

DANMARKS NATIONALBANK

14 MARCH 2018 — NO. 3

Monetary and financial trends – March 2018

- The krone has been stable, on the strong side of the central rate vis-à-vis the euro. Since the last report from September 2017, there have been several instances of significant trading in the foreign exchange market. Danmarks Nationalbank has nonetheless not intervened up to the end of February.
- As in many other parts of the world, government bond yields in Denmark increased towards the end of 2017 and at the beginning of 2018, as a consequence of such factors as higher inflation and growth prospects in the euro area and the USA.
- Companies and households increased their borrowing at a stable, but subdued, rate. Lending growth is driven by the mortgage banks' lending. The level of the overall credit extension to households and companies is still high.

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Significant trading in the foreign exchange market

The krone

has been stable, on the strong side of the central rate vis-à-vis the euro

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Normalisation of mon- etary policy on the way?

Interest rates

rose towards the end of 2017 and at the beginning of 2018, as a consequence of higher inflation and growth prospects

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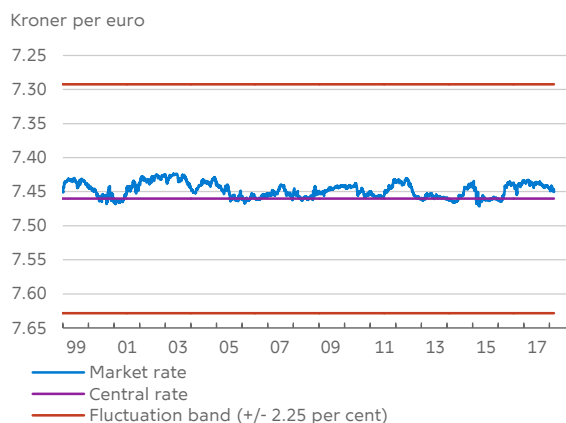
Foreign exchange market

The krone has been stable

During the last six months, the krone has been stable vis-à-vis the euro and on the strong side of the central rate, cf. Chart 1. There was no intervention in the foreign exchange market by Danmarks Nationalbank during the period. The foreign exchange reserve was by and large unchanged and amounted to kr. 467 billion at the end of February 2017. There was minor fluctuation in the krone rate during the period. The krone weakened slightly during the autumn, in view of the more negative money market spreads to the euro area, cf. the Danish Money Market. There were also large transactions in the krone market, with a moderate impact on the krone rate, although these effects were shortlived. The Danish Defence hedged the foreign exchange risk on the procurement of new fighter aircrafts, cf. Box 1. The krone was also affected by major corporate transactions, including an equity fund's acquisition of Nets A/S.

The krone has been stable on the strong side of the central rate

Chart 1



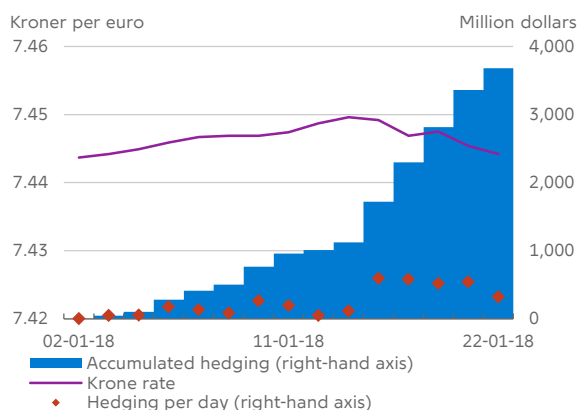
Hedging of the foreign exchange risk concerning procurement of fighter aircrafts by the Danish Defence

Box 1

At the beginning of January 2018, Danmarks Nationalbank hedged payments totalling 3.7 billion dollars in conjunction with the procurement of 27 new fighter aircrafts, cf. the Chart below. This entailed considerable purchases of foreign exchange. When Danmarks Nationalbank purchases foreign exchange on behalf of the central government, this increases the supply of kroner in the foreign exchange market, which will tend to weaken the krone. However, the krone rate only fluctuated marginally in conjunction with these transactions.

The Danish Defence's payments are due from 2018 up to and including 2027, and Danmarks Nationalbank therefore hedged the payments in the forward market for US dollars. This means that Danmarks Nationalbank purchased dollars for future delivery at a rate which is locked when the forward contract is established today.¹ Initially, the transactions were divided into contracts for 50 million dollars. Later, the transaction size was increased to 100 million dollars. For each transaction, Danmarks Nationalbank obtained bids from minimum three counterparties, to ensure that the exchange rates were competitive. Danmarks Nationalbank's experience from the transactions was that the forward foreign exchange market between kroner and dollars is liquid, but that market liquidity declines a little for forward contracts falling due after more than six years.

Hedging the Danish Defence's foreign exchange risks on the procurement of new fighter aircrafts



Source: Danmarks Nationalbank.

¹ The exchange rate corresponds to the spot rate on the trading date, adjusted for the forward discount up to the delivery date.

Danmarks Nationalbank has held the monetary policy interest rates unchanged since January 2016. This means that the interest rate on certificates of deposit is still -0.65 per cent. The monetary policy interest rate spread to the ECB of -0.25 per cent has been unchanged since March 2016.

Neutral demand for kroner in 2017 in overall terms

Residents purchased kroner to largely the same extent as non-domestic residents sold kroner in 2017. This can be seen from Danmarks Nationalbank's statistics for the sectors' purchase and sale of kroner, cf. Box 2. The demand for kroner from the two groups was thereby neutral in overall terms during the year, and Danmarks Nationalbank only intervened in the foreign exchange market to a

limited extent. This took place in February and March 2017, when Danmarks Nationalbank intervened in conjunction with political uncertainty in the euro area. There was no intervention in the foreign exchange market during the rest of the year. As a consequence of the fixed exchange rate policy, in the first instance Danmarks Nationalbank will normally buy or sell kroner if there is pressure on the krone rate against the euro.¹ This was the situation during the first months of 2015, for example, when there was demand for kroner from abroad, and from insurance and pension companies, with Danmarks Nationalbank intervening for considerable amounts in the foreign exchange market. This was followed by sales of kroner from abroad, with residents and Danmarks Nationalbank as counterparties, cf. Chart 2.

Net purchases of kroner by sectors and instruments

Box 2

Since 2015, Danmarks Nationalbank has compiled the sectors' net kroner purchases by instrument. The statistics are based on reported trading in financial assets and liabilities, foreign exchange exposure and hedging, and data for payments for goods and services, as well as interest and dividend payments.

The basis for the statistics is that a current account surplus (including the capital account) is offset by residents' acquisition of an equivalent foreign asset. This may either be Danmarks Nationalbank's acquisition of assets from abroad, thereby increasing the foreign exchange reserve, or residents (all residents excluding Danmarks Nationalbank) increasing their holdings of foreign assets:¹

Current account surplus²
 = Danmarks Nationalbank's net purchase of foreign exchange
 + Non-residents' net purchase of assets from abroad

In more simplified terms, the krone will tend to appreciate if residents are not willing (for a given krone rate) to hold

new foreign assets in foreign exchange for an amount equivalent to the current account surplus. If the appreciation does not lead to increased demand for foreign exchange, in accordance with its normal reaction pattern Danmarks Nationalbank will intervene, and thereby increase its foreign exchange exposure.

Each sector's net demand for kroner will correspond to its contribution to the current account surplus, less its net purchase of foreign exchange denominated assets from abroad. In Danmarks Nationalbank's compilation of kroner purchases, in isolated terms the current account of the balance of payments is therefore included as demand for or supply of kroner. However, this does not necessarily reflect that a surplus as such actually leads to net purchases of kroner, since many companies' transactions take place in foreign exchange, and their foreign exchange revenue is never converted to kroner before e.g. reinvestment in foreign exchange assets.

1. Danmarks Nationalbank's total net purchase of kroner is included in the statistics, and not just intervention purchases. Besides Danmarks Nationalbank's purchases of foreign exchange, the foreign exchange reserve is affected by value adjustments that are not included in the kroner purchase statistics. Here, value adjustments are disregarded.
2. The actual payments related to the current account surplus are of significance to the purchase of kroner. The actual payments do not include reinvested earnings, accrued interest and capital losses that are included in the balance of payments. In order to minimise noise in the compilation of the demand for kroner, companies which primarily do business in dollars, which in practice comprises oil and shipping companies, are disregarded. Since these companies have an external surplus, the current account surplus in terms of krone demand is lower than the overall current account surplus. On the other hand, these companies' surpluses do not lead to net demand for kroner, since they place the surplus in foreign exchange assets.

1 Cf. M. Spange and M. Toftdahl, Fixed exchange rate policy in Denmark, *Danmarks Nationalbank Monetary Review*, 1st Quarter, 2014.

Denmark's current account surplus in 2017 meant that in overall terms Denmark's net foreign exchange exposure increased. This primarily took place by residents (excluding Danmarks Nationalbank) increasing the foreign exchange exposure by reducing the debt denominated in foreign exchange and purchasing foreign assets. Households and non-financial corporations among other things reduced their bond-based loans in euro. The insurance and pension sector invested in foreign assets.

In overall terms, in 2017 there were net kroner sales from abroad. During 2017, foreign investors increased their holdings of Danish mortgage bonds in particular. In the same period, investors abroad hedged the foreign exchange risk on new or existing investments, which had the opposite effect on the demand for kroner. Furthermore, all other things being equal, payments of krone-denominated dividend and interest to abroad contributed to foreign investors' sales of kroner.

Monetary policy in the euro area and the USA

Continuation of the ECB's asset purchase programme

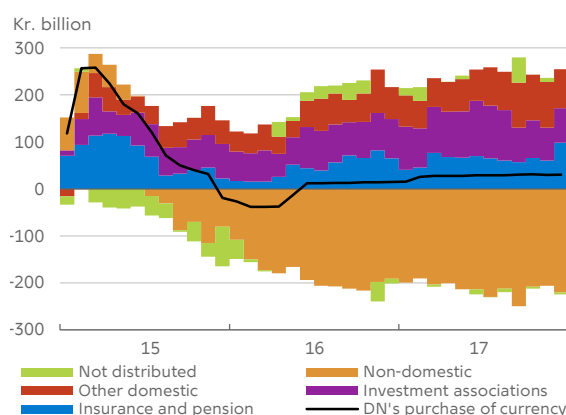
In October 2017, the ECB's Governing Council decided to extend the expanded asset purchase programme, APP, and reduce the monthly net purchases from 60 billion euro to 30 billion euro as from January 2018 until the end of September 2018. The Governing Council has not yet announced the final strategy for the asset purchase programme after September 2018. In principle, the asset purchase programme will continue for as long as the Governing Council deems this necessary in order to achieve the ECB's inflation target for the euro area.

At the most recent interest rate meetings, the ECB held the monetary policy interest rates unchanged. The ECB's deposit rate was thus maintained at -0.4 per cent. The ECB expects interest rates to remain at the current level for a longer period, i.e. for some time after the conclusion of the ECB's net bond purchases.

During the past half-year, the short-term money market interest rate in the euro area, EONIA, has usually remained close to the ECB's deposit rate, cf. Chart 3.

Net purchase of kroner by sectors

Chart 2

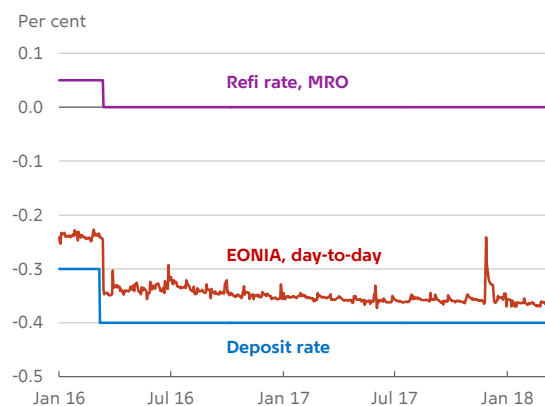


Note: Accumulated kroner purchases since 2015. Other domestic includes households, non-financial corporations, the public sector and banks. The surplus on the balance of goods and services is included in Other domestic.

Source: Danmarks Nationalbank.

Low and stable money market rates in the euro area

Chart 3



Source: Bloomberg.

Surplus liquidity in the euro area has led to record-high Target2 balances

Box 3

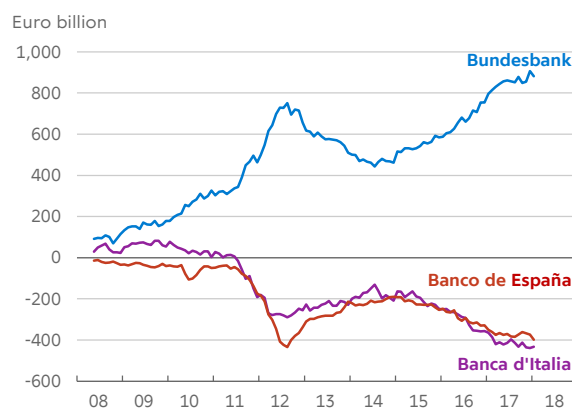
The ECB's bond purchases contribute liquidity to the euro area's banking sector.¹ The ECB's provision of liquidity has increased surplus liquidity considerably since 2015. Surplus liquidity is the banks' total deposits with the central bank in addition to the sum of the individual banks' minimum reserve requirements.² Surplus liquidity is now at a level of around 1,900 billion euro. The concentration of surplus liquidity in individual euro area member states has shaped the background to the growing Target2 balances since 2015, cf. the Chart below.³

According to the ECB, the growing Target2 balances are a consequence of the decentralised implementation of the ECB's asset purchase programme and the financial structure of the euro area. The ECB's asset purchase programme affects the Target2 balances. This is related to the decentralised implementation of the ECB's asset purchase programme, leading to transfers of central bank reserves across national borders. When Banca d'Italia, for example, purchases Italian government bonds from counterparties in Germany, the central bank will build up a liability vis-à-vis the ECB. The selling bank in Germany will deposit funds at the Bundesbank, which will thereby gain an equivalent asset.

The Eurosystem's Target2 balances have increased since the beginning of 2015 and now exceed the level during the government debt crisis in 2012. The Target2 balances have, inter alia, increased for the Bundesbank, which overall has built up a large claim on the ECB, while especially the central banks in Spain and Italy, on the other hand, have built up negative balances and thereby have liabilities to the ECB, cf. the Chart below. According to the ECB, 80 per cent of the national central banks' bond purchases take place via foreign counterparties, and 50 per cent through counterparties outside the euro area, which use correspondent banks in the euro area's financial centres in e.g. Germany, the Netherlands or Luxembourg.

The Target2 balances are increasing because the provision of liquidity from the Eurosystem's bond purchases is concentrated in a few countries. During the government debt crisis in 2012, the Target2 balances increased because the banking sector in a few euro area member states became dependent on loans from their national central banks, as a consequence of the capital flight to countries where the banking sector was deemed to be more robust. Yet while the growing Target2 balances up to 2012 were primarily due to uncertainty concerning the banking sector in some countries, to a great extent the current balances originate from the Eurosystem's liquidity injections from the ECB's asset purchase programme.

The Target2 balances have increased



Source: ECB.

1. Cf. *ECB Economic Bulletin*, Issue 3, 2017 – Boxes, The ECB's asset purchase programme and Target balances: monetary policy implementation and beyond.

2. The minimum reserve requirement is the volume of liquidity that each bank in the euro area must hold in reserve on its account with the national central bank on average over a specific period, called the reserve maintenance period.

3. Target2 is the Eurosystem's internal system for settlement of euro-denominated payments between banks across national borders. Target2 balances arise between the ECB and the national central banks when payments take place between banks, across national borders. The balances reflect the national central banks' claims (positive) or liabilities (negative) vis-à-vis the ECB and are stated as a separate item of the central banks' balance sheets.

This is primarily because the asset purchase programme has led to a significant increase in surplus liquidity in the banking sector, cf. Box 3. At the end of November 2017, EONIA fluctuated temporarily, when the rate climbed by more than 10 basis points, before gradually falling back again. The low trading volume behind the EONIA calculation entails that even minor shifts in trading activity can lead to significant changes in the rate.

On 21 September 2017, the ECB announced that they will calculate and publish a day-to-day reference interest rate. The interest rate is intended to supplement the existing benchmarks and to be a backstop for market initiatives, if the basis for calculation of the existing benchmarks is inadequate ([link](#)).

Like EONIA, the ECB's day-to-day interest rate will be based on transaction data which the banks already deliver to the ECB (MMSR data), but the panel of banks will be larger than for the EONIA calculation. The new interest rate is planned to be ready before 2020 and is an element of the mandate for a recently appointed working group with focus on risk-free euro interest rates. Participants in the working group include private banks and the European Commission ([link](#)).

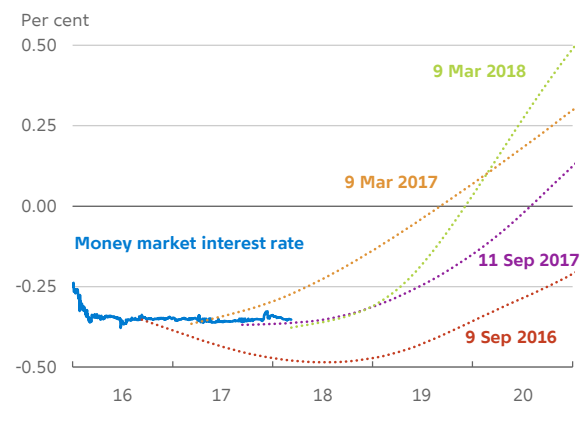
Market participants' expectations of the onset of interest rate increases have increased

Since the beginning of 2016, the money market interest rate in the euro area, measured as the 3-month EONIA swap rate, has been close to the day-to-day interest rate, at a level of around -0.35 per cent, cf. Chart 4. The weak slope of the forward curve for the money market interest rates up to the end of 2018 indicates that market participants only expect a moderate increase in the short-term money market interest rates in the course of the next year. As from 2019, market prices indicate that the increases in the short-term money market interest rates are gaining momentum, and that interest rates are expected to be positive in the autumn of 2019.

The steeper slope of the forward curve compared to recent years reflects the market participants' general expectation that the ECB can begin normalisation of monetary policy sooner than expected. This is e.g. due to rising inflation and growth expectations in the euro area. At the meeting of the Governing Council in December 2017

Stable money market interest rates, but expectations of a more rapid increase from 2019

Chart 4



Note: 3-month EONIA swap rate. The dashed curves indicate the 3-month forward interest rates on the specified dates.

Source: RIO Scanrate.

and March 2018, the ECB upgraded the growth prospects for the euro area. This improvement is confirmed by the ECB's Survey of Professional Forecasters. This questionnaire survey also indicates moderately increasing inflation expectations, which is backed up by inflation-pegged financial products.

Interest rate hikes continuing in the USA

The Federal Reserve has raised the Federal Funds Target Rate five times since December 2015, from 0.00-0.25 per cent to 1.25-1.50 per cent. The most recent interest rate hike was in December 2017. The central bank anticipates three interest rate increases in 2018 and two in 2019. In October 2017, The Federal Reserve commenced a gradual reduction of its balance sheet, which expanded strongly after the financial crisis, as a consequence of bond purchases. The design of the USA's monetary policy has been debated in view of the long period of very low interest rates. For example, the former Chairman of the Federal Reserve, Ben Bernanke, has proposed supplementing the central bank's inflation target with a price-level target when the monetary policy interest rates have reached a lower bound cf. Box 4.

Temporary price-level targeting – a possible solution to the problem with a lower bound for the monetary policy interest rates

Box 4
 Continues

The combination of low nominal interest rates, low inflation and a lower natural real interest rate presents monetary policy challenges.¹ If the central bank wishes to stimulate activity in the economy, and thereby increase inflation, the actual real interest rate must be lower than the natural real interest rate. If the natural real interest rate is low, there is an increased risk of reaching the effective lower bound for the monetary policy interest rates. This reduces the central bank's opportunities to use conventional monetary policy, i.e. changes in the short-term monetary policy interest rates, to achieve its objectives.² One consequence is that since the financial crisis the major central banks have faced challenges in reaching their inflation targets.

This problem has led to discussion of the design of the monetary policy regime in the USA. The current regime is based on an inflation objective, whereby the central bank conducts monetary policy according to an inflation target of 2 per cent. One proposal is that central banks temporarily set a price-level target when the monetary policy interest rate has reached the effective lower bound.³ The price level may increase over time, so as to correspond to average inflation of 2 per cent. The proposal is called *temporary price-level targeting*.

Temporary price-level targeting – a compromise between two monetary policy ideas

Under price-level targeting, the central bank aims to reach a price-level target. The price-level target can increase over time in accordance with inflation of 2 per cent p.a., cf. Chart A. Since the financial crisis, inflation in a number of countries has systematically remained below 2 per cent, cf. Chart B. This low inflation has led to a significant accumulated deviation

between the actual price index and the price index if inflation had been 2 per cent on average during the period, cf. Chart A.

There is a significant difference between price-level targeting and the current monetary policy regime in the USA:

- Under an inflation target, historical deviations from the target have no effect on determining monetary policy today. The central bank stops easing or tightening monetary policy when inflation has reached the target.
- Under price-level targeting, the accumulated difference will have to be recovered. An expansionary or tighter monetary policy must continue and allow inflation to be higher or lower, respectively, until the price-level target has been reached; and the average inflation during the period must be 2 per cent.

This difference is important. In the current situation, price-level targeting entails the expectation that, going forward, monetary policy must be eased. If the policy is credible, it will increase inflation expectations and thereby reduce the real rate of interest, since it is equivalent to the nominal interest rate less inflation expectations, which stimulates demand and increases the inflationary pressure in the economy.

Moreover, price-level targeting means that monetary policy must e.g. be more expansionary with regard to the inflation target for a longer time, if inflation has e.g. been below the target.⁴ Forward-looking households and companies will anticipate the future expansionary monetary policy, and they will already require higher wage and price increases at the time when inflation has begun to diverge from the target. Inflation will therefore decline less than under an inflation target.

Since the onset of the financial crisis, inflation in the USA and the euro area has been below the inflation target

Chart A

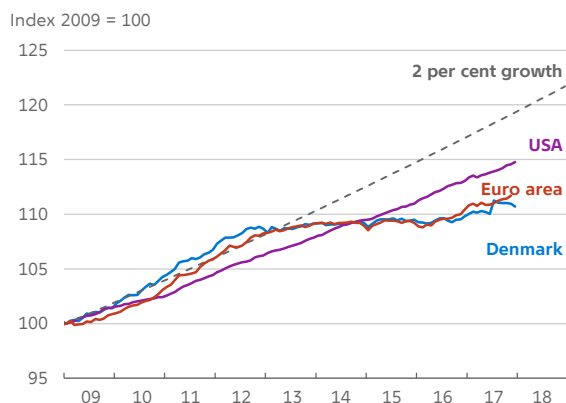
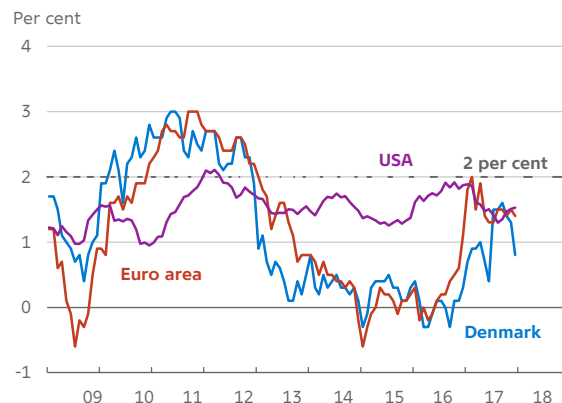


Chart B



Note: Chart A shows price indexes for the USA (PCE), the euro area (HICP) and Denmark (HICP), together with a target for the price indexes at an inflation rate of 2 per cent p.a. Chart B shows the development in these indexes.

Source: Datastream and own calculations.

Temporary price-level targeting – a possible solution to the problem with a lower bound for the monetary policy interest rates

Box 4
Continued

Price-level targeting can be extra useful at the lower effective bound for the monetary policy interest rates

Price-level targeting is particularly interesting in a situation where the lower bound for the monetary policy interest rates limits the central bank's scope, because this can contribute to increasing inflation expectations and reducing real interest rates. With temporary price-level targeting, the central bank promises to allow inflation to exceed the target precisely when the lower bound for the monetary policy interest rate is reached.⁵ This can reduce the period in which the central bank is limited by the lower bound for the monetary policy interest rates, since inflation expectations increase and the real interest rate is thereby reduced.

Making price-level targeting temporary can resolve a known problem with the policy

Under price-level targeting, contractive supply shocks, i.e. higher prices and lower output, require the central bank to raise interest rates. When interest rates are raised, demand will decline in a situation where the level of activity is already under pressure. This is a significant drawback with price-level targeting.⁶ Under an inflation target, the same applies, with the important difference that, in this case, monetary policy is eased immediately when inflation reaches 2 per cent. Under price-level targeting, on the other hand, monetary policy must be tighter for a longer period, since after a period of high inflation, in the following period inflation must be below 2 per cent, for the required price level to be reached. This extends the period of low economic activity.

The advantage of *temporary* price-level targeting is that, like today, the central bank conducts monetary policy according to an inflation target when the lower bound for the monetary policy interest rates is not binding. The central bank only switches to price-level targeting when the effective lower bound for the short-term monetary policy interest rates has been reached.

Temporary price-level targeting is not without its challenges either

Temporary price-level targeting requires a high degree of credibility for the central bank. First of all, there is the question of the credibility of switching to price-level targeting: How can the Federal Reserve convince households, companies and the financial markets that they actually will and can achieve the required price level? And how does the market interpret this switch? If the market is not convinced of this credibility, or misunderstands the central bank's actions, even a temporary switch to price-level targeting can be perceived as a signal of deep crisis in the economy. Secondly, there is the question of whether the central bank will, after all, increase the interest rate before the promised price level is reached and inflation rises above 2 per cent. There can also be a risk that inflation expectations will increase and lose their anchoring, if sustained relatively high inflation is required in order to achieve the required price index level. Finally, keeping the monetary policy interest rate low for a long time is important for ensuring financial stability.⁷

1. The natural real interest rate is defined as the real interest rate which closes the output gap and ensures that inflation is at the central bank's target, cf. e.g. M. Woodford, *Interest and Prices*. Princeton University Press, Chapter 4, 2003.
2. Kiley and Roberts analyse the significance of low natural real interest rates for the probability of reaching the lower zero limit. The authors find that low natural real interests and an inflation target can lead to more volatile real economic activity and inflation. Periods in which the monetary policy interest rate lies at its effective lower bound are longer and more frequent than periods in which the natural real interest is higher. Cf. M.T. Kiley and J.M. Roberts, *Monetary Policy in a Low Interest Rate World*, *Brookings Papers on Economic Activity*, pp. 317-396, spring 2017.
3. Cf. Ben Bernanke, *Monetary Policy in a New Era*, Peterson Institute for International Economics, October 2017.
4. Here, it is assumed that, under the inflation target, the central bank conducts monetary policy according to a "Taylor" rule, whereby the monetary policy interest rate in each period is adjusted according to movements in inflation and real activity.
5. Krugman describes this as a promise to be "less responsible", cf. P. Krugman, *It's baaack: Japan's Slump and the Return of the Liquidity Trap*, *Brookings Papers on Economic Activity*, pp. 137-205, 1998.
6. Cf. Ben Bernanke, *Monetary Policy in a New Era*, Peterson Institute for International Economics, October 2017.
7. This concern is shared by e.g. Leal Brainard: "the combination of low interest rates and low unemployment that would prevail during the inflation overshooting period could well spark capital markets to overextend, leading to financial imbalances". Panel debate at the conference on 12 October 2017, *Rethinking Macroeconomic Policy*, Peterson Institute for International Economics. *FRBSF Economic Letter*, 8 May 2017.

The Danish money market

The money market spread has become a little more negative

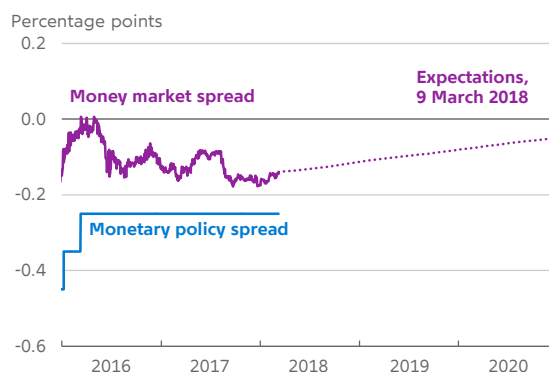
The negative spread between money market interest rates in Denmark and the euro area has widened slightly. The spread between 3-month CITA and EONIA swap rates has moved from around -0.10 percentage point in mid-2017 to -0.15 percentage point, cf. Chart 5. The widening primarily reflects lower Danish money market interest rates, driven by lower T/N fixings. Up to the turn of the year, the spread temporarily narrowed a little. This was because market participants expected the money market to be more affected by year-end effects² in Denmark than in the euro area, i.e. that over the turn of the year the day-to-day interest rates in Denmark would increase more than in the euro area – called year-end effects.³

The leading monetary policy spread to the euro area was unchanged at -0.25 percentage point.

The very low and declining trading volume in the money market at the beginning of 2017 was replaced by an increasing trading volume at the end of the year and the beginning of 2018, cf. Chart 6. The trading volume is back at the level from before the introduction of daily open market operations in February 2017. The generally low trading volume is related to such factors as the banks' considerable liquidity holdings at Danmarks Nationalbank, cf. Chart 7. There is no indication that the introduction of daily open market operations has had any particular impact on trading volume in the money market.

The money market spread has narrowed

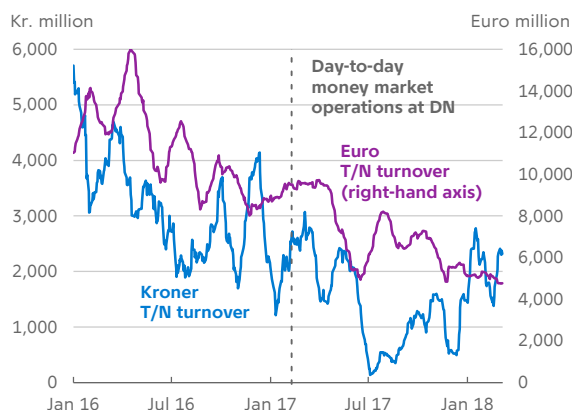
Chart 5



Note: The money market spread is between 3-month OIS swap rates (CITA-EONIA). The monetary policy spread is between Danmarks Nationalbank's rate of interest for certificates of deposit and the ECB's deposit facility rate. Expectations are the implicit expectation for market participants derived from the money market forward curves.
 Source: Rio Scanrate, Thomson Reuters Datastream and Danmarks Nationalbank.

Trading volume in the Danish T/N market has increased

Chart 6



Note: 21-day moving average.
 Source: Bloomberg and Danmarks Nationalbank.

² Cf. e.g. J. Christensen, P. Mindested and L. Risbjerg, Recent money market trends, *Danmarks Nationalbank, Monetary Review*, 4th Quarter 2014.

³ The T/N rate over the turn of the year was 15 basis points, which was a good 70 basis points more than on the preceding days. EONIA was by and large unchanged over the turn of the year, compared to the preceding days.

Capital markets

Government bond yields increased in December 2017 and January 2018

Government bond yields in the euro area increased at the end of 2017 and the beginning of 2018, cf. Chart 8. The increase e.g. reflects market participants' expectations of a faster normalisation of monetary policy in the euro area, cf. Monetary policy in the euro area and the USA. In a longer perspective, however, interest rates in the euro area are still at a very low level.

The implied volatility derived from options on 10-year German government bond futures increased slightly at the beginning of 2018, in conjunction with the increase in interest rates and the general uncertainty in the financial markets. The actual volatility of bond prices remained subdued. In historical terms, both the actual and implicit volatility are low.

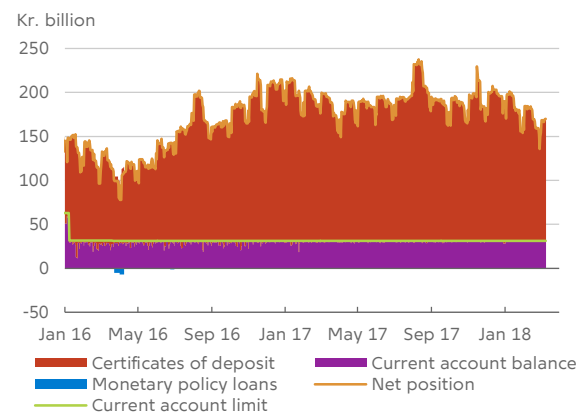
The ECB's asset purchase programme has been running for more than two years and is still impacting the bond markets. The ECB has significant bond holdings compared to the size of the euro-denominated bond market. In itself, this exerts downward pressure on yields.⁴ On the other hand, the reduction of the net monthly purchases to 30 billion euro means that the immediate effect on yields from additional purchases is lower than before. Besides net purchases, the Eurosystem continuously reinvests the principal of maturing bonds.⁵ The ECB has notified that the reinvestments will continue for an extended period of time after the end of its net asset purchases. In overall terms, the ECB's monetary policy is still highly expansionary and contributes to holding government bond yields at a low level.

The yield spread for bonds with a lower credit rating is still declining

During the last six months, yields on bond types other than government bonds have declined, thereby con-

The net position shows a large liquidity surplus

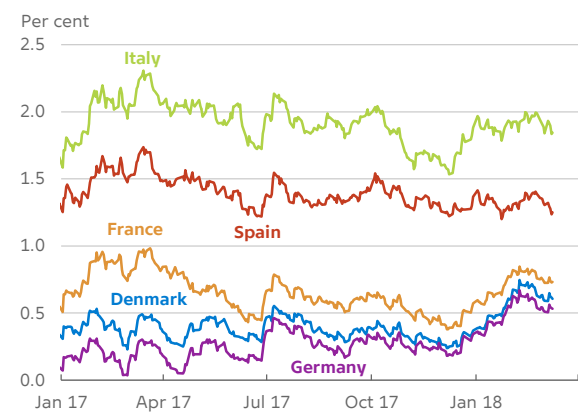
Chart 7



Source: Danmarks Nationalbank.

Increasing government bond yields around the turn of the year

Chart 8



Note: To ensure cross-country comparability, 9-year par yields are shown here.

Source: Nordea Analytics.

4 Cf. e.g. P. Praet: Maintaining price stability with unconventional monetary policy, January 2018. ([link](#)).

5 In 2018, the ECB will reinvest around 12 billion euro on average per month, compared to approximately 4 billion euro in 2017. The reinvestments are increasing since bonds purchased under the ECB's Public Sector Purchasing Programme (PSPP) are beginning to mature on a larger scale.

tinuing the trend from most recent years, cf. Chart 9. For example, the yield spread between corporate bonds and government bonds has fallen to the lowest level since before the financial crisis erupted in 2007.⁶ This decline is related to that the ECB purchases mortgage bonds and corporate bonds (CSPP and CBPP3), as part of its asset purchase programme. The ECB purchases assets with a high credit rating and thereby depresses their yields.⁷ Some investors place their funds in more risky assets, in order to achieve higher expected yields. This is reflected in the stronger decline in spreads for the higher-risk bond classes, even though they are not included in the ECB's asset purchase programme.

The improvement in the economy increases the credit quality of e.g. companies and households, and thereby reduces the credit risk on their loans. This has contributed to the narrowing of the yield spreads. The increased financial volatility at the beginning of 2018 did not affect the yield spreads to any significant degree.

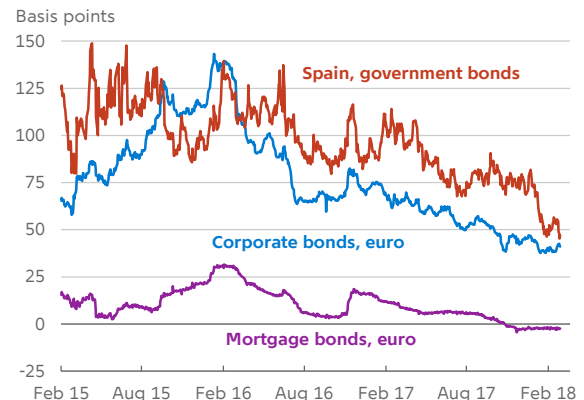
Government bond yields also increased in Denmark

From the end of 2017, Danish government bond yields increased across the yield curve, in line with the development in the euro area, cf. Chart 10. Yields on short-term Danish government bond yields are still negative, while yields on bonds with longer maturities increased to the highest level in two years. Nevertheless, the level remains low in a historical context.

The yield spread to Germany has narrowed since the beginning of 2016 and is close to zero, cf. Chart 11. The fact that the government bond yield spread is so low, even though the ECB has purchased e.g. German government bonds over two years, reflects that Danish and German government bonds are close substitutes. In view of the fixed exchange rate policy, the exchange rate risk is low.⁸

Narrowing of yield spreads in the euro area

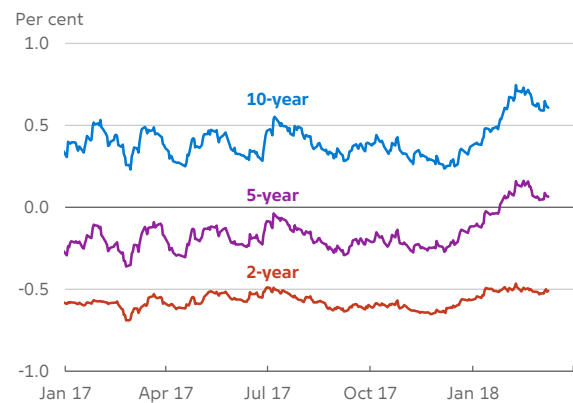
Chart 9



Note: Spread to Euribor swaps. Corporate bonds are for non-financial corporations.
 Source: Thomson Reuters Eikon.

Long-term Danish government bond yields at the highest level in two years

Chart 10



Note: Par yields. The 10-year yield is derived as the 9-year par yield.
 Source: Nordea Analytics.

⁶ The yield spread for government bonds issued by euro area member states with a lower credit rating is also narrowing.

⁷ Cf. *ECB Economic Bulletin*, Issue 4, 2017 – Boxes, The ECB's corporate sector purchase programme: its implementation and impact.

⁸ Cf. Jensen, Mikkelsen and Spange, The ECB's unconventional monetary policy and the role of exchange rate regimes in cross-country spillovers, *Danmarks Nationalbank Working Paper*, no. 119, October 2017.

The narrowing of the spread in the autumn of 2017 is primarily a consequence of increasing interest from abroad in Danish bonds, and the improved market liquidity of Danish government bonds, as a consequence of the central government's new primary dealer scheme.⁹ The yield spread widened slightly during the first two months of 2018. This may reflect that some investors sold Danish government bonds with long maturities in order to hedge the increase in the duration of their Danish mortgage bond holdings deriving from the general increase in interest rates. The duration, and thereby the interest rate risk, of callable Danish mortgage bonds rose strongly in as a result of the increase in interest rates at the beginning of 2018. The proportion of fixed-rate mortgage loans has increased in recent years and accounts for 36 per cent of all lending. As a consequence, since the end of 2014, the size of the market for fixed-rate mortgage bonds has exceeded the size of the market for Danish government bonds.

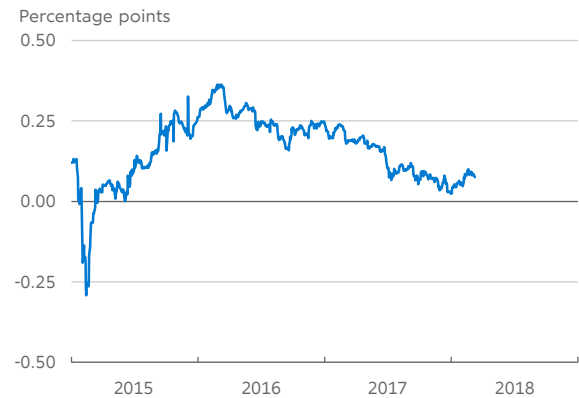
The mortgage credit yield spread narrowed, but yields increased

During 2017, in line with the development in the euro area, the yield spread between mortgage and government bond yields narrowed. Foreign investor demand for Danish mortgage bonds rose and they own more than 25 per cent of the total outstanding volume of these bonds. Danish mortgage bond yields increased at the beginning of 2018. This increase is due to the general increase in interest rates, as well as the widening of the spread between mortgage and government bonds.

Share prices fell and volatility increased

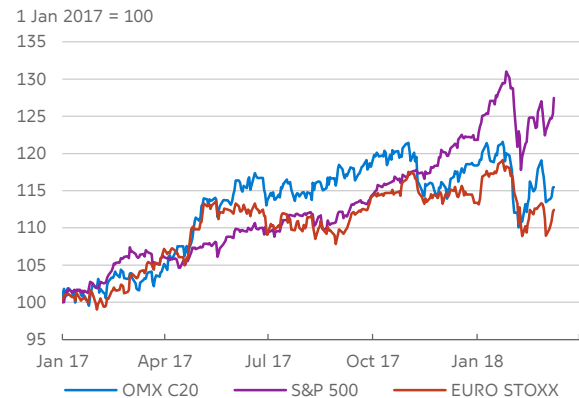
The Danish stock market, OMX C20, has dropped by 1 per cent over the last six months, cf. Chart 12. The decline in November 2017 was part of a European phenomenon and was particularly pronounced for Denmark in view of significant price drops for certain companies' shares. The sharp drop in February 2018 was a global phenomenon triggered by investors' nervousness concerning the speed of a forthcoming normalisation of monetary policy. This downturn followed a long period of very low volatility in the equities markets. The implied volatility derived from options on the German share market increased strongly at the beginning of 2018. Volatility rose

The yield spread to Germany has narrowed in the 10-year maturity segment Chart 11



Note: Par yields. To ensure cross-country comparability, 9-year par yields are shown.
 Source: Nordea Analytics.

Sharp price drops in the equities markets in 2018 Chart 12



Note: Index 100 is 1 January 2017. A total return index is used (i.e. including dividends).
 Source: Thomson Reuters Datastream.

⁹ Cf. Danmarks Nationalbank, Danish Government Borrowing and Debt 2017, *Danmarks Nationalbank Report*, no. 1, January 2018.

more in the share than in the bond market. Volatility declined towards the end of February, and the share markets increased somewhat.

Money and credit

Increasing lending growth, but declining debt burden

Credit extension to households and non-financial corporations (hereafter “companies”) has increased moderately during the last six months, and amounts to 163 per cent of GDP, cf. Chart 13. Lending from mortgage banks increased by just over 3 per cent during the past year. On the other hand, the banks’ lending to households continued to decline, while lending to companies was broadly unchanged in 2017, after increasing in 2016. In overall terms, the credit growth at the beginning of the current upswing has been subdued. It is still below the growth in GDP, so that overall lending as a ratio of GDP has declined.

The background to the moderate credit growth is that the starting point for the current upswing is a significantly higher debt level than prior to earlier upswings. The years before the financial crisis were characterised by strong and unsustainable credit growth.

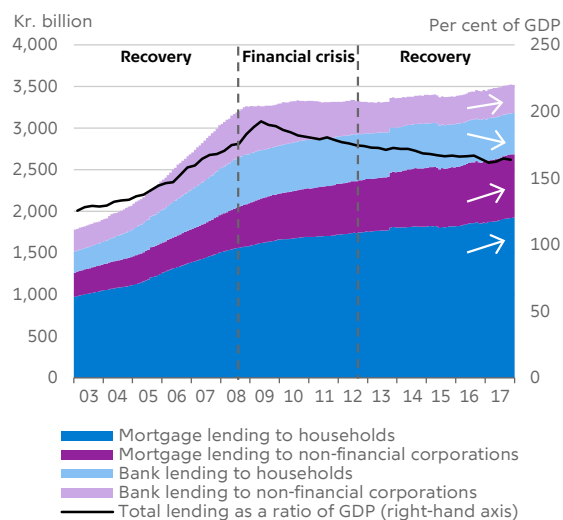
Companies are financing investments from savings

Companies have been able to cover a large proportion of the financing requirement with internal funding. Since mid-2016, on a net basis companies have reduced their holdings of liquid assets, cf. Chart 14. The background is the increased investment scope. The development has thus followed the normal pattern whereby companies use internal financing to finance investments in the first stage of an upswing.

The consolidation of companies’ balance sheets in the years after the financial crisis led to a significant positive savings surplus (net lending). Companies used their profits to reduce debt and save up liquid assets. This has made many companies more resilient to temporary decreases in earnings. The improved credit quality supports a balanced upswing.

Stable, but subdued development in lending by banks and mortgage banks

Chart 13



Note: Lending in all currencies to households and non-financial corporations domiciled in Denmark seasonally adjusted. Total lending is defined as the sum of the four sub-categories shown in the Chart. The vertical line in Q4 2008 indicates the time when lending growth subsided during the financial crisis. The vertical line in Q4 2012 indicates the time of the start of the reduction of the negative output gap at that time. The arrows indicate the lending trends measured as the average year-on-year growth rate over the last six months.

Source: Danmarks Nationalbank.

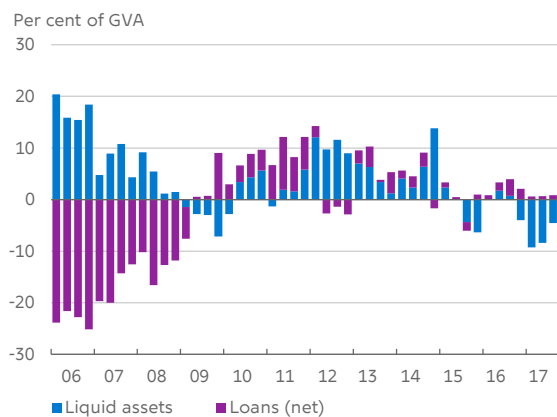
Interest rates for bank loans are declining in step with the easing of credit standards

An increasing proportion of household and corporate debt is mortgage debt. Part of the background to this is that the banks’ collateral requirements are tighter than prior to the financial crisis. In addition, the average interest rate for mortgage loans has declined relatively more than the interest rate for bank loans since prior to the financial crisis, cf. Chart 15. The interest rate gap between mortgage loans and bank loans to the corporate sector has been narrowing in recent years, however, as the banks have eased credit standards for the corporate sector. This has supported the banks’ lending to the corporate sector during the last two years.

The banks and mortgage banks have continued the gradual easing of credit standards and have now eased a little in most quarters since 2014, cf. Chart 16. The easing has been particularly pronounced for the medium-sized banks and has in particular

Companies have reduced their liquid assets

Chart 14



Note: The Chart shows transactions. Four-quarter moving averages of financial transactions and gross value added, GVA, for non-financial corporations in the national accounts. Liquid assets are cash, deposits, bonds, portfolio shares, etc. Loans are stated net, and negative figures therefore indicate an increase in corporate borrowing. Due to the transition to the new national accounts manual (ESA2010), there is a data break in Q4 2012. Data for previous periods is compiled in accordance with the ESA95 manual.

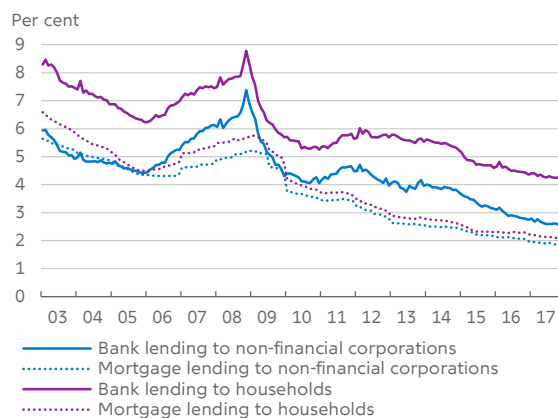
Source: Statistics Denmark and Danmarks Nationalbank.

taken place as price reductions (interest rate margins and charges). Furthermore, the banks' appetite for lending risk has increased.¹⁰

Both credit standards and prices have been eased particularly for companies with the best credit rating. This can be seen from the banks' comments to the responses to Danmarks Nationalbank's lending survey, where the easing is stated to be due to increased competition between banks, especially for the best customers. An analysis of the dataset behind Statistics Denmark's confidence indicators confirms that companies with a good credit standing still have good borrowing opportunities. On the other hand, conditions are more constrained for companies with poor financial ratios cf. Box 5. Overall, this indicates a healthier credit policy than in the period up to the financial crisis.

Lending rates are still falling

Chart 15

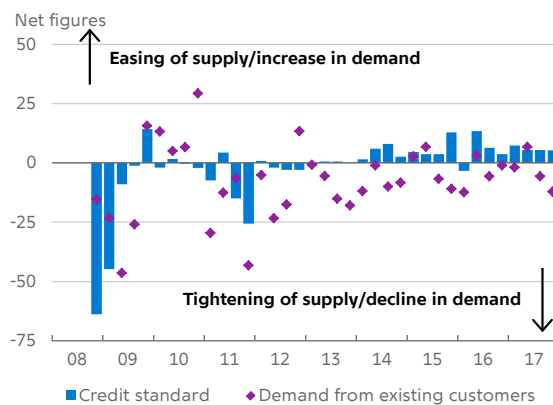


Note: Average interest rates for outstanding lending. Mortgage lending includes administration margins.

Source: Danmarks Nationalbank.

Easing of the banks' credit standards and subdued demand for bank loans in recent years

Chart 16



Note: Changes in the banks' credit standards for legal entities and change in legal entities' demand for bank loans, both according to Danmarks Nationalbank's lending survey. The questions in the lending survey each have five possible responses, which each have a numerical value: -100 (tightened/diminished a good deal), -50 (tightened/diminished a little), 0 (unchanged), +50 (eased/increased a little), +100 (eased/increased a good deal). The responses are weighted together to give a net figure according to the banks' share of total lending.

Source: Danmarks Nationalbank.

¹⁰ Cf. Danmarks Nationalbank, Risks are building up in the financial sector, *Danmarks Nationalbank Analysis (Financial Stability)*, no. 23, November 2017.

Easing of credit standards for the corporate sector – but not back to pre-crisis level

Box 5

During the financial crisis, banks and mortgage banks undertook a highly necessary tightening of credit standards with regard to legal entities. The results of a questionnaire survey showed that virtually all loan applications were accepted in the years preceding the financial crisis, without any consideration of a company's financial ratios. This survey was repeated in 2009/10 and 2014, and the results showed a clear relation between companies' key ratios and the probability of a loan application being granted.¹ The very low loan rejection ratios and high credit demand paved the way for a strong increase in corporate debt during the period up to the financial crisis. To some extent, this contributed to deepening the subsequent economic downturn.²

A sound credit policy entails a certain percentage of companies being refused credit financing. However, the rejection rates alone are insufficient basis for assessment of the credit standards, since a credit institution's rejection rate in a given period will depend on the characteristics of the companies applying for loans. A supplementary indicator is the companies' own assessment of whether lack of access to financing is a production-limiting factor. In Statistics Denmark's

confidence indicators, around 5 per cent of companies state financial constraints as the reason for curtailment of production, cf. Chart A. During the period up to the financial crisis, very few companies named financial constraints.

Closer analysis of the dataset behind the confidence indicators indicates increased differentiation of credit standards. For example, a considerably larger share of building and construction companies with a low profit ratio in recent years name financial constraints, compared to other companies in the industry, cf. Chart B. Among companies with poor financial ratios, the share facing financial constraints is still at a rather higher level than prior to the financial crisis. In the same way, most of the increase in the proportion of financially constrained manufacturing companies since 2012 can be attributed to an increasing incidence of financial constraints among less creditworthy companies.

In overall terms, the credit standards are more restrictive than in the years before the financial crisis, but companies with a good credit standing still have good opportunities to obtain credit financing.

More companies face financial constraints than before the financial crisis – in particular the less creditworthy

Chart A

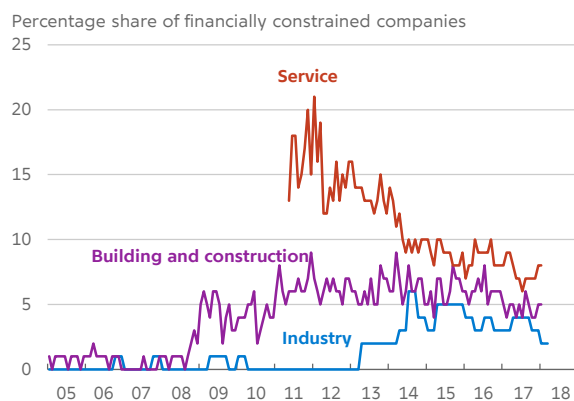
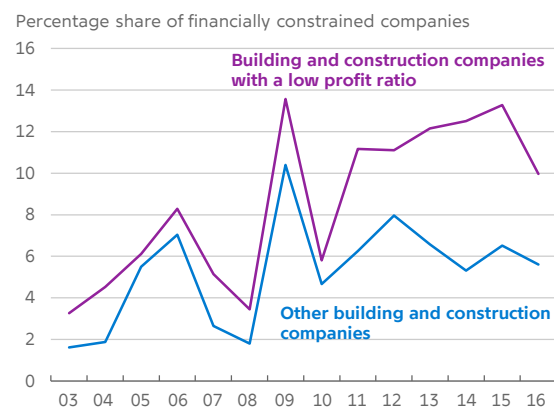


Chart B



Note: Chart A: The questionnaires were redesigned in the 1st and 2nd quarters of 2013, contributing to a decrease in the "no production constraints" response category in favour of responses stating production constraints. Data for manufacturing is quarterly, while data for other industries is monthly. Chart B: Companies experiencing financial constraints are defined as companies which have stated financial constraints as an impediment to production for at least three months in the given year in Statistics Denmark's confidence indicator. Profit ratio is defined as the profit/loss for the year before extraordinary items as a ratio of revenue, measured for the preceding financial year. Companies with a low profit ratio are companies with a profit ratio in the lowest quartile in a given year.

Source: Statistics Denmark and own calculations based on firm-level data from Statistics Denmark.

1. Cf. S.G. Andersen and A. Kuchler, Credit standards and capital allocation in a low interest-rate environment, *Danmarks Nationalbank Working Paper*, no. 107, June 2016.
2. See S.J. Hviid and A. Kuchler, Consumption and savings in a low-interest rate environment, *Danmarks Nationalbank Working Paper*, no. 116, June 2017.

The lending survey furthermore indicates a moderate increase in companies' demand for mortgage loans since 2012. On the other hand, the demand for loans from the banks' existing corporate customers has declined, cf. Chart 16. The demand from new customers has increased in most quarters since 2012, but this is a smaller customer group than existing customers.

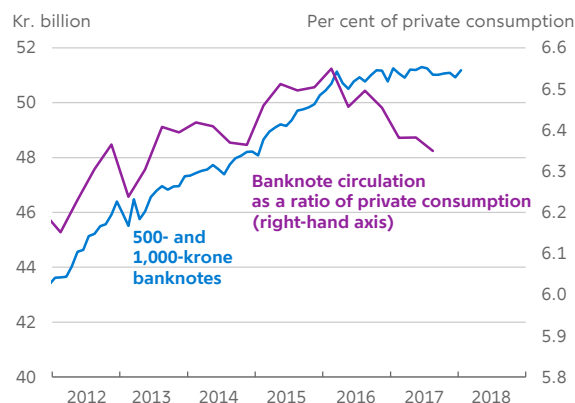
At its most recent meeting, in December 2017, the Systemic Risk Council assessed that risks are building up in the financial system. The Council therefore recommended to the Minister for Industry, Business and Financial Affairs that the countercyclical capital buffer should be activated. The sustained low level of interest rates, combined with a strengthening upswing and rising property prices, could lead to a rapid increase in credit risks.¹¹

Low demand for cash despite low interest rates

For some groups of corporate customers, the banks' deposit rates have been negative for around three years. This especially concerns large customers. There are no indications, however, that this has led to any extraordinary increase in demand for cash as a store of value, cf. Chart 17. Both the overall banknote circulation and the circulation of 500- and 1,000-krone banknotes has been by and large unchanged since 2016. The reason may be that households' bank deposits still do not accrue negative interest. The circulation of smaller-denomination banknotes (50-, 100- and 200-krone) has been virtually unchanged since 2015, at almost kr. 13 billion. Only 23 per cent of Danish households' payments in physical stores are cash payments. The equivalent figure for the euro area is 79 per cent.¹² The low ratio of cash payments can e.g. be ascribed to how electronic means of payment are typically less expensive and easier to handle than cash for banks, commercial operators and consumers.

No indications of any extraordinary increase in the demand for cash

Chart 17



Note: The banknote fraction is defined as the value of all banknotes in circulation divided by private consumption in current prices. Both series are seasonally adjusted.
 Source: Danmarks Nationalbank.

11 Cf. Press Release, Meeting of the Systemic Risk Council, 20 December 2017. ([link](#))

12 Cf. V.G. Smestad, Danish households opt out of cash payments, *Danmarks Nationalbank Analysis*, no. 24, December 2017.

ABOUT REPORT



Reports are periodical reports and accounts describing the activities and tasks of Danmarks Nationalbank.

Reports include e.g. Danmarks Nationalbank's annual report and the semi-annual report on monetary and financial trends.

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This edition closed for
contributions on 9 March 2018



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