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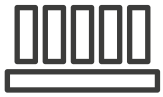
MONETARY AND FINANCIAL TRENDS – SEPTEMBER 2022

Tighter monetary policy has made financing more expensive

Central banks have tightened monetary policy

High inflation and rising inflation expectations entail a need to tighten monetary policy in e.g. the US and the euro area. This has taken the form of interest rate hikes, signalling of future interest rate hikes and a reversal of the extraordinary monetary policy measures of recent years.



Danmarks Nationalbank's interest rates are positive for the first time in eight years

Danmarks Nationalbank has followed the ECB's interest rate hikes in accordance with its fixed exchange rate policy. Main policy rates increased by a total of 125 basis points in July and September. The new reference rate, DESTR, followed Danmarks Nationalbank's interest rate hikes.

Significantly tighter financial conditions will dampen demand going forward

Tighter monetary policy and developments in the financial markets have increased lending rates for Danish households and companies significantly. The rise in interest rates is expected to dampen demand in the economy, but with some delay.

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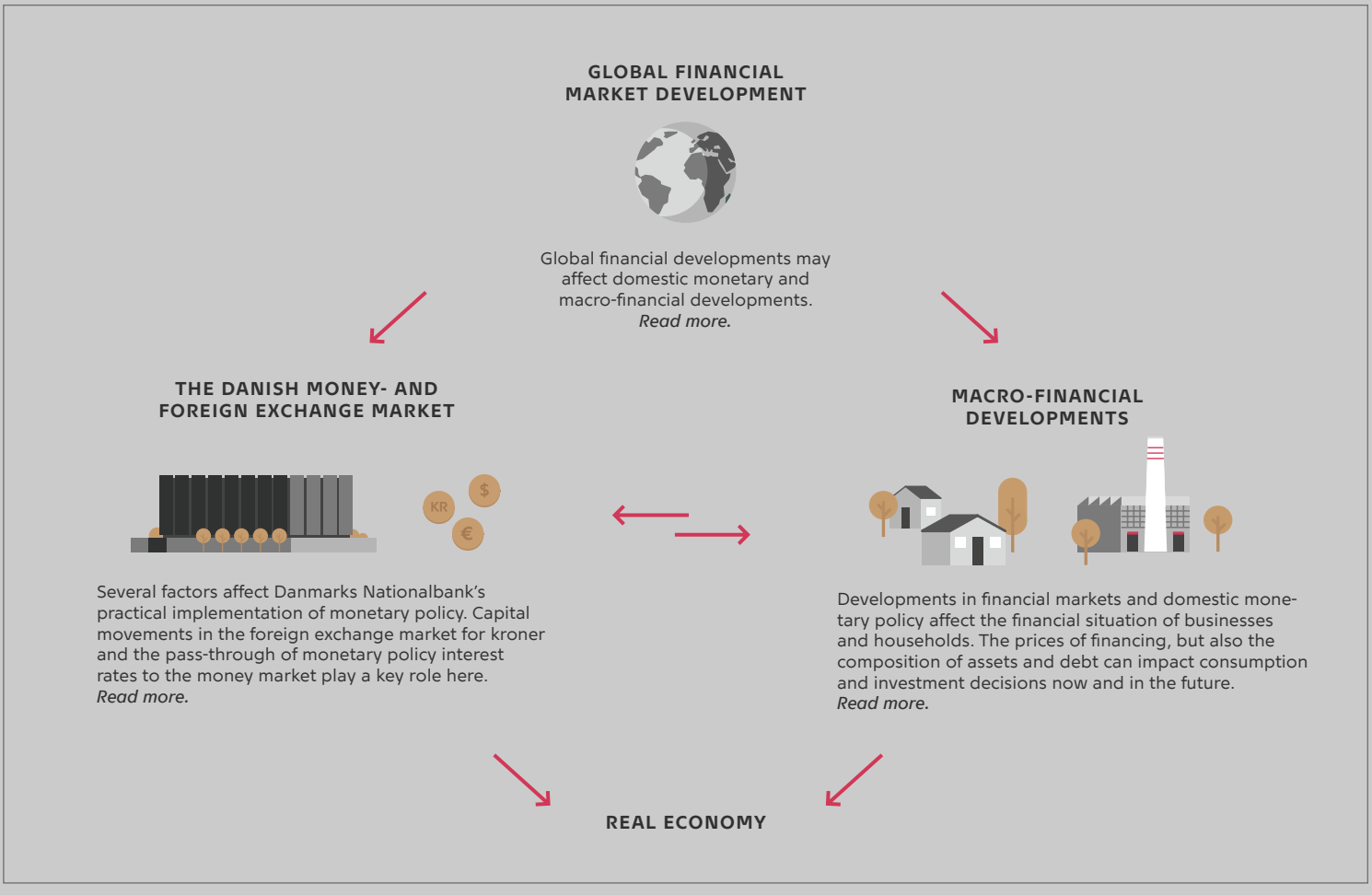
Danmarks Nationalbank publishes the *Monetary and financial trends* analysis twice a year.

The Danish fixed exchange rate policy means that monetary policy is tailored towards ensuring a stable krone exchange rate against the euro. Denmark is a small open economy and closely integrated into the international financial system. Global financial developments can affect the demand for Danish kroner and thus the fixing of monetary policy interest rates by Danmarks Nationalbank. The fixed exchange rate policy also means that monetary policy in the euro area has a major impact on Denmark.

An important element of the analysis is the assessment of how the fixed exchange rate policy, in interaction with developments in the global financial markets, affects financial conditions in Denmark. The financial conditions are important for Danmarks Nationalbank's assessment of the current state of the Danish economy and the outlook for the future. Financial conditions also affect the potential build-up of macro-financial imbalances.



Global financial market development

In 2022, the financial markets have been characterised by increasing interest rates and large volatility. Persistently high inflation heightens the risk that inflation expectations will become deanchored from central bank targets. Higher inflation expectations could contribute to further increases in inflation. Based on this, central banks around the world have tightened monetary policy significantly through interest rate hikes, by signalling more interest rate hikes in the future and by ending or rolling back extraordinary monetary policy measures. As a result, both short-term and long-term interest rates as well as risk premia have increased. Several central banks have stated that the top of their agenda is to bring inflation down, setting aside economic slowdowns and the risk of recessions.

Danish government bond yields and mortgage bond rates have increased as a result of higher risk-free interest rates and rising risk premia. The high volatility and uncertainty in the financial markets have increased the 10-year government yield spread to Germany, something that is also seen in other countries such as the Netherlands. Danish mortgage rates have seen significant increases, partly because the yield spread between mortgage and government bonds has widened. Danish equities have followed the global development with equity price declines. The price drop is in part driven by higher interest rates.

Central banks have tightened monetary policy

Since the beginning of 2022, global financial markets have been characterised by rising interest rates and high and persistent uncertainty. This development has been driven in particular by the high inflation and the central banks' response to it in the form of substantial monetary policy tightening. The tightening measures were implemented against a backdrop of low or negative interest rates and extraordinary measures introduced before and during the covid-19 pandemic.

The rapidly rising interest rates have led to high volatility, in particular in the interest rate markets after several years of very low and stable interest rates across maturities. In addition to significant increases in underlying expectations for monetary policy rates, higher risk premia have pushed up bond yields. At the same time, rising interest rates have contributed to fluctuations and price declines in the equity markets.

Russia's ongoing invasion of Ukraine has led to drastic increases in energy prices, bringing up inflation from already high levels. As Europe is a net importer of energy, it has been particularly affected by this. The euro area's current account has therefore declined from a significant surplus to a small deficit. This has contributed to a weakening of the euro, and thus the krone, against the US dollar. Due to the high inflation, market participants expect central banks in the US and the euro area, among others, to continue tightening monetary policy, regardless of the risk that this may lead to a recession.

Inflation expectations remain well-anchored, but the high inflation increases the risk of decoupling

In August, inflation rose to 9.1 per cent in the euro area, and was 8.3 per cent in the US.[1] Market participants expect inflation in the euro area to peak around 10 per cent towards the end of 2022, see chart 1 (left). Market-based inflation expectations have increased from a level which remained below the European Central Bank's 2 per cent target for many years to a level close to the medium-term objective, see chart 1 (right). Questionnaire-based measures, such as the Survey of Professional Forecasters, SPF, and the Survey of Monetary Analysts, SMA, also show that, on average, long-term inflation expectations are well-anchored around the ECB's inflation targets.

Elevated inflation for a longer period of time increases the risk of inflation expectations rising. The risk of a price-wage spiral increases the longer inflation remains elevated. There is heightened uncertainty about inflation and some indications of upside risks to inflation expectations. For example, the ECB's Consumer Expectations Survey, CES, shows that the median consumer in the euro area expects inflation to be around 3 per cent in three years, up from around 2 per cent a year ago. In addition, an increasing number of respondents to the SPF expect inflation to be significantly above the ECB's medium-term target.

Need for tighter monetary policy to ensure well-anchored inflation expectations

Monetary policy has been tightened significantly in most economies in order to curb the high inflation and risks that inflation expectations will not remain anchored around central banks' inflation targets

Most central banks either have a mandate to ensure price stability or a specific inflation target. Senior members of both the Federal Reserve and the ECB have stated that, in the current situation, there are risks to price stability over the medium term and, thus, to the credibility of central banks. Therefore, monetary policy may need to be tightened significantly, regardless of the impact this may have on the rest of the economy.[2] If other economic policies contribute to higher inflationary pressures, this will further increase the need for monetary policy tightening.

Monetary policy has been tightened through multiple channels

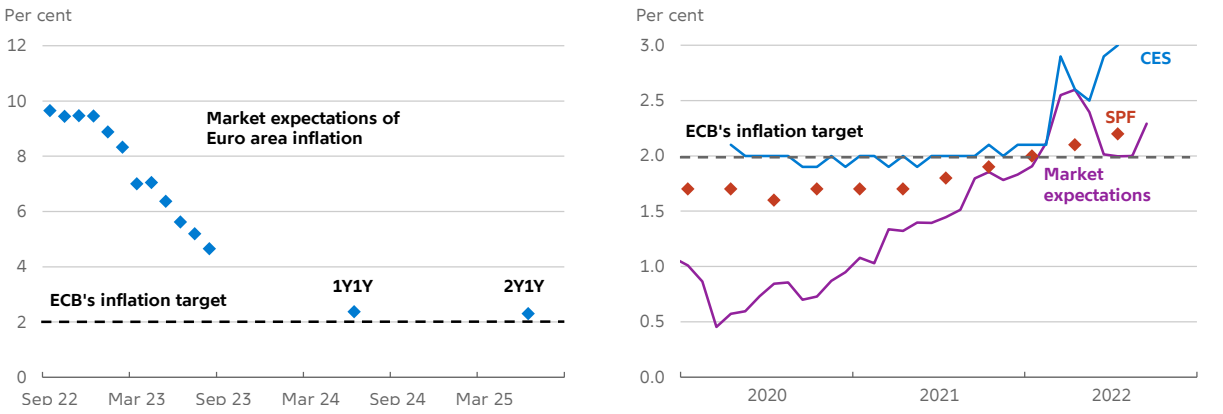
The tightening of monetary policy has led to interest rate increases across maturities. The measures have taken the form of, among other things, interest rate hikes, communication on future monetary policy

1 Inflation calculated for HICP in the euro area and CPI in the US. See Danmarks Nationalbank, The pressure on the economy should be eased, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 11, September 2022.

2 See, for instance, speeches given by Fed Chair Jerome Powell (*link*) and ECB's Isabel Schnabel (*link*) at Jackson Hole.

Inflation expectations remain well-anchored, but some indicators have risen above the ECB's inflation target

Chart 1



Note: The left chart shows market participants' expectations for inflation (not adjusted for any risk premia) over the next 12 months, along with a 1Y1Y and a 2Y1Y forward inflation swap (i.e. expected inflation over the following year, starting in one and two years, respectively). The right-hand chart shows inflation expected by the market derived from a 1Y4Y inflation swap (i.e. expected inflation over the subsequent four years, starting in one year). The SPF indicates the ECB's Survey of Professional Forecasters' expectations for inflation in five years. CES provides the median of three-year inflation expectations from the ECB's Consumer Expectations Survey.
Source: Refinitiv Eikon, Bloomberg, ECB, Eurostat and own calculations.

tightening (*forward guidance*) and halting or reversal of extraordinary measures (e.g. asset purchase programmes). In March, the Federal Reserve began raising monetary policy rates. At its last two meetings, the Federal Reserve raised interest rates by 75 basis points. The ECB started raising its monetary policy rates by 50 basis points in July and then by 75 basis points in September. However, the ECB has tightened monetary policy through other channels throughout 2022, see box 1, p. 7.

Market participants' expectations of future ECB interest rate hikes have increased significantly since March, see chart 2. Rising expectations imply higher medium-term and long-term interest rates and therefore contribute in themselves to a tightening of the financial conditions. As a result of the fixed exchange rate policy, higher market expectations for the ECB's interest rate increases will also lead to expectations of tighter monetary policy in Denmark.

Market participants expect a short period of interest rate hikes

Current market prices indicate that market participants expect the ECB's benchmark interest rate to rise to 2.8 per cent towards the end of 2023.[3] The overall expected increase is relatively large compared to previous episodes of monetary policy interest rate increases, see box 1, p. 7. In relation to inflation, however, it is modest in a historical context. This is partly due to the fact that the ECB uses an array of instruments in the current situation.

New ECB instrument to facilitate continued normalisation of monetary policy

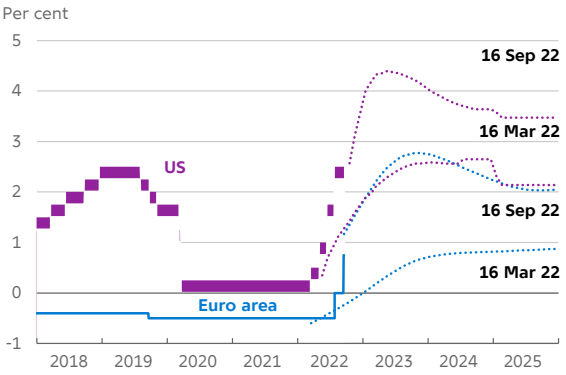
Since March, the yield spread of inter alia Italian government bonds to Germany has widened, see chart 3. Widening government bond yield spreads may make the transmission of the ECB's monetary policy less efficient, as a country's government bond yields have historically been benchmarks for

3 By comparison, the ECB's Survey of Monetary Analysts (SMA) for September 2022 points to an expectation (median) that the first ECB interest rate cut will take place in April 2023. The results are based on responses collected in the period 22-25 August 2022 (*link*).

household and corporate financing conditions.[4] This connection was evident during the euro area sovereign debt crisis in 2011-12, but, in recent years, factors such as monetary policy measures have made the connection less clear, see box 2, p. 8. An effective and consistent transmission across the euro area is important for the ECB to continue normalising its monetary policy, thereby ensuring price stability.

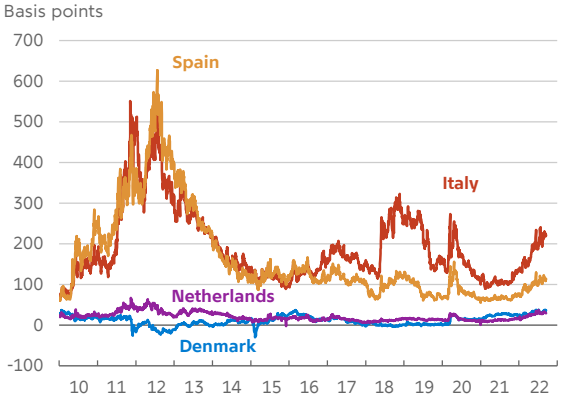
In July 2022, the ECB introduced the Transmission Protection Instrument, TPI, to ensure a continued consistent transmission of monetary policy. Under the TPI, the ECB can buy bonds in market segments where detrimental market developments threaten the transmission of its monetary policy across the euro area. The scope for purchases under the TPI is in principle unlimited, but the ECB will ensure that purchases under the TPI will not ease the overall monetary policy stance. The Governing Council of the ECB has set up a number of criteria for fiscal and macroeconomic sustainability to activate the instrument.[5]

Significant interest rate hikes by the Federal Reserve and the ECB since March and expectations of more to come Chart 2



Note: Dashed lines indicate market-implicit expectations for money market interest rates in the US and the euro area.
Source: Macrobond, Scanrate Rio and Danmarks Nationalbank.

Extensions in euro government bond yield spreads have increased fragmentation risk Chart 3



Note: 10-year government bond yields and yield spreads to Germany based on par yields. The latest data point is 16 September 2022.
Source: Nordea Analytics and Danmarks Nationalbank.

4 Studies show that long-term government bond yields in a country set the tone for other interest rates in the same economy, including other bond yields and banks' lending rates, see, for example, the International Monetary Fund (IMF), Italian Sovereign Spreads: Their Determinants and Pass-through to Bank Funding Costs and Lending Conditions, *IMF Working Paper*, 2013.

5 See the ECB's press release *(link)*.

The ECB has used several tools to tighten monetary policy

Box 1

Central banks have several tools available to stimulate or dampen demand in the economy, affecting interest rates with different maturities. Short-term monetary policy rates determine the overall level of the yield curve. Expectations for future monetary policy rates determine the slope of the yield curve and are influenced by communication on future monetary policy, including forward guidance. Bond purchases reduce the term premium on bonds and thus particularly affect the long end of the yield curve.

More tools used to tighten monetary policy in 2022 than before

The ECB started its monetary tightening earlier this year through forward guidance and by ceasing net asset purchases under its asset purchase programmes. The result was a steeper yield curve and a higher term premium, see chart 5. Overall monetary policy and financial conditions in the euro area therefore tightened significantly even before the ECB's first interest rate hike in July 2022 took place.

Expectations of the ECB's interest rate increases are relatively high compared to tightening episodes of recent times

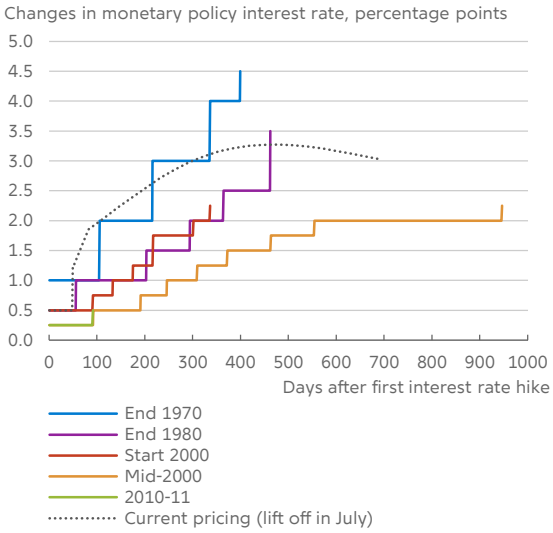
Market prices indicate an expected interest rate path (dotted grey curve) with faster increases in monetary policy rates than was the case during the boom before the financial crisis (orange curve), see chart A. Conversely, the end point of the current projected interest rate path is significantly lower than was the case with the tightening in the latter half of the 1970s (blue curve).

The ECB to gradually increase interest rates towards a neutral level

The benchmark monetary policy interest rate was likely below the level of the natural interest rate[1] at the beginning of 2022, and the realised and expected interest rate increases over the course of the year will cause the gap to the natural interest rate to gradually close.[2] In previous periods of tightening, interest rates at the end of the tightening episode have been both significantly lower and higher than estimated neutral levels, see chart B.

Chart A

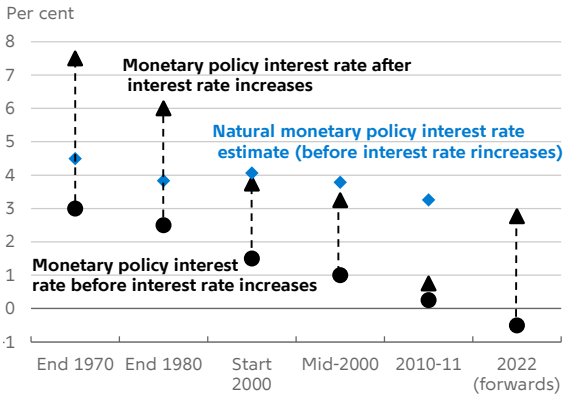
Market participants expect relatively large interest rate increases from the ECB



Note: Periods of interest rate increases for the Bundesbank and the ECB, respectively (Bundesbank for the two earliest episodes). Grey dots implicitly indicate market expectations for the ECB's future deposit facility rate as of 16 September 2022, based on the euro OIS forward curve. The late 1980s period reflects the first period of interest rate increases.
Source: Macrobond, Thomson Reuters, Scanrate Rio and Danmarks Nationalbank.

Chart B

Previous tightening cycles have resulted in rates below and above neutral



Note: The natural level of the nominal monetary policy interest rate is for the euro area for all periods and is based on Kathryn Holston, Thomas Laubach and John C. Williams: Measuring the neutral rate of interest: International trends and determinants, *Journal of International Economics*, 2017. The calculation from real to nominal natural interest rates assumes an expected inflation rate of 2 per cent, corresponding to the ECB's inflation target.
Source: Macrobond, Thomson Reuters, Scanrate Rio and Danmarks Nationalbank.

1. The natural interest rate is a theoretical concept of the level of the key interest rate that is neutral for economic growth, i.e. that is neither contractionary nor expansionary. See Jakob Adolfsen and Jesper Pedersen, The natural real interest rate in Denmark has declined, *Danmarks Nationalbank Analysis*, No. 13, June 2019. This level ensures, in theory, stable price developments around the 2 per cent monetary policy target over the medium term. There is significant uncertainty associated with estimating a nominal natural interest rate.
2. See Christine Lagarde's blog, Monetary policy normalisation in the euro area, ecb.eu, from 23 May 2022 (*link*).

Improved transmission of the ECB's monetary policy since the sovereign debt crisis

Box 2

Rising Italian government bond yields increased other Italian interest rates during the sovereign debt crisis

In the context of the sovereign debt crisis in 2011-12, the Italian government bond yield spread widened significantly relative to German government bonds and swap rates, see chart A. For Italian households and companies, interest rates increased in step with government bond yields, while the corresponding German interest rates developed very differently. This so-called fragmentation prompted the ECB to take a number of measures to restore transmission, including LTRO lending, Mario Draghi's 'Whatever It Takes' speech and the Outright Monetary Transactions (OMT) purchase programme.

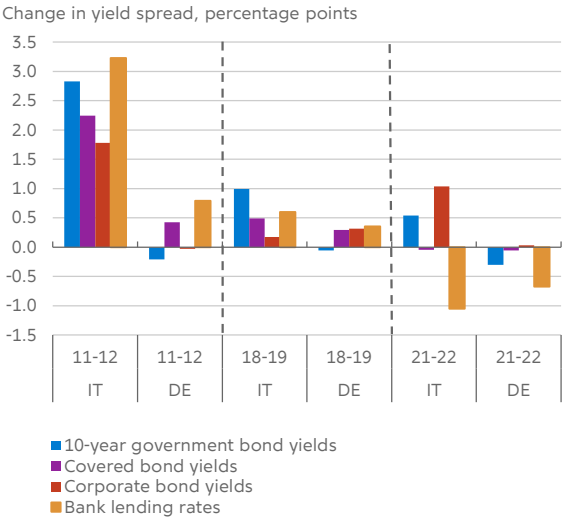
Monetary policy measures have reduced spillover effects from government bond yields since then

In 2019, the spread on Italian government bond yields increased relative to swap rates. Interest rates in the rest of the Italian economy did not rise to the same extent and developed broadly in line with those in Germany, see chart A. This should be viewed in the light of the fact that in 2014-16, the ECB had introduced a number of measures directly targeting banks and companies. These included, among others, a corporate and mortgage bond purchase programme and long-term lending to banks (T-LTRO's).

In 2021-22, the Italian government bond yield spread increased again. However, there have not yet been clear developments in interest rates affecting households and corporate financing costs.

Chart A

Fewer spillover effects in 2021-22 than in 2011-12



Note: Yield spread against the 10-year euro overnight indexed swap. The periods are divided as follows: 11-12 is from January 2011 to August 2012, 18-19 is from May 2018 to June 2019, and 21-22 is from February 2021 to June 2022.

Source: Bloomberg, Refinitiv Eikon, ECB Statistical Data Warehouse, Macrobond and own calculations.

Government bond yields have increased due to expectations of higher monetary policy rates

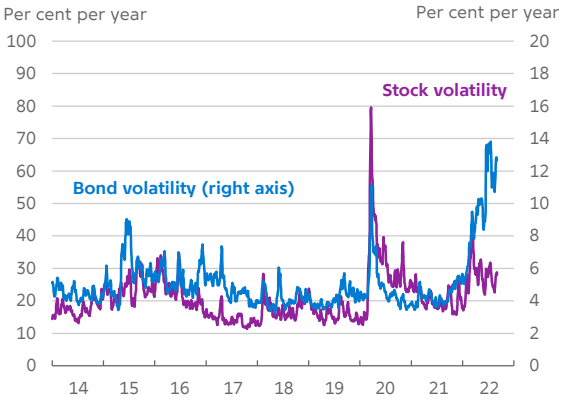
High inflation and monetary policy tightening have led to significant fluctuations in financial markets in the course of 2022, see chart 4. This has been particularly evident in bond markets, which have been characterised by high volatility and deteriorating liquidity. Since March 2022, the yield on the 10-year German and US government bonds have both risen by 1.6 percentage points. Overall, the increase in 2022 is the highest in more than 20 years.

Developments in 10-year government bond yields reflect the tighter monetary policy. Model calculations indicate that the ECB's and the Federal Reserve's interest rate hikes, as well as market expectations of future increases in short-term interest rates, have been the main drivers of the sharp rise in 10-year government bond yields since March 2022, see chart 5.[6] The rollback of the ECB's and the Federal Reserve's asset purchase programmes is estimated to have contributed to increasing term premia slightly.[7]

Rising Danish government bond yield spread to Germany mainly reflects increased market volatility

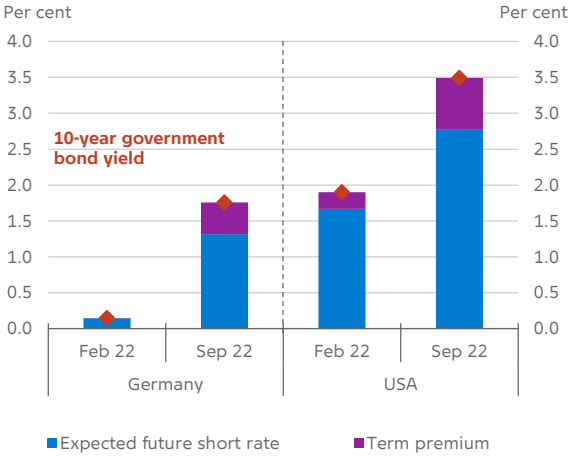
The yields on Danish government bonds have largely followed the increase in German government bonds, but have risen slightly more. The 10-year government bond yield spread has widened to 40 basis points, which is at the same level as when it last peaked in 2015. From March to the end of August, the 10-year government bond yield spread increased by 10 basis points.

Significant increase in bond market volatility since the turn of the year Chart 4



Note: Implicit volatility for German government bonds as well as the German DAX stock index for options. The latest data point is 16 September 2022.
Source: Bloomberg and Danmarks Nationalbank.

Rising government bond yields due to higher expectations for future monetary policy rates Chart 5



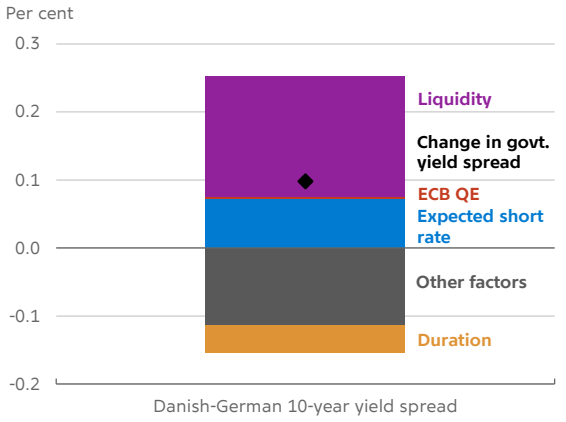
Note: 10-year government bond yields decomposed using the Scott Joslin, Kenneth J. Singleton and Haoxiang Zhu, A new perspective on Gaussian dynamic term structure models, *The Review of Financial Studies* 24.32011: 926-970, 2011 (Germany), and Jens Christensen, Francis X. Diebold and Glenn D. Rudebusch, The affine arbitrage-free class of Nelson–Siegel term structure models, *Journal of Econometrics* 164.1 2011: 4-20 (USA). Based on zero coupon rates. The latest data point is 16 September 2022.
Source: San Francisco FED and Danmarks Nationalbank.

6 For a description of the method, see box 1 in Danmarks Nationalbank, Rising inflation and Russian invasion has increased volatility, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 4, March 2022.

7 The development in the term premium captures changes in risk premia and reflects the risk compensation demanded by investors for holding long bonds rather than rolling over a series of short bonds over the same period.

Market volatility has increased the Danish-German yield spread through changed liquidity

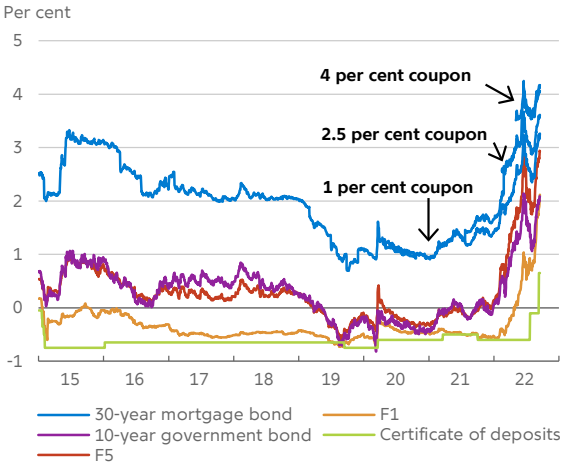
Chart 6



Note: Decomposition of contributions to yield spread change from March 2022 through August 2022. Based on Asger Munch Grønlund, Jonas Ladegaard Hensch and Simon Thinggaard Hetland, Explaining the Danish-German sovereign yield spread, Danmarks Nationalbank Economic Memo, No. 7, June 2022.
Source: Danmarks Nationalbank.

The increase in mortgage rates has continued since March

Chart 7



Note: Selected 30-year mortgage rates for on-the-run bonds from Nykredit. Par yields for 10-year government bonds as well as F1 and F5 loans. The latest data point is 16 September 2022.
Source: Refinitiv Eikon, Nordea Analytics, Nykredit Markets and Danmarks Nationalbank.

The widening in the government bond yield spread should be viewed in the light of the increased volatility and uncertainty in the markets, which has led investors to turn to core markets such as the market for German government bonds. For the same reason, the development in the government bond yield spread seen in Denmark has been in line with that seen in e.g. the Netherlands. The volatility and uncertainty have resulted in relatively poorer liquidity on Danish government bonds compared to the market for German bonds in the period since March. Thus, in a model decomposition of the government bond yield spread, the spread widening due to the increased market volatility is captured by the liquidity factor, see chart 6.

The discontinuation of net purchases in the ECB's asset purchase programmes have had no clear effect on the yield spread, although the ECB's net sales of German government bonds (taken in isolation) reduce the scarcity of them.[8] This may reflect that demand for German government bonds via repo transactions[9] was increasing in the run-up to the ECB Governing Council meeting on 8 September 2022. At the meeting, it was decided to temporarily remove the zero per cent interest rate ceiling for remuneration of government deposits in the Eurosystem.[10] Before the change, this may have led governments to place their excess liquidity by purchasing short-term euro government bonds or via repo transactions in the financial markets, thereby possibly increasing the scarcity of short-term German government bonds. There may have been spillovers from this to long-term government bonds. After September 8th there are still signs of scarcity of German government bonds in the repo market.

8 Scarcity may cause the yield on German government bonds to fall relative to other yields, and hence, the Danish yield spread to Germany to rise.

9 Repo transactions are the equivalent of a party selling a bond to a counterparty today and committing to buy back the same bond at a future date.

10 See the ECB's press release (*link*).

Highest increase in Danish mortgage bond rates in more than two decades

Yields on Danish mortgage bonds have risen further since March across maturities and interest rate fixation periods, see chart 7. Most of the increase in 30-year mortgage rates can be explained by developments in long-term interest rates in the euro area, but mortgage bond rates have also risen more than government yields, see chart 8. This reflects rising risk premia, which are primarily related to higher volatility in mortgage rates. In mid-September 2022, the spread between a benchmark 30-year mortgage bond and the 10-year government bond was approximately 2.3 per cent.[11] By comparison, the spread in 2021 averaged 1.4 per cent.

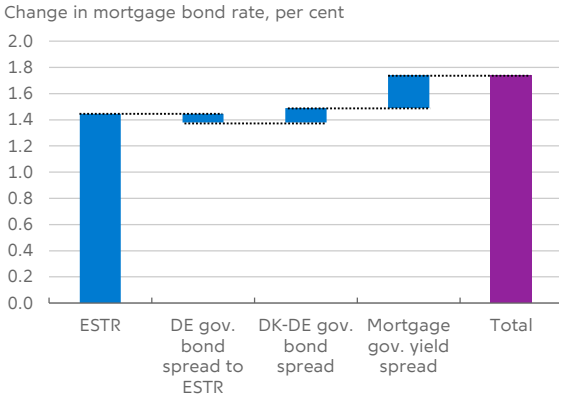
Higher interest rates have contributed to lower equity prices

Since March, equity prices have declined in Denmark, the euro area and the US, see chart 9. This should be viewed in the light that higher interest rates contribute to a somewhat higher required return on equities, see chart 10.

Expectation of higher earnings in the short term

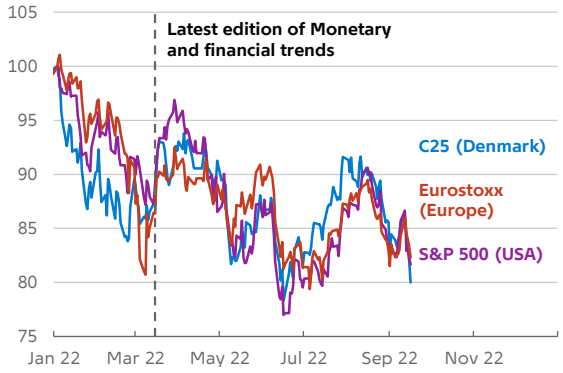
For the euro area and the USA, equity analysts expect corporate earnings to grow between 2022 and 2023, see chart 11. Thus, earnings expectations do not indicate a significant economic slowdown in 2022 or 2023. Viewed in isolation, the development in earnings and in earnings expectations for the coming years has contributed positively to equity prices. The lower expected earnings in 2023 than in 2022 for Danish listed companies are due to very high earnings for A.P. Møller-Mærsk in 2022.

Mortgage bond rates have risen more than government bond yields Chart 8



Note: The chart shows contributions to changes in the 30-year fixed-rate mortgage bond rate between 16 March 2022 and 16 September 2022. ESTR is a 10-year ESTR swap rate and indicates an underlying 'risk-free' interest rate. The Danish-German government spread is measured as the 10-year government yield spread. The mortgage-government yield spread is defined as the difference in interest rates between a Danish 10-year bond government bond and a 4-per cent 30-year NYK mortgage bond. 4 per cent 30-year Nykredit bond for 16 September 2022 and 2.5 per cent bond for 16 March 2022.
Source: Refinitiv Eikon, Scanrate Rio and Danmarks Nationalbank.

Equity prices have fallen since March Chart 9

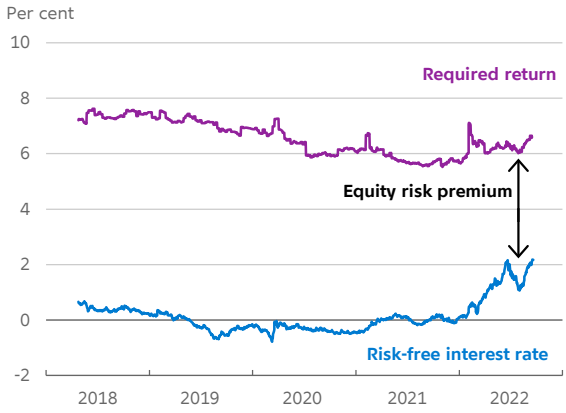


Note: Total return index. The latest data point is 16 September 2022.
Source: Refinitiv Eikon and Danmarks Nationalbank.

11 A 4 per cent Nykredit bond maturing in 2053 is used.

The required rate of return on equities has increased

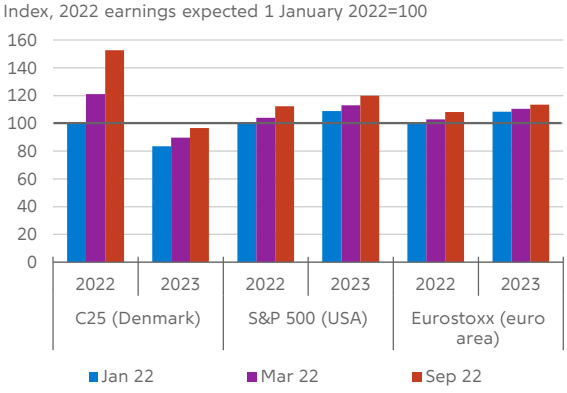
Chart 10



Note: Calculated using a dividend discount model in accordance with the description in Jonas Ladegaard Hensch, Kristian Loft Kristiansen and Peter Nikolaos Halling Vaporakis, Investors pay a premium for green equities, *Danmarks Nationalbank Analysis*, No. 1, January 2022. Changes from 16 March 2022 to 16 September 2022.
Source: Own calculations.

Increased earnings expectations

Chart 11



Note: Equity analysts' expectations for companies' total earnings for the three indices in the years 2022 and 2023. The latest data point is 16 September 2022.
Source: Refinitiv Eikon and Danmarks Nationalbank.

Danish monetary and foreign exchange market

Danmarks Nationalbank has increased the benchmark monetary policy rates twice by a total of 125 basis points since March and maintained the monetary policy interest rate spread to the euro area at minus 10 basis points.

The new reference rate, DESTR, has followed the rise in monetary policy rates and has remained stable slightly below the current account rate.

Fluctuations in the financial markets and Danmarks Nationalbank's interest rate hikes have not affected the Danish krone significantly. The krone rate remains on the strong side of the central parity rate.

Danmarks Nationalbank's interest rates are positive for the first time in eight years

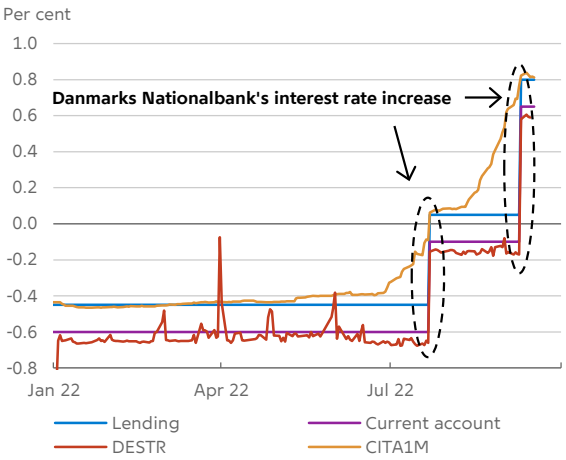
DESTR has followed Danmarks Nationalbank's interest rates upwards

Following the ECB's interest rate hikes in July and September, Danmarks Nationalbank raised the Danish benchmark monetary policy rates. The current account rate, the interest rate on certificates of deposit and the lending rate were increased by a total of 125 basis points in July and September. The discount rate was raised by 65 basis points in September, bringing it on a par with the interest rate on the current account and certificates of deposit. The monetary policy interest rate spread to the euro area has remained unchanged at minus 10 basis points between Danmarks Nationalbank's current account rate and the rate on the ECB's deposit facility. The interest rate increase in September means that Danmarks Nationalbank's benchmark interest rate is once again positive, having been negative since the autumn of 2014.

The overnight reference rate, Denmark Short-Term Rate (DESTR), has followed the monetary policy interest rate hikes and has remained stable around slightly below the current account rate, see chart 12. The reason that DESTR can be below the current account rate is that some DESTR counterparties do not have access to monetary policy instruments[12], and that the net position has increased to a high level since June because of a reduction of the threshold in companies' tax accounts, see box 3, p. 15 and chart 13.[13]

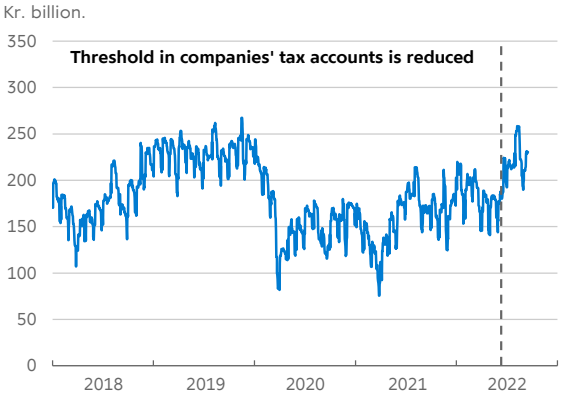
The spread between ESTR and DESTR was unaffected by the monetary policy rate hikes. Leading up to the ECB Governing Council meeting on 8 September short-term euro market interest rates declined, e.g. interest rates on short-maturity German government bonds. Therefore, the yield spread between short-maturity Danish and German government bonds

DESTR has followed the rise in monetary policy rates Chart 12



Note: The Denmark Short-Term Rate (DESTR) is a short transaction-based reference rate for the Danish krone market. Fluctuations in DESTR are due to fluctuations in liquidity in connection with the change of month. Typically, the lower the liquidity, the more pronounced the fluctuations will be. See box 3 for further details. The latest data point is 16 September 2022.
Source: Danmarks Nationalbank.

Lower thresholds in companies' tax accounts have contributed to higher net position Chart 13



Note: The net position refers to the total net deposits of monetary policy counterparties with Danmarks Nationalbank. The latest data point is 16 September 2022.
Source: Danmarks Nationalbank.

12 The calculation of DESTR also includes transactions involving DESTR reporters and counterparties that cannot deposit at Danmarks Nationalbank. For more details on DESTR, see nationalbanken.dk (*link*).

13 Since March, the net position has increased by kr. 38.4 billion. The development should be seen in the light of the fact that the threshold in companies' tax accounts as of 15 June was significantly reduced to kr. 200,000 from a limit of kr. 350 million, which was introduced as part of a number of covid-19 measures. This reduction caused companies to move a share of their deposits from tax accounts to bank accounts, which has added almost kr. 40 billion to the krone liquidity in the banks.

Pricing of overnight deposits on the Danish money market

Box 3

The new Danish transaction-based overnight reference rate, Denmark Short-Term Rate (DESTR), was launched on 1 April 2022. DESTR is important for the monetary policy pass-through via the short swap spread and the implicit yield spread between kroner and euros in the forward exchange market. The forward spread reflects what it costs to finance the purchase of Danish kroner relative to euros, and has a major impact on the krone exchange rate against the euro.

DESTR is sensitive to a low net position

Overall, DESTR is determined by Danmarks Nationalbank's monetary policy instruments, which since the technical adjustment in March 2021 have included a clear interest rate for lending and loans, respectively.[1] DESTR's position in relation to Danmarks Nationalbank's deposit and lending rates depends on each bank's probability of having to borrow to cover its daily liquidity requirement. This probability is influenced by several factors, including the total net position, which is an expression of available money market liquidity. For example, if the overall liquidity in the money market is low, banks will require a higher interest rate to place overnight deposits (O/N deposits) with other banks.

Danmarks Nationalbank has set up a model for pricing O/N deposits in the Danish money market.[2] The model points to a non-linear negative correlation between the total net position and DESTR's position relative to the current account rate, see chart A.[3] DESTR is sensitive to changes in the net position (large slope) when the net position is low, and almost not sensitive when the net position is high (flat slope). This reflects the fact that when the net position is above kr. 200 billion, for example, the banks' loan terms do not improve to any material extent by increases in the net position. Conversely, in a situation with low overall liquidity, small changes in liquidity will affect the banks' price of borrowing liquidity in the money market.

At a high net position, DESTR will be slightly below the current account rate

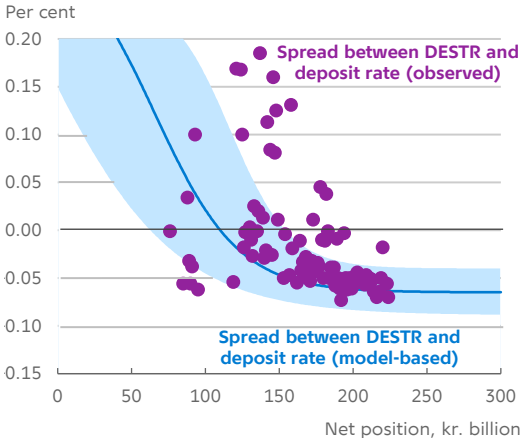
In a situation where the banks reporting to DESTR have a high net position, they will have an incentive to accept O/N deposits at an interest rate equal to or lower than Danmarks Nationalbank's current account rate. Here, it should be borne in mind that some DESTR counterparties[4] are not monetary policy counterparties and thus do not have access to Danmarks Nationalbank's monetary policy instruments. The DESTR banks can therefore set an interest rate on O/N deposits that is lower than Danmarks Nationalbank's current account rate.

The range for DESTR is greater at low net positions

In a situation where the net position is moderate, DESTR banks may be willing to accept O/N deposits at an interest rate higher than the interest rate at which they can alternatively place their liquidity (the current account rate). This should be viewed in the light of the low but positive probability that DESTR banks themselves will need liquidity overnight. They will therefore pay an interest rate higher than the current account rate. In such a situation, DESTR will typically be somewhere between Danmarks Nationalbank's deposit and lending rates.

If all DESTR banks have a liquidity shortage (corresponding to a low or negative net position), they will be willing to accept O/N deposits at an interest rate equal to Danmarks Nationalbank's lending rate plus a premium. The size of the premium depends on the willingness of DESTR counterparties placing liquidity in the money market, and which business day of the week it is, as Danmarks Nationalbank's loan facility is only open on the last business day of the week.

Chart A
DESTR is sensitive to a low net position



Note: The results are based on a trading day with normal market conditions without liquidity fluctuations over closing, etc. The light blue shaded area indicates a 95 per cent confidence interval. The observed DESTR values are based on the period from March 2021 to 16 September, and closing effects are excluded.
Source: Danmarks Nationalbank.

1. Danmarks Nationalbank's monetary policy instruments comprise a standing deposit facility via the current account and a loan facility where monetary policy counterparties can only take out monetary policy loans from Danmarks Nationalbank's loan facilities on the last banking day of the week. For more details, see Danmarks Nationalbank, Technical adjustment of the monetary policy instruments, *Danmarks Nationalbank Analysis*, No. 5, March 2021.
2. See Danmarks Nationalbank, Rising inflation and Russian invasion has increased volatility, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 4, March 2022.
3. Data points to the left of the confidence interval are from the first days after the implementation of the technical adaptation of the monetary policy instruments in March 2021. During that period, pricing was characterised by greater uncertainty, especially in view of the low net position. Data to the right capture liquidity-depending ultimo-effects.
4. The calculation of DESTR also includes transactions involving DESTR reporters and counterparties categorised as financial undertakings that cannot place with Danmarks Nationalbank. For more details on DESTR, see nationalbanken.dk (*link*).

increased. That contributed to make it more attractive to buy kroner vis-a-vis the euro.[14] At the meeting the ECB Governing Council decided to temporarily remove the zero per cent interest rate ceiling for remuneration of government deposits, see earlier. The decision entailed that the interest rate spread between short-maturity Danish and German government bonds partly reversed again. However, there are still signs of scarcity of inter alia German government bonds in financial markets.

The krone rate against the euro has been on the strong side of the central parity rate since spring 2020, see chart 14. At end-August, Danmarks Nationalbank had not intervened in the foreign exchange market since December 2021.

Neutral krone demand from institutional investors

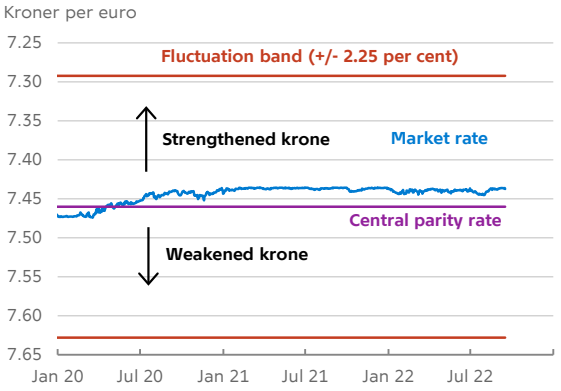
The significant fluctuations in the global financial markets have given rise to fluctuations in Danish institutional investors' krone demand from March to July, see chart 15. During the period as a whole, institutional investors' net krone purchases remained broadly neutral. In comparison, institutional investors bought kroner for kr. 138 billion in 2021. In particular, pension funds' currency hedging to kroner (blue columns) has fluctuated in line with prices in the global financial markets. For example, falling prices of foreign equities will reduce pension funds' currency exposure and thus their need to buy kroner in the forward exchange market to the extent that they maintain their hedging ratio.

In addition, with the global decline in the price of equities and bonds in the course of 2022, Danish institutional investors have had to provide large amounts in currency as collateral for losses on derivative contracts (red columns). The losses are large, among others, for global equity futures and forward exchange contracts where US dollars are sold against euros or kroner. The need for collateral, which consists partly of cash, has contributed to a lower krone demand from institutional investors.

Conversely, institutional investors have sold foreign securities (orange columns), and this, viewed in isolation, translates into a purchase of kroner.

The Danish krone has been on the strong side of the central parity rate since spring 2020

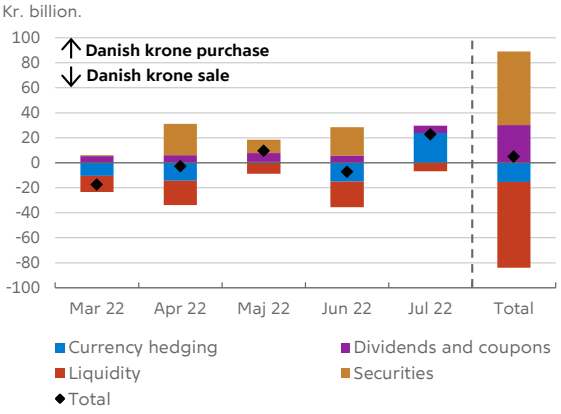
Chart 14



Note: Exchange rate of the krone vis-à-vis the euro. Reverse y axis. The latest data point is 16 September 2022.
Source: Refinitiv Datastream and Danmarks Nationalbank.

Danish institutional investors' krone demand has, on average, been close to neutral

Chart 15



Note: Net krone purchases in the period from March to July 2022. 'Secuties' is net sales of securities in foreign exchange. 'Liquidity' is net borrowing in foreign exchange. The most-right column indicates institutional investors' total krone purchases over the period from March to July 2022. Institutional investors comprise Danish insurance and pension companies as well as Danish investment funds.
Source: Danmarks Nationalbank.

14 See box 5 in Danmarks Nationalbank, Rising inflation and Russian invasion has increased volatility, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 4, March 2022.

Price declines on Danish securities reduced the need abroad for currency hedging

During the year, foreign investors[15] have suffered significant losses on their holdings of Danish equities and bonds. The price drops may also have reduced the need for foreign investors to hedge kroner, which will typically lead to a purchase of kroner in the forward exchange market. Conversely, foreign investors have sold Danish securities and received large dividends from Danish companies, which results in net krone sales since March.

Balance of payments surplus contributes to the strong krone

With Denmark's large current account surplus and investment income, non-financial corporations in particular continuously demand significant amounts of kroner. The balance of payments surplus is expected to remain high, primarily reflecting developments in the balance of services, where higher freight rates result in strong earnings and high maritime transport exports.[16]

15 There is no full picture of who the foreign investors are. However, they primarily comprise investment funds, pension funds, other asset managers and foreign central banks or funds.

16 See Danmarks Nationalbank, The pressure on the economy should be eased, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 11, September 2022.

Macro-financial developments

Falling equity prices and rising bond yields have led to a sharp tightening of nominal financing conditions in Denmark. Real interest rates across maturities have also increased.

Overall, the development of financing conditions is considered to contribute to dampening economic activity in the period to come, although the magnitude and timing of the tightening effect are subject to considerable uncertainty.

As a result of the interest rate increases, Danish households have bought back mortgage bonds at a large scale. The realised capital gains from the refinancing of loans have been used to reduce debt and at the same time have supported consumption opportunities.

Corporate borrowing from banks has increased further since March, reflecting, among other things, higher corporate investments and repayment of government loans provided during the covid-19 pandemic.

Significantly tighter financial conditions will dampen demand going forward

Tighter monetary policy and increased market volatility have made financing more expensive

Global monetary policy tightening and rising risk premia on government and mortgage bonds, among others, have increased the cost to households of financing home purchases and to companies of financing investments. In addition, equity price drops and increased market volatility have made it more expensive for companies to raise capital on the equity markets, where there has been few new issuances.

Rising real interest rates across maturities, with the exception of the very shortest, have contributed to a tightening of real financing conditions in the course of 2022, see chart 16. In general, longer-term interest rates have a greater impact on the decisions taken by households and companies.[17] The decline in real short-term interest rates has been driven by higher short-term inflation expectations. When inflation expectations are driving a decline in real interest rates, its effect on consumption and investment may be small.[18] This should be viewed in the light of the fact that higher short-term inflation expectations are associated with expectations of lower future growth and high uncertainty, as it was the case with the oil crises of the 1970s for example.

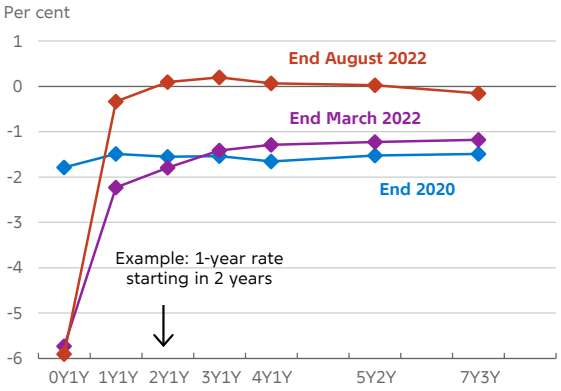
Overall, it is assessed that financing conditions for Danish households and companies have tightened significantly in the course of 2022, both in nominal and real terms.

Tighter financing conditions dampen activity, but it is uncertain how much and when

High inflation and the risk of inflation expectations not remaining well-anchored have necessitated a significant tightening of monetary policy in order to dampen economic activity and, in turn, inflation. The reduction in activity through monetary policy occurs with a delay, and there is considerable uncertainty surrounding both the timing and magnitude of the impact.

Macro-financial structures have an impact on how much and how quickly higher interest rates affect the real economy. For example, the pass-through from higher market rates to existing homeowners' interest expenses in Denmark is gradual, as households have a relatively long interest rate fixation period on their mortgage debt. Market rates have

Rising real interest rates across maturities Chart 16



Note: The chart shows the real Danish forward government yield curve. Real interest rates are derived from zero coupon government bond yields as well as European inflation swaps. This is an ex ante real interest rate curve.
Source: Refinitiv Eikon, Scanrate Rio and own calculations.

17 See, for example, Philip Lane's speech, 'Monetary policy in the euro area: the next phase' from 29 August 2022, ecb.eu (*link*).

18 See Bachmann et al, Inflation Expectations and Readiness to Spend: Cross-sectional Evidence, *American Economic Journal: Economic Policy*, 7(1), pp. 1-35, 2015, Mary Burke and Ali Ozdagli, Household Inflation Expectations and Consumer Spending: Evidence from Panel Data, *The Review of Economist and Statistics*, 2021, and Coibion et al, Inflation Expectations and Firm Decisions: New Causal Evidence, *The Quarterly Journal of Economics*, vol. 153(1), pp. 165-219, 2020.

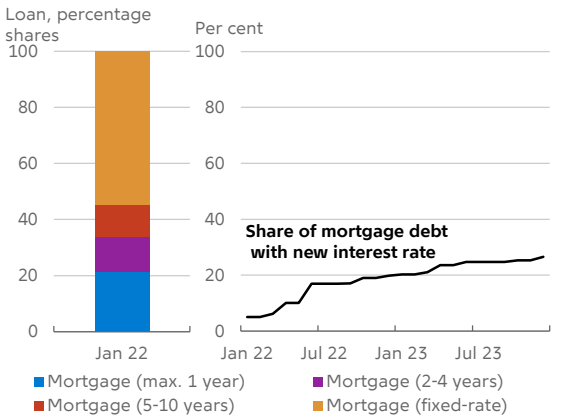
increased during the year, and approx. 20 per cent of household mortgage debt is expected to get a new interest rates by the end of the year, see chart 17.

Danish companies have shorter fixed interest periods on their mortgage debt than households, and the pass-through to their interest costs is therefore faster.[19]

Model estimates indicate that an increase in global nominal interest rates of 100 basis points could lead to a decline in economic activity (GDP) in Denmark of approx. 1.5 per cent over the following approx. 2.5 years.[20] Both the timing and magnitude of the downturn are subject to great uncertainty, see box 4, p. 21.

The uncertainty reflects, among other things, that the model estimates are based on historical correlations over the past 40-50 years. During that period, the combination of large increases in interest rates and inflation has been rare. This increases uncertainty about how households and companies perceive the evolution of their real borrowing costs. In addition, a given economic situation will rarely be identical to historical situations. For example, among Danish households there has been a very large buy-back activity of mortgage loans, as described below. This has been possible since interest rates have increased sharply following a number of years with very low and stable mortgage bond rates. Viewed in isolation, this activity may support private consumption, even though it is a reaction to rising interest rates.

The interest rate pass-through occurs gradually Chart 17



Note: Planned interest rate adjustments on existing household mortgage loans in January 2022. Categories indicate interest rate fixation period. The shares indicate loans with new interest rate since January 2022. Loans that are given new interest rates several times only count once.
Source: The Credit Register and own calculations.

19 Companies may have hedged their interest rate sensitivity using derivatives, but the extent of this is unknown.

20 The 100 basis point increase is roughly equivalent to the average increase across the yield curve *seen throughout 2022*. This is, thus, more than the average increase in short-term money market interest rates seen over the whole year, but somewhat less than the increase in long-term nominal interest rates, including mortgage rates, see chart 8.

Higher interest rates are gradually reducing GDP, but there is a lot of uncertainty surrounding the timing and magnitude of the effects

Box 4

A multi-model approach

In general, there is consensus that interest rate increases reduce economic activity and thereby contribute to lower inflation. Overall, the literature in the field concludes that transmission to the economy takes time, but that there is great uncertainty surrounding the exact timing and magnitude.[1] There is therefore no exact formula for how much and how the economy will be affected by interest rate increases. In order to gain a better understanding of the magnitude and timing of the real economic effects in Denmark of rising interest rates in Denmark and globally, three macroeconomic models are employed below: MONA, Danmarks Nationalbank's DSGE model and MAKRO.[2] The models provide a quantitative estimate of how nominal interest rate increases (viewed in isolation) affect economic activity based on historical relationships. It is normal practice to use several models, as each model has its pros and cons. Due to the high uncertainty, model scenarios still constitute just one of several inputs in the overall assessment of the effects on activity in the Danish economy.

The interest rate increase in the calculation is 100 basis points and temporary, which means that interest rates gradually fall back towards the starting point over the subsequent five years. All market rates in the models, including all maturities, are increasing in parallel in Denmark and abroad.

Downward impact on GDP depends on choice of model

Danmarks Nationalbank's semi-structural model, MONA, predicts a gradual decline in GDP, which peaks at approx. 1.5 per cent after about 2.5 years, see chart A. The decline in GDP reflects a broad decline in all private demand components.

Compared to both MAKRO and Danmarks Nationalbank's DSGE model, the effects in MONA are gradual. This reflects, among other things, that households and companies react more gradually in the model. In MAKRO and DSGE, on the other hand, the effects are most pronounced already in the first quarter after the interest rate increase, when GDP falls by approx. 1.6 and 2.5 per cent, respectively.[3] This reflects the fact that households and companies in these models base their behaviour more on expectations for the future, where interest rates are also assumed to be higher. With an increase in interest rates, households will be incentivised to defer their consumption as returns on savings increase, so-called intertemporal substitution, while companies reduce their investments.[4,5]

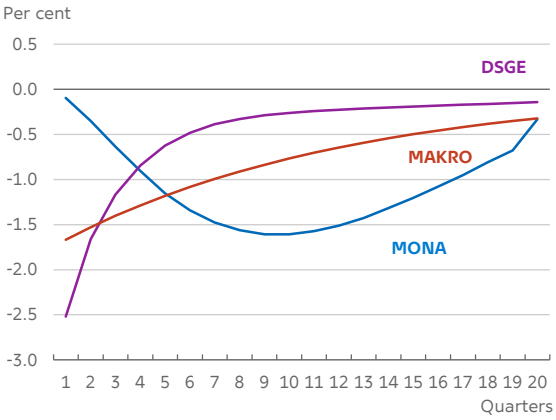
At the same time, this means that inflation is also gradually affected as demand subsides. In addition to the impact through demand, by tightening monetary policy, central banks can send a clear signal of their determination to reduce inflation. This may dampen inflation expectations included in wage and price formation in the economy and thus reduce inflation.

High inflation increases uncertainty about results

The size of the rise in nominal interest rates is in line with the current monetary policy tightening. However, uncertainty about the effects of the current situation is particularly high, partly as the estimates do not account for the fact that the rising interest rates are driven by high inflation.[6] Higher inflation suggests a lower increase in real interest rates than nominal interest rates if inflation is also expected to be higher in the future. To the extent that behaviour in the economy is determined more by real interest rates rather than nominal interest rates, this in isolation suggests more subdued effects on GDP than shown in the chart. However, the underlying causes of the increased inflation will have separate effects on the development of GDP.

Chart A

GDP effects of a temporary global interest rate increase



Note: GDP change in relation to the baseline of the scenario analysis. Since MAKRO is an annual model, the scenario of quarters within the year is interpolated exponentially.
Source: Own calculations based on the models, see note 2.

1. See Valerie A. Ramey, Macroeconomic Shocks and their Propagation, *Handbook of Macroeconomics*, vol. 2., 2016.
2. For more information about the models, see the following sources: MONA: Danmarks Nationalbank, MONA – a quarterly model of the Danish economy, 2003. Danmarks Nationalbank's DSGE model: Jesper Pedersen, An Estimated DSGE model for Denmark with Housing, Banking and Financial Frictions, *Danmarks Nationalbank Working Paper*, No. 108, October 2016. MACRO: The DREAM group, MAKRO Model Documentation, 2021.
3. As MACRO is an annual model, the effect is 1.6 per cent over the first year. Chart A shows the GDP effect in Q1 and then smoothened, as described in the note in the chart.
4. The size of the change in consumption due to higher interest rates also depends on other effects, including the size of the so-called income effect and wealth effect. See Mikkel Bess, Jakob Feveile Adolfsen and Jesper Pedersen, Real interest rates are affected by inflation expectations, *Danmarks Nationalbank Analysis*, No. 19, October 2020.
5. In both the DSGE model and MAKRO, borrowing by credit-constrained households, and thus their opportunities for shifts in consumption, is limited by their housing wealth.
6. If the effects were instead due to a change in real interest rates, these would depend less on monetary policy tightening and more on whether the higher inflation is supply-driven or demand-driven. The reasons for the increased inflation and the economic effects of this are described in Danmarks Nationalbank, The pressure on the economy should be eased, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 11, September 2022.

Higher interest rates are gradually reducing GDP, but there is a lot of uncertainty surrounding the timing and magnitude of the effects

Box 4

continued

Private consumption plays a major role in the development of GDP and is affected via various interest rate channels

If households engage in a high degree of intertemporal substitution, this will imply a rapid decline in both private consumption and GDP. This channel is just one of several interest rate channels and is less pronounced in MONA than in the other two models.

The pass-through from market rates to household budgets is called *the cash flow channel* and is sluggish, see chart 17. For some segments of households, there is a significant increase in the debt service burden ratio (debt payments as a share of disposable income), but for the vast majority, the increase is modest.[7] The modest increase in the debt service burden ratio overall suggests that households are generally able to absorb payments of higher interest rates without having to significantly reduce consumption. This is further supported by the fact that households, on average, have significant liquid assets.

Consumption may also decrease due to declines in household wealth *(wealth channel)*. This reflects the fact that households are becoming less wealthy due to lower prices of, for example, their housing, bonds and equities. When house prices decline, homeowners' scope for increasing their mortgage loans using their homes as collateral is narrowed. The models suggest that house prices will fall as a result of the interest rate increases, thereby reducing consumption. The fall in house prices due to higher interest rates typically occurs gradually. Interest rates have increased during the year and house price growth has gradually become more subdued. Most recently, there has been a drop in prices over the summer. This points to subdued effects via the wealth channel in the short term.[8]

7. See Stine Ludvig Bech, Simon Juul Hviid and Jakob Guldbæk Mikkelsen, Measuring household interest-rate sensitivity in Denmark, *Danmarks Nationalbank Working Paper*, no. 183, 2021.
8. This is further supported by the fact that a Danish study did not find a wealth effect of a fall in house prices in isolation. See Henrik Yde Andersen and Søren Leth-Petersen, Housing Wealth Effects and Mortgage Borrowing: How Home Value Shocks Drive Home Equity Extraction and Spending, *Journal of the European Economic Association*, vol. 19, no. 1, 2021.

Rising interest rates on new mortgage loans and declining credit growth for households

Rising interest rates on new mortgage loans, but bank interest rates remain low

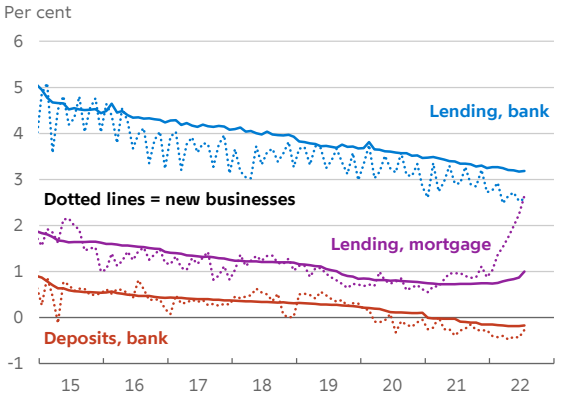
Rising mortgage bond yields have impacted the households' new mortgage loans, with interest rates rising by 1.1 percentage points since March, see chart 18. A similar development is observed in the euro area. However, the average interest rate on household mortgage debt remains low, which is linked to the long fixation periods of interest rates, see chart 17. At the end of July, interest rates on both new and existing bank loans, as well as bank deposits, remained very low.

Following Danmarks Nationalbank's interest rate hikes, several banks have increased interest rates on deposits for private customers. In July, the average deposit rate was -0.17 per cent. During September, several banks have announced that they will remove negative deposit rates.

Declines in growth of mortgage debt have dragged down credit growth

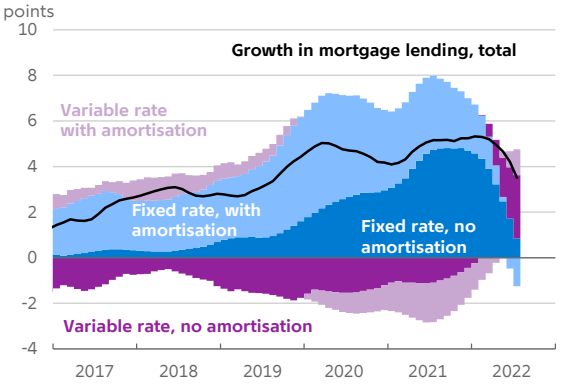
The annual growth rate of household borrowing from banks and mortgage credit institutions has slowed in recent months and stood at 2.2 per cent in July. This reflects in particular a decline in the growth rate of household mortgage debt, see chart 19. According to Danmarks Nationalbank's lending survey for Q2, several institutions expected declining loan demand from household customers, partly as a result of a slowdown in trading activity in the housing market. In 2021, new home buyers accounted for the majority of household credit growth.[21] The rise in mortgage rates has contributed to the slowdown in activity in the housing market, and thereby in credit growth, after two years of historical high sales figures and significant house price increases.[22]

Interest rates on new mortgage debt have risen significantly Chart 18



Note: Interest rates on both bank and mortgage loans as well as deposits for Danish households. The dotted lines indicate interest rate on new business. The latest data point is July 2022.
Source: Danmarks Nationalbank.

The growth in households' mortgage debt declined during 2022 Chart 19



Note: Lending by mortgage credit institutions for owner-occupied homes and holiday homes to all Danish households. Nominal value. The latest data point is July 2022.
Source: Danmarks Nationalbank.

21 See Danmarks Nationalbank, Rising inflation and Russian invasion has increased volatility, *Danmarks Nationalbank Analysis (Monetary and financial trends)*, No. 4, March 2022.

22 See Danmarks Nationalbank, The pressure on the economy should be eased, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 11, September 2022.

Price declines on long mortgage bonds have caused many households to buy back loans

The increase in long-term market rates has led to large price drops on outstanding fixed-rate long mortgage bonds with low coupon rates. In the first half of 2022, a total of 92,000 borrowers have refinanced their fixed-rate mortgages by buying back the underlying bond. Total refinancing amounted to kr. 173 billion, of which private customers' refinancing accounted for approx. kr. 111 billion, see chart 20. In connection with refinancing, private customers have realised capital gains after costs of approx. kr. 14 billion, see chart 21. In July and August, buy-backs continued at a high pace.

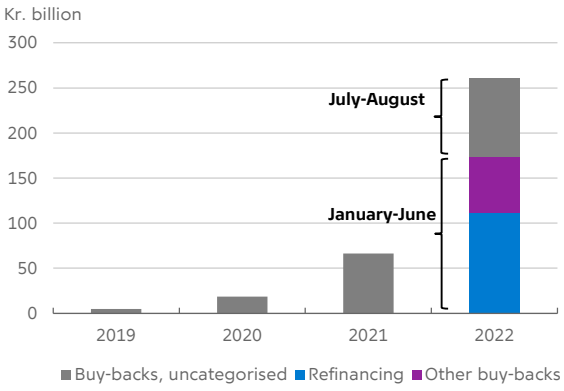
The realised capital gains are partly used for debt reduction

More than half of the realised capital gain from household customers' loan refinancing has been used for debt reduction, see chart 21.[23] In connection with the loan refinancing, mortgage debt was reduced by kr. 4 billion, and a further kr. 4 billion was used to reduce bank debt.[24]

Loan buy-backs also support consumption opportunities

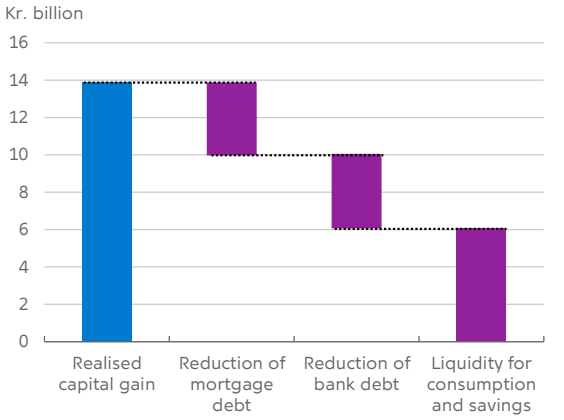
The remaining kr. 6 billion from the realised capital gains corresponds to 0.5 per cent of the expected private consumption in 2022 and can potentially support consumption opportunities and housing investments here and now. Part of the amount can also be saved as deposits or financial assets, and the amount must be considered as an overestimate of the isolated contribution of the buy-backs to private consumption. In 2022, real private consumption is expected to increase by 0.2 per cent.[25]

Sharply increasing mortgage bond buy-backs Chart 20



Note: Buy-backs during the 1st half of 2022 decomposed into buy-backs in connection with refinances or other purposes. These other buy-backs primarily cover activity in connection with the purchase and sale of properties as well as buy-backs made of companies. The latest data point is June 2022. For July-August, it is not yet possible to distinguish between refinancing and other buy-backs.
Source: Danmarks Nationalbank.

Realised capital gains have been used for debt reduction and have supported consumption opportunities Chart 21



Note: Danish households' estimated realised capital gain from refinancing of fixed-rate mortgage loans in H1 2022.
Source: Danmarks Nationalbank.

23 This is based on an average buy-back price of 85, an average price of 98.5 for taking out the new loan as well as fixed costs of kr. 25,000 for refinancing.

24 The debt reduction also includes any liquidity from draws on deposit accounts or other free savings.

25 See Danmarks Nationalbank, The pressure on the economy should be eased, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 11, September 2022.

However, consumers face higher borrowing costs and rising consumer prices. This can put a damper on homeowners' propensity to consume. In addition, house prices are expected to fall in the coming year.[26] A decline in house prices can, viewed in isolation, dampen consumption appetite and motivate homeowners to build up a buffer.

The Danish mortgage system and the spread of fixed-rate mortgage loans imply that borrowers have an incentive to refinance their loans regardless of whether interest rates fall or rise. When interest rates fall, homeowners withdraw home equity for consumption, which was most recently the case in the 2010-19 period.[27] When interest rates rise, as is the case this year, homeowners also withdraw home equity to support consumption, see chart 21. Private consumption can thus be stimulated by large interest rate movements via the mortgage credit system, regardless of whether interest rates rise or fall.

Refinancing from fixed to variable rate loans have reduced homeowners' payments

Approximately 40 per cent of the homeowners who have bought back fixed-rate mortgage loans have switched from fixed to variable rates. As a result of this, variable rate mortgages and mortgages without amortisation have increasingly contributed to the growth of household mortgage debt, see chart 19. The shorter fixation period of interest rates has reduced current household interest costs at the expense of a higher interest rate risk going forward. However, the money saved on lower debt service payments will be eroded if short term interest rates rise going forward, and the expectation of future interest rate increases will, viewed in isolation, encourage borrowers to build up greater precautionary savings.

Companies have increased their borrowing from banks

Bank borrowing increased significantly, driven by companies with particularly high activity

The annual growth rate of corporate borrowing from banks has increased in the course of 2022 and stood at 23.8 per cent in July, see chart 22, the highest annual growth rate since 2008. This corresponds to increased corporate lending of kr. 102 billion over the past year. Over the same period, mortgage lending has increased moderately by 3.8 per cent.

Lending growth has been strongest for the largest companies, but lending to small and medium-sized enterprises has also increased significantly during the first half of 2022. Companies in sectors with particularly high activity have accounted for a significant part of the credit growth. Overall, corporate bank debt relative to gross value added is higher than in recent years, but in line with 2018.

Increased investment appetite and fluctuations in the equity markets may have contributed to higher borrowing

The high demand as well as the greater turmoil in global supply chains and rising input prices have translated into strong investment appetite among companies, including build up of inventories. This may have increased the need for more external financing for some companies. The turmoil in the financial markets may have barred companies from financing activities by issuing debt or venture capital such as equities. This may have led them to draw more on existing liquidity facilities or increased demand for new credits.

26 See Danmarks Nationalbank, The pressure on the economy should be eased, *Danmarks Nationalbank Analysis (Outlook for the Danish economy)*, No. 11, September 2022.

27 In this context, the marginal propensity to consume was estimated at 60 per cent. 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.

Bank loans have replaced some expired covid-19-related loans

Part of the increase in borrowing reflects the repayment of covid-19-related loans through the taking out of bank loans. Data from the Danish Tax Agency indicates that as of 25 July 2022, Danish companies had repaid covid-19-related loans of kr. 20.4 billion out of the total amount of these loans of kr. 34 billion, which are to be repaid during 2022 and 2023. However, part of the repayment of government covid-19-related loans may also be financed through other sources, including corporate savings.

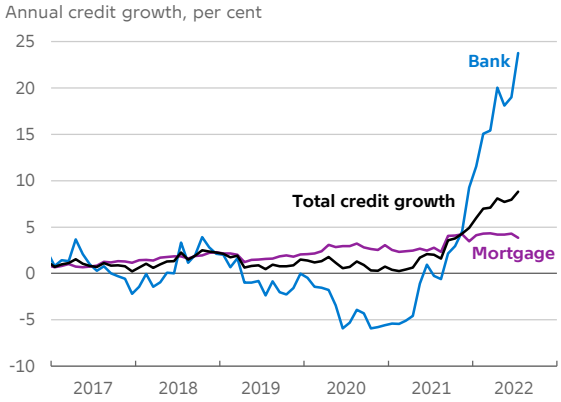
High credit growth comes after several years of consolidation

Corporate debt is currently relatively low relative to the market value of corporate financial assets compared to previous years, see chart 23. This reflects not least the fact that companies generally performed well through the covid-19 crisis, and it is also linked to significant consolidation and savings surpluses since the financial crisis.

Several years of decline in lending rates followed by slight increase

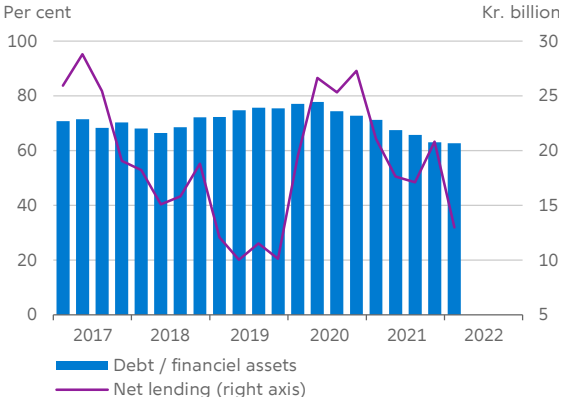
Interest rate increases throughout 2022 have increased the average interest rate on corporate loans from banks and mortgage credit institutions by 0.1 and 0.3 percentage points, respectively, see chart 24. As small and medium-sized enterprises are often more dependent on debt financing than larger companies, the pass-through to costs will generally be largest for smaller companies. Historically, the level of investment of small and medium-sized enterprises has been lower than that of larger companies.[28]

Corporate bank loans have increased significantly over the past year Chart 22



Note: Annual growth in borrowing for companies, which here only include non-financial undertakings as well as personally owned companies. Seasonally adjusted. The latest data point is July 2022.
Source: Danmarks Nationalbank.

Danish corporate debt has fallen in recent years Chart 23

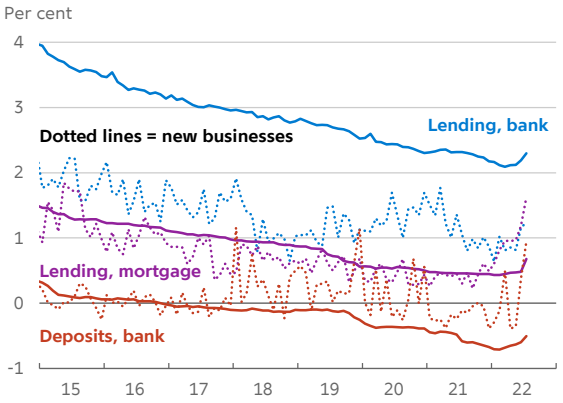


Note: Financial assets-to-debt ratio and net lending for non-financial undertakings and other financial institutions (OFI). The latest data point is Q1 2022.
Source: Danmarks Nationalbank.

28 The level of investment is measured as investments per person employed (FTE) in the private non-primary sector excluding real estate activities and lettings is based on the accounting statistics (*link*). According to the Confederation of Danish Industry, it is especially the small and medium-sized enterprises' investment appetite that is expected to be reduced as a result of the significant interest rate increases. See results from the Confederation of Danish Industry's survey from June (*link*) (only in Danish).

Higher interest rates on corporate borrowing from banks

Chart 24



Note: Interest rates on deposits and loans for companies, which here include non-financial undertakings as well as personally owned companies. The dotted lines indicate the interest rate on new business. The latest data point is July 2022.

Source: Danmarks Nationalbank.

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