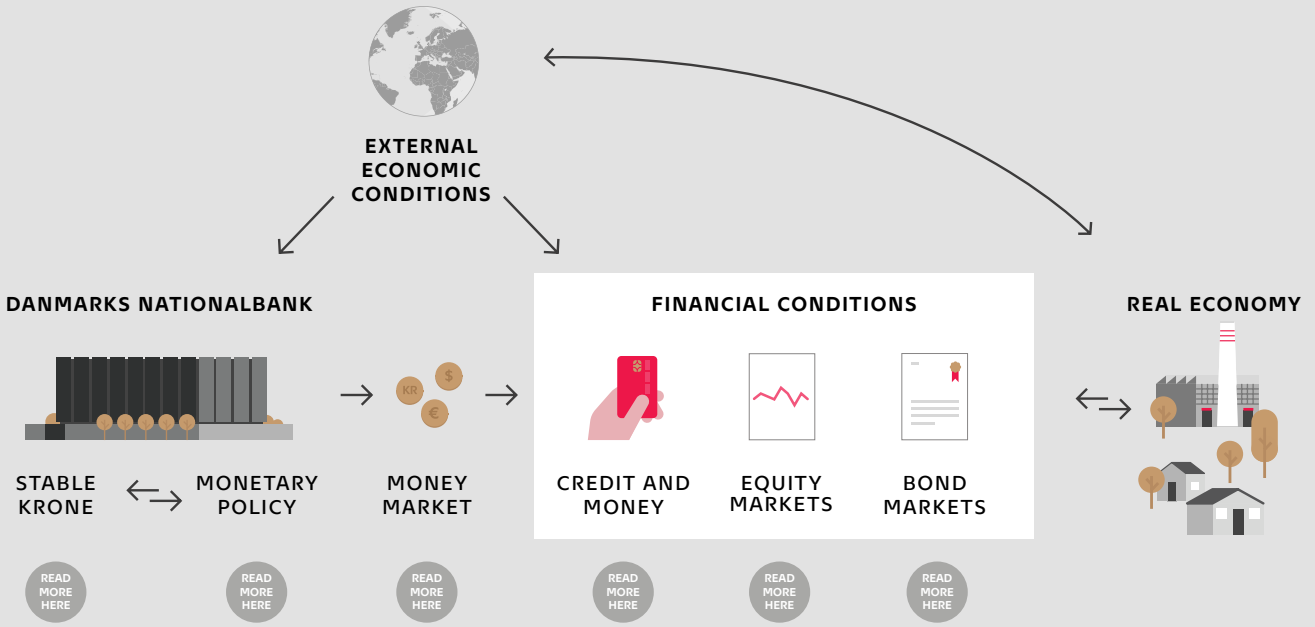
The market development since June implies that the financing costs of households and non-financial corporations have declined further and are now leveled with the start of 2020.

Credit growth for non-financial corporations and households has slowed since the covid-19 outbreak. This is due, among other things, to the economic contraction being smaller in Denmark compared to other countries, and that Danish corporations consolidated themselves up to the outbreak of the pandemic.

Equities have increased, while interest rates have decreased



Note: The blue bar indicates changes at the cut-off date of 17 September 2020 relative to the latest edition of Monetary and Financial Trends from 12 June 2020. The endpoints of the black lines indicate the largest and smallest changes, respectively, over the entire period.
Source: Refinitiv Datastream and Eikon.



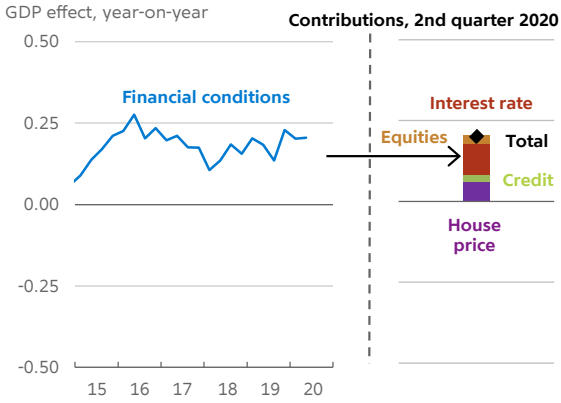
The economy and financial conditions

Financial conditions support GDP

The Danish economy suffered a historical setback in the 2nd quarter of 2020. Viewed in isolation, however, the financial conditions contributed to supporting GDP in the 2nd quarter, see Chart 1. This is mainly due to the low interest rate levels, but also to rising house and equity prices. The financial conditions are also expected to have a positive impact on GDP growth in the 3rd quarter. The reason for this is that, so far, interest rates have decreased during the 3rd quarter, while equities and house prices have increased. Furthermore, favourable financial conditions may have a positive contribution on the following quarters. One of the reasons is that it may also take some time for gains from equity and house price increases to be realised or cause behavioural changes.

The favourable financial conditions in Denmark are also due to a number of central banks, including the ECB, having supported liquidity and monetary policy transmission through large-scale asset purchase programmes. As seen in March, rising infection numbers and new government restrictions may have an economic impact and lead to great uncertainty in financial markets. This risk is still present, which is also reflected in the VIX index that remains slightly higher compared with the pre-pandemic level.

Financial conditions support the economy Chart 1



Note: Financial conditions show the overall contribution to GDP growth from developments in credit, equity prices, house prices and interest rates. Financial conditions have been calculated by means of a structural VAR model. This means that they are purged of cyclical factors. For further details, see Jensen and Pedersen (2019), Macro financial linkages in a SVAR model with application to Denmark, *Danmarks Nationalbank Working Paper*, No. 134.

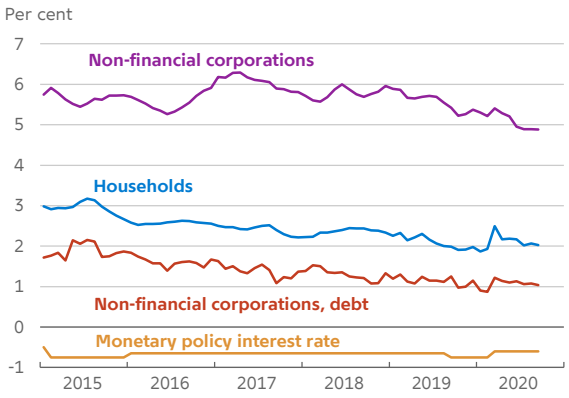
Source: Danmarks Nationalbank, Statistics Denmark and own calculations.

Non-financial corporations and households have access to cheap financing

The costs of raising new financing for non-financial corporations and households are low. This is true for both market-based financing and financing via banks. Since March, costs have fallen back to the levels seen at the start of this year, see Chart 2.

To a large extent, the most recent decrease in total household financing costs reflects lower long-term mortgage bond yields, accounting for a large portion of household financing. The primary reason for the fall in non-financial corporations' financing costs is that it has become cheaper for such corporations to raise capital in equity markets, as investors have a lower required rate of return for investing in equities, see the *Equity markets* section. The decline in yields on mortgage bonds and corporate bonds has also contributed to the fall in non-financial corporations' financing costs.

Financing costs have declined Chart 2



Note: Costs of external financing for households and non-financial corporations. Non-financial corporations rely heavily on equity financing, which goes a long way towards explaining their relatively high costs. For an elaboration on the method, see Box 1 in Monetary and Financial Trends – Decline in interest rates and refinancing boom, *Danmarks Nationalbank Analysis,* No. 19, September 2019.
Source: Danmarks Nationalbank, Statistics Denmark, Refinitiv Datastream and own calculations.

Declining inflation expectations have affected the real interest rate

Nominal interest rates, as described above, indicate the return or cost in monetary terms of savings or incurring debt. When assessing how interest rates are expected to impact consumption and investment decisions made by households and non-financial corporations, however, the real interest rate is the determining factor. The real interest rate is the nominal interest rate less expected inflation, see Box 1. The real interest rate thus takes into account that prices change on an ongoing basis and thereby reflects the return on savings in terms of how this affects consumption options.

The real interest rate depends on expected inflation. If, for example, a household expects inflation to be high over the coming year, the real cost of incurring debt will, all other things being equal, be lower.

In recent years, inflation expectations in Denmark have declined as actual inflation has been low over a long period of time. Viewed in isolation, this has increased the real interest rate, thus making it less attractive to incur debt and more attractive to save.

Determining the real interest rate is difficult, as it is very difficult to measure inflation expectations. Against this background, it is important not to over-interpret short-term changes in different measures of the real interest rate, but instead focus on persistent changes which may have an impact on the real economy.

Declining inflation expectations may increase the real interest rate[1]

Box 1

The real interest rate, defined as the nominal interest rate minus expected inflation, has an impact on financial conditions and is thus important for private savings and investment decisions and hence economic growth and inflation. This is due to the fact that a fair reflection of the real return on savings and investments takes both the nominal interest rate and the future development in the price level into account.

The real interest rate is important to central banks
Monetary policy affects the real interest rate through both the nominal interest rate and inflation expectations, and the real interest rate therefore plays an important role for central banks. Several central banks have explicit inflation targets, thus anchoring inflation expectations. In Denmark, the fixed exchange rate policy safeguards stable inflation expectations and thus provides a solid basis for long-term economic decisions, ensuring a robust Danish economy.

Declining inflation expectations have narrowed the difference between nominal and real interest rates
Lower and more stable inflation expectations have implied that the difference between the nominal interest rate and the real interest rate has decreased and has become more stable over time. This means that the level and fluctuations in the nominal interest rate has become a more fair reflection of incentives for saving and investments. The stability of inflation and interest rates on a lower level has also implied that the consequences of the taxation of nominal capital income (including interest rate deductions) have become smaller. In the 1970-80's, nominal interest rates were much higher, see chart A, whereas the real interest rate was low. The after tax real interest rate was even lower and permanently negative. The reason is that taxation applies to the nominal interest rate, which was very high during the 1970-80's. Large fluctuations in inflation cause a very unpredictable real interest rate after tax. The negative real interest rate after tax contributed to imbalances in the Danish economy during the period, and the unpredictable development implied an uncertain foundation for economic decision-making. This problem has become smaller as inflation and nominal interest rates have stabilised at a lower level. Besides, the percentage of interest rate expenses deductible has gradually been brought down. Today, the difference between real rates before and after tax is less than 1 percentage point compared to 11 percentage points during the 1970-80's.

In recent years, inflation and inflation expectations in the euro area, and in Denmark, have moved below the ECB's target of inflation below, but close to, 2 per cent. A sustained decline in inflation expectations will, all other things being equal, mean a tightening of financial conditions, which partially counteracts the easing of the conditions resulting from low nominal interest rates.

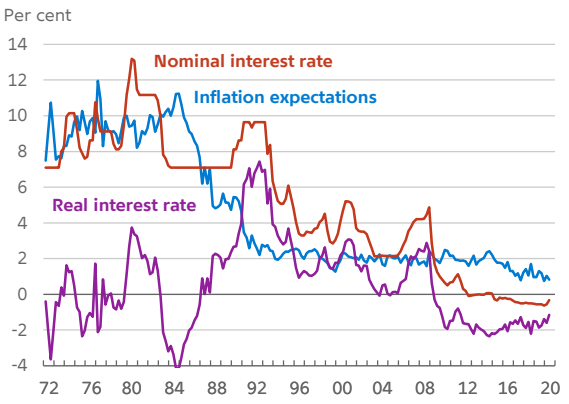
Measures of inflation expectations are inaccurate
The real interest rate is not unambiguous since different agents have different inflation expectations. Inflation expectations are difficult to make up because the measures are not precise. There are different measures of inflation expectations, for instance market-based measures and survey-based measures. Market-based measures are often based on inflation-protected government bonds, where the principal is indexed by the development in inflation. Thereby so-called breakeven inflation is calculated. Another similar market-based measure is computed from the fixed payment in an inflation swap. Both breakeven inflation and the implicit inflation from inflation swaps are interpreted as market participants' expectations to future inflation.

However, market-based measures include a risk premium for inflation, since a fixed payment is compared to a floating payment, varying with the price level. Besides, it might include a liquidity premium, for instance if the inflation-indexed government bond is less liquid than the one it is compered to. This is difficult to adjust for.

Continues

Declining inflation expectations may increase the real interest rate

A



Note: Inflation expectations are estimated as the expectation of future inflation calculated using a univariate AR(3) model estimated on the basis of inflation data in Denmark. So, the inflation expectations shown in the chart represent a projection based on this simple model. This statistical model is estimated over a rolling window of 40 quarters. The real interest rate has been generated using quarterly averages of the T/N rate (and Danmarks Nationalbank's lending rate before 1997) less the series of inflation expectations.
Source: Updated estimate from Jesper Pedersen, The Danish natural real rate of interest and secular stagnation, *Danmarks Nationalbank Working Paper*, No. 94, 2015.

1. See Jakob Feveile Adolfsen, Mikkel Bess and Jesper Pedersen, Real interest rates are affected by inflation expectations, Danmarks Nationalbank Analysis, forthcoming 2020, for an in-depth analysis of the significance of real interest rates for the real economy.

Declining inflation expectations may increase the real interest rate Box 1
Continued

An advantage of market-based measures is that they are highly frequent. Contrary, it is not obvious that market-based measures reflect the expectations of households and non-financial corporations, which are most relevant for real savings and investment decision. Surveys show that households and non-financial corporations do not update their inflation expectations as quickly as do, for example, financial market participants following the release of new macroeconomic information. Households rely heavily on their inflation expectations for goods and services which they frequently purchase, as predicting inflation is costly.

Households and non-financial corporations may also tend to focus on money and interest rates in nominal terms and forget to correct for inflation, also known as money illusion. This can imply that decisions are based on nominal and not real interest rates. A long period of stable and low inflation can increase the tendency to money illusion. The significance of short-term changes in market-based measures of inflation expectations for real economic activity should therefore not be over-interpreted. On the other hand, persistent changes in a broader set of measures of inflation expectations could be a strong indication of changes in financial conditions resulting from changes in the real interest rate.

Monetary policy and money markets

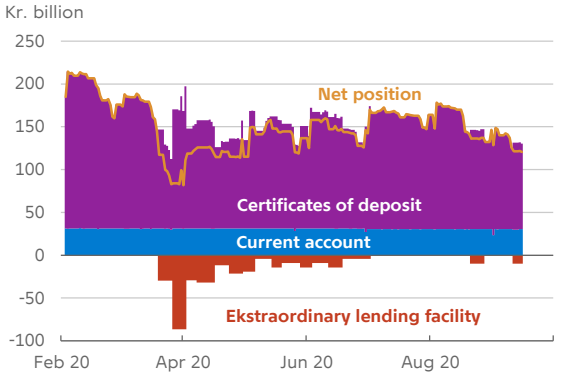
Unchanged monetary policy in Denmark and the euro area

At end-August, Danmarks Nationalbank had not intervened in the foreign exchange market since March, and monetary policy interest rates remained unchanged. This reflects the fact that the ECB has maintained their monetary policy interest rates and that the krone market has been calm.

Low demand for liquidity through extraordinary lending facility

Since end-June, demand for liquidity through Danmarks Nationalbank's extraordinary lending facility has been low, see Chart 3.[1] Demand has declined substantially since the spring, which may be a result of the calm on the financial markets following the covid-19-related fluctuations in March. The low demand for liquidity could also reflect the development in the net position. From start-April to mid-August the use of the extraordinary lending facility fell as the net position increased. Afterwards, there has been a small demand for liquidity following a decline in the net position. The net position indicates the total net balance of banks with Danmarks Nationalbank and

Banks' demand for loans with Danmarks Nationalbank is low Chart 3

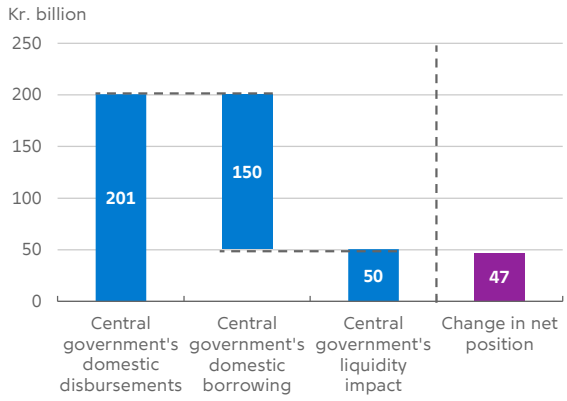


Note: The most recent observations are from 15 September 2020.
Source: Danmarks Nationalbank.

1 For a detailed description of the extraordinary lending facility, see Monetary and Financial Trends – Stabilisation of financial markets after COVID-19 turmoil, *Danmarks Nationalbank Analysis*, No. 11, June 2020.

The central government has supported the increase in the net position from April to August

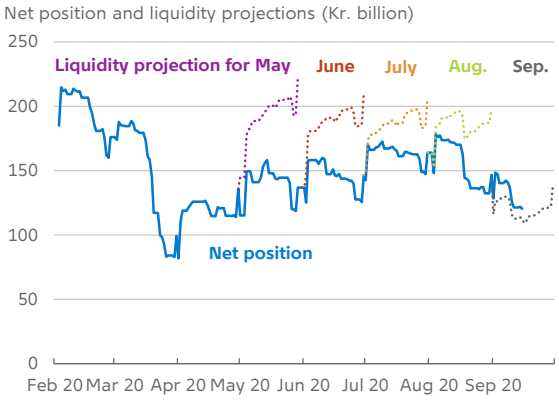
Chart 4



Note: Viewed in isolation, the central government's liquidity impact increases the net position. The central government's domestic disbursements correspond to its gross domestic financing requirement specified in Danmarks Nationalbank's press releases 'Foreign Exchange and Liquidity and Monthly Balance Sheet'.
Source: Danmarks Nationalbank.

Net position has not increased as expected

Chart 5



Note: Danmarks Nationalbank's liquidity projection published at the end of the month for the following month, based on government finance estimates from the Ministry of Finance.
Source: Danmarks Nationalbank.

is affected by transactions involving either Danmarks Nationalbank or the central government.[2]

In connection with government borrowing, the development in the net position depends on whether the central government relies on domestic or foreign funding. Viewed in isolation, domestic borrowing reduces the net position. Banks purchase the government bond issuances and pay with their deposits at Danmarks Nationalbank. Investors then purchase the government bond issuances from their bank. The central government's foreign borrowing through commercial papers[3] has no impact on the net position, as the sale does not take place via Danish banks. Instead, the foreign currency loan proceeds are exchanged for kroner at Danmarks Nationalbank. Foreign borrowing thus increases both the foreign exchange reserves and the central government's account.

Viewed in isolation, disbursements from the central government's account with Danmarks Nationalbank increase the net position. Via its account with Danmarks Nationalbank, the central government transfers liquidity to the banks, and their deposits with Danmarks Nationalbank increase. At the same time, the bank account of the recipient of the government disbursement is increased. From April to August, transactions involving the central government increased the net position by kr. 50 billion, see Chart 4. The increase in the net position has been well below the liquidity projections, which are based on the central government's expected incoming and outgoing payments in connection with relief packages as a consequence of covid-19, see Chart 5. This should be seen in the context that public relief packages have been relied on to a lesser extent than originally expected by the central government.

Monetary policy measures continue to increase the ECB's balance sheet

As a result of the ECB's monetary policy easing in the first half of the year, excess liquidity in the European

2 For more detail, see Danmarks Nationalbank's balance sheet: (*link*).

3 For the definition of commercial papers, see www.nationalbanken.dk (*link*).

money market has been increased by around 70 per cent this year.[4] Monthly net purchases under the temporary asset purchase programme PEPP[5] declined somewhat in July and August. Still, the ECB purchased bonds totalling more than 80 billion euro in the secondary market in August. The ECB's total bond purchases from March to July correspond to more than half of the net issuances in the European bond markets, see Chart 6. The large purchases help to keep European interest rates down.

In connection with the covid-19 pandemic, the ECB expanded its lending facility targeting households and non-financial corporations (TLTRO III[6]). As loans through the facility were allotted the ECB's balance sheet increased by about 550 billion euro in June 2020. The ECB finds that the increased euro liquidity through TLTRO III has supported higher credit growth in the euro area.[7]

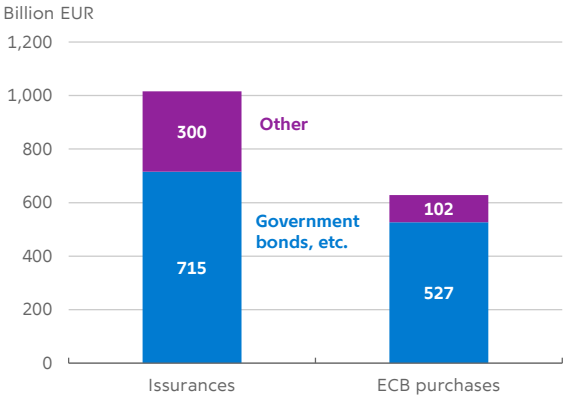
Danish short-term money market interest rates are stable

The CITA swap rate is almost unchanged since June and is still lower than the interest rate of Danmarks Nationalbank's extraordinary lending facility, see Chart 7. The spread to the corresponding interest rate in the European money market, EONIA swap, has been relatively stable since March, see Chart 8.

New Danish reference rate may be on the way

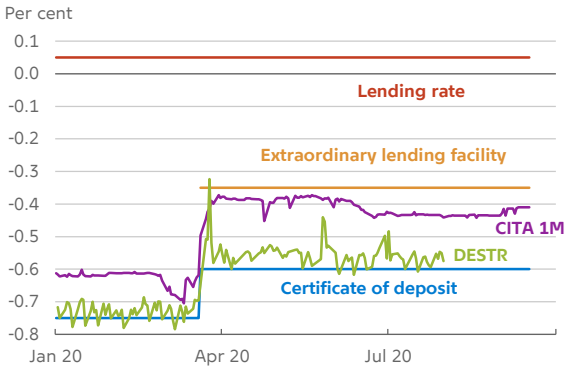
The tomorrow-next (T/N) rate is the current reference rate of the short-term Danish money market. Due to the low turnover on which the T/N rate is based, Finance Denmark has proposed introducing a new Danish reference rate based on overnight (O/N) deposits, called Denmark Short-Term Rate (DESTR). O/N deposits are placed today and mature tomorrow and reflect the interbank rate at which money market participants can place funds

ECB purchases correspond to more than half of new bond issuances in euro Chart 6



Note: Net euro bond issuances in the euro area and the ECB's total purchases from March to July. Both APP and PEPP purchases are included. 'Government bonds etc.' are bonds issued by the public sector.
Source: ECB.

Money market rates almost unchanged since June Chart 7



Note: CITA 1M is the interest rate on a one-month CITA swap.
Source: Danmarks Nationalbank, Finance Denmark and Refinitiv Datastream.

4 Excess liquidity in the euro area indicates banks' money market liquidity in exceeds of ECB's minimum reserve requirement.

5 Pandemic Emergency Purchase Programme.

6 TLTRO is short for Targeted Long Term Refinancing Operations (and III indicates that it is the third TLTRO facility). It is a sort of "funding for lending" programme where the amount banks can lend is tied to their existing loans to non-financial corporations and households (excluding housing loans). The incentive to further lending is reinforced by the interest rate being lower, if banks increase their lending.

7 See the ECB's lending survey.

with one another without collateral. DESTR is transaction-based to a greater extent than the T/N rate, see Box 2.

DESTR is expected to become the new Danish reference rate in the short-term money market, and as such may have great impact both on the transmission of monetary policy interest rates and a range of future financial contracts. Danmarks Nationalbank supports the proposal of introducing a reference rate based on O/N deposits. DESTR is a deposit rate and has been close to the certificates of deposit rate (CD rate) since the turn of the year. The spread to the short-term reference rate of the euro area money market, €STR, has generally remained unchanged since March, see Chart 8.

Potential new overnight reference rate in the Danish money market

Box 2

Reference rates are essential for the smooth functioning of the financial system because they are the interest rate benchmark used to set the interest rates of a broad range of financial products such as bank loans, mortgage bonds and interest rate swaps. The tomorrow-next (T/N) rate is the current reference rate of the short-term Danish money market. The T/N rate is the interbank interest rate at which banks are prepared to lend to one another from tomorrow to the next day without collateral. The T/N rate is subject to credit risk because it is based on unsecured loans where no collateral is required. After the financial crisis, the use of unsecured loans has decreased significantly, and interbank turnover of T/N loans has been low. Therefore, the T/N rate is often partly based on quotations, see Chart A, and thus no longer meets an essential requirement for serving as an optimal reference rate.

Finance Denmark has proposed replacing the T/N rate with a new reference rate based on overnight (O/N) deposits, called Denmark Short-Term Rate (DESTR). Turnover in O/N deposits is significantly higher than in T/N loans, see Chart A. Moreover, the calculation basis of O/N deposits is greater, for instance because transactions with other financial institutions (such as pension funds) are included. This means that DESTR is based on actual transactions to a greater extent than the T/N rate. DESTR is currently in the testing phase, and it must subsequently be decided whether DESTR should become the benchmark Danish reference rate. Danmarks Nationalbank supports the development of a reference rate based on O/N deposits. The new euro area short-term reference rate, €STR, introduced in October 2019, is also based on O/N deposits. DESTR is calculated on a method similar to that of €STR.

Potential reference rate is closer to the monetary policy interest rate

A test run of DESTR shows that the potential new reference rate is about 10 basis points lower than the T/N rate and close to the certificates of deposit rate (CD rate), see Chart B. The DESTR volatility has also been much lower, even in periods of financial stress caused by the covid-19 outbreak in March.

Part of the interest rate differential between T/N loans and O/N deposits is reflected in the bid/ask spreads applying to overnight lending and deposit rates.

Low turnover of T/N loans has led to quoted interest rates

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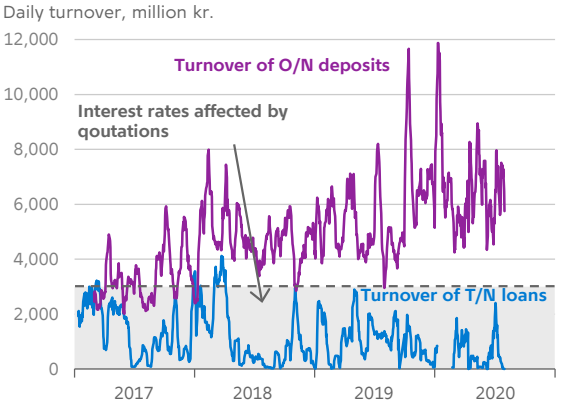
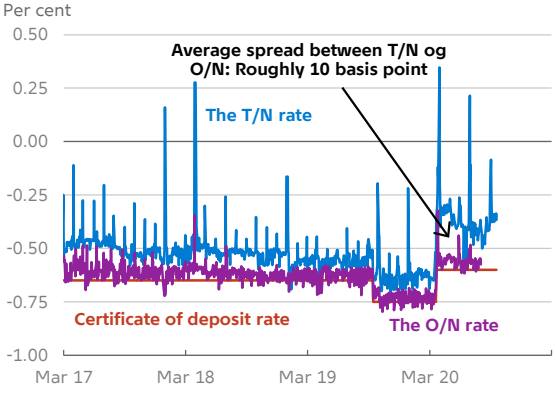


Note: 10-day average of T/N loan and O/N deposit turnover. Data for the T/N loan turnover is missing for mid-January to mid-February.
Source: Finance Denmark, Danish Financial Benchmark Facility and Danmarks Nationalbank.

Potential new reference rate is closer to the CD rate

B



Note: Both the T/N and O/N rates are overnight interest rates.
Source: Refinitiv Datastream, Danish Financial Benchmark Facility and Finance Denmark.

The Fed's monetary policy strategy review
On 27 August, the Federal Reserve, Fed, announced the conclusions of a review of its monetary policy strategy. Based on the review, the Fed announced that, in future, the Fed's monetary policy objective will be to seek an average inflation target of 2 per cent. This announcement means that following periods when inflation has been running below 2 per cent, monetary policy will likely aim to achieve inflation above 2 per cent for some time.

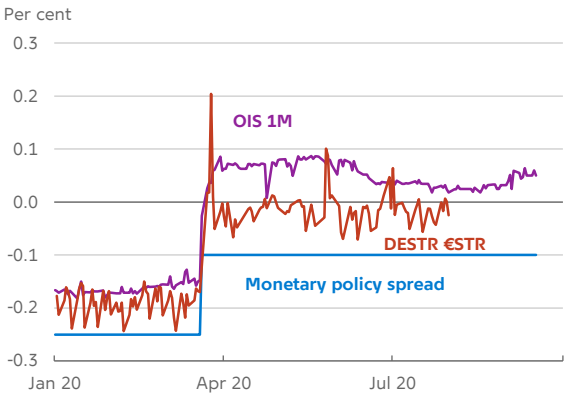
The decision to focus on average inflation targeting should be seen in the context that inflation has been persistently low for a number of years, and nominal interest rates are close to their lower bound. In a situation in which inflation is below the 2 per cent target, an announcement that a period of relatively low inflation must be followed by a period of relatively high inflation may increase the private sector's inflation expectations. This will result in a lower real interest rate, which will stimulate the economy and, ultimately, bring inflation closer to the target.

Based on its review, the Fed maintains its *dual mandate*, focusing on both low inflation and maximum employment. While the Fed will continue to focus on preventing that employment drops below what is perceived as its maximum level, it will have less focus on preventing periods in which employment rises above this level. This reflects that the risk that a period of high employment will lead to unsustainably high inflation has declined.

Krone demand and foreign exchange markets

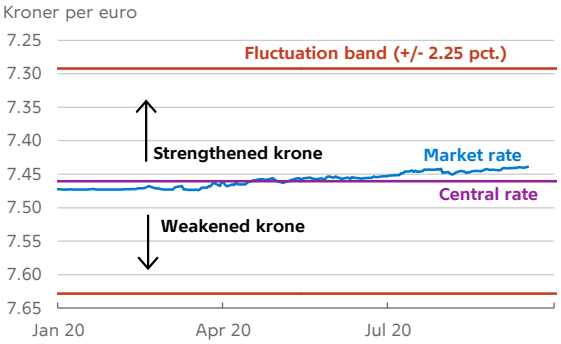
Moderate strengthening of the Danish krone since March
The exchange rate of the krone against the euro has strengthened moderately since March, see Chart 9. This could reflect Danmarks Nationalbank's independent interest rate increase in March, among other factors. Moreover, Danish pension funds have increased their dollar hedging by kr. 59 billion since late March, see Chart 10. While part of the dollar exposure is hedged to euro, historically at least 80 per cent of the dollar hedging is hedged to kroner. The reason for the increased dollar hedging is not that the insurance and pension sector hedges a higher *percentage* of

Money market spreads to the euro area are stable Chart 8



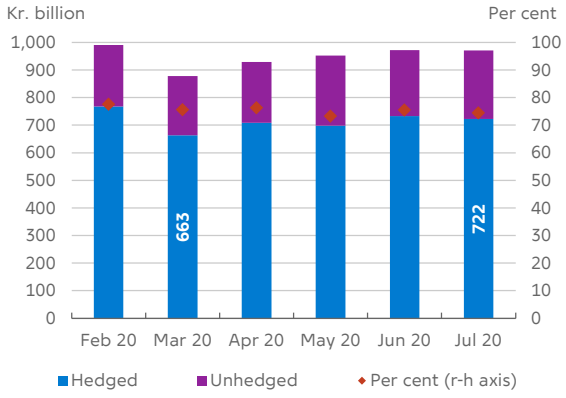
Note: The monetary policy spread is the spread between the CD rate and the interest rate on the ECB's deposit facility. DESTR and €STR are O/N deposit rates. OIS 1M are swap rates where a fixed rate of interest is exchanged for the overnight lending rate (CITA for Denmark and EONIA for the euro area).
Source: ECB, Refinitiv Datastream and Finance Denmark.

Moderate strengthening of the Danish krone since March Chart 9



Note: Exchange rate of the krone vis-à-vis the euro. Reverse y axis.
Source: Refinitiv Datastream.

Pension funds' dollar exposure and hedging have increased since March Chart 10



Note: Dollar hedging in the insurance and pension sector.
Source: Danmarks Nationalbank.

their dollar exposure, see Chart 10. Rather, the reason is that their dollar exposure has increased following the recovery of the US equity market.

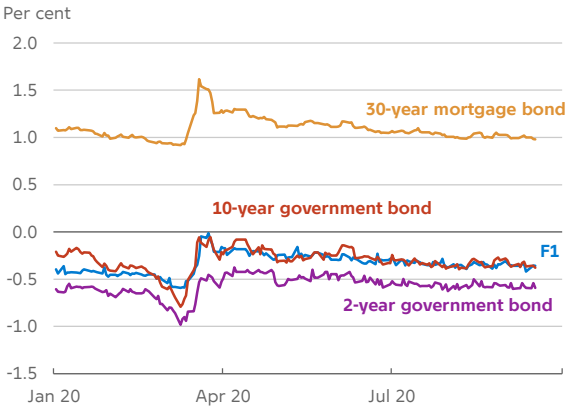
At the end of August, Danmark's Nationalbank had not intervened in the foreign exchange market since March.

Bond markets

Yields on Danish government and mortgage bonds have declined slightly in recent months, and fluctuations have been limited, see Chart 11. Compared with the start of the year, short-term interest rates have increased slightly, while long-term rates have decreased. This is related to Danmarks Nationalbank's interest rate increase in March.

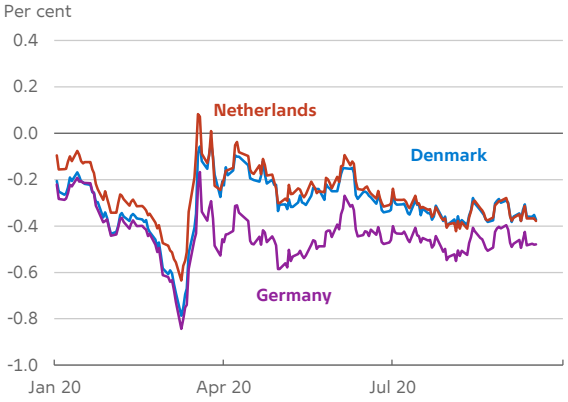
The Danish 10-year government yield has largely mirrored European government yields, see Chart 12. Long-term yields reflect expectations of future short-term rates, adjusted for risk premia to compensate for, for instance, inflation or liquidity risk. The 10-year government yield spread to Germany has widened by about 15 basis points since the start of the year, and Danish yields are in line with those of the Netherlands, while, at the start of the year, Danish yields were about 10 basis points lower. The yield spread widening should be seen in the context that market

Bond yields are low and stable Chart 11



Note: F1 is a Nykredit mortgage bond maturing on 1 October 2021, and the 30-year mortgage bond yield is Nykredit's 1 per cent mortgage bond maturing in 2050. Government yields apply to the benchmark bonds maturing in 2022 and 2029, respectively.
Source: Refinitiv Eikon.

The Danish 10-year government bond yield in line with the Dutch Chart 12



Note: Generic benchmark for 10-year government yields. All three bonds have been assigned AAA ratings.
Source: Refinitiv Eikon.

participants' expectations of future short-term money market rates have declined more in the euro area than in Denmark.[8]

Lower risk premia in the bond market

The risk premium on corporate bonds has narrowed significantly since March, but is still higher than at the start of the year, see Chart 13. Credit and liquidity premia on mortgage bonds have also been reduced. This is reflected in a considerable decline in the option-adjusted spread (OAS[9]) since March, which has fallen back to the level from the start of the year. The decline in risk premia in the bond market is due to large ECB purchases, putting downward pressure on risk premia and thus interest rates. This might have a spillover effect on Danish interest rates.

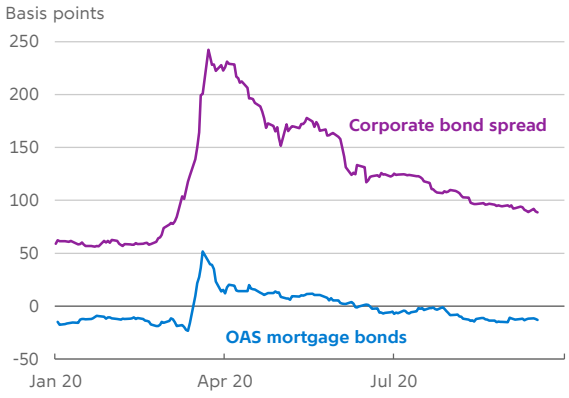
Government bond issuances have been purchased by a broad investor base

Lower interest rates mean that the central government has access to cheap funding of the relief packages launched to address the financial implications of covid-19 on non-financial corporations and households.

The central government issued government bonds and T-bills totalling kr. 106 billion from April to July. [10] Only the new 30-year government bond was issued with a positive yield to maturity.

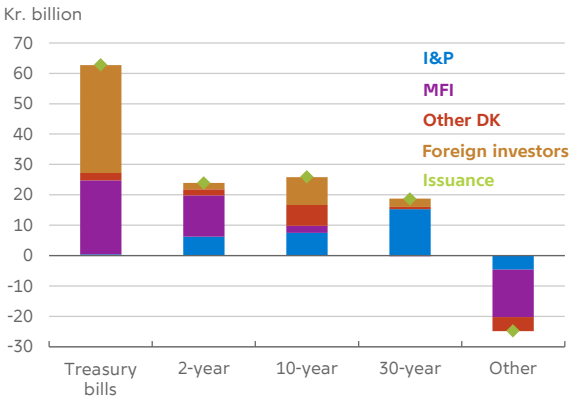
Investors have different maturity preferences, see Chart 14. The price of long-term government bonds is highly sensitive to interest rate changes.[11] This makes them attractive to pension funds whose liabilities are also highly interest rate sensitive. Therefore, the insurance and pension sector is the main buyer of the new 30-year government bond.

Decline in bond risk premia Chart 13



Note: "Corporate bond spread" is a weighted average of yields to maturity on Danish corporate bonds less a maturity-adjusted 6-month EURIBOR swap rate. OAS is the additional return on mortgage bonds relative to the CIBOR swap curve, adjusted for the value of the right to redeem the loan at par.
Source: Danmarks Nationalbank and Nykredit.

Investors prefer different government debt segments Chart 14



Note: Net purchases of government bonds and T-bills April-July 2020. 2-year, 10-year and 30-year bonds are the three benchmark bonds. Commercial papers are not included in the distribution.
Source: Danmarks Nationalbank.

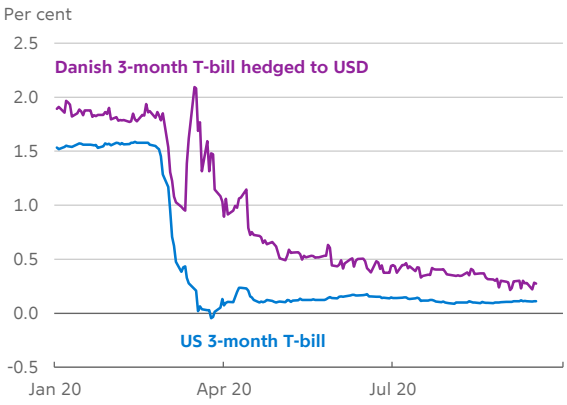
8 Based on Overnight Indexed Swaps (OIS) rates in Denmark and the euro area.

9 The OAS represents the compensation required by investors for purchasing mortgage bonds compared with an interest rate swap, adjusted for the right to refinance at par value. So, the OAS reflects credit and liquidity premia on mortgage bonds relative to the swap curve.

10 Moreover, a large proportion of the relief packages is funded through commercial papers, see above.

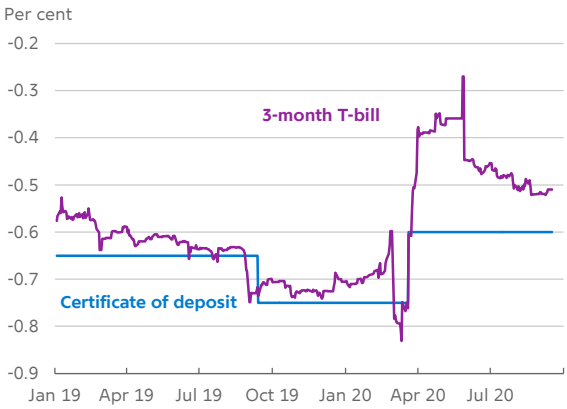
11 Duration is a measure of the interest rate risk exposure. The duration of the new 30-year government bond is about three times higher than that of a 0.5 per cent 30-year mortgage bond. The reason is that the mortgage bond is amortised periodically, and there is a risk of early redemption.

Danish T-bills are attractive to dollar investors Chart 15



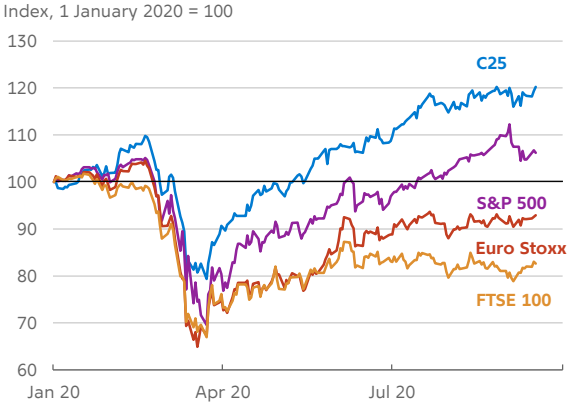
Note: Interest rate on 3-month T-bills for a dollar investor. "Danish 3-month T-bill hedged to USD" indicates the rate of interest on Danish 3-month T-bills (generic) hedged to USD using a 3-month forward contract. "US 3-month T-bill" is a generic benchmark.
Source: Refinitiv Eikon.

The T-bill rate is higher than the certificates of deposit (CD) rate Chart 16



Note: Interest rate on Danish 3-month T-bills (generic) compared with the CD rate.
Source: Refinitiv Eikon and Datastream.

Danish equities have picked up Chart 17



Note: Total return index for Danish OMXC25C, US S&P 500, European EuroStoxx and UK FTSE 100. Latest observation from 16th September 2020.
Source: Refinitiv Datastream.

Danes are showing renewed interest in T-bills
Foreign investors and Danish banks and mortgage credit institutions have purchased most of the just over kr. 60 billion worth of the T-bills issued by the central government. Since the financial crisis, foreign investors have been the main buyers of T-bills.

Danish T-bills have long been attractive to dollar investors that receive a gain from hedging their currency risk. This gain means that dollar investors will make a higher return after currency hedging on Danish T-bills than on US T-bills, see Chart 15. Danish banks' renewed interest in T-bills might reflect that the T-bill yield has been somewhat higher than the CD rate since April. Previously, the T-bill rate was in line with or lower than the CD rate, see Chart 16.

Equity markets

Large return on Danish equities this year
This year, the Danish C25 index has generated a return of about 20 per cent, higher than in other countries, see Chart 17. Part of the explanation for the great cross-country variation is differences in equity market sector composition, see Chart 18. Corporations in health care constitute about half of the Danish equity market, and across countries the health care sector is less affected than other sectors. Danish energy and utilities corporations have also been doing relatively well compared to their foreign counterparts because they are largely targeting green energy. This means that they are not affected by the plunge in oil prices, which has a severe impact on the conventional energy sector. Developments in individual corporations may also have a major impact because the C25 index includes only 24 corporations.

The Danish economy is also less affected than the USA, the euro area and the UK. In the euro area, the sharpest drops in equity indices tend to be in countries with the largest declines in GDP.

Increases in the US equity market are driven by an overweight of technology corporations, see Chart 18. The overall increase in the S&P500 is also largely driven by a few large equities.

If they do not reflect fundamental economic conditions, such as corporate earnings or the level of interest rates, large increases in equity prices may reflect imbalances. Such imbalances involve a risk of divergence between real economic and financial developments that may trigger a financial market correction.

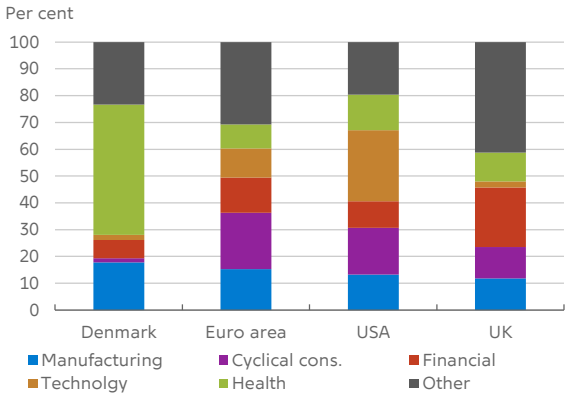
Earnings expectations have declined

Equity analysts' expectations of the total earnings of the C25 corporations for 2020 are substantially lower than at the start of the year. The most recent earnings expectations are some 20 per cent lower, although they have increased since April, see Chart 19.[12] Earnings expectations for 2021 and 2022 are 5 per cent and 3 per cent, respectively, lower than at the start of the year, indicating that corporations are expected to recover much of their lost earnings relatively quickly.

If corporate earnings are expected to recover quickly, even sharp short-term drops in earnings will have a relatively small impact on equity prices, see Box 3. On the other hand, permanent declines in earnings expectations may, to a greater extent, exert downward pressure on equity prices.

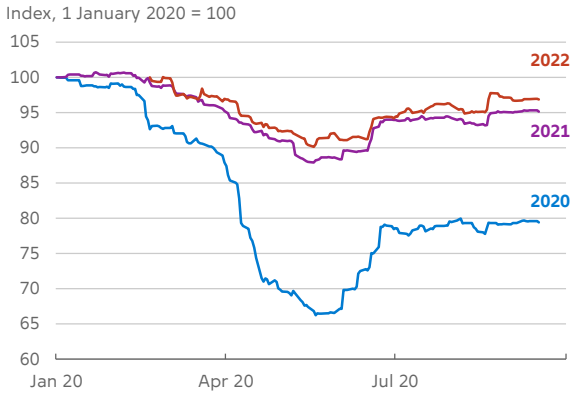
Another explanation for the rise in equity prices could be that investors have a lower return requirement for investing in equities. The required return may decrease if investors require a lower risk premium for investing in equities.[13] Even small permanent declines in the risk premium may have a large impact on equity prices, see Box 3.

Great variation in equity market sector composition Chart 18



Note: Total market value of the countries' equity market, broken down by sector.
Source: Refinitiv Datastream.

20 per cent decline in earnings expectations for 2020 Chart 19



Note: Aggregated earnings expectations for C25 corporations. Based on market analyst expectations. For 2022, the index is calculated using 20 February 2020 = 100 as all C25s were not covered until this date.
Source: Refinitiv Eikon.

12 Equity analysts' expectations are updated regularly, but not daily. This means that there could be a slight delay in the specification. The overall expectation is a weighting of individual analysts' expectations. This weighting depends on the historical accuracy of the analysts and how recent their expectations are.

13 The risk premium is the additional return required by investors for investing in equities rather than a safer alternative such as government bonds.

Equity prices are particularly sensitive to investors' required return[1]

Box 3

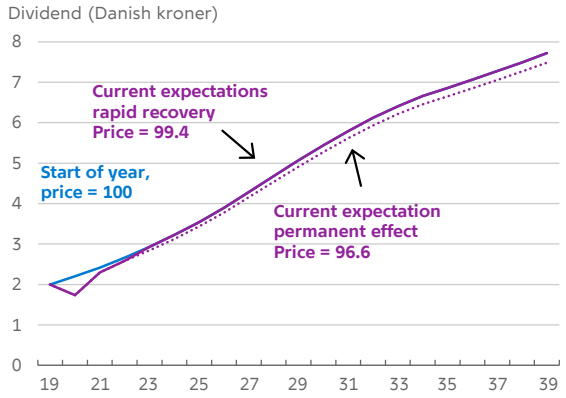
Relatively simple calculations can illustrate the sensitivity of equity prices to changes in earnings expectations and investors' required return on equities. The required return on equities may be divided into the risk-free interest rate and a risk premium. The government bond yield is often used as a measure of the risk-free interest rate. The risk premium is the additional return required by investors for investing in equities compared with the risk-free interest rate.

An indication of the changes in earnings expectations for the years 2020-2022 is the development in equity analysts' expectations shown in Chart 19. Longer-term changes in earnings expectations are harder to assess, but they largely depend on how the economy is expected to perform compared with expectations at the start of the year.

If the recovery is relatively rapid, with earnings fully recovered from 2023 onwards, even the relatively sharp drop in earnings expectations for 2020 will have a modest impact on the price of a fictitious equity, see the purple curve in Chart A. In case of a more permanent impact on the economy, with long-term earnings reduced by the equivalent of the decline in earnings expectations for the year 2022, the impact will be greater, see the dotted purple curve in Chart A. Still, the decline in equity prices will be moderate. Major permanent declines in long-term earnings expectations will impact equity prices further.

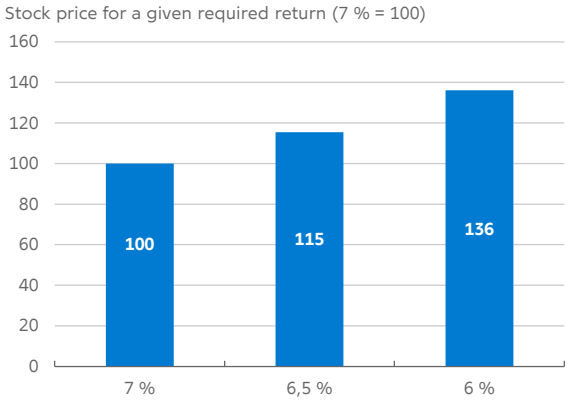
Equity prices are highly sensitive to investors' required return on equities. As mentioned earlier, the required return depends on both the risk-free interest rate and the equity risk premium. Even small permanent changes in the required return have a large impact on the price of an equity, see Chart B.

Temporary declines in earnings have a small impact on equity prices A



Note: Equity prices based on a fictitious equity with a 7 per cent risk premium. Based on market analyst expectations of total earnings of C25s in the years 2020, 2021 and 2022 at the cut-off date of 17 September 2020 compared with the start of the year. "Rapid recovery" assumes a full recovery of earnings from 2023 onwards. "Permanent effect" indicates a scenario in which the decline in market analysts' earnings expectations for the year 2022 is permanent. See more details in the note.
Source: Refinitiv Eikon and own calculations.

Investors' required return has a large impact on equity prices B



Note: Equity prices for a fictitious equity for given required return. See more details in the note.
Source: Own calculations.

1. Calculations based on a 3-stage dividend discount model from Fuller and Hsia (1984), A Simplified Common Stock Valuation Model, Financial Analysts Journal Vol. 40, Issue 5, Sep-Oct. An initial dividend of 2 per cent has been assumed, growing by 10 per cent over the first eight years and then converging towards long-term growth of 3 per cent over eight years. The risk-free interest rate is 0 per cent.

Lower interest rates may have increased equity prices

Investors' required return on equities may also be reduced if interest rates decline. Lower interest rates mean lower discounting of future dividends, which will increase equity prices. So, the global monetary policy easing programmes may have had a spillover effect on equity prices because they have contributed to reduce interest rates. The development in interest rates has differed across countries.

Credit and money

Total credit growth has slowed

Annual credit growth to households and non-financial corporations has slowed since March, amounting to 1.9 per cent in July, see Chart 20. This is in line with the credit growth of recent years, which has largely tracked nominal GDP growth.

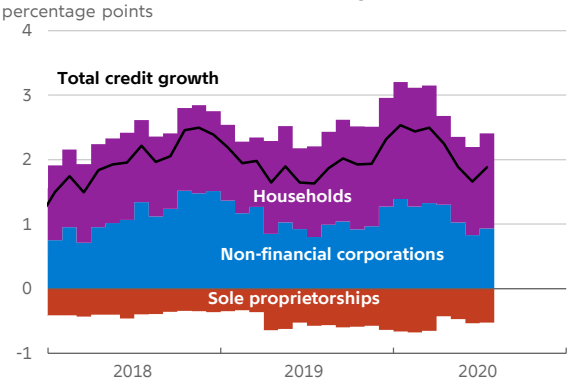
Slight decline in corporate lending since March

From March to July, a slight decline of kr. 1.4 billion was recorded in corporate lending, adjusted for ordinary seasonal variations. This covers a decrease in bank lending and an increase in mortgage lending. The decline in total lending has taken place in the face of the central government's guarantee of loans totalling kr. 9 billion in connection with covid-19. Especially corporations in agriculture, professional services and culture, entertainment and sports have reduced their bank lending, but growth in bank lending has declined across virtually all main industries, see Chart 21.[14]

Recent years have seen a general trend towards a reduction of bank debt – a trend which has been reinforced during the covid-19 crisis. On the other hand, mortgage lending growth has been relatively stable since the spring. Danmarks Nationalbank's lending survey shows unchanged loan demand in the 2nd quarter compared with the 1st quarter. Banks expect a moderate increase in loan demand in the 3rd quarter compared to 2nd quarter when expectations of higher demand following the lockdown failed to materialise.

Annual credit growth has fallen since March Chart 20

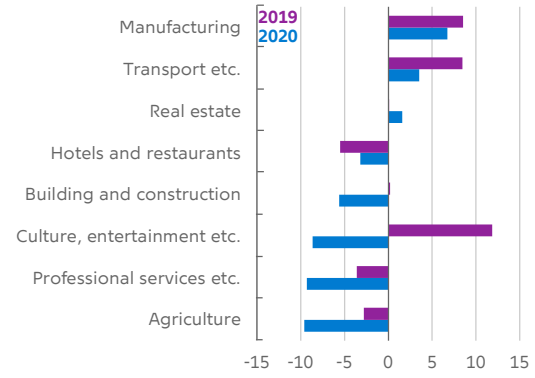
Growth contribution to total annual credit growth, percentage points



Note: Lending by banks and mortgage credit institutions in all currencies to individuals and entities resident in Denmark. Households comprise employees and pensioners etc. The most recent data point is from July 2020.
Source: Danmarks Nationalbank.

Growth in bank lending has declined in most industries Chart 21

Bank lending (change from Mar-Jul year-year, per cent)



Note: Percentage growth is average bank lending during the period from March to July relative to 12 months earlier for both 2019 and 2020.
Source: Danmarks Nationalbank.

14 During the same period, mortgage lending increased to all of the selected industries, except for Manufacturing and Agriculture.

Corporations now have a customer funding surplus with banks

Bank deposits of non-financial corporations and sole proprietorships increased by kr. 90 billion[15], to just over kr. 480 billion, during the period from March to July. This means that corporate bank deposits now exceed corporate bank debt. This should be seen in the context of the deferral of tax and VAT payments, among other factors. The government liquidity measures may provide part of the explanation for both lower lending and higher deposits. Viewed in isolation, the combination of corporations scaling down their investment plans and increasing their deposits points towards an increase in positive net lending.

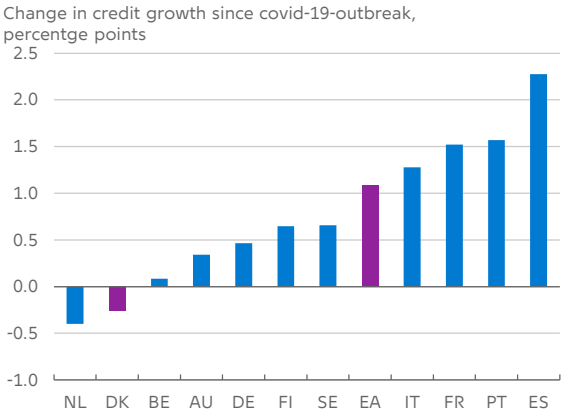
Low Danish corporate borrowing during the covid-19 crisis

The covid-19 downturn has reduced earnings of many corporations – both in Denmark and abroad, resulting in increased need for liquidity. But since the start of the covid-19 pandemic, Danish corporate borrowing from credit institutions has shown a weaker trend than in most countries in the euro area, see Chart 22. One reason is that the economic downturn in Denmark has been less severe than in many other countries, see Chart 23. Vulnerable professions such as the hotel and restaurant industry account for a relatively smaller percentage of value creation and total employment in Denmark than in, say, Spain and Italy. Viewed in isolation, this may have reduced the need for liquidity, thereby contributing to lower credit demand.

Another factor impacting credit demand is that Danish corporations consolidated themselves right up to the outbreak of the covid-19 crisis, building liquidity, to a greater extent than in the euro area. This is reflected in higher positive net receivables by non-financial corporations in the run-up to the covid-19 outbreak. This means that corporations have been able to cover part of their liquidity need by relying on own savings.

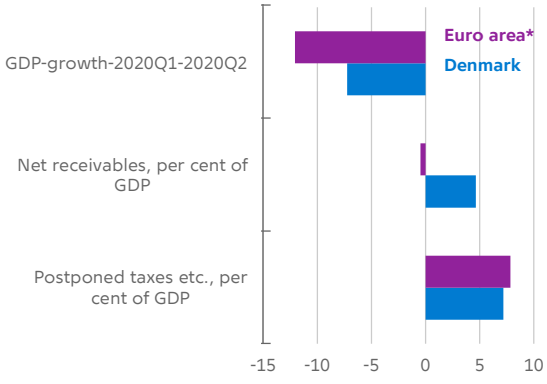
Various types of government liquidity measures have been applied across countries, including deferral of tax and VAT payments. As these measures

Wide cross-country differences in changes in borrowing following the covid-19 outbreak Chart 22



Note: Change in credit growth before and after the outbreak of covid-19. Change in credit growth is measured as the change in percentage points in average monthly credit growth since March compared with the period January 2019 to February 2020. So, the focus is on the *change* in borrowing as the countries' borrowing varied greatly before the corona outbreak. "EA" indicates the euro area.
Source: Macrobond and own calculations.

Several factors may explain lower Danish corporate lending growth Chart 23



Note: * Due to data constraints, deferred taxes, etc. as a percentage of GDP for 2019 are calculated as a weighted average of selected euro area countries. These countries are Belgium, France, Greece, the Netherlands, Italy, Portugal, Spain and Germany for which GDP figures are used as weights. The figures also include deferral of corporate debt service payments with the central government temporarily covering expenses. Positive net receivables by non-financial corporations as a percentage of GDP is calculated as an average in the year leading up to the covid-19 outbreak (2019Q1-2020Q1).
Source: Macrobond, Brügel, ECB and own calculations.

15 If only non-financial corporations are considered, bank deposits increased by kr. 81 billion during the period.

have supported liquidity, they have undoubtedly curbed part of the need for credit, but the impact is difficult to quantify. Moreover, several European countries introduced programmes of government-guaranteed loans. In the euro area, the ECB supported the loan supply through its bank funding programme with Targeted Long-Term Refinancing Operations (TLTRO-III).

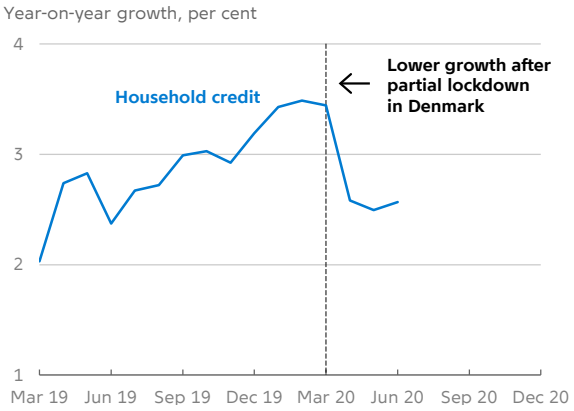
Household credit growth has also declined

Household credit growth has also declined since March, see Chart 24, following a long period of subdued household credit growth. Since the financial crisis, household debt as a percentage of housing wealth has decreased, and a smaller percentage of household income is spent on borrowing costs. Debt has continuously been better aligned with underlying economic conditions, including structural incomes, interest rates and wealth, than before the financial crisis.[16] This consolidation places households in a stronger position in the current economic downturn.

Lower mortgage yields have provided the basis for relatively large refinancings of households' fixed rate loans at the October pay date. The lower costs for borrowers refinancing to lower-rate loans may support private consumption, and, by extension, economic activity.

During previous refinancing booms, many homeowners increased their borrowing when refinancing loans, and the additional funds were, to a great extent, used to finance increased private consumption and for home improvements.[17] It is estimated that additional borrowing from refinancings has increased households' fixed-rate mortgage debt by about kr. 8.1 billion in the course of 2020. By way of comparison, additional borrowing amounted to about kr. 32 billion during the large refinancings in 2019. This explains part of the lower credit growth.

Lower household credit growth following the covid-19 outbreak Chart 24



Note: Lending by banks and mortgage credit institutions in all currencies to employees and pensioners, etc. The most recent data point is July 2020.
Source: Danmarks Nationalbank and own calculations.

16 See Alexander Meldgaard Otte and Ianna Georgieva Yordanova, What's the story behind Danish households' rising debt?, *Danmarks Nationalbank Analysis,* No. 13, June 2020.

17 See Henrik Yde Andersen, Stine Ludvig Bech, Ida Rommedahl Julin and Alexander Meldgaard Otte, Mortgage refinancing supports private consumption, *Danmarks Nationalbank Analysis,* No. 17, September 2019.

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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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SECRETARIAT AND COMMUNICATIONS