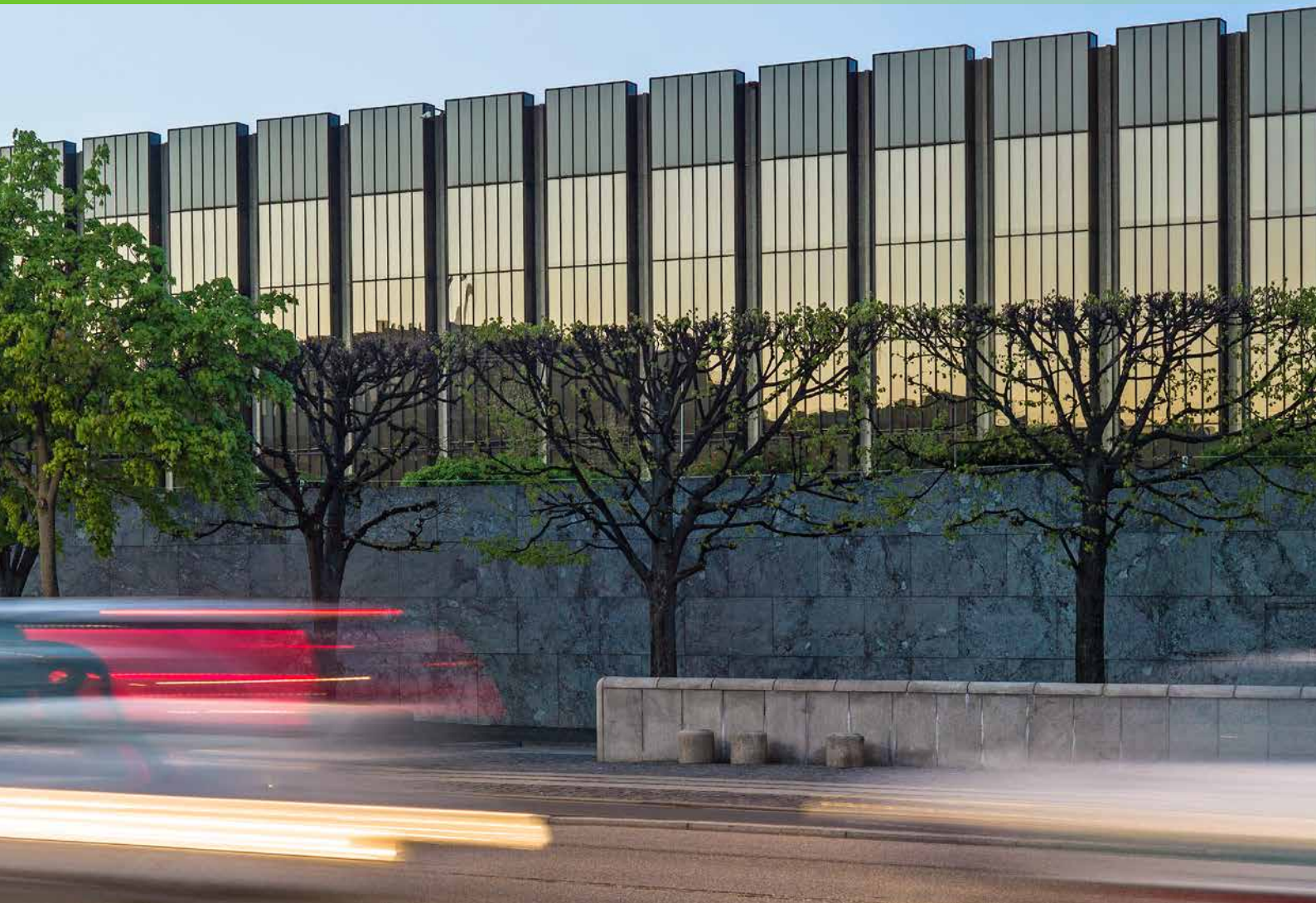


DANMARKS
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MONETARY REVIEW
4TH QUARTER

2015



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Søren Lejsgaard Autrup, Paul Lassenius Kramp, Erik Haller Pedersen
and Morten Spange, Economics

Since 1990, the current account of Denmark has shown a surplus, which is currently almost 8 per cent of GDP. Even in the event of a return to a neutral cyclical position, Denmark's current account is estimated to currently show a surplus of around 4-5 per cent of GDP. This mainly reflects sustainable public finances and savings for a future with a considerably larger share of elderly people in the population. Substantial net foreign assets may contribute to ensuring a low interest rate spread to the euro area, but may also periodically entail capital inflows and upward pressure on the krone, resulting in a large foreign exchange reserve.

53 THE MONEY MARKET AT PRESSURE ON THE DANISH KRONE AND NEGATIVE INTEREST RATES

Morten Fremmich Andresen, Banking and Markets
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In a situation like the current one where the monetary policy counterparties' need to place funds with Danmarks Nationalbank exceeds the overall current account limit, the rate of interest on certificates of deposit (the CD rate) is key for Danish money market rates. The CD rate's move into negative territory has not affected its significance for the Danish krone, nor Danmarks Nationalbank's ability to manage the exchange rate of the krone. The reduction of the CD rate in early 2015 has increased the spread between the current account rate and the CD rate – and thus the scope for fluctuations in overnight money market rates. Volatility does not change the effect of monetary policy rates on the krone exchange rate. Turnover in the unsecured overnight money market has declined since Danmarks Nationalbank's introduction of negative interest rates. This especially reflects that banks' deposits with Danmarks Nationalbank have been large, and thus the need for money market transactions has been low.

Troels Kromand Danielsen and Casper Winther Nguyen Jørgensen,
Economics

Since 2011, Danmarks Nationalbank has estimated potential output and an output gap for the Danish economy. The output gap, which constitutes an overall indicator of the current cyclical position, plays a prominent role in the planning of economic policy. For this reason, it should be available as early as possible, but at the same time be calculated as accurately and reliably as possible. The article revisits the method in order to assess the reliability of the output gap as an indicator of the cyclical position. Modest revisions of the output gap in recent years indicate that the method provides a relatively reliable view of the economy in real time.

CURRENT ECONOMIC AND MONETARY TRENDS

SUMMARY

The advanced economies are generally picking up steam. The USA and the UK are in an upswing with slightly higher growth than in the euro area. Although euro area growth is more moderate, most member states are exceeding their growth potential. Economic activity is being supported by low oil prices and the very low level of interest rates. The weakening of the exchange rate also has a positive impact on euro area exports. Moreover, fiscal policy is no longer dampening activity in the euro area and the USA. In the emerging market economies, growth has subsided. This has caused growth in world trade to lose momentum.

The international organisations expect global economic growth gradually to accelerate. The estimates for this year and next year have, however, been adjusted marginally downwards because activity is rising more slowly in the emerging market economies.

On 3 December, the European Central Bank, ECB, announced that its deposit rate would be reduced by 10 basis points to -0.3 per cent. At the same time, the existing asset purchase programme was extended by six months until March 2017. Danmarks Nationalbank kept its monetary policy interest rates unchanged. This meant that the monetary policy spread between Danmarks Nationalbank's rate of interest on certificates of deposit and the ECB's deposit rate narrowed from -0.55 to -0.45 percentage point. The decision to keep Danmarks Nationalbank's interest rates unchanged was taken against the background of sales of foreign exchange since April 2015.

Denmark's gross domestic product, GDP, was 0.1 per cent lower in the 3rd quarter than in the preceding quarter, following eight quarters of growth. The labour market continued to improve in the 3rd quarter, supporting the view that the upswing is well underway. The low price of oil and low interest rates are still fuelling the upswing and in addition the low effective exchange rate of the krone is supporting exports. Consequently, growth in real GDP is forecast at 1.4 per cent this year, rising to 1.8 per cent in 2016 and 2.0 per cent in 2017. Compared with Danmarks Nationalbank's most recent projection, this represents a downward adjustment of approximately 0.5 percentage point for the three years taken as one.

The economy is assessed to reach a normal level of capacity utilisation within the next couple of years. Employment is expected to rise by almost 65,000 from the 3rd quarter of this year to the 4th quarter of 2017, and the unemployment gap, which indicates how much unemployment can fall before reaching a cyclically neutral level, is forecast to close in 2017. So the capacity situation will tighten in the coming years, and by the end of the projection period there will be very little spare capacity left. In that situation, fiscal policy should gradually be adjusted from currently stimulating activity to having a neutral effect on the economy. The agreed Finance Act for 2016 involves tightening of fiscal policy, which is appropriate in the current economic environment.

Developments in the housing market have been more subdued during the past six months

after having accelerated in the first part of the year. In connection with the Finance Act for 2016 it has been agreed to put a freeze on land tax in 2016. That will have a destabilising effect on the housing market in the areas where house price increases have been most pronounced. There is an urgent need to find a solution that ensures a link between house prices and housing taxes.

THE INTERNATIONAL ECONOMY AND THE FINANCIAL MARKETS

ECONOMIC DEVELOPMENT AND GROWTH OUTLOOK

In the euro area, the economy grew by 0.3 per cent in the 3rd quarter, cf. Chart 1 (left), and growth was positive in nearly all member states. The growth rate was particularly high in Spain. The Purchasing Managers' Index, PMI, which provides a good indication of where the economy is heading, points to further moderate growth in activity in the euro area overall in the 4th quarter.

Although the rate of increase in economic activity subsided a little in the 3rd quarter, the USA is in an economic upswing, cf. Chart 1 (right). The same applies to the UK, while growth is weak in Japan.

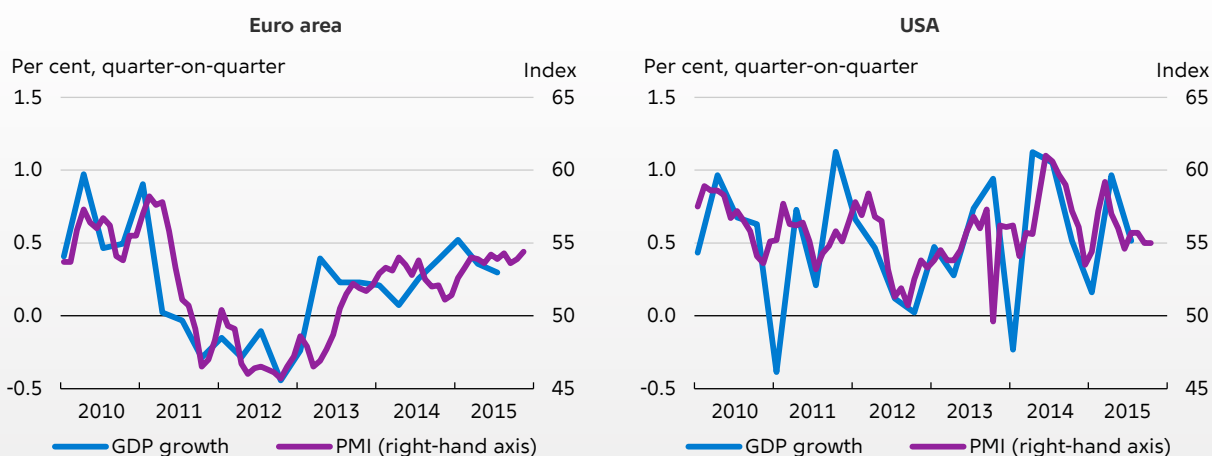
Sweden is seeing strong economic growth. In 2015, GDP has increased by an average of nearly 1 per cent per quarter. In Norway, on the other hand, growth has declined, mainly because oil prices have fallen. This has had a negative impact on the Norwegian oil industry, with a knock-on effect on the rest of the economy. As a result, growth in GDP excluding the oil industry (mainland GDP) was only 0.2 per cent in the 3rd quarter. Growth in the economy overall was weak in the first two quarters of the year but rose to 1.8 per cent in the 3rd quarter, reflecting a surge in natural gas production, among other factors.

Activity in the advanced economies is driven by domestic demand, which is supported by, inter alia, low oil prices and the very low level of interest rates. The weakening of the nominal effective exchange rate also has a positive impact on exports in the euro area and Japan. Moreover, fiscal policy is no longer dampening activity in the euro area and the USA. These drivers also create a basis for continued growth.

In 2015 and the coming years, EU GDP may also be temporarily boosted by the marked rise in the number of asylum seekers in Europe as this involves additional public expenditure. The European Commission and the OECD assess that, viewed in isolation, it may increase GDP by 0.1-0.2 per cent annually in 2015-17 compared with a situation where the number of asylum seekers

GDP growth and PMI in the euro area and the USA

Chart 1



Note: Composite output PMI for the services and industrial sectors. A value above (below) 50 indicates positive (negative) growth.
Source: Thomson Reuters Datastream.

In 2015, the number of asylum seekers coming to Europe has been far higher than previously. It is estimated that approximately 1.2 million people, corresponding to 0.2 per cent of the EU's population, came to the EU to seek asylum from January to October.¹ By comparison, the EU received 630,000 asylum seekers in 2014.

The economic effects of the increase in the number of asylum seekers vary across the EU member states, depending on the number of asylum seekers arriving in a given member state, whether they stay there or continue their journey, whether they are granted asylum and refugee status, and the ability of the host country to integrate refugees, including in the labour market. In the short term, many member states will see a rise in public spending due to e.g. increased expenses for humanitarian assistance and processing of asylum applications. According to the European Commission, expenses for both transit and host countries will rise by a maximum of 0.2 per cent of GDP in 2015, but by 0.5 per cent of GDP in Sweden, which is among the member

states receiving the highest number of refugees relative to the size of its population. Unless it is offset by savings in other areas, the increase in public spending constitutes an unfinanced easing of fiscal policy. In the assessments of the Commission and the OECD, this will, viewed in isolation, boost EU GDP by 0.1-0.2 per cent annually in 2015-17 relative to a baseline scenario.²

In the longer term, the effect on the economy will depend mainly on how well the refugees are integrated in the labour market. The effect may be positive if they can ease pressures in the labour market and on public spending resulting from an ageing population. In the preliminary assessment of the Commission, the level of GDP in the EU will rise by 0.2-0.3 per cent in 2020 relative to a baseline scenario. However, GDP per capita will presumably be lower as the productivity and participation rate of the refugees are not likely to match those of the existing population in the short to medium term.

1. Cf. the European border management agency Frontex.

2. Cf. the European Commission's autumn forecast 2015 and OECD, *Economic Outlook*, November 2015.

had been the same as in previous years, cf. Box 1. The calculations assume that the increase in public expenditure constitutes an unfinanced fiscal easing. However, GDP per capita will presumably be lower as the productivity and participation rate of the refugees are not likely to match those of the existing population in the short to medium term.

Growth has slowed down in the emerging market economies. In China this reflects a notable decline in investment growth that is not fully offset by higher consumption. As a result, China's imports of raw materials are not rising as sharply as they were. This has reduced growth in global demand for raw materials and exerted downward pressure on commodity prices. But prices have mainly fallen because commodity producers have increased the supply by boosting their production capacity over a number of years. Brazil and Russia are among the countries affected by lower commodity prices and resultant lower export values.

According to the OECD, the weaker development in the emerging market economies is the primary reason why growth in world trade has declined from 2014 to 2015. In the assessment of the

OECD, China, Brazil and Russia jointly account for around two thirds of the fall in imports by emerging market economies.¹ Conversely, imports have risen in the advanced economies. In other words, the situation has reversed within just a few years, so that it is now the advanced economies, not the emerging market economies, that are buoying up world trade.

The international organisations expect growth in the global economy gradually to accelerate. All the same, estimates for 2015 and 2016 have been adjusted marginally downwards. This is mainly because growth in activity will be lower in the emerging market economies, cf. Table 1. In the assessment of the OECD, the decline in growth in China has only a limited impact on the advanced economies via direct trade relations, but it may have a stronger impact if the slowdown leads to global financial turmoil.

Although growth is generally moderate, virtually all euro area member states are exceeding their growth potential. This means that the output gap – the difference between actual and potential output – is gradually closing, cf. Chart 2 (left). The unemployment gap will also narrow, and by 2017

1 Cf. OECD, *Economic Outlook*, November 2015.

Forecasts of real GDP growth in selected economies

Table 1

Per cent	Change relative to June 2015					
	2014	2015	2016	2017	2015	2016
USA	2.4	2.4	2.5	2.4	0.4	-0.3
Euro area	0.9	1.5	1.8	1.9	0.1	-0.3
- Germany	1.6	1.5	1.8	2.0	-0.1	-0.5
- France	0.2	1.1	1.3	1.6	0.0	-0.4
- Italy	-0.4	0.8	1.4	1.4	0.2	-0.1
- Spain	1.4	3.2	2.7	2.5	0.3	-0.1
UK	2.9	2.4	2.4	2.3	0.0	0.1
Japan	-0.1	0.6	1.0	0.5	-0.1	-0.4
China	7.3	6.8	6.5	6.2	0.0	-0.2
India	7.3	7.2	7.3	7.4	0.3	-0.3
Brazil	0.2	-3.1	-1.2	1.8	-2.3	-2.3
Russia	0.6	-4.0	-0.4	1.7	-0.9	-1.2

Source: OECD, *Economic Outlook*, November 2015.

unemployment in the euro area overall will be close to its structural level, which is approximately 10 per cent according to the European Commission.²

The potential growth of the euro area member states has declined over the last decades, from an average of 2.2 per cent p.a. in the 1990s to 0.7 per cent in 2008-14, cf. Chart 2 (right). This is attributable to lower underlying growth in employment combined with a fall in potential productivity growth. Previously, potential growth was to a large extent driven by productivity. However, the potential labour force also contributed strongly, as the number of people of working age rose and the participation rate increased in many countries (especially for women).

The OECD estimates potential euro area growth at 1.6 per cent p.a. on average in the period 2014-25. Growth will be driven by potential productivity, which is estimated to grow by an average of 1.4 per cent p.a.; this is somewhat higher than the historical average. The contribution

from potential employment will be modest. This is because the population of working age (15-64 years) is expected to shrink in the period under review, while a higher expected retirement age, a higher participation rate for women and lower structural unemployment will increase potential employment.

In the USA, potential growth is expected to be somewhat higher, averaging 2.4 per cent p.a. The reason is, inter alia, that the share of the population aged 15-64 years will continue to increase. Potential GDP per capita is estimated to rise by an average of 2 per cent p.a. in the USA in 2014-25 and by 1.7 per cent p.a. in the euro area.

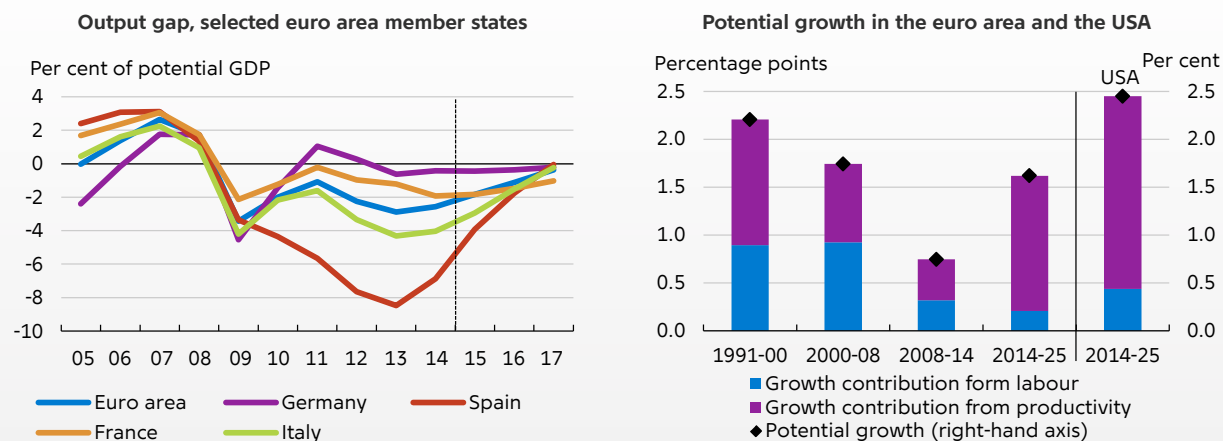
LABOUR MARKETS, WAGES AND INFLATION

In the euro area, employment has risen since the economy began to pick up in 2013. The employment rate (15-64-year-olds) for the euro area overall rose by almost 1 percentage point from the 2nd quarter of 2013 to the 2nd quarter of 2015, cf. Chart 3 (left). However, developments are very

² In the European Commission's autumn forecast 2015, NAWRU (non-accelerating wage rate of unemployment) is 9.9 per cent in 2017, and unemployment is 10.3 per cent.

Output gap and potential growth

Chart 2



Note: Left-hand chart: Data from the European Commission. Forecasts after 2014. Right-hand chart: Data for 1991-2014 is from OECD, *Economic Outlook*, November 2015. Data for 2014-25 is from the OECD's most recent long-term baseline projections. Average annual growth in the periods stated. The contribution to growth from productivity has been calculated residually and includes effects of a change in capital intensity.

Source: European Commission, OECD, *Economic Outlook*, November 2015 and OECD, *Long-term baseline projections*, May 2014 and own calculations.

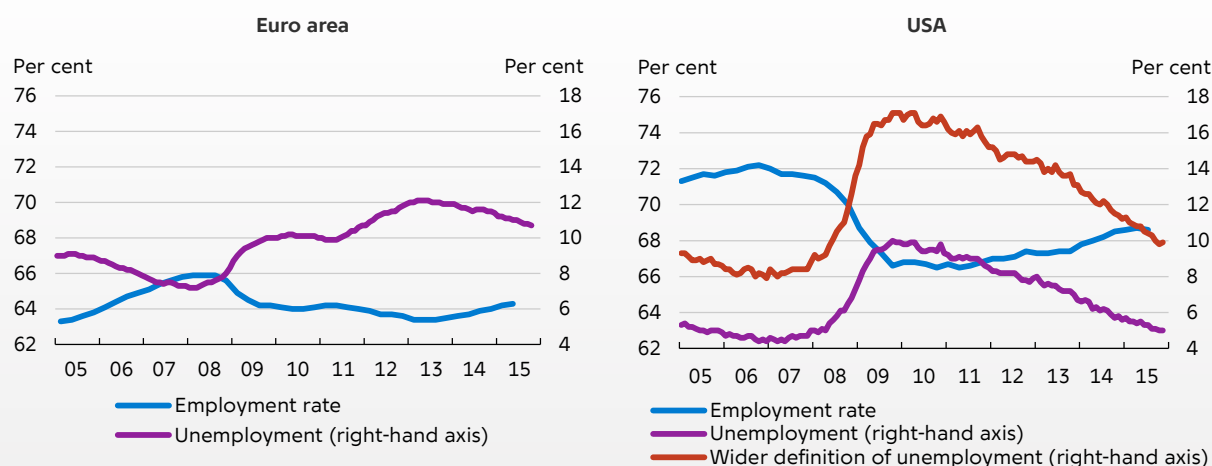
heterogeneous across euro area member states. In Portugal, Spain and Ireland, it has risen by 3-4 percentage points, while it has fallen in e.g. France and Finland, cf. Chart 4. Growth in employment has helped to reduce euro area unemployment to 10.7 per cent in October, which is 1.4 percentage

points below the peak in the spring of 2013. The fall in unemployment has generally been most pronounced in the member states where the level of unemployment was and is highest.

In most euro area member states, the labour force has grown, both during the crisis and in the

Employment and unemployment in the euro area and the USA

Chart 3

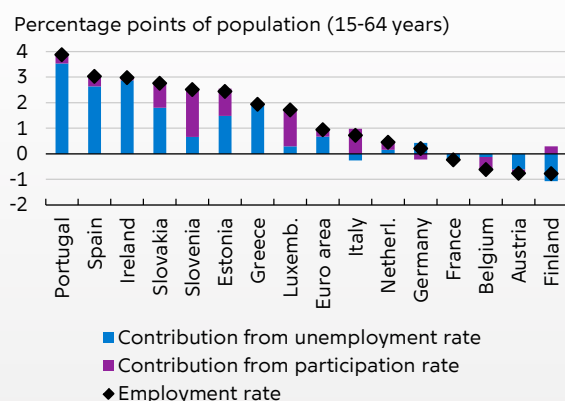


Note: Employment rate as a percentage of the population aged 15-64, unemployment as a percentage of the labour force. Right-hand chart: The wider definition of unemployment includes not only the unemployed but also those marginally attached to the labour market and people working part time for economic reasons (i.e. U6).

Source: OECD and Macrobond.

Decomposition of the euro area employment rate

Chart 4

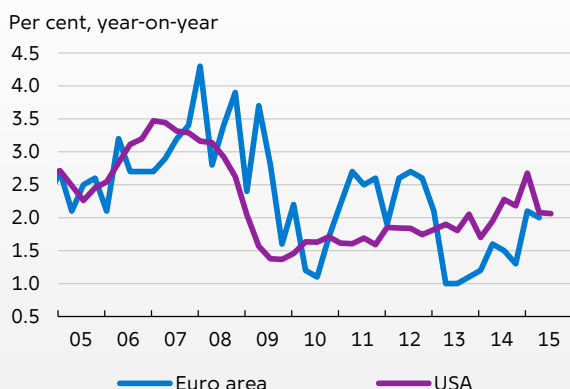


Note: Change from the 2nd quarter of 2013 to the 2nd quarter of 2015. The sign has been reversed for the change in the unemployment rate.

Source: OECD and own calculations.

Wage growth in the euro area and the USA

Chart 5



Note: Wage growth is measured as the annual rate of growth in private sector wages.

Source: Macrobond.

last couple of years, and hence the participation rate has increased. This is a result of, inter alia, labour market and pension reforms. These developments have led to structural improvements and will boost euro area growth. But in the short term, the increase in the labour force means that unemployment has fallen less in the last two years than the rise in employment would imply.

In the USA, employment rose strongly in October and November, and unemployment fell to 5

per cent, cf. Chart 3 (right). So measured by the unemployment rate, spare capacity in the US labour market is almost down to the pre-crisis level. But the employment rate (15-64-year-olds) is still approximately 4 percentage points lower. A wider definition of unemployment, which also includes those marginally attached to the labour market and people working part time for economic reasons, shows that there is still some spare capacity, but it is shrinking rapidly. Especially the number of part-timers who would like to work full time has decreased in recent years.

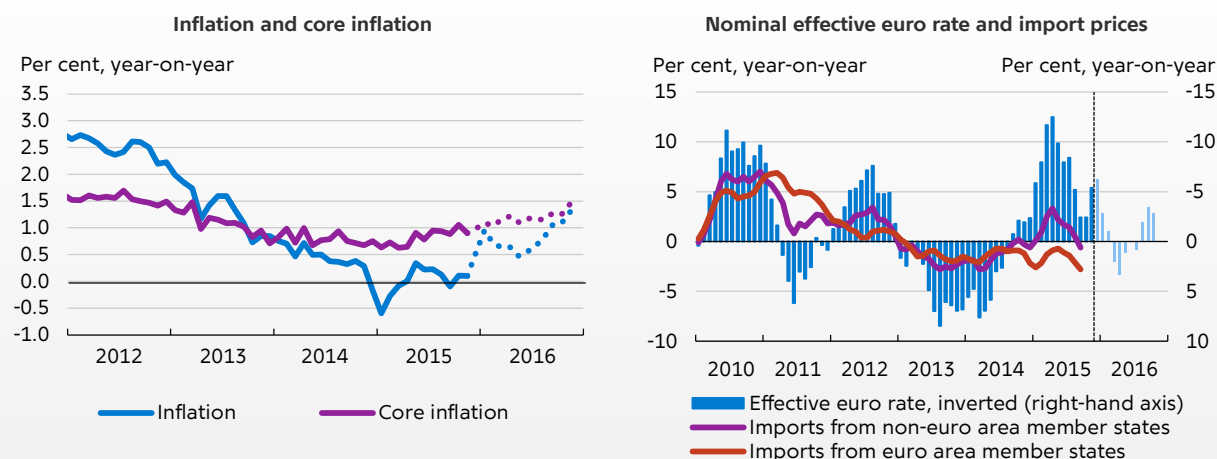
Despite the mounting pressure on the US labour market, wage growth declined in the 3rd quarter, cf. Chart 5. Wage growth is, however, trending upwards, and both employers and employees expect the rate of growth to accelerate over the coming year. Wage growth in the euro area declined slightly in the 2nd quarter following a strong increase in the 1st quarter, but euro area households also expect wage increases over the next year.

In the euro area, the annual rate of increase in the EU Harmonised Index of Consumer Prices, HICP, was around 0 per cent in September, October and November, having been marginally positive since May, cf. Chart 6 (left). The rate of price increase is mainly being curbed by a renewed fall in energy prices. Core inflation, calculated as HICP excluding the price effects of energy, food, alcohol and tobacco, has been rising since the spring and reached 1.1 per cent in October, but fell back to 0.9 per cent in November. By the end of 2015, the fall in oil prices from July 2014 to January 2015 will no longer have any direct effect on price inflation, which will result in an upward base effect. But in the 1st half of 2016 the rate of increase will be reduced again as the effects of the rise in oil prices from January to May this year fade away.

On the other hand, the 14 per cent depreciation of the nominal effective euro rate from March 2014 to April 2015 pushes up prices. This is reflected in e.g. import prices, which rose considerably more for goods from non-euro area member states than for those from euro area member states in early 2015, cf. Chart 6 (right). From April to mid-October, the euro strengthened, which has dampened the rise in import prices. A study by the ECB shows that a change in the exchange rate of the euro mainly affects import prices the first year (by around one third), while the effect is

Price developments in the euro area

Chart 6



Note: Left-hand chart: The broken lines indicate base effects. The projection has been based on the average ECB expectations of inflation and core inflation in 2016 and 2017 from December 2015. Right-hand chart: Price developments for imports for manufacturing and the nominal effective euro rate vis-à-vis 38 trading partners. After November 2015, the effective exchange rate has been projected at an unchanged value.

Source: Eurostat and Macrobond.

smaller in subsequent years.³ In the coming quarters, the contribution from the previous depreciation of the euro is therefore expected to weaken, both because it lessens over time and because it is offset by a subsequent strengthening of the euro.

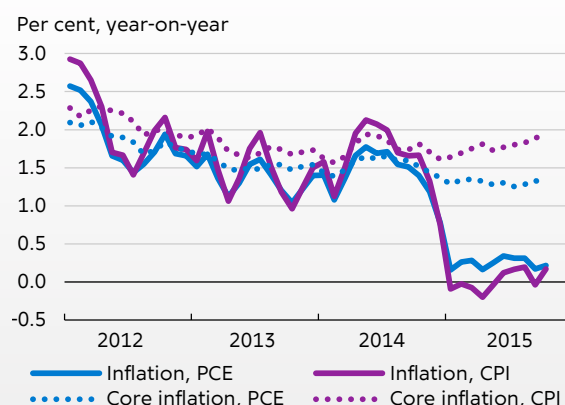
In the USA, inflation, measured as the annual rate of increase in the consumer price index, CPI, is marginally positive, cf. Chart 7. The rate of increase in the price index for Personal Consumption Expenditures, PCE, which is the Federal Reserve's preferred measure of inflation, has been a little higher in 2015. This is, inter alia, because the PCE is based on a broader measure of private consumption and reflects changes in consumption patterns on a current basis, whereas the composition of the CPI is fixed annually. For example, food and energy constitute a somewhat smaller share of the PCE, so that the effect of the fall in energy prices is less pronounced. Furthermore, core inflation is lower when measured by the PCE than when measured by the CPI, one reason being that healthcare, for which price inflation is low, carries substantially more weight in the PCE than in the CPI.

FISCAL POLICY

As already mentioned, the euro area output gap is gradually closing. When the economy is in an upswing, there is less need for economic policy measures that stimulate the economy. For the euro area overall, fiscal policy seems to have been adjusted to the cyclical environment, in that it is expected to be more or less neutral in 2016 (measured by discretionary fiscal policy measures). However, there are considerable differences across the euro area member states. There is

Price developments in the USA

Chart 7



Source: Macrobond.

3 Mauro, Rüffer and Bunda, *The changing role of the exchange rate in a globalized economy*, ECB, Occasional Paper Series, no. 94, 2008. The effects refer to an appreciation of the nominal effective exchange rate of the euro.

a tendency for member states with high growth and/or large government debt to take a more accommodative fiscal policy stance, cf. Chart 8 (left and right). In October and November, the European Commission assessed that the draft budgets of, inter alia, Spain, Austria and Italy were at risk of non-compliance with the requirements for 2016 under the Stability and Growth Pact.

In the USA, Congress in late October concluded an agreement to suspend the current debt ceiling until March 2017. At the same time, a framework budget agreement was concluded, which will allow federal spending to increase by a total of 0.4 per cent of GDP over the next two years. This will contribute to a neutral fiscal impact on economic activity in the coming years, whereas fiscal policy impeded growth in 2011-14. The new framework agreement paves the way for an actual budget bill for the fiscal year 2016 when the temporary budget expires on 11 December.

FINANCIAL CONDITIONS

On 3 December, the ECB announced that its deposit rate would be reduced by 10 basis points to -0.3 per cent. At the same time, the existing asset purchase programme was extended by six months until March 2017 and marketable debt instruments issued by regional and local governments were included in the programme. In addition, principal payments will be reinvested in future.

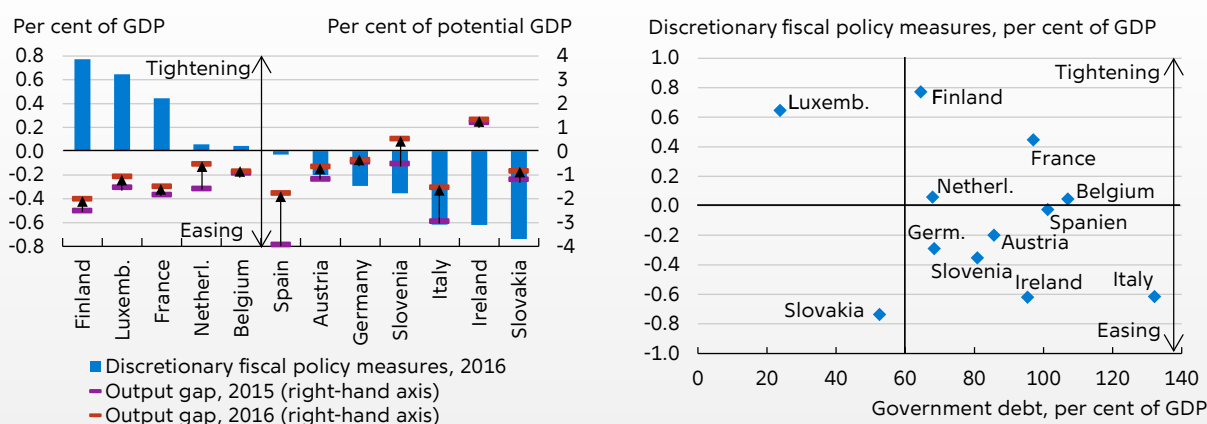
The ECB's balance sheet has been expanded considerably since the ECB began to purchase government bonds in March 2015, cf. Chart 9 (left and right). From the beginning of March 2013 until September 2014, the balance sheet shrank as banks repaid loans under the 3-year longer-term refinancing operation, LTRO. Since September 2014, quarterly targeted longer-term refinancing operations, TLTROs, have balanced LTRO repayments. If the expanded asset purchase programme is implemented as planned, this will increase the ECB's balance sheet so that it corresponds to more than 35 per cent of GDP by end-March 2017. This means that the balance sheet of the ECB will constitute a larger share of GDP than those of the Federal Reserve and the Bank of England, cf. Chart 9 (right). All the same, the ECB's total purchases are smaller than those made by the Federal Reserve and the Bank of England in the period from 2008 to 2014, while monthly purchases are of the same size.

In late October, Sveriges Riksbank expanded its programme for purchase of government bonds by 65 billion Swedish kronor, to a total of 200 billion Swedish kronor or just under 5 per cent of GDP. The programme runs until end-June 2016.

To counter the negative impact on the Norwegian economy of the lower oil price, Norges Bank reduced its key policy rate by 25 basis points to 0.75 per cent in late September 2015. This is the third reduction within the last year.

Euro area fiscal policy, 2016

Chart 8

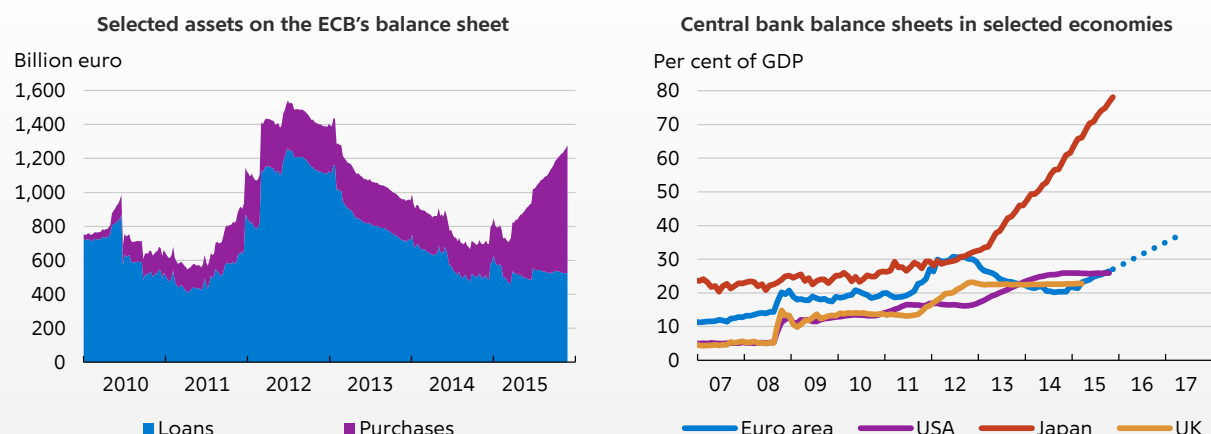


Note: The European Commission has calculated the discretionary fiscal policy measures on the basis of the euro area member states' draft budgets, mid-October 2015. Right-hand chart: The vertical line indicates the EU Treaty's reference value for government debt of 60 per cent of GDP.

Source: European Commission and own calculations.

Central bank balance sheets

Chart 9



Note: Left-hand chart: "Loans" is the sum of main refinancing operations, MRO, longer-term refinancing operations, LTRO, and targeted longer-term refinancing operations, TLTRO. "Purchases" is the sum of covered bond purchase programmes, CBPP, asset-backed securities, ABSP, securities market programme, SMP, and public sector purchase programme, PSPP. Right-hand chart: Total central bank balance sheets as a percentage of GDP in 2014. The broken line shows the projection of the ECB's balance sheet assuming that purchases total 60 billion euro per month until March 2017. Other factors that may affect the ECB's balance sheet have not been taken into account.

Source: ECB, Bank of England and Macrobond.

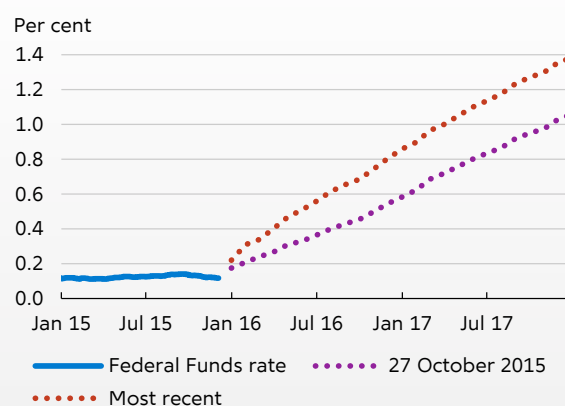
In the USA, announcements by the Federal Reserve after the monetary policy meeting on 27-28 October and favourable key figures for the labour market have strengthened expectations that the Federal Reserve will soon raise its interest rates, cf. Chart 10.

The diverging monetary policies in the USA and the euro area are reflected in e.g. short-term interest rates and the exchange rate of the euro, cf. Chart 11 (left and right). US interest rates have risen since the Federal Reserve began to taper its monthly asset purchases in December 2013. In the same period, the ECB has eased monetary policy on several occasions. Most recently, strengthening expectations of higher interest rates in the USA in the near future, combined with announcements from the ECB that further easing had been considered up to the December meeting, have increased the interest rate spread between the USA and the euro area. In parallel with the widening of the interest rate spread, the euro has weakened against the dollar.

The credit conditions of euro area firms have improved, cf. Chart 12 (left). At the same time, the rates of interest on corporate bank loans have fallen, especially in Portugal, Spain and Italy, cf. Chart 12 (right). As a result, the spread in interest rates between euro area member states has nar-

Expectations of overnight interest rate in the Federal Funds market

Chart 10

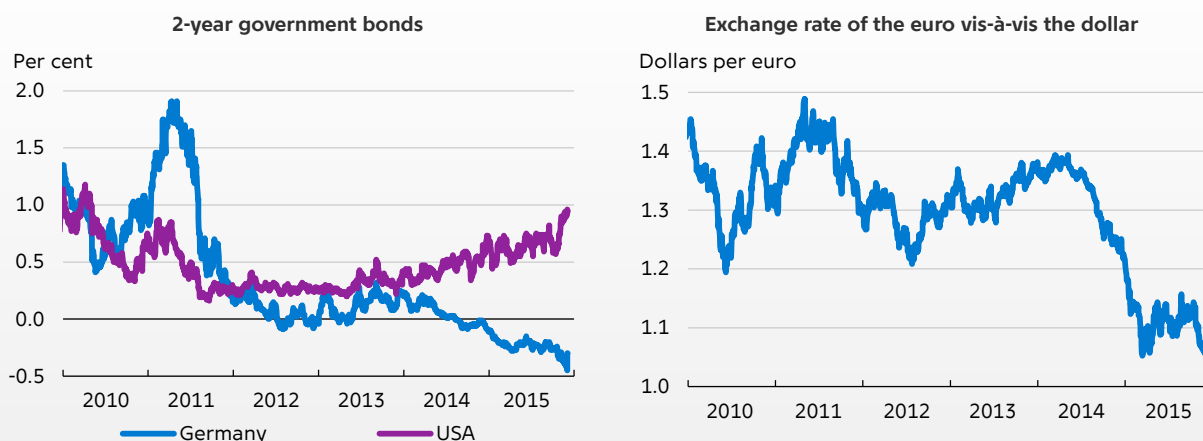


Note: The Federal Funds rate is shown as a 30-day average. Interest rate expectations have been calculated on the basis of Federal Funds Futures. The most recent observation is from 4 December 2015.

Source: Macrobond.

Government bond yields and exchange rate

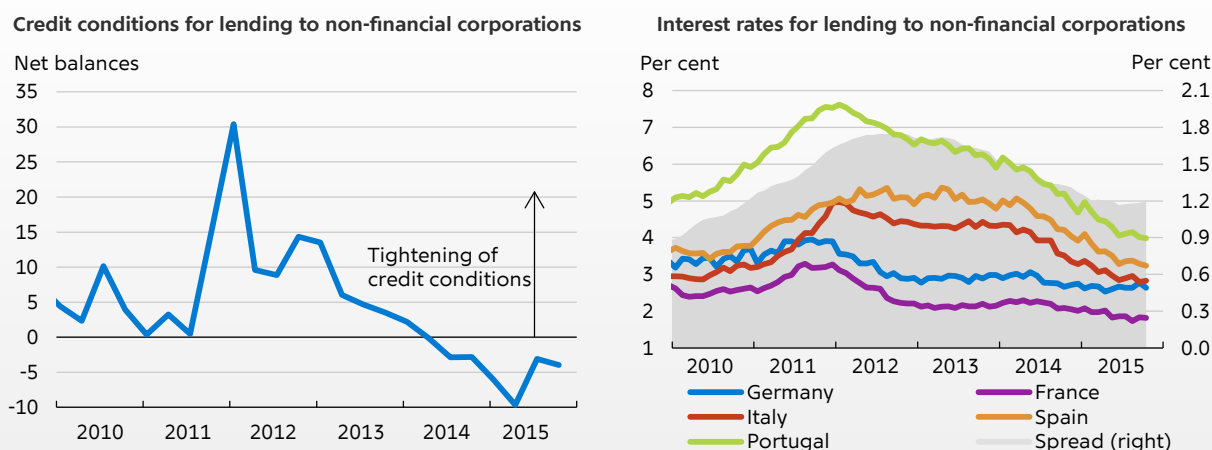
Chart 11



Note: Left-hand chart: 2-year benchmark bonds.
Source: Macrobond.

Credit conditions and lending rates in the euro area

Chart 12



Note: Left-hand chart: A positive net balance for credit conditions means that, overall, conditions have been tightened.
Source: Macrobond.

rowed. This development reflects factors such as the economic recovery and the effect of the ECB's monetary policy initiatives.⁴ The ECB's purchases increase liquidity in the banking sector, both via the purchases made directly from banks and via increased deposits in banks due to purchases from households and firms.

MONETARY AND EXCHANGE RATE CONDITIONS

THE MONEY AND FOREIGN EXCHANGE MARKETS

Danmarks Nationalbank kept its monetary policy interest rates unchanged, when the ECB reduced

4 Cf. ECB, *Economic Bulletin*, no. 7, 2015.

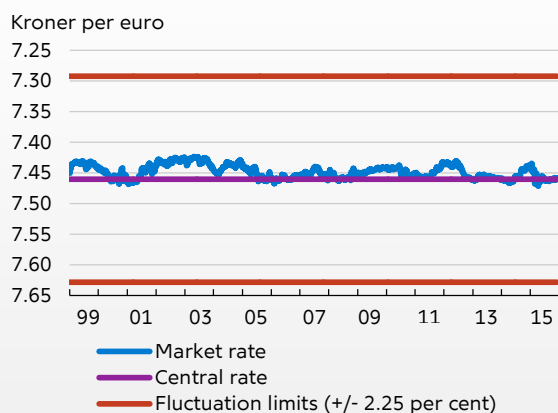
its monetary policy deposit rate at the meeting on 3 December. This meant that the monetary policy spread between Danmarks Nationalbank's rate of interest on certificates of deposit and the ECB's deposit rate narrowed from -0.55 to -0.45 percentage point. The decision to keep Danmarks Nationalbank's monetary policy interest rates unchanged was based on the sale of foreign exchange in the market since April 2015.

In recent months, the krone has been stable vis-à-vis the euro at a level very close to its central rate in ERM2, cf. Chart 13. The considerable inflow of capital to Denmark at the beginning of the year in connection with the pressure on the krone has turned into an outflow of capital since April. This outflow has diminished in recent months. Hence, at kr. 39 billion, Danmarks Nationalbank's net intervention sales of foreign exchange from September to November were somewhat lower than in the preceding months. Total intervention sales of foreign exchange for kroner by Danmarks Nationalbank have amounted to kr. 230 billion since April. Net intervention purchases at the beginning of the year reached kr. 275 billion.

In November, the foreign exchange reserve decreased by almost kr. 8 billion to kr. 484 billion, cf. Chart 14. This was mainly because Danmarks Nationalbank sold foreign exchange for kr. 7 billion net in connection with intervention in the foreign exchange market.

Exchange rate of the krone vis-à-vis the euro

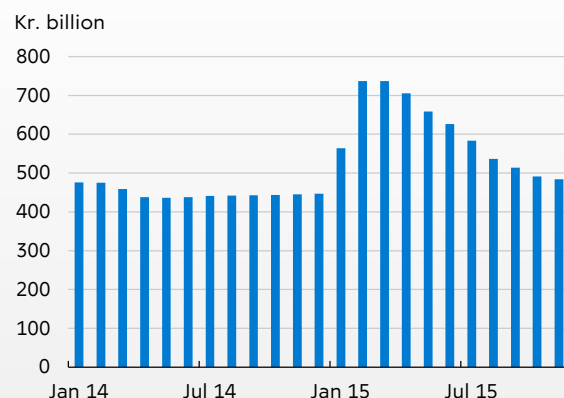
Chart 13



Note: Reverse scale for the exchange rate of the krone. The most recent observation is from 4 December 2015.
Source: Danmarks Nationalbank.

Danmarks Nationalbank's foreign exchange reserve

Chart 14



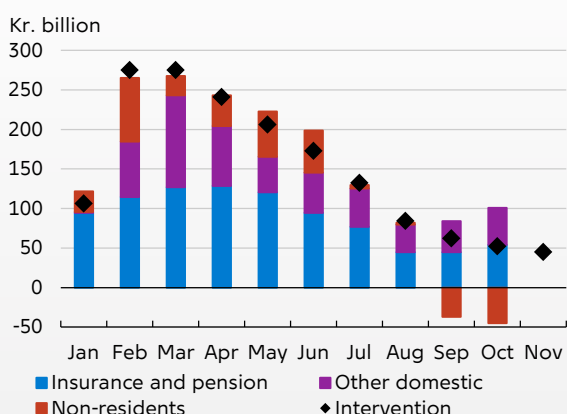
Note: The most recent observation is from November 2015.
Source: Danmarks Nationalbank.

The reduction of the foreign exchange reserve from April onwards reflects a shift in demand for kroner, cf. Chart 15. Since March, non-resident investors, who were behind a substantial share of the krone purchases in the first months of the year, have on aggregate sold kroner. From January to October, non-resident investors sold kroner for almost kr. 45 billion net. The insurance and pension sector, which was one of the main sectors behind the krone purchases at the beginning of the year because it increased its exchange rate hedging, has also reduced its total purchases of kroner during the year. All the same, this sector's net purchases of kroner totalled just over kr. 50 billion in the period January-October.

Short-term money market interest rates in Denmark gradually rose until the last part of September, after which they fell by almost 0.25 percentage point to around -0.5 per cent up to the ECB's interest rate meeting on 3 December, cf. Chart 16 (left). The fall was accelerated by the ECB's announcements at its interest rate meeting on 21 October, when it signalled that monetary policy might be eased further. These announcements also meant that market participants' expectations of a forthcoming interest rate increase on the part of Danmarks Nationalbank were dampened. Danish money market interest rates were virtually unaffected by Danmarks Nationalbank's decision to keep its monetary policy interest rates unchanged on 3 December.

Accumulated net purchases of kroner against foreign exchange broken down by sectors and Danmarks Nationalbank's intervention purchases of foreign exchange in 2015

Chart 15



Note: "Other domestic" includes purchase and sale of foreign exchange by MFIs and investment associations, as well as the central government's transactions in foreign exchange. "Intervention" is Danmarks Nationalbank's accumulated net intervention purchases of foreign exchange against sale of kroner.

Source: Danmarks Nationalbank.

Since euro area interest rates were relatively stable until the beginning of November, the falling Danish interest rates caused the money market spread between Denmark and the euro area to become more negative, standing at approximately -0.25 percentage point in early November, cf. Chart 16 (right). Market participants' increasing expectations of further monetary policy announcements by the ECB at the December interest rate meeting subsequently caused interest rates to fall more sharply in the euro area than in Denmark, so that the spread narrowed a little again until the beginning of December. After the ECB's interest rate reduction, which was smaller than many market participants had expected, European money market interest rates rose slightly, and

the spread between Denmark and the euro area therefore widened a little.

The interest rate spread between kroner and euro calculated on the basis of FX swaps broadly mirrored the money market spread, but the fall after the ECB's October interest rate meeting was stronger for the FX swap spread.⁵ Until early November, the interest rate spread based on FX swaps approached the monetary policy interest rate spread. From mid-October, the interest rate spread between kroner and dollars based on FX swaps fell considerably more than the equivalent money market spread between Denmark and the USA. Therefore it became more expensive to borrow dollars against kroner via the FX swap market. The same applies when borrowing dollars via FX swaps in euro, yen and pounds, one of the reasons being an increase in demand for dollars over the turn of the year. Normally the interest rate spread based on FX swaps is very close to the corresponding money market spread. In practice, deviations may occur as a result of e.g. differences in the liquidity situation or demand for liquidity in the various markets. The market for FX swaps in kroner is limited to a small number of providers, which may also drive the deviation between the interest rate spread calculated on the basis of FX swaps and other interest rate spreads.

Market participants' expectations of future overnight money market interest rates in Denmark can be derived from current longer-term interest rates. Following the ECB's interest rate reduction, market participants' expectations of the overnight interest rate 1 year ahead is around 0.2 percentage point lower than the expectations derived in September, cf. Chart 17 (left). This is approximately 0.1 percentage point higher than the market participants expected before the interest rate meeting, corresponding to the development in expectations regarding the euro area overnight interest rate. In Denmark, the interest rate is ex-

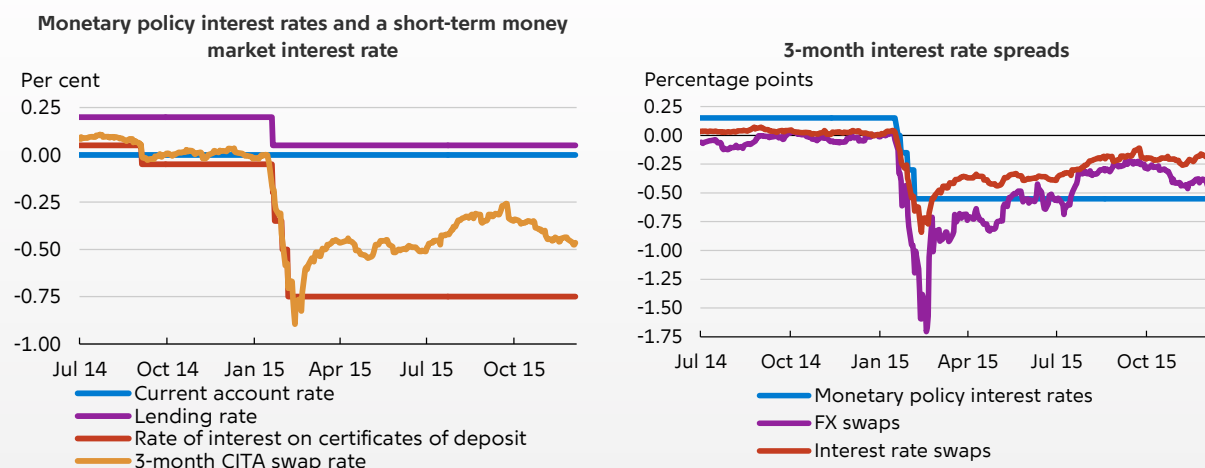
5 An FX swap is an agreement comprising a simultaneous spot transaction and forward contract. In connection with the spot transaction an amount is exchanged from e.g. euro to kroner at the current spot rate; in connection with the forward contract the amount is exchanged back at a later date and at an agreed exchange rate. Financial institutions typically used the FX swap market to procure liquidity in foreign exchange against other currencies as collateral. A financial institution with a need for funding in foreign exchange can either borrow directly in the uncollateralised foreign exchange market or borrow via kroner in the FX swap market. The financing cost of borrowing via the FX swap market is equal to the implied FX swap rate.

pected to be negative until March 2018, which is approximately 1 year longer than the September expectations showed. In the euro area, interest rates are expected to be negative for just under

3 years, until September 2018. The interest rate spread between Denmark and the euro area is expected to remain negative for another year, cf. Chart 17 (right).

Danmarks Nationalbank's interest rates and interest rate spreads between Denmark and the euro area

Chart 16

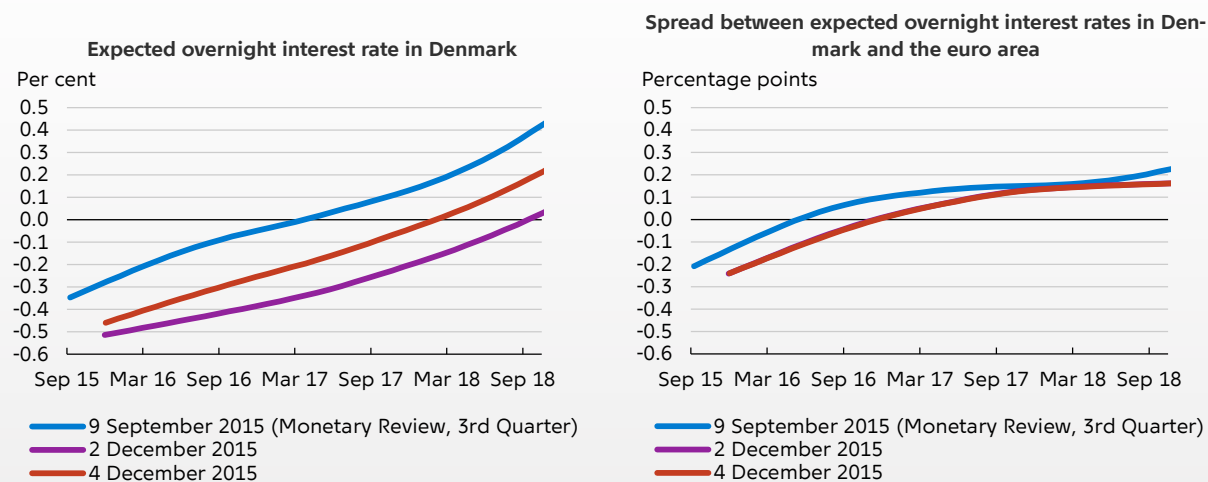


Note: Left-hand chart: The money market interest rate is the 3-month CITA swap rate. The most recent observations are from 4 December 2015. Right-hand chart: The monetary policy spread is the spread between Danmarks Nationalbank's rate of interest on certificates of deposit and the ECB's deposit rate. The interest rate swap spread is the spread between the 3-month EONIA and CITA swap rates. The FX swap spread is the implied 3-month interest rate spread calculated on the basis of the market price of a EUR/DKK FX swap and indicates the relationship between the day's rate and the forward rate for kroner against euro, converted into an interest rate spread. The most recent observations are from 4 December 2015.

Source: Nordea Analytics, Thomson Reuters Datastream, Thomson Reuters Eikon, ECB and Danmarks Nationalbank.

Market expectations of Danish overnight money market interest rates and of the spread between Denmark and the euro area

Chart 17



Note: The curves are forward interest rates calculated on the basis of CITA and EONIA interest rates swaps, respectively. Forward interest rates indicate what the overnight interest rate is expected to be at a given future date.

Source: Scanrate Rio.

The current account limits mean that the monetary policy counterparties must place a large share of their liquidity in certificates of deposit. Hence, the rate of interest on certificates of deposit is key for money market interest rates. The large spread between the rate of interest on certificates of deposit and the current account rate following the reduction of the former to -0.75 per cent has increased fluctuations in overnight interest rates in the money market, cf. Chart 18. These fluctuations are essentially technical and are also linked to the low level of activity in the market.

The tomorrow-next interest rate fixing on a given day is based on few transactions and depends on liquidity conditions in the market that day. Activity has to a large extent been driven by institutions with deposits below the current account limit lending from those exceeding the limit. For a while, the average rate of interest on such loan transactions has been somewhere between the rate of interest on certificates of deposit and the current account rate. This shows that institutions with deposits below the current account limit have been willing to borrow at a higher rate of interest than the marginal rate for the market overall – the rate of interest on certificates of deposit – because they have been able to deposit the funds in their current accounts at

the current account rate, cf. the article “The Money Market at Pressure on the Danish Krone and Negative Interest Rates” in this Monetary Review.

In December 2011, Danmarks Nationalbank offered its monetary policy counterparties 3-year loans. These loans were aimed at temporarily providing access to long-term funding for these institutions. 3-year loans were offered on two occasions, in March and September 2012, respectively, and total borrowing amounted to kr. 56 billion. The last of the 3-year loans expired on 25 September 2015. As the monetary policy counterparties had repaid the loans on a current basis, the outstanding volume on expiry was only kr. 80 million.

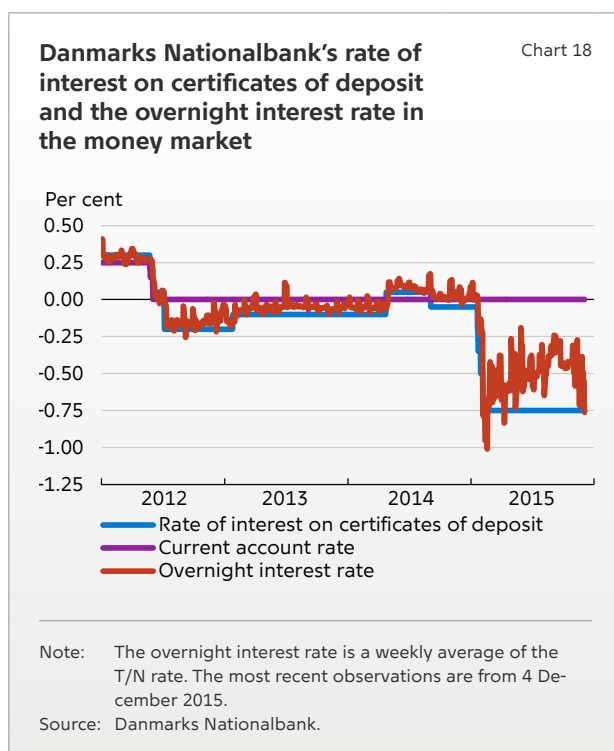
CAPITAL MARKET

In October, Danmarks Nationalbank resumed issuance of government bonds. By the beginning of December, five of the planned six auctions in the 4th quarter had been held, with total sales of kr. 23.3 billion. The announced target for total sales in the 4th quarter and in 2016 is kr. 100 billion. The last auction in 2015 will be held on 16 December.

Demand has generally been strong at the auctions. The ECB’s purchases of government bonds contribute to pushing down interest rates in core European countries, thereby making Danish government bonds more attractive. The declining FX swap interest rate spread between kroner and dollars, cf. the section on the money and foreign exchange markets, may also have an effect on demand for T-bills and short-term government bonds, as investors with access to dollars have been able to achieve a higher dollar return by borrowing kroner against dollars via FX swaps and investing in e.g. T-bills.

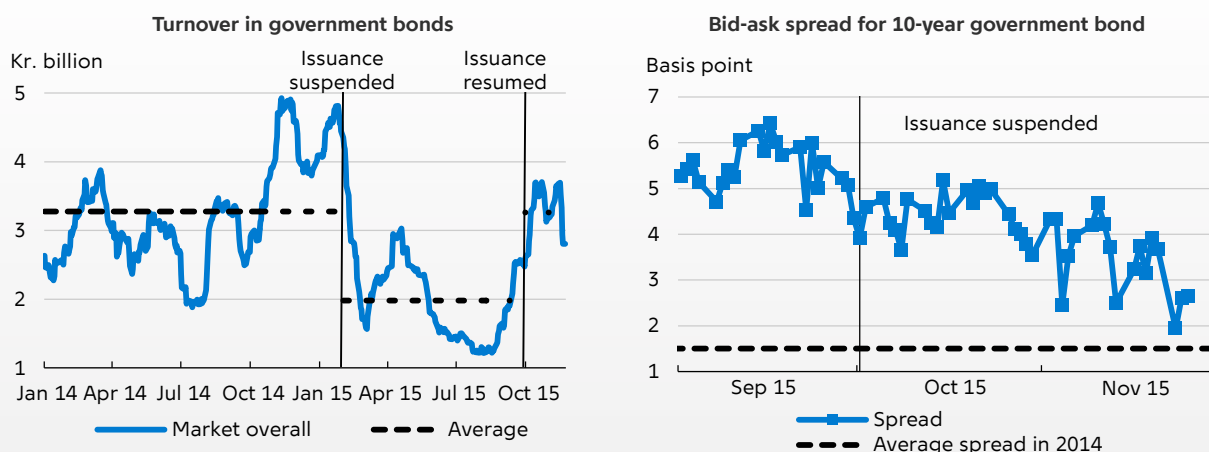
Since bond issuance was resumed, there have been indications that market liquidity has improved, cf. Chart 19. Turnover has increased in the market overall, and there is a tendency for the spread between bid and ask prices to have narrowed. In the most recent T-bill auctions, bidding has also been high relative to the amount allotted, and the marginal rates have fallen.

The yield on 10-year Danish government bonds fell by 0.25 percentage point from early September to early December 2015, cf. Chart 20 (left). The yield has more or less mirrored the equivalent German yield. The fall should be viewed in the



Turnover in government bonds and bid-ask spread

Chart 19



Note: Left-hand chart: The daily trading volume is calculated as a 30-day centred moving average. The trading volume for the market overall has been found via filtered MiFID data. Filtering comprises steps 2-8, as described in Danmarks Nationalbank *Danish Government Borrowing and Debt* 2013, Table 8.A.1. Right-hand chart: Daily bid-ask spreads have been calculated as the average bid-ask spread during the most liquid period of each day.

Source: Danish Financial Supervisory Authority and MTS Denmark.

light of market expectations of further monetary policy easing by the ECB. The 10-year yield spread to Germany briefly widened in connection with the resumption of government bond sales, but narrowed again in the subsequent weeks as liquidity in the market for Danish government bonds improved, cf. Chart 19 (right). Following the ECB's interest rate reduction on 3 December, both Danish and German government bond yields rose by around 0.2 percentage point.

The Danish 2-year yield was stable until the ECB interest rate meeting in October, after which it fell by approximately 0.3 percentage point. The German 2-year government bond yield also fell, but by a little less than the Danish yield. This caused the 2-year yield spread between Denmark and Germany to widen by just over 0.15 percentage point in the negative direction until mid-November. Factors such as the distortion of the FX swap market in dollars have contributed to increased demand for 2-year government bonds. 2-year yields rose by just under 0.15 percentage point in both Denmark and Germany after the ECB's interest rate reduction on 3 December.

Mortgage yields have broadly developed in line with government yields. The 30-year yield on callable mortgage bonds has been stable at a level of around 3 per cent, cf. Chart 21 (left). From late August until late October, the yield on

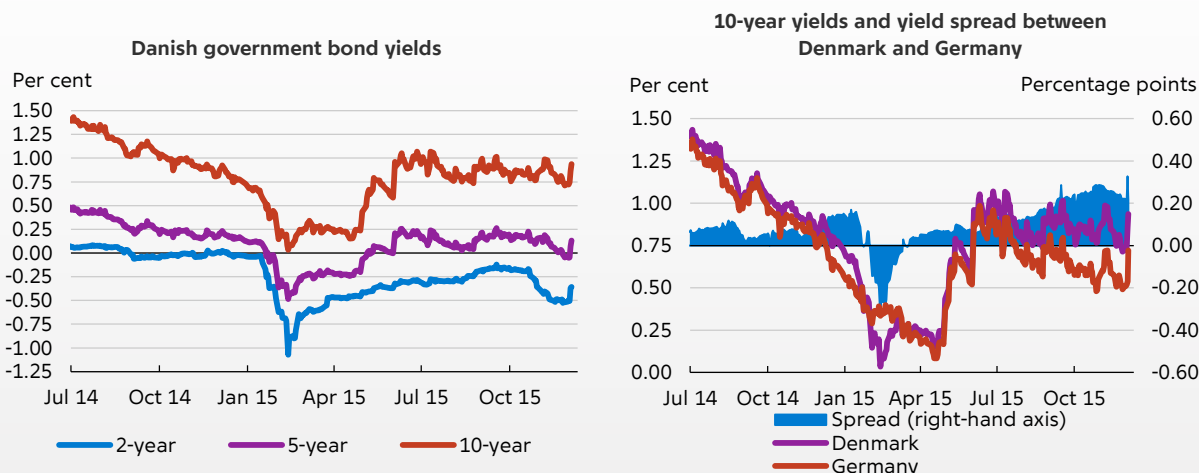
1-year fixed bullets for financing adjustable rate loans was also stable at just under 0 per cent. Since then it has fallen a little in line with the fall in short-term government bond yields.

Between mid-November and early December, the mortgage banks held fixed bullet auctions for financing adjustable rate loans with adjustment on 1 January 2016. Fixed bullets in kroner and euro for kr. 154 and 23 billion, respectively, were offered; this is considerably less than the value of the bonds maturing, which totalled kr. 213 billion. In addition, variable rate bonds for kr. 18 billion will mature in January 2016. Combined with remortgaging out of adjustable rate loans, spreading the refinancing auctions over the year has reduced the volume of refinancing with effect from January. So at kr. 120 billion, the value of maturing 1-year bonds for financing adjustable rate mortgages is considerably lower than in recent years and almost kr. 430 billion lower than in January 2010, when it peaked, cf. Chart 21 (right).

The volume of remortgaging has declined notably for fixed rate loans. Prior to the termination deadline at the end of October, fixed rate mortgage loans totalling around kr. 10 billion were terminated with effect from January, which is in line with the volume in the preceding quarter. By comparison, it was just over kr. 180 billion in the first two quarters this year.

Danish government bond yields and Danish and German 10-year government bond yields and yield spread

Chart 20

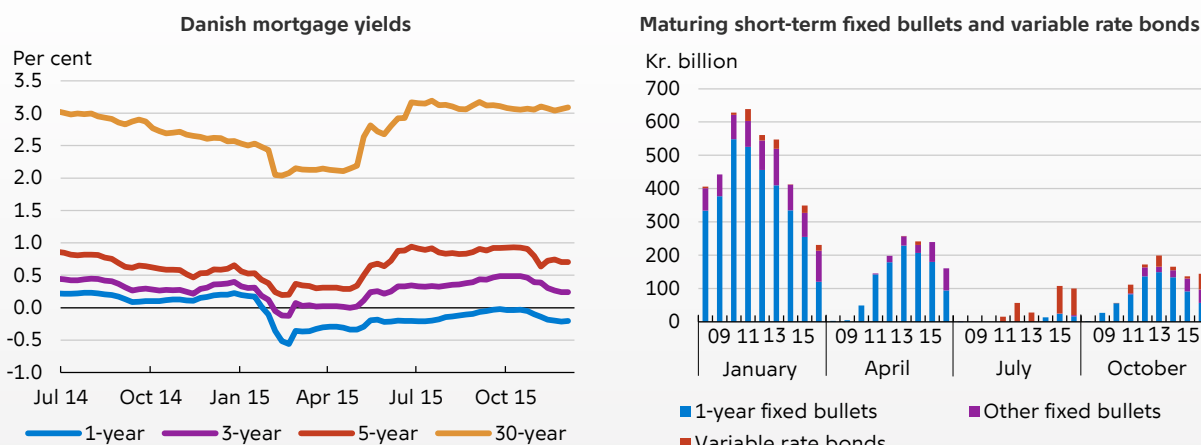


Note: Par yields, i.e. calculated yields for remaining maturities of exactly 2, 5 and 10 years. The most recent observations are from 4 December 2015.

Source: Nordea Analytics.

Mortgage yields and prevalence of mortgage loan types

Chart 21



Note: Left-hand chart: The 1-, 3- and 5-year mortgage yields are based on fixed bullets. The 30-year yield is a yield to maturity based on fixed rate callable mortgage bonds. The most recent observations are from 4 December 2015. Right-hand chart: Stated at nominal value the day before ordinary maturity. The calculations for January, April and October 2016 have been made on the basis of outstanding volumes at end-October 2015. Due to amortisation and remortgaging, the refinancing requirement is lower than the volume maturing. The distribution of short-term fixed rate bonds on loans with different refinancing frequencies has been estimated on the basis of changes in the nominal outstanding volumes within various intervals for remaining time to maturity. "1-year fixed bullets" has been calculated as the change in the nominal outstanding volume 0-1.5 years before the maturity of the bonds, "Other fixed bullets" has been calculated for a remaining time to maturity of more than 1.5 years.

Source: Nordea Analytics, Thomson Reuters Eikon, Nasdaq OMX and Danmarks Nationalbank.

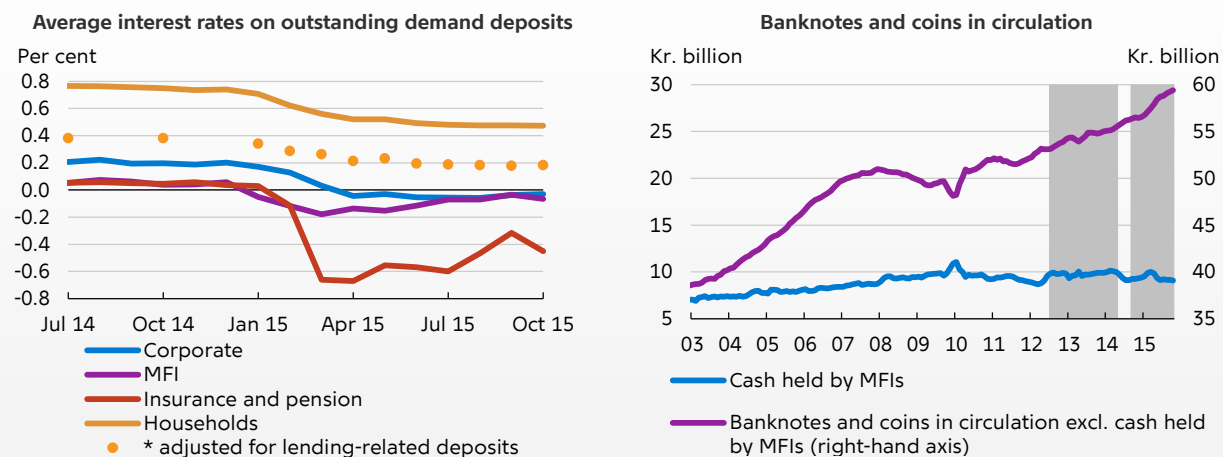
THE BANKS' AND MORTGAGE BANKS' LENDING, DEPOSITS AND INTEREST RATES

The banks' lending and deposit rates for households and the corporate sector were virtually unchanged from end-July to end-October 2015,

when the banks' lending rates for households and the corporate sector were 4.7 and 3.2 per cent, respectively, while deposit rates were 0.5 and 0 per cent. Compared with one year earlier, lending rates had fallen by 0.7 percentage point

Bank interest rates on demand deposits and banknotes and coins in circulation

Chart 22



Note: Left-hand chart: Average monthly interest rates. Demand deposits for households include deposits linked to mortgage-like bank loans, which means that the overall average rate of interest on demand deposits is somewhat higher than the rate of interest on the ordinary salary accounts of most households. In October 2015, almost 15 per cent of household demand deposits were linked to mortgage-like bank loans. The most recent observations are from October 2015. Right-hand chart: Banknotes include Faroese banknotes. Seasonally adjusted data shown as a 3-month centred moving average. The increased cash holdings of MFIs at the end of 2009 and the beginning of 2010 reflect the introduction of the new Danish banknote series and a period with overlapping banknote series. The grey areas denote periods with a negative rate of interest on certificates of deposit. The most recent observations are from October 2015.

Source: Danmarks Nationalbank.

for households and 0.6 percentage point for the corporate sector, while deposit rates had fallen by 0.4 and 0.3 percentage point, respectively.

Developments in deposit rates have been driven mainly by demand deposits. For households and the corporate sector, the rate of interest on demand deposits has been virtually unchanged in recent months, cf. Chart 22 (left). In parallel with the rise in money market interest rates until the end of September, the rate of interest on demand deposits from the pension and insurance sector and the MFI sector also rose. This has been particularly notable for the insurance and pension sector's rate of interest, which from late July to late September rose by 0.3 percentage point to -0.3 per cent, but has subsequently fallen back a little again.

Danmarks Nationalbank has conducted a survey of deposits at negative rates of interest; it shows that the share of deposits for which the rate of interest was negative in September 2015 was slightly smaller than the share accruing interest at a positive rate. However, most deposits were remunerated at 0 per cent. For MFIs and the insurance and pension sector, most deposits accrued interest at a negative rate, and the rate of interest was positive for only a very small share.

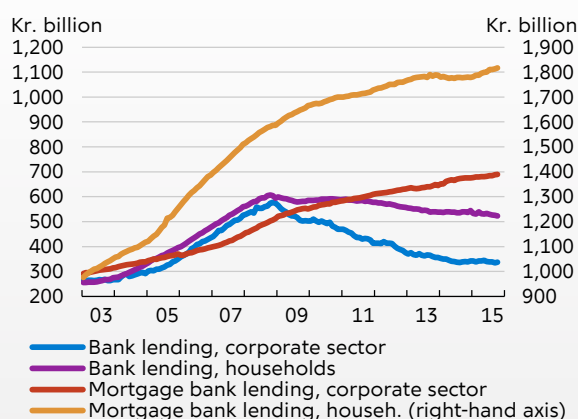
The value of banknotes and coins in circulation has increased by almost 4 per cent since the beginning of 2015. There are still no signs that the MFI sector, whose deposits are remunerated at a negative rate, has increased its holdings of cash to any notable degree, cf. Chart 22 (right). The same applies to the other sectors.

Total lending by banks and mortgage banks to households was unchanged from July to October 2015, while lending to the corporate sector increased by kr. 4 billion, cf. Chart 23. However, lending by banks to households and the corporate sector fell by kr. 7 billion, while lending by mortgage banks to the same sectors rose by kr. 11 billion. Viewed over the last year, lending to households and the corporate sector has risen by kr. 23 and 11 billion, respectively. For both sectors, lending by banks continues to decline, while lending by mortgage banks is rising.

Quarterly repayments on mortgage loans for owner-occupied dwellings and summer cottages continue to rise, reaching almost kr. 7 billion at the end of the 3rd quarter. There has been a steady increase in recent years. Since the spring of 2014, it has been driven mainly by fixed rate loans. The main reason is that customers have remortgaged into loans with amortisation and a

Lending by banks and mortgage banks to households and the corporate sector

Chart 23



Note: Seasonally adjusted lending at nominal value. Adjustment has been made for the break resulting from the transition to new MFI statistics in September 2013. The most recent observations are from October 2015.

Source: Danmarks Nationalbank.

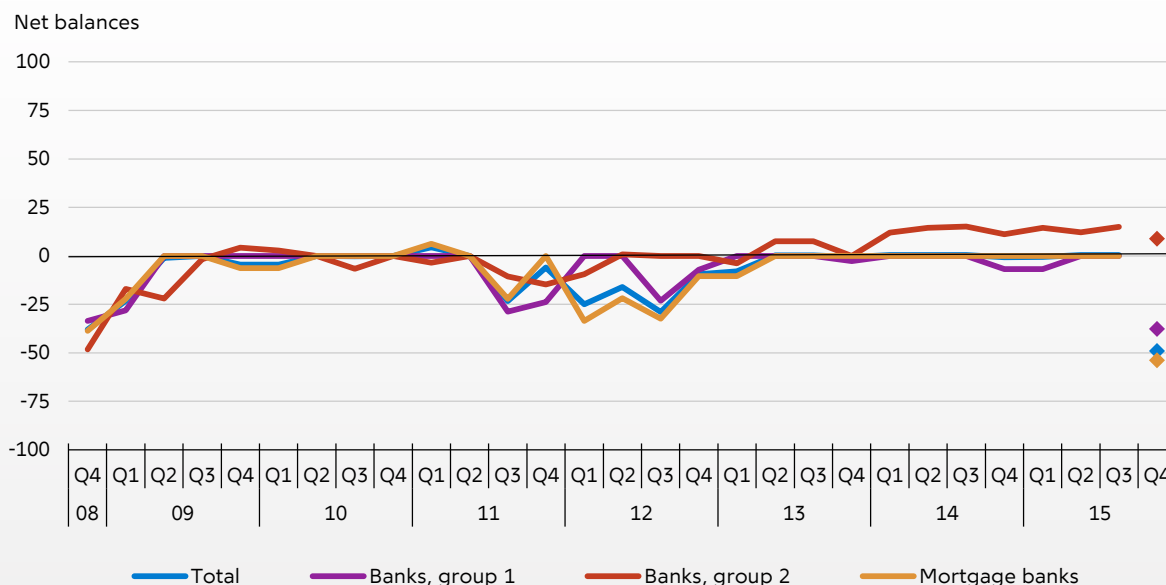
such as the low level of interest rates and expiry of the deferred amortisation period for some customers. The share of loans with amortisation has risen from 45 to 48 per cent during 2015.

In Danmarks Nationalbank's most recent lending survey, the large banks and mortgage banks responded that credit policies vis-à-vis both corporate and retail customers were unchanged in the 3rd quarter of 2015. But in recent quarters, the medium-sized banks have tended to report a slight easing of credit standards for retail and corporate customers. One of the underlying factors is an improved risk perception. In the survey, they state that they now have a more positive view of e.g. economic activity, the housing market and the outlook for specific industries and firms. Overall, the banks still indicate that the competitive situation points to easing, as it has done in the last two years. This has not affected overall credit standards. Following a prolonged period of unchanged credit standards for retail customers, the banks expect to tighten their standards in the 4th quarter of 2015, cf. Chart 24. The reasons cited include the new guidelines for good practice for financial corporations, which mean that from No-

fixed rate of interest for just over kr. 55 billion in the first three quarters of 2015, reflecting factors

Changes in credit standards for retail customers

Chart 24



Note: Retail customers are households excluding farms. The dots for the 4th quarter of 2015 indicate expectations. The net balance lies within the interval -100 to 100, where -100 corresponds to all institutions having "tightened considerably", -50 = "tightened somewhat", 0 = "unchanged", +50 = "eased somewhat" and +100 = "eased considerably". The banks have been divided into groups 1 and 2 as defined by the Danish Financial Supervisory Authority.

Source: Danmarks Nationalbank.

vember 2015 house buyers must, as a main rule, pay an own contribution of 5 per cent of the value of the home. Some mortgage banks also expect tighter credit standards in the 4th quarter due to an indirect effect of the good practice guidelines.

Statistics Denmark has looked at small and medium-sized enterprises' access to funding in 2014 in a theme publication based on a sample of approximately 2,000 firms. The report shows that in 2014 considerably fewer small and medium-sized enterprises applied for funding compared with the previous surveys in 2007 and 2010. At the same time, a larger share of firms obtained full funding of the amount applied for compared with the 2010 survey. This masks a higher degree of acceptance of loan applications by the banks, while the opposite applied to the mortgage banks. In fact, the survey shows that among the firms applying for mortgage funding, the share that received the full amount applied for fell from 60 to 50 per cent during this period, while lending by mortgage banks to the corporate sector has been steadily increasing. However, only approximately 5 per cent of the firms in the sample applied for mortgage funding, so the result is subject to considerably uncertainty. At the same time, the rise in the rejection rate does not necessarily indicate that credit standards have been changed, as the credit quality of the firms applying for loans must also be taken into account.

THE DANISH ECONOMY

DOMESTIC ACTIVITY

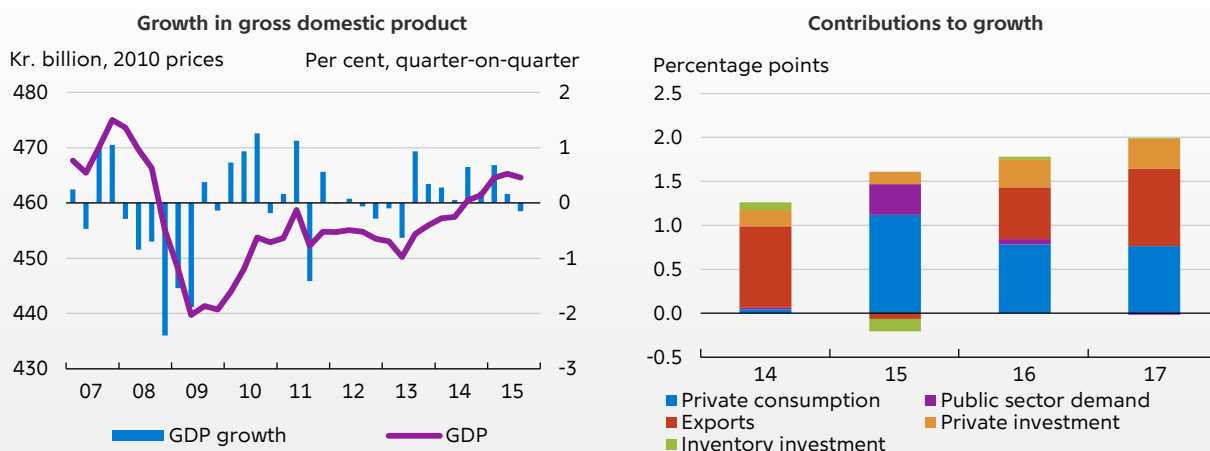
Following eight quarters of growth, GDP, adjusted for price developments and seasonal fluctuations, fell by 0.1 per cent in the 3rd quarter according to the preliminary statistics, cf. Chart 25 (left). The slowdown was mainly attributable to a decline in exports of goods. Domestic demand generally rose, driven by increased business investment. Private consumption was flat in the 3rd quarter, but if consumption of electricity and fuel is excluded, it grew by 0.8 per cent. Public consumption fell by 0.3 per cent, cf. Table 2.

Growth is set to be a little weaker this year and in 2016 than previously forecast, but the Danish economy is basically on the path to normalisation of capacity utilisation within the next couple of years. The labour market is strong, with rising employment and falling unemployment. Low oil prices and interest rates will drive the economy in future, both in Denmark and in Denmark's nearest export markets. Add to this a fall in the effective krone rate, which supports exports.

Growth in real GDP is forecast at 1.4 per cent this year, rising to 1.8 per cent in 2016 and 2.0 per cent in 2017. Compared with the most recent projection, this represents a downward adjustment of approximately 0.5 percentage point for the

Growth in real GDP and contributions to growth

Chart 25



Note: Left-hand chart: Seasonally adjusted. Right-hand chart: Contributions to GDP growth adjusted for imports.
Source: Statistics Denmark and own calculations.

Key economic variables

Table 2

Real growth on preceding period, per cent	2015						
	2014	2015	2016	2017	Q1	Q2	Q3
GDP	1.3	1.4	1.8	2.0	0.7	0.2	-0.1
Private consumption	0.5	2.2	2.0	2.2	1.0	-0.1	0.0
Public consumption	0.2	1.1	0.5	0.0	1.1	0.0	-0.3
Residential investment	3.1	-1.7	3.0	4.3	-1.0	-0.4	-1.6
Public investment	7.4	-2.3	-1.3	2.4	-9.4	0.1	-2.1
Business investment	2.1	2.2	3.6	4.6	-0.1	1.4	2.6
Inventory investment, etc. ¹	0.3	-0.4	0.2	0.0	-0.7	0.2	0.9
Exports	3.1	-0.7	2.2	3.6	1.8	-2.9	-1.7
Industrial exports	1.4	1.9	3.7	4.8	4.9	-2.4	-3.4
Imports	3.3	-1.6	2.4	3.9	-0.3	-3.0	0.4
Employment, 1,000 persons	2,765	2,793	2,818	2,850	2,783	2,790	2,797
Gross unemployment, 1,000 persons	134	124	118	114	127	125	122
Balance of payments, per cent of GDP	7.7	7.3	7.4	7.3	8.1	6.1	7.5
Government balance, per cent of GDP	1.5	-2.6	-2.8	-1.8	-3.1	-2.3	-2.3
House prices, per cent year-on-year	3.4	5.9	3.8	3.2	5.9	6.0	6.0
Consumer prices, per cent year-on-year	0.3	0.3	1.3	1.9	0.0	0.4	0.4
Hourly wages, per cent year-on-year	1.3	1.9	2.5	2.7	1.3	1.9	1.9

1. Contribution to GDP growth (this item comprises inventory investment, valuables and statistical discrepancy).

three years taken as one. Growth in the coming years is predicted to be driven mainly by exports and private consumption, and to a slightly lesser extent by private investment, cf. Chart 25 (right). Public sector demand is not forecast to contribute notably to growth.

The output gap, which is a measure of spare capacity, has been forecast at -1.5 per cent in 2015, and the economy is assessed to reach a normal level of capacity utilisation over the next couple of years. Growth in employment has been adjusted downwards in view of the slightly more subdued economic development and is now expected to rise by just under 65,000 from the 3rd quarter of this year to the 4th quarter of 2017. Part of the downward adjustment of output has been seen in industries where employment is low relative to output. The unemployment gap, which indicates how much unemployment can fall before reaching

a cyclically neutral level, is still expected to close in 2017. So the outlook remains unchanged, i.e. the capacity situation will tighten in the coming years, and by the end of the projection period there will be very little spare capacity left.

Exports in volume terms fell by 0.4 per cent in the first three quarters of the year compared with the same period of 2014, while imports fell by 1.2 per cent. This predominantly reflects a marked fall in both imports and exports of services, including sea freight, partly due to a slow-down in world trade. On the other hand, exports of goods rose. The fall in exports is expected to be temporary, and next year export volumes are forecast to grow by just over 2 per cent, rising to 3.6 per cent in 2017. Given Denmark's strong competitiveness, especially industrial exports are expected to grow as the international economy picks up.

Private consumption rose by 2.4 per cent in the first three quarters of the year compared with the same period of 2014, and the underlying drivers of further consumption growth are basically unchanged since the previous projection. Against the backdrop of increased employment and disposable income, as well as rising wealth due to higher house and equity prices, private consumption is forecast to grow by approximately 2 per cent p.a. in the coming years. Consumption

relative to household income, i.e. the consumption ratio, is set to grow towards 2017, albeit from a low level.

Residential investment declined in the first three quarters of 2015. This reflects a decrease in new construction, while there was a small increase in major repairs to and maintenance of existing properties. In the coming years residential investment is expected to rise again, supported by e.g. higher trading activity in the housing market,

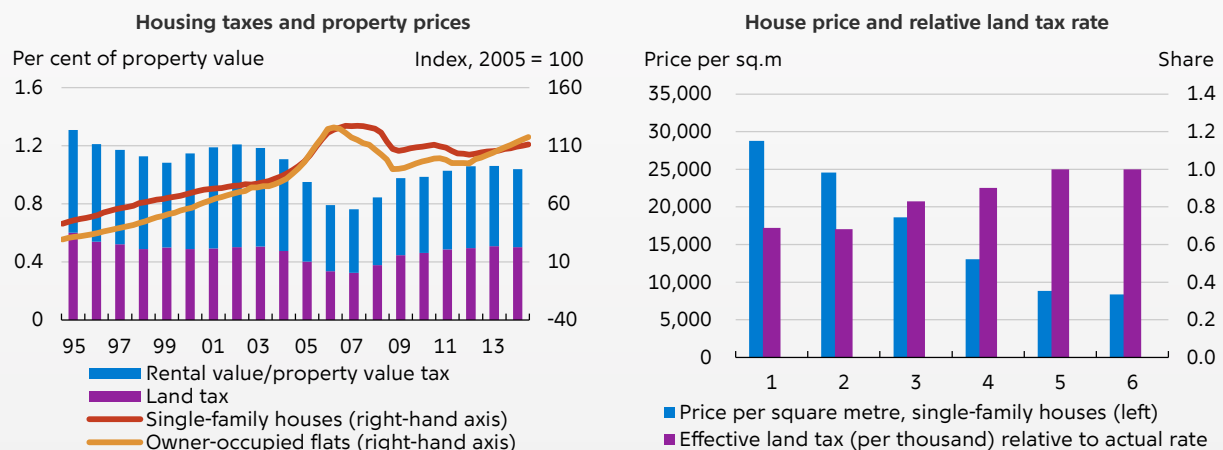
The freeze on land tax in 2016 has a destabilising effect on the housing market

Box 2

The agreement on the Finance Act for 2016 entails a freeze on land tax next year so that the nominal taxable land value is unchanged from 2015 to 2016. In 2017, the cap on the increase in land tax means that the land tax payable cannot increase by more than 7 per cent relative to the level in 2015 and 2016. This is in line with the current rules, but in that the point of departure – the taxable land value – is lower, the tax on homeowners will also be eased in 2017 and the coming years. With the freeze, land values will reach the uncapped level one year later than without the freeze. A revision of the land valuation system has been announced.

Neither land tax nor property value tax has had a stabilising effect on property prices since 2002, as the effective tax rates – tax paid relative to the taxation base – are procyclical, i.e. the rate of taxation falls when property and land prices rise, and vice versa, cf. the chart (left). This amplifies fluctuations in house prices, and the freeze on land tax in 2016 will increase the destabilising impact, especially in the areas where price increases are strongest.

Housing taxes and house prices and the relationship between effective and actual land tax rate in selected parts of Denmark



Note: Right-hand chart: 1 Copenhagen city, 2 Copenhagen's suburbs, 3 North Zealand, 4 Eastern Jutland, 5 Southern Jutland, 6 Northern Jutland. The bars show the seasonally adjusted price per square metre for single-family houses according to data from the Association of Danish Mortgage Banks and the effective land tax rate (per thousand) calculated as land tax paid relative to the official land value versus the statutory land tax rate.

Source: SKAT, Association of Danish Mortgage Banks, Statistics Denmark and own calculations.

In certain municipalities – especially in and around Copenhagen – land values have risen by considerably more than the statutory regulation percentage, which indicates how much land tax may rise from one year to another. This means that in these municipalities it will take some time before the gap between the capped and uncapped land tax rate closes. Hence, there is a considerable spread between

the statutory land tax rate and the effective rate, i.e. the land tax actually paid relative to the value of the land in the most recent public valuation, cf. the chart (right). At the same time, the municipalities with the largest spreads are those where house prices have risen most strongly and the pressure for further increases is highest so that the need for stabilisation is greatest.

which leads to renovation, as well as an upward trend in house prices, which makes new construction more favourable.

Business investment is forecast to grow by just over 2 per cent this year. Looking ahead, the combination of rising economic activity, low interest rates and higher capacity utilisation is expected to boost business investment further. This view is supported by a large savings surplus in the corporate sector. In the coming years, investments in plant and equipment are expected to grow at a faster rate than value added in the non-primary sector, i.e. the investment ratio for plant and equipment will rise. Conversely, business investment in building and construction is expected to increase less, so that the investment ratio will rise only slightly. This reflects factors such as a large number of vacant premises, which limits the need for non-residential construction.

The projection involves both upside and downside risks. The weaker development in the global economy is reflected in Danish exports. If this turns out to be a more general global slowdown, future exports may also be lower than expected, which could weaken growth. The primary upside factor is that upswings have previously been both faster and stronger than expected, driven by shifts in the propensity to consume and invest. That could lead to pressures on the labour and housing markets in the coming years, which may

derail the upswing. The preconditions for a sudden and strong increase in domestic demand are in place following a long period of consolidation, and on the supply side there are only few spare labour resources.

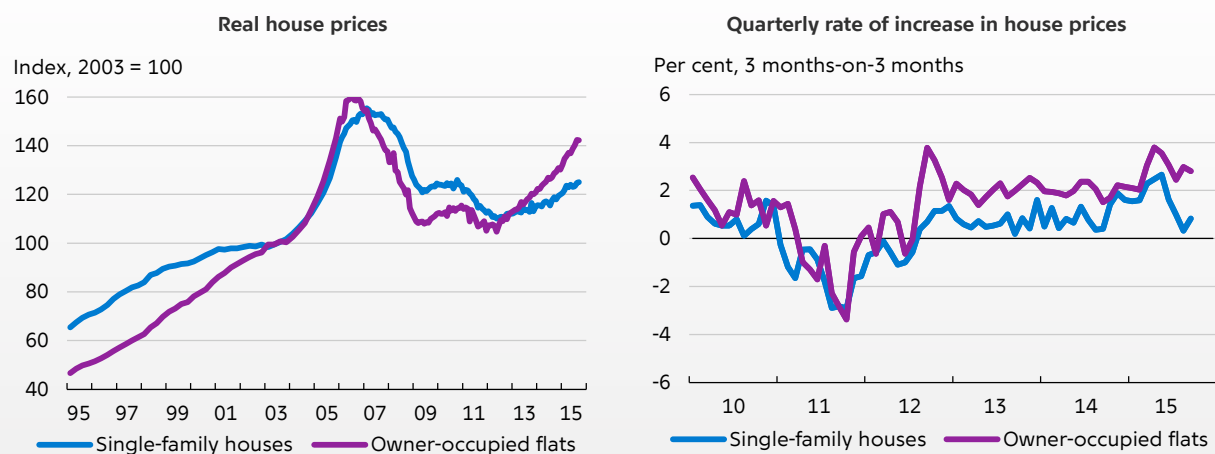
THE HOUSING MARKET

Developments in the housing market have been more subdued during the past six months after having accelerated in the first part of the year, cf. Chart 26 (left). Long-term interest rates have been rising since the beginning of the year and this seems to have dampened both activity and price increases. The trend is most pronounced for single-family houses and slightly less so for owner-occupied flats, and awareness is still needed, especially of the housing market in Copenhagen. The freeze on land tax in 2016 will have a destabilising effect on the housing market, especially in the areas where price increases are strongest, cf. Box 2.

For single-family houses, the quarterly rate of price increase fell from 2.7 per cent in May to just under 1 per cent in September – i.e. the months July-September relative to the preceding three months, cf. Chart 26 (right). The annual rate of price increase is just over 6 per cent. Quarterly price increases for owner-occupied flats have also slowed down since the spring, but the rate of increase is around 3 per cent, and thus high, as it has been for some time now.

Real house prices and rate of increase in house prices

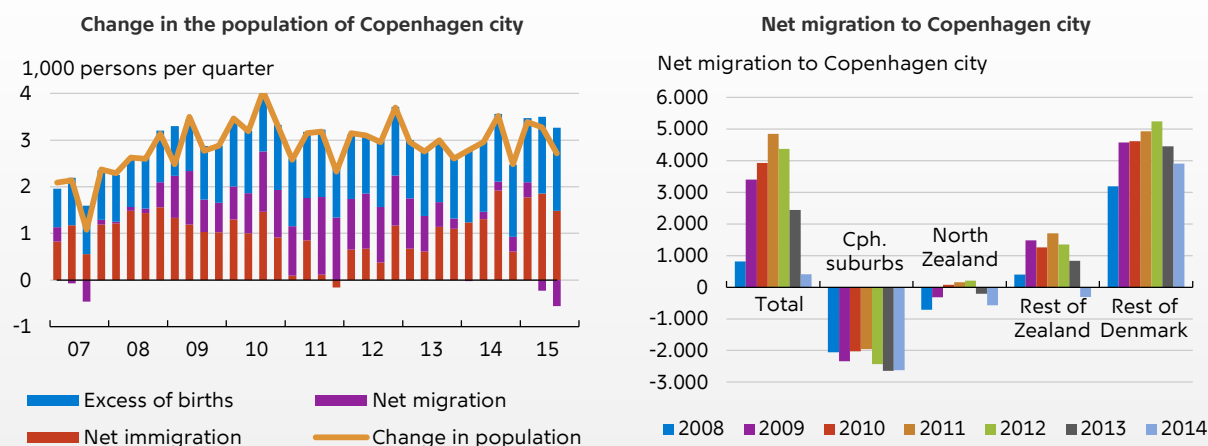
Chart 26



Note: Own seasonal adjustment. Left-hand chart: House prices deflated using the consumer price index. Right-hand chart: 3-month periods relative to the preceding 3-month period. The most recent observation is for July-September.
Source: Statistics Denmark.

Development in the population of Copenhagen

Chart 27



Note: Copenhagen city includes the cities of Copenhagen and Frederiksberg and the municipalities of Tårnby and Dragør. Left-hand chart: The distinction between net immigration and migration reflects where the person in question comes from and moves to. Net immigration is to and from abroad, while net migration is to and from other parts of Denmark.

Source: Statistics Denmark and City of Copenhagen. Own seasonal adjustment.

Trading activity, measured by the number of sales registered in the land register, has fallen back after the surge at the beginning of the year. This applies to both single-family houses and owner-occupied flats. For both housing types, trading activity is still around 20 per cent higher than one year ago, but viewed in a longer-term perspective the number of sales of single-family houses is low relative to the housing stock, while it is at the pre-crisis level for owner-occupied flats. At approximately 280 days, the time on market is also relatively high for houses, as is the supply of homes for sale. This shows that a backlog of houses ready for sale has accumulated in many parts of Denmark. That will dampen price increases in the areas in question.

At the regional level, the highest increases have been seen in and around Copenhagen. There are indications that in these areas, too, the price curve has become less steep recently, but the rate of increase remains high, driven by strong population growth, which boosts demand for housing, cf. Chart 27 (left). Net migration to Copenhagen from the rest of Denmark has decreased in recent years, and in 2014 migration to and from other Danish municipalities almost balanced. More people are moving to nearby commuter areas, i.e. the

suburbs of Copenhagen, northern Zealand and the rest of Zealand, cf. Chart 27 (right). Presumably this will help to dampen the upward price pressures on owner-occupied flats in the city, but on the other hand there is considerable immigration from abroad.

Housing market expectations⁶ peaked in the spring and have subsequently weakened a little. However, a positive development is still expected in the housing market.

House prices for Denmark overall are forecast to grow by almost 6 per cent this year. Most of this increase has already taken place, and the forecast is unchanged compared with the previous projection. In the coming years, the rate of increase is expected to be more subdued at 3-4 per cent p.a. The continued increase in house prices should be viewed in the light of the very low level of interest rates, the improved economic situation in general and positive expectations of housing market developments.

FOREIGN TRADE AND BALANCE OF PAYMENTS

In value terms, exports of both goods and services declined in the 3rd quarter, thereby falling back to the level one year earlier after fairly strong increases in late 2014 and early 2015.

6 Measured by Nykredits Huspristillid (the Nykredit house price confidence indicator) and the Green house confidence indicator.

Adjusted for normal seasonal fluctuations, exports of goods, excluding ships and aircraft, etc., fell by just over 3 per cent relative to the preceding quarter, cf. Chart 28 (left). Imports rose slightly. With a monthly surplus of just under kr. 5 billion in recent months, the trade balance is somewhat lower than at the beginning of the year.

The fall in exports of goods has been broadly distributed on countries. For example, sales of mink furs to China and Hong Kong have declined, as have fuel exports. Exports of machinery have also fallen, mainly reflecting lower sales of parts for wind turbines to Germany and other countries. Conversely, sales of pharmaceuticals to the USA have risen. Exports of services also fell in the 3rd quarter due to lower sales of sea freight, cf. Chart 28 (right).

Developments in foreign trade in the 3rd quarter indicate that exports – in both value and volume terms – will be weaker this year than previously expected. This applies to both goods and services. Growth in Denmark's export markets has been adjusted downwards in the forecast and is expected to be around 4.5 per cent p.a. in the coming years, cf. Appendix 1. Against that background, growth in exports of goods, including industrial exports, is forecast to be a little weaker next year. Likewise, the slowdown in world trade means that the outlook for exports of services, which are dominated by sea freight, are less positive. All the same, there is a basis for strong-

er export growth in the medium term. For some years, wage growth has been more subdued than in other countries, and the effective krone rate has weakened over the last year. That is a good point of departure for higher future exports when the export markets pick up.

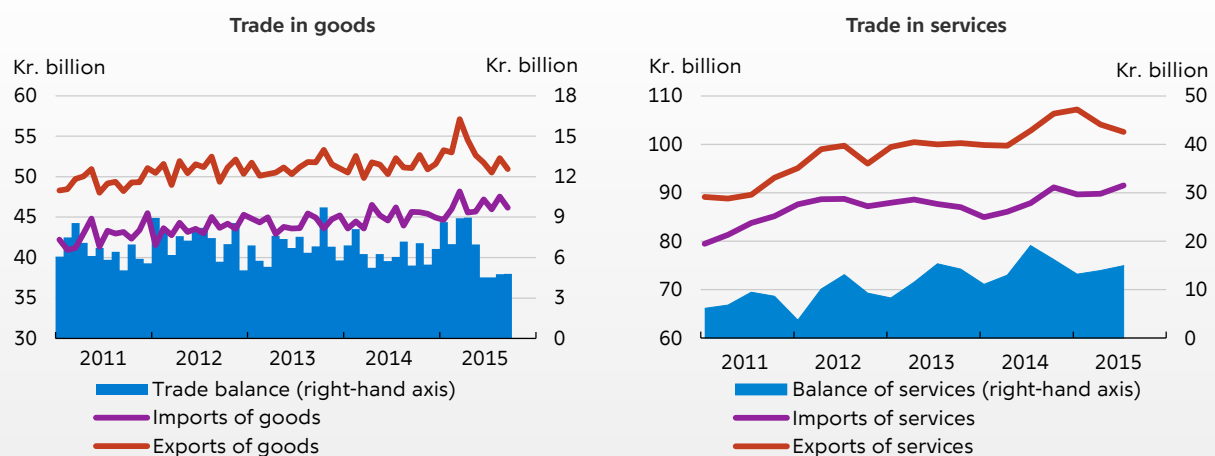
The seasonally adjusted current account surplus was kr. 12.5 billion in September 2015. Calculated as a 12-month sum until September, the surplus amounted to almost kr. 150 billion, corresponding to nearly 8 per cent of GDP. That is slightly lower than in the preceding 12-month period. The current account surplus is to some extent a result of low private consumption and especially investment. Both are expected to rise in the coming years. Even if consumption and investment ratios return to their long-term averages, the current account surplus will still be considerable. This is attributable to large private sector savings. The cyclically adjusted surplus is forecast at around 4-5 per cent of GDP, which is slightly above the average for the last 20 years, cf. the article "Balance of Payments, Net External Assets and Foreign Exchange Reserve" in this Monetary Review.

LABOUR MARKET AND CAPACITY

According to the national accounts, employment rose by 6,300 in the 3rd quarter, cf. Chart 29 (left). This means that employment has risen by approximately 60,000 since it bottomed out in 2012. The

Balance of trade and balance of services

Chart 28



Note: Current prices.
Source: Statistics Denmark.

increase has taken place in the private sector only, while public sector employment has been falling slightly. The rise in employment is expected to continue in the coming years. Of the increase in employment of 65,000 from the 3rd quarter of 2015 to the end of 2017, just under half will be attributable to the economic recovery while the rest will reflect increased structural employment. Underlying factors include the 2011 retirement reform, which will boost the structural participation rate in the coming years. Add to this positive net immigration. However, part of the latter is related to an increased influx of asylum seekers, who are expected to contribute less to employment.

The rise in employment is broad-based across industries, public administration being the only industry that has seen a notable fall in employment, cf. Chart 29 (right). Growth in employment has been strongest in the service and trade sectors and in construction.

The labour market gap, which indicates how much employment can rise without causing inflationary pressures, is assessed to be just under 40,000 persons in 2015, of which gross unemployment accounts for approximately 10,000. The gap is expected to narrow over the next couple of years and will be marginally positive by end-2017. Hence there is a risk of a stronger-than-expected increase in capacity pressures in the Danish

economy over a short-term horizon if the rise in activity exceeds the forecast.

The rise in employment in the 3rd quarter has only to a limited extent come from the ranks of the unemployed, so the labour force has increased. Gross unemployment was 120,400 in October, corresponding to 4.5 per cent of the labour force. By end-2017, gross unemployment is expected to be just over 110,000, more or less corresponding to the structural level, so that the labour reserve in this group will have been absorbed.

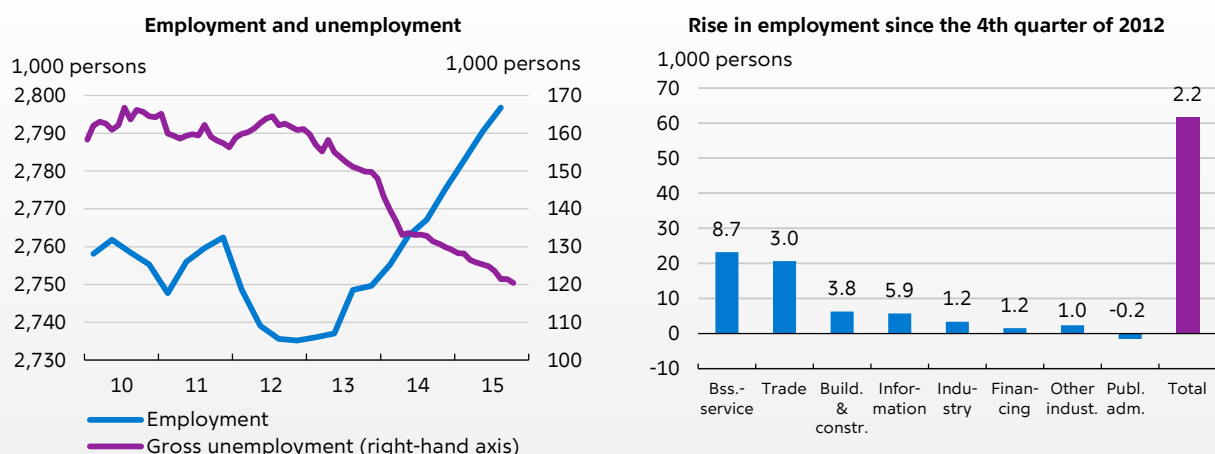
WAGES

Private sector wage growth is accelerating. According to Statistics Denmark, wages in the private sector labour market were 1.5 per cent higher in the 3rd quarter than one year earlier. The rate of increase was 1.4 per cent in the building and construction sector, while it was around 2 per cent in parts of the service sector. These are the areas where the increase in employment has been most pronounced. Employment has also increased in the manufacturing industries, where wages have risen by 1.9 per cent over the last year, cf. Chart 30.

Wage growth is expected to accelerate further in the coming years as the labour market continues to tighten. Industrial wages are forecast

Employment, unemployment and rise in employment since the 4th quarter of 2012

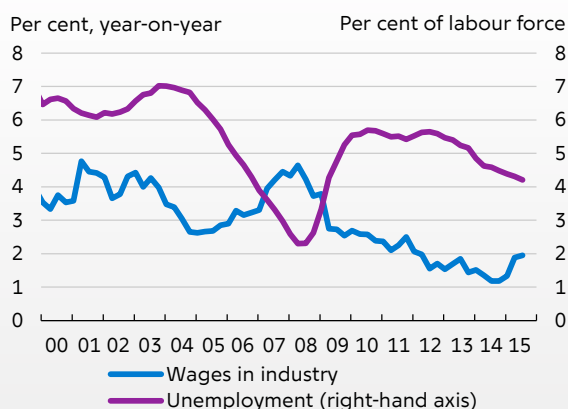
Chart 29



Note: Left-hand chart: Number of people in employment according to the national accounts. Right-hand chart: The bars indicate the increase in employment since the 4th quarter of 2012, while the numbers above the bars show the percentage increase.
Source: Statistics Denmark.

Wage growth and unemployment

Chart 30



Source: Statistics Denmark and Danmarks Nationalbank.

to rise by 1.9 per cent this year, 2.5 per cent in 2016 and 2.7 per cent in 2017. With inflation set to be very low, this will entail a sizeable increase in real wages. Given the higher rate of increase in Denmark, it is not likely that wage growth will contribute to improved wage competitiveness in the coming years. There is room for this in the economy.

Public sector wage growth is affected by developments since 2008, when wages for a period

rose at a faster pace than in the private sector. This situation will reverse in the coming years as public sector wages are regulated relative to private sector wages so that they ultimately move in parallel. Over the last year, regional and local government wage increases have been 2.5 and 1.9 per cent, respectively, while central government wage growth has been somewhat lower. This is because a significant share of the agreed wage increases will take place at the end of the collective agreement period, i.e. in 2017. So public sector employees can also look forward to higher real wages in the coming years.

PRICES

Consumer prices are still rising only slightly, cf. Chart 31 (left). The annual rate of increase in the EU Harmonised Index of Consumer Prices, HICP, was 0.2 per cent in October, down from 0.3 per cent in the preceding month. Especially the lower energy prices have a strong downward impact, while import prices excluding energy have made a positive contribution since the turn of the year, cf. Table 3.

Core inflation – calculated as HICP excluding energy and unprocessed food – is slowly rising and stood at 1.0 per cent in October, cf. Chart 31 (right). This is attributable to factors such as high-

Consumer prices

Table 3

Per cent, year-on-year	Weights ¹	2015/16				2015					
		2014	2015	2016	2017	Q3	Q4	Q1	Oct.	Nov.	Dec.
HICP		0.3	0.3	1.3	1.9	0.4	0.4	1.0	0.2	0.4	0.5
Index of net retail prices	100.0	0.7	0.7	1.3	2.0	0.8	0.8	1.1	0.6	0.7	0.9
Exogenous:											
Energy	7.8	-2.8	-10.1	-5.2	2.5	-10.3	-11.3	-6.6	-11.9	-12.7	-8.9
Food	4.6	-1.5	3.0	3.3	1.8	3.2	4.0	4.3	3.5	4.1	4.5
Adm. prices	4.2	1.4	0.9	2.5	3.1	1.5	2.2	2.1	2.1	2.3	2.3
Rent	26.1	2.5	2.1	1.9	2.3	2.1	1.9	2.0	2.0	1.9	1.9
Excl. exogenous:	57.3	0.7	1.4	1.6	1.8	1.4	1.4	1.3	1.5	1.8	1.4
Imports	18.1	-0.8	2.4	1.9	1.6	3.3	2.9	2.3	3.0	3.0	2.7
IMI	39.2	1.2	1.0	1.5	1.9	0.8	0.9	1.0	0.8	1.2	0.7

Note: The most recent actual figures are from October 2015.

1. Weight in the index of net retail prices, per cent. The weights are from January 2015.

er prices for imports due to the weaker effective exchange rate of the krone, while the lower oil price on the other hand exerts downward pressure on core inflation as the lower energy prices ripple through to consumer goods and services.

Danish consumer prices mirror those of the euro area closely. In 2015 to date, both HICP inflation and underlying inflation have been a little above the euro area level.

Domestic market-determined inflation, IMI, was 0.8 per cent in October. This is lower than at the beginning of the year. In the slightly longer term, IMI is determined by developments in the level of costs in the economy, including wages. But in the short term firms typically keep their retail prices unchanged, thereby absorbing some of the fluctuations in input prices via gross profits. The development in IMI indicates that in 2015 to date firms have found it hard to fully pass on the higher import prices to consumers. Hence, domestic price pressures remain limited.

In October, the price index for the domestic supply of goods was broadly unchanged compared with one year earlier. This means that price pressures from the wholesale link remain weak. Energy prices have a strong downward impact, and wholesale prices excluding energy were 2.8 per cent higher than in October 2014. The reason is that the price of imports excluding energy was 3.5 per cent higher in October than one year

earlier, mainly due to the lower effective krone rate. Producer prices for Danish goods excluding energy have been flat since 2013.

The price of oil has fallen further since the September projection so that energy prices will curb consumer prices for the rest of 2015 and throughout most of 2016. Consequently, the increase in consumer prices is forecast at 0.3 per cent this year, rising to 1.3 per cent next year and 1.9 per cent in 2017, when the effect of the fall in oil prices will no longer be seen.

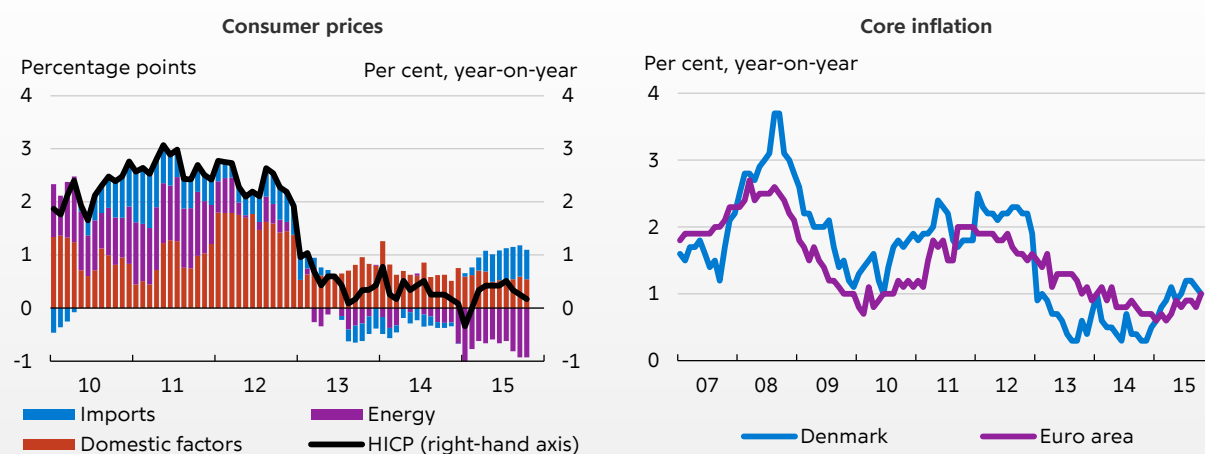
PUBLIC FINANCES

Real public consumption is expected to rise by 1.1 per cent this year. Growth in public consumption is forecast to be fairly subdued in the years to come. For several years, the government has been planning to reduce public investment, but this has proved to be difficult, and aggregate public sector demand has remained high, cf. Chart 32 (left). The projection assumes that the level of public investment will be reduced somewhat.

The government budget is forecast to show a deficit of 2.6 per cent of GDP this year. Thanks to the pension package, extraordinary revenue corresponding to 0.8 per cent of GDP has been brought forward in 2015. A government budget deficit of 2.8 per cent of GDP is forecast for 2016. One of the reasons for this increase is that there will no longer be any temporary revenue from the

Increase in consumer prices and core inflation

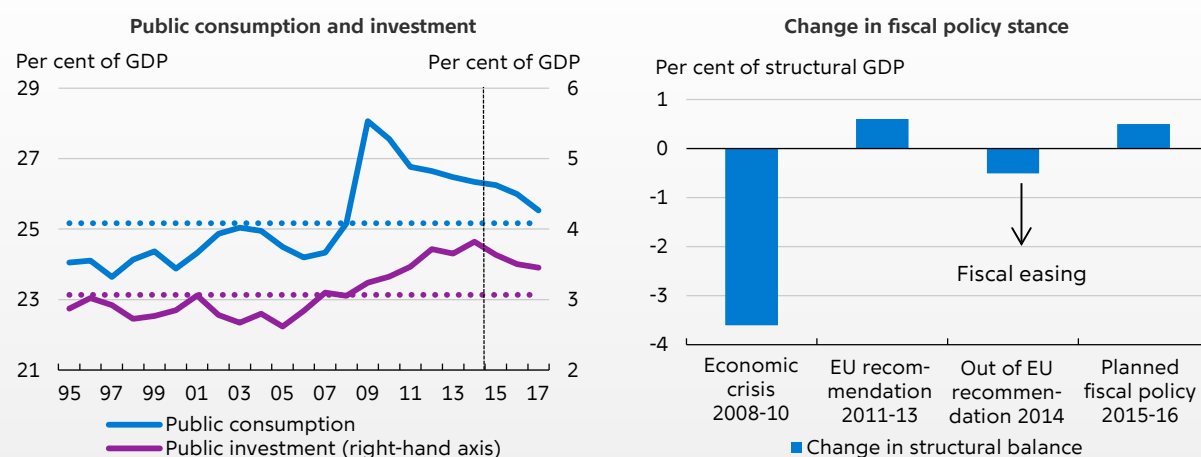
Chart 31



Note: Left-hand chart: HICP is the EU Harmonised Index of Consumer Prices. The contributions add up to HICP inflation. Right-hand chart: Core inflation is HICP excluding energy and unprocessed food.
Source: Statistics Denmark.

Public consumption and investment and change in structural balance

Chart 32



Note: Left-hand chart: The broken lines are averages for the period 1995-2014. Danmarks Nationalbank's projection. Right-hand chart: Change in the Ministry of Finance's compilation of the structural balance in the Finance Bill from September 2015.

Source: Statistics Denmark, Ministry of Finance and Danmarks Nationalbank.

pension package. In 2017 the deficit will decrease to 1.8 per cent of GDP as the economy picks up.

The compilation of the structural balance made by the Ministry of Finance still indicates that fiscal policy will be very close to the limit specified in the Budget Act. According to the Act, the structural deficit may not exceed 0.5 per cent of GDP when the Finance Bill is presented. In September 2015, the government expected a structural deficit of 0.9 per cent of GDP this year, falling to 0.4 per cent of GDP in 2016. That leaves only a very small margin for unforeseen events such as an even stronger influx of asylum seekers. Although tightening of fiscal policy is envisaged for next year, there is a risk that this will only to a limited extent dampen activity, cf. Chart 32 (right). Expenses for asylum seekers have been funded by cutting development aid, which has a very small effect on domestic demand, and hence there is a risk that the activity-dampening element will be undermined. When presenting the Finance Bill, the government forecast that fiscal policy – measured as the 1-year fiscal effect – will be virtually GDP neutral this year, but will have an activity-dampening effect of 0.2 percentage point in 2016.

ECONOMIC POLICY

Despite a slightly weaker economic development and downward adjustment of the growth forecast for this year and next year, the Danish economy is

in an upswing and on the path to normalisation of capacity utilisation. The output gap is expected to close during the next couple of years. In that situation, fiscal policy should gradually be adjusted from currently stimulating activity to having a neutral effect on the economy.

The agreed Finance Act for 2016 includes tightening of fiscal policy in order to keep the structural deficit within the 0.5 per cent of GDP stipulated in the Budget Act, albeit with only a narrow margin. Such tightening would be well-timed in a cyclical perspective. However, it is important that the agreed and budgeted fiscal policy is actually implemented so that the structural balance does not slide and the deficit becomes larger than assumed, as has been seen in the previous two years.

Funding of any expenses beyond those budgeted for in connection with the increased influx of asylum seekers by cutting development aid entails a risk that fiscal policy will not dampen activity to the extent envisaged. But a cause for special concern is the freeze on land tax, which will have a destabilising effect on the housing market in the areas where price increases have been most pronounced. The tax savings for homeowners apply both this year and in the coming years and are greatest in areas where price rises are already unsustainably high. Self-reinforcing price increases have previously been a source of macroeconomic

instability and the risk that this could happen again is higher because housing taxes do not dampen price fluctuations – on the contrary. There is an urgent need to find a solution that ensures a link between house prices and housing taxes.

Furthermore, it is necessary to increase the supply of labour, which can help to reduce pressures on the labour market at a time when the economy is approaching its normal capacity as demand normalises.

Denmark's persistent current account surplus has led to the build-up of substantial net foreign assets. This has contributed to narrowing the monetary policy interest rate spread between Denmark and the euro area and hence the level of monetary policy interest rates in Denmark in the longer term. The large net foreign assets meant that domestic investors taken as one must place part of their portfolios in external assets.

If Danish investors are not willing to take on the foreign exchange risk associated with larger net external assets, it falls upon Denmark's Nationalbank, and the interest rate spread narrows or becomes negative. Maintaining a stable exchange rate of the krone is essential. Purchase of foreign exchange for the foreign exchange reserve is typically offset by an increase in short-term debt to the banks. A larger foreign exchange reserve does not entail a change the risk profile.

APPENDIX 1: ASSUMPTIONS IN THE PROJECTION FOR THE DANISH ECONOMY

The projection has been prepared using the macroeconomic model MONA⁷ and is based on the available economic statistics, including Statistics Denmark's preliminary quarterly national accounts for the 3rd quarter of 2015. The projection involves a number of assumptions concerning the international economy, financial conditions and fiscal policy.

THE INTERNATIONAL ECONOMY

The international economy and those of most of Denmark's trading partners are gradually recovering. GDP growth in the euro area has generally been moderate and the upswing is broad-based. The international growth outlook is supported by low oil prices and interest rates as well as a low rate of the euro against e.g. the dollar. But compared with the previous projection, growth estimates have been adjusted downwards for both 2015 and 2016. This is attributable primarily to lower import growth in the emerging market economies. Overall, growth in the markets for Danish industrial exports is assumed to 2.9 per cent this year and by 4.0 per cent and 4.6 per cent in 2016 and 2017, respectively, cf. Table 4.

Foreign wage growth is assumed to be modest as labour markets are still weak, although pressures are mounting in several countries. The fall in oil prices will keep inflation at bay among most of Denmark's key trading partners. All in all, prices in Denmark's export and import markets are expected to fall both this year and next year. Moderate foreign price increases are expected in 2017.

INTEREST RATES, EXCHANGE RATES AND OIL PRICES

Developments in short-term and long-term interest rates in the projection are based on the expectations of future developments that can be derived from the interest rate curves in the financial markets. The 3-month money market interest rate, measured by the CITA swap rate, was negative at just below -0.4 per cent in early December

⁷ The model is described in Denmark's Nationalbank, *MONA – a quarterly model of the Danish economy*, 2003.

2015 and is expected to rise to almost 0.0 per cent towards the end of 2017.

The average bond yield is an average of the yields to maturity on outstanding government and mortgage bonds. It was just below 1.0 per cent at the beginning of December and is assumed to rise to just over 1.7 per cent by the end of 2017.

The effective exchange rate of the krone fell at the beginning of the year and is somewhat lower than in 2014; it is expected to remain at this level throughout the projection period. In the projection, the dollar rate is assumed to remain constant at the current level.

The price of oil fell sharply from the summer of 2014 until January 2015. It rose from January to May, but has subsequently fallen back again. In early December, the price of oil was just under 45 dollars per barrel. The oil price is assumed to develop in line with futures prices, rising to just over 55 dollars towards the end of 2017.

FISCAL ASSUMPTIONS

The projection is based on the planned fiscal policy in the agreements on the Finance Act for 2016 from November, the agreements on local and regional government budgets for 2016 from October and the Budget Review and updated 2020 scenario from September.

For 2015, revenue of kr. 15 billion is expected from the government's pension package, which provides for tax relief not only on capital pensions but also on pension disbursements from Lønmodtagernes Dyrtdidsfond, LD.

Real public consumption is assumed to rise by 1.1 per cent this year, cf. Table 4. Consumption growth is forecast at 0.5 and 0.0 per cent in 2016 and 2017, respectively. Public investment is expected to fall by 2.3 per cent this year and by 1.3 per cent next year and then to rise by 2.4 per cent in 2017.

Overview of projection assumptions

Table 4

	2014	2015	2016	2017
International economy:				
Export market growth, per cent year-on-year	3.9	2.9	4.0	4.6
Export market price ¹ , per cent year-on-year	-0.6	-1.7	-0.3	1.6
Foreign price ² , per cent year-on-year	-0.6	-1.7	-0.3	1.6
Foreign hourly wages, per cent year-on-year	2.2	1.9	2.3	2.5
Financial conditions, etc.:				
3-month money market interest rate, per cent p.a.	0.0	-0.4	-0.4	-0.2
Average bond yield, per cent p.a.	1.3	1.0	1.3	1.6
Effective krone rate, 1980 = 100	103.3	99.1	99.0	99.0
Dollar exchange rate, DKK per USD	5.6	6.7	6.9	6.9
Oil price, Brent, USD per barrel	99.0	52.9	48.1	53.8
Fiscal policy:				
Public consumption, per cent year-on-year	0.2	1.1	0.5	0.0
Public investment, per cent year-on-year	7.4	-2.3	-1.3	2.4
Public sector employment, 1,000 persons	817	816	819	818

1. Weighted import price for all countries to which Denmark exports.

2. Weighted export price for all countries from which Denmark imports.

APPENDIX 2: REVISIONS IN RELATION TO THE PREVIOUS PROJECTION

The growth outlook for Denmark has been adjusted downwards for both 2015 and 2016. The downward adjustment for 2015 is mainly attributable to declining exports in the 3rd quarter. Both industrial exports and shipping have been adjusted substantially downwards.

Growth in Denmark's export markets has declined notably in both 2015 and 2016, cf. Appendix 1. The lower price of oil and the lower effective krone rate point in the opposite direction.

Interest rates have been adjusted downwards since September, but not sufficiently to seriously affect GDP growth or inflation. Money market interest rates have been adjusted downwards from just under 0.1 per cent to just over -0.3 per cent in 2016, while bond yields have changed only marginally.

The forecast for HICP inflation has been adjusted downwards relative to the September projection due to the falling oil prices. However, this effect is to some extent offset by the lower effective krone rate.

Revisions in relation to the previous projection

Table 5

Per cent, year-on-year	GDP			Consumer prices, HICP		
	2015	2016	2017	2015	2016	2017
Projection, August 2015	1.8	2.1	1.8	0.3	1.5	1.9
Contribution to revised forecast from:						
Export market growth	-0.2	-0.2	0.0	0.0	0.0	0.0
Interest rates	0.0	0.0	0.0	0.0	0.0	0.0
Exchange rates	0.0	0.1	0.0	0.0	0.1	0.1
Oil prices	0.0	0.1	0.0	0.0	-0.3	0.0
Other factors	-0.2	-0.2	0.2	0.0	0.0	0.0
This projection	1.4	1.8	2.0	0.3	1.3	1.9

Note: The transition from the previous to this projection may not add up due to rounding. "Other factors" includes data revisions.

ARTICLES

BALANCE OF PAYMENTS, NET FOREIGN ASSETS AND FOREIGN EXCHANGE RESERVE

Søren Lejsgaard Autrup, Paul Lassenius Kramp,
Erik Haller Pedersen and Morten Spange, Economics

INTRODUCTION AND SUMMARY

Since 1990, the current account of Denmark's balance of payments¹ has shown a surplus. This follows a long period of deficits. Consequently, the foreign debt, which peaked at approximately 45 per cent of the gross domestic product, GDP, in the second half of the 1980s, has made way for net foreign assets of the same magnitude, cf. Chart 1. The shift from a debtor to a creditor nation reflects a considerable increase in gross savings in the economy over the last 30-35 years.

At present the current account surplus is almost 8 per cent of GDP. This is the highest level in the post-war era, to some extent reflecting the cyclical position with low investment and consumption ratios. But even in the event of normalisation of these ratios and a return to a neutral cyclical position, Denmark's current account is estimated to show a surplus of around 4-5 per cent of GDP.

This underlying current account surplus is attributable to a private sector savings surplus, primarily as a result of contributions to labour market pensions, combined with healthy public finances designed to be sustainable in the long term.²

A well-developed financial system, among other factors, has enabled households and firms to plan their consumption and investment as they wish. Households save for spending later, and pension savings, for example, contribute to

households being able to maintain more or less the same level of consumption after retirement from the labour market. Especially the building up of labour market pensions has boosted gross savings in the private sector and entailed strong growth in private pension wealth. However, the number of Danes receiving pension benefits is rising, and the difference between pension contributions and pension pay-outs is diminishing. The accumulation of pension wealth will therefore gradually subside, and households will start to draw on their wealth. Consequently, the current account surplus is expected to decline. But the adjustment is expected to be gradual, inter alia because investment income from net foreign assets, which accounted for 4 per cent of GDP last year, increases domestic demand only slowly.

The primary drivers of the large current account surplus are thus the current cyclical position, sustainable public finances and savings for a future with a considerably larger share of elderly people in the population. Hence, the surplus per se does not give rise to adjustment of economic policy, neither at present as a result of the current large surplus, nor in future when the surplus begins to decline. For example, it is not advisable to try to reduce the current account surplus by seeking to offset the private sector savings surplus by large government deficits.

1 "Current account" and "balance of payments" are used synonymously here.

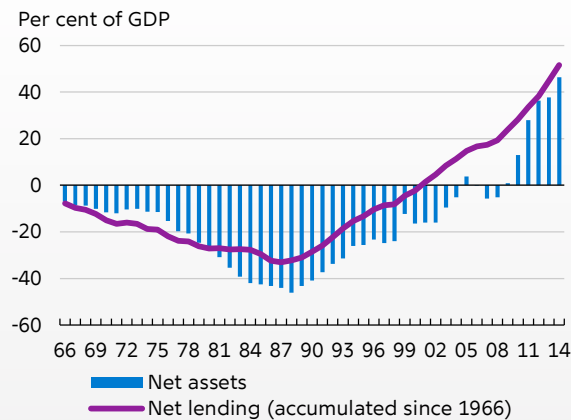
2 Savings surplus is used synonymously with net lending.

Moreover, the accumulation of net foreign assets has consequences for monetary policy. Substantial net foreign assets may contribute to ensuring a low interest rate spread to the euro area, but

may also periodically entail capital inflows and upward pressure on the krone, resulting in a large foreign exchange reserve. Purchases of foreign exchange for the reserve do not entail a need to change its risk profile.

Denmark's net foreign assets

Chart 1



Note: Denmark's net foreign assets. Net lending is the difference between gross domestic savings and investments in real capital. Accumulated net lending corresponds to net assets adjusted for capital gains and losses. These are generally evened out over time. Denmark's net lending corresponds to the balance of the current account plus the capital account, net, e.g. payment of insurance premiums.

Source: Danmarks Nationalbank.

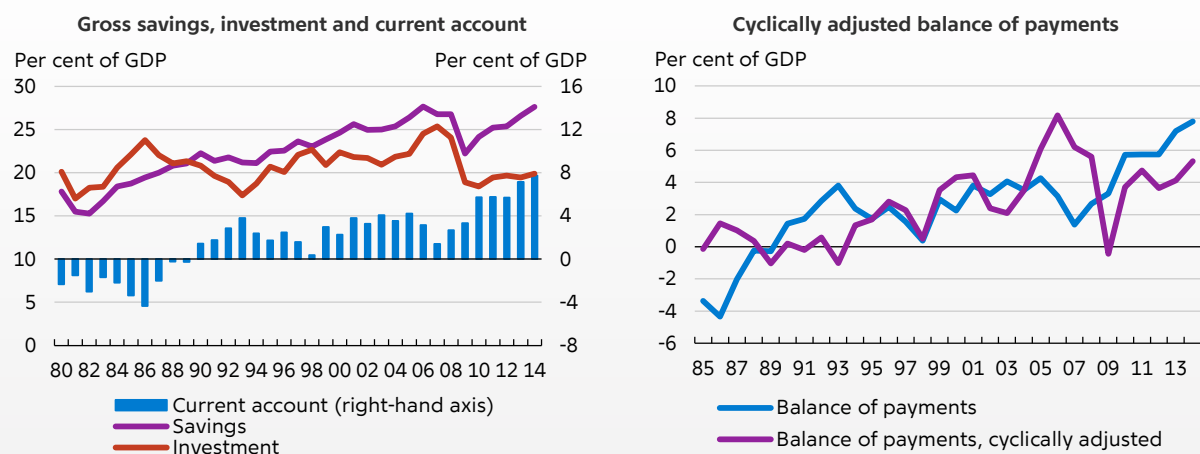
WHY IS THERE A CURRENT ACCOUNT SURPLUS?

In the national accounts, the balance of payments is the difference between domestic savings and domestic investment in real capital. The improvement of the current account since the early 1980s has been driven mainly by higher gross domestic savings, which rose by around 10 per cent of GDP until the beginning of this millennium and has since been more or less constant, cf. Chart 2 (left). Investment in Denmark, on the other hand, has fluctuated around a level of 20 per cent of GDP throughout the period. It has been on the low side of this level since 2009.

The current account surplus tends to grow during a downturn, chiefly because firms and households reduce their volume of new investment in Denmark. Gross domestic savings, on the other hand, are less cyclical, one reason being that sav-

Savings, investment and current account and cyclically adjusted balance of payments

Chart 2



Note: Left-hand chart: Investment includes inventory investment and gross fixed investment in Denmark. The difference between gross savings and investment is not in full accordance with the current account, since capital transfers are not included. The current account is based on the national accounts. Right-hand chart: The calculation of the cyclically adjusted balance of payments assumes that investment income and other transfers do not fluctuate in step with the output gap (actual correlation in the period 1990-2014: -0.02 per cent). The elasticity between the balance of goods and services and the output gap is assumed to be around -1 in the period 1990-2014. This elasticity is used to calculate a cyclically neutral balance of goods and services. The substantial fluctuations in the cyclically adjusted balance of payments in 2005-12 are due to strong fluctuations in the output gap in the wake of the financial crisis.

Source: Statistics Denmark and own calculations.

ings in the private and public sectors typically develop in opposite directions. This is because the private sector increases savings during a downturn, while the public sector has higher expenditure, lower revenue and hence lower savings.

The substantial current account surplus is partially due to the fact that the Danish economy is still below its cyclically neutral level, cf. Chart 2 (right). Calculations using Danmarks Nationalbank's macroeconomic model show that normalisation of the currently low levels of investment and consumption would reduce the current account surplus as a percentage of GDP by around 3-4 percentage points from the current level, cf. Box 1. Even if the output gap closes and the relatively low investment and consumption ratios in the private sector rise, the current account surplus is estimated to be around 4-5 per cent of GDP, which is slightly higher than the average surplus in the period 1995-2014.

The current account balance can also be calculated as the difference between the value of exports and imports plus net investment income from abroad. This approach shows that recent years' rising trend in the actual surplus is primarily due to an increase in the net return on foreign assets, cf. Chart 3. The return has risen in step with the increase in net foreign assets, but it also depends on the composition of assets and liabilities and on interest rates and equity prices. Whereas it used to be negative, the net return on foreign assets has been positive since 2005, by 4 per cent of GDP last year. The balance of goods and services, on the other hand, has declined slightly since the early 1990s.

The current account surplus is influenced by competitiveness. During a boom, with high domestic investment and a low current account surplus, domestic wage growth tends to be higher than wage growth abroad, and competitiveness

Current account on normalisation of consumption and investment ratios

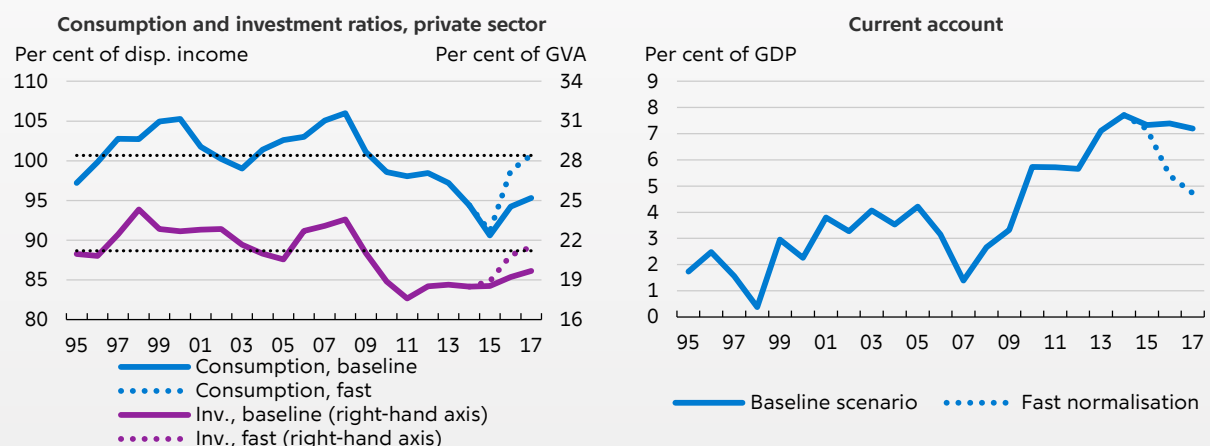
Box 1

The Danish economy is in an upswing. Growth is expected to increase only gradually. This implies a slow normalisation of consumption and investment ratios, which will remain low in the coming years compared with recent decades, cf. the chart below (left). The current account surplus will remain more or less at the current high level, cf. the chart below (right).

In an alternative scenario with faster normalisation of consumption and investment, on the other hand, the current

account surplus will fall from the current level by approximately 3-4 percentage points until 2017. But this scenario too shows a considerable current account surplus in the region of 4-5 per cent of GDP. The calculation is based on average consumption and investment ratios since 1995, so the underlying current account surplus will be close to the average surplus in this period.

Normalisation of investment and consumption ratios

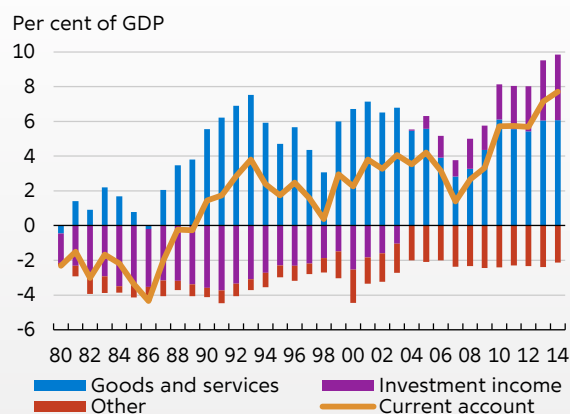


Note: Left-hand chart: The black broken lines are averages for the period 1995-2015, 2nd quarter. The baseline scenario is Danmarks Nationalbank's central forecast. The stronger upswing (fast normalisation) begins in the 2nd quarter of 2015 in both scenarios. The consumption ratio shows private consumption relative to household disposable income adjusted for extraordinary tax from the restructuring of capital pensions. The investment ratio shows business investments as a ratio of GVA in the private sector excluding housing.

Source: Own calculations using Danmarks Nationalbank's macroeconomic model, MONA.

Current account broken down by balance of goods and services, investment income and other items

Chart 3



Note: Net figures. "Other" covers EU payments and development aid, among other payments.

Source: Statistics Denmark and own calculations.

weakens. Over time, weak competitiveness will reduce exports and exert downward pressure on output and employment. This will reduce domestic wages, thereby strengthening competitiveness, while at the same time weak domestic demand dampens domestic investment, resulting in improvement of the current account. At present, Denmark's competitiveness is good, and there is

scope for slightly higher wage increases in the coming years, as labour market pressures intensify. Competitiveness problems cannot be structural in nature, since the economy will adapt over time, although it may take time.

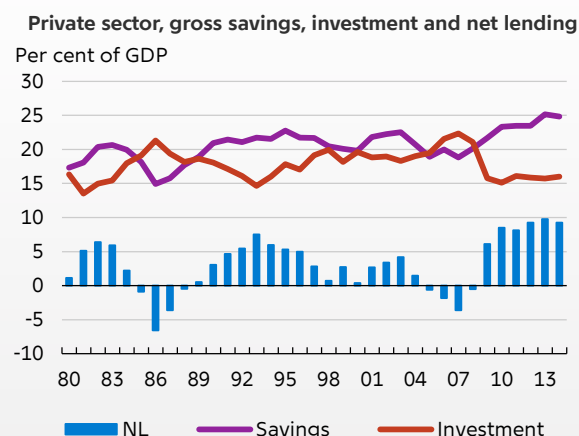
THE TAX SYSTEM, DEMOGRAPHICS AND LABOUR MARKET PENSIONS HAVE INCREASED PRIVATE SECTOR SAVINGS

The current account surplus is attributable to a large private sector savings surplus, i.e. it is the result of many decentralised decisions. In 2014, the private sector savings surplus was around 9 per cent of GDP, adjusted for early taxation of capital pensions. It has shown a slightly increasing trend since the 1980s, cf. Chart 4 (left). This development has been driven by firms in particular, while the savings surplus of households has fluctuated around a consistently low level. However, since it is difficult to break down the private sector savings surplus by households and firms, cf. Box 2, the focus is on the private sector as a whole.

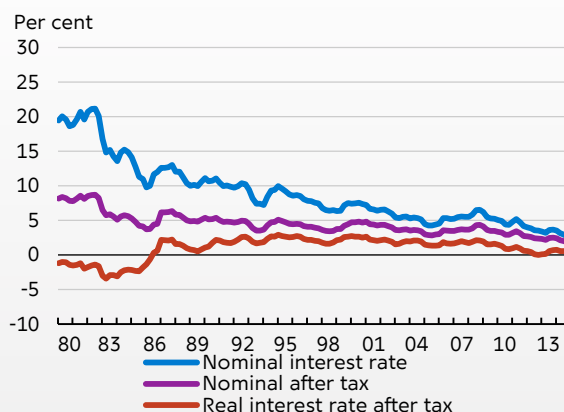
The strengthening of the private sector's propensity to save reflects, inter alia, a substantial reduction of the originally very high tax value of interest deductibility that began with the tax reform in the mid-1980s, followed by further reductions, cf. Chart 4 (right). The lower value of

Private sector net lending and interest rate development

Chart 4



Interest rate development, nominal and real, before and after tax



Note: Left-hand chart: NL is net lending. Investment includes inventory investment. Differences between NL and savings less investment are capital transfers and net acquisition of non-financial, non-manufactured assets. Savings and NL have been adjusted for early taxation of capital pensions in 2013 and 2014.

Source: Statistics Denmark, Danmarks Nationalbank, Macrobond and own calculations.

interest deductibility has made it more attractive to save and contributed to boosting the structural level of private sector savings during the 1980s. At present, given the very low inflation and level of nominal interest rates, the reduced interest deductibility plays a smaller role than previously. Another driver of increasing savings has been the demographic development with large cohorts who have saved while in employment – especially in the latter part of their working life, experience shows. But large cohorts are retiring these years

and are being replaced by smaller, younger cohorts.

Since the early 1990s, the social partners have concluded agreements on contributions to labour market pensions in order to ensure higher income for pensioners than state old age pension alone. In the build-up phase, contributions exceed pay-outs, cf. Chart 5 (left). However, larger contributions to labour market pensions prompt some households to reduce other savings or raise debt. Consequently, a contribution of one krone to a

Breakdown of net lending in the private non-financial sector by households and firms

Box 2

Since households own a substantial part of Danish firms, they can save up in these firms. This makes it difficult to distinguish between net lending by households and firms. Instead, it makes sense to consider the two sectors as one.

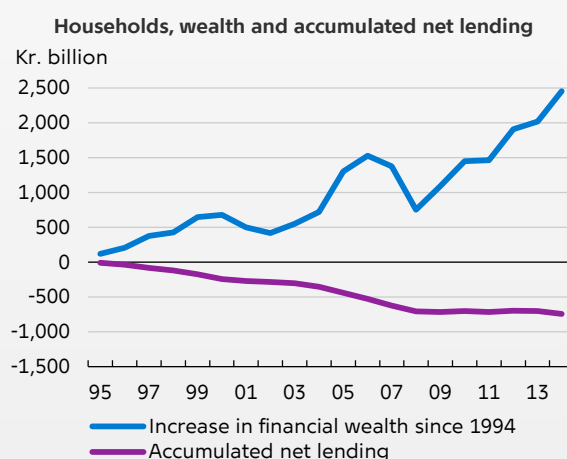
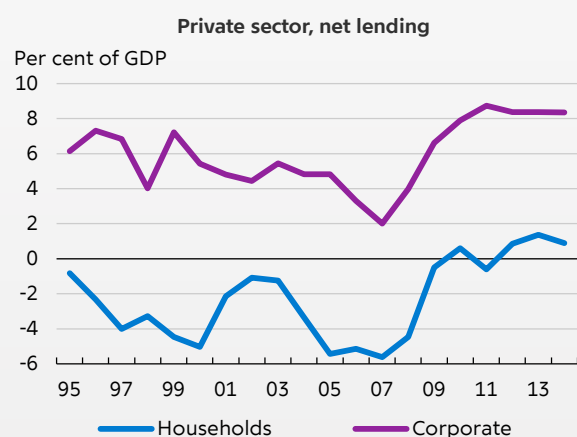
According to the national accounts, household net lending has averaged -2.3 per cent of GDP annually since the mid-1990s, while corporate net lending has been 5.9 per cent of GDP, cf. the chart below (left). Household net lending is the difference between income after tax and expenses for consumption and investment. Part of the income is investment income. But how to determine this is not so simple.

A firm's profit is not necessarily distributed as dividend. Instead, the owners may choose to retain the firm's profit or pay out the profit as buy-back of own equities. The owners' choice of profit disbursement method depends on tax-related factors, inter alia. If the owner – e.g. a household – opts for saving up in the firm, no disbursement is made from the

firm to the household, which obtains a capital gain instead, since the profit after dividend increases the value of the firm. If the profit is disbursed as buy-back of own equities, this is registered in the national accounts as sale of part of the owner's wealth and not as a disbursement from the firm to the owner. All in all, the calculation of household investment income in the national accounts may entail underestimation of actual household gross savings and overestimation of corporate gross savings.¹

Considering only household net lending in the national accounts, households have accumulated net debt since 1995 amounting to kr. 740 billion, cf. the chart below (right). But over the same period, their financial wealth has grown by more than kr. 2,450 billion, implying capital gains of approximately kr. 3,190 billion. Some of these capital gains reflect that the owners of the firms, including households, have chosen to retain the profit in the firms.

Net lending, wealth development and accumulated net lending by households

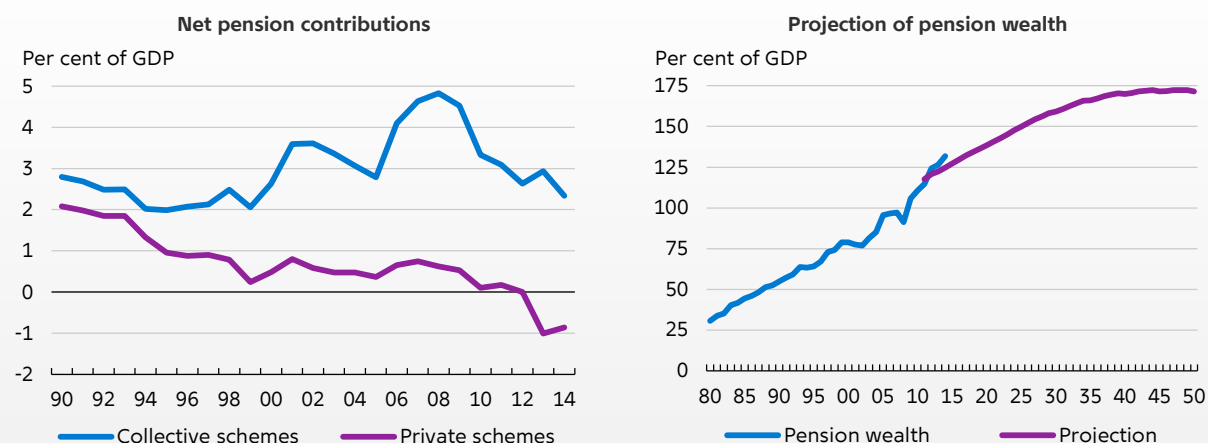


Anm.: Left-hand chart: Household net lending has been adjusted for early taxation of capital pensions in 2013 and 2014. Right-hand chart: Accumulated net lending and change in net financial wealth
Kilde: Statistics Denmark and own calculations.

1. The calculation of savings in the national accounts is different for Danish firms owned by non-residents. Non-disbursed profit is registered as investment income to non-residents via the reinvested earnings item. As a result of this and other factors, changes in foreign assets over time tend to follow the accumulated balance of payments, cf. Chart 1.

Net pension contributions and development in household pension wealth

Chart 5



Note: Left-hand chart: Net contributions are the difference between contributions including pension yield less taxes and pay-outs. Adjusted for early taxation of capital pensions. Right-hand chart: Pension wealth is the private sector's total pension wealth, i.e. both private and collective schemes. The projection of pension wealth as a share of GDP is DREAM's structural pension wealth relative to structural GDP. The structural and actual ratios diverge in 2011-14, since the actual ratio is influenced by cyclical factors.
Source: ADAM, Danmarks Nationalbank and own calculations. DREAM – Long-term economic projection, 16 November 2015.

labour market pension scheme does not increase total household savings by one krone. Studies based on individual data show that an extra labour market contribution of one krone increases total household savings by around kr. 0.70-0.85, cf. Danish Economic Councils (2008). Contributions to private pension schemes have a smaller effect on household savings.³ Pension contributions are tax deductible at pay-in, which reduces tax revenue, thereby reducing public sector savings. Hence, the increase will be lower for public and private sector savings taken as one than that for household savings viewed in isolation.

Labour market pensions are still in the build-up phase and will remain so for the next 25-30 years. Pension wealth is expected to peak at around 170 per cent of GDP in 2040-50, cf. Chart 5 (right). However, the pace of pension wealth accumulation is declining, and in future this will slowly lead to lower structural savings and hence a smaller current account surplus.

The tax system may influence savings incentives. Taxation depends on the type of savings, i.e. pen-

sion savings, other financial savings or home equity savings. Furthermore, the size of both wealth and investment income may entail reduction of public benefits. This leads to substantial differences in composite taxation of returns across individuals and types of savings, cf. Danish Economic Councils (2008).⁴ Thus, it is not clear whether the tax system overall provides a savings incentive.

Nor is it clear whether oil and gas extraction in the North Sea has contributed to increasing private sector savings, since this revenue influences and is driven by both consumption and investment. In addition, foreign firms account for a large part of the extraction. Hence, some of the profit from oil and gas production goes to these firms, which repatriate part of it in the form of dividend payments; viewed in isolation this reduces the current account surplus. For a number of years, dividend payments were kr. 8-10 billion p.a., but they have declined to a somewhat lower level in recent years.

The large private sector savings surplus is the result of many decentralised decisions. Labour

3 The effect of pension savings on total household savings varies with age and status as homeowner or tenant. Andersen (2015) estimates that a contribution of one krone to a private pension scheme increases total household savings by around kr. 0.20. The smaller effect from private pension schemes compared with labour market pensions is due mainly to the fact that contributions are voluntary.

4 The composite yield taxation is defined as the total effect of taxation of yields and reduction of public benefits.

market pensions are voluntary agreements concluded by the social partners, and it is difficult to point out distorting factors in e.g. the tax system which overall entail higher private sector savings. Moreover, households and firms in Denmark have ample opportunity to optimise their consumption and investment decisions. For example, Denmark has a very well-developed financial system which offers households and firms savings or borrowing opportunities. This enables them to plan their savings, consumption and investment over time more or less as they wish. So it is not advisable to try to reduce the current account surplus by seeking to offset the private sector savings surplus by large government deficits.

HEALTHY AND SUSTAINABLE PUBLIC FINANCES

The public sector had substantial deficits in the early 1980s, cf. Chart 6 (left). However, since the late 1990s, the focus has been on fiscal policy planning to ensure sustainability, which has contributed to increasing public sector savings by around 5 per cent of GDP from the early 1980s to the late 1990s. Fiscal sustainability considerations and the wish to smooth out public expenditure mean that large, but temporary, revenue will only to a minor degree entail higher public consumption or tax relief. Instead it will to a higher degree be used for savings. A case in point is government revenue from oil and gas extraction.

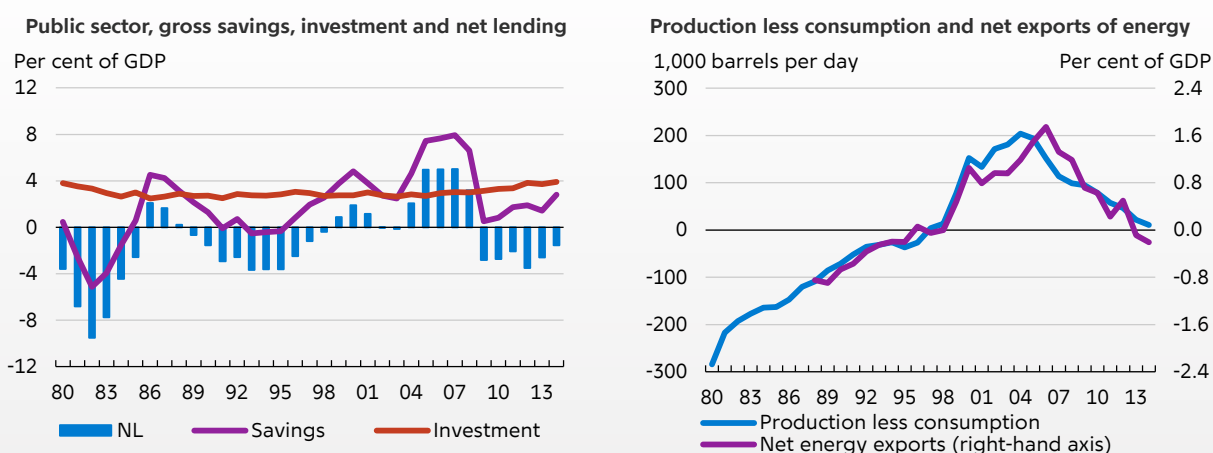
Denmark has extracted oil and gas for many years, and the energy account of the balance of payments has shown a surplus since 1997, cf. Chart 6 (right). Extraction has fallen over the last decade, and Denmark's energy trade almost balanced in 2014. But the production reduces the need for energy imports.

Oil and gas production is taxable, and according to the Danish Energy Agency the government's share of the proceeds is estimated at around 60 per cent in 2014. In the period 1963-2014 the tax revenue amounted to kr. 404 billion in 2014 prices, corresponding to 21 per cent of GDP in 2014, concentrated in the latter part of the period. Given the objective of fiscal sustainability, a share of government revenue from oil has probably been saved, thereby contributing to the reduction of central government debt from more than 50 per cent of GDP in the mid-1990s to just 11 per cent of GDP in 2008. Since then, the downturn in the wake of the financial crisis and the resultant government deficit have increased government debt, which was approximately 24 per cent of GDP at the end of 2014.

Combined with the low level of interest rates, the lower government debt has in itself contributed to improving public finances, resulting in a rise in public net investment income from -5 per cent of GDP in the mid-1980s to a positive figure today, including public funds.

Public sector net lending and production of and trade in energy

Chart 6



Note: Left-hand chart: NL is net lending. Investment includes inventory investment. Differences between NL and savings less investment are capital transfers and net acquisition of non-financial assets. Savings and NL have been adjusted for early taxation of capital pensions in 2013 and 2014.

Source: Statistics Denmark, Macrobond and own calculations.

IS THE CURRENT ACCOUNT SURPLUS A PROBLEM?

IT MAY MAKE SENSE TO HAVE A SURPLUS

A current account surplus does not necessarily reflect imbalances in the economy. A surplus is a way of postponing consumption until later. This makes sense in a situation like Denmark's with an ageing population over the coming decades. Most advanced economies are facing population ageing over the coming decades, although to varying degrees.

Not all countries can have current account surpluses at the same time. One country's surplus is offset by other countries' deficits. A distinguishing feature of Denmark compared with other countries is that we have chosen to fund part of the future pension expenditure via savings – while also adjusting the retirement age to match life expectancy. This is done via private pensions, labour market pensions and public savings. Many other countries have to fund future pensions primarily out of future current public revenue, i.e. future taxation of people in the labour market. Denmark focuses on ensuring fiscal sustainability so that there will be no need to raise taxes in future to cover current expenditure for e.g. public pensions and healthcare. As a result of this and other factors, Denmark's public finances are, on average, healthier than those of other countries.

Moreover, it is natural for relatively prosperous countries like Denmark and several other Northern European countries to have current account surpluses, while countries in e.g. Southern and Eastern Europe, with a smaller capital stock and greater growth potential ("catching-up effect"), have deficits. These countries need foreign capital in order to develop their economies and realise their growth potential. But it is also important that countries with current account deficits do not accumulate too much foreign debt. Debt must be sustainable, or non-resident investors may lose confidence in the country, which may then find it more difficult to finance the deficit.

However, countries which are growing may have a permanent current account surplus or

deficit. So a surplus or deficit for a long period does not necessarily reflect an unsustainable development. But this requires adjustment of the balance of payments composition, i.e. investment income and other accounts. For example, if Denmark's current account surplus is assumed to be permanent at 5 per cent of GDP, net foreign assets will converge towards 130 per cent of GDP, given nominal growth of 4 per cent.⁵ If the nominal return on net foreign assets is then assumed to be 5 per cent, investment income alone will be 6.5 per cent of GDP ($130 \times 5/100$). This requires a permanent level of the balance of goods and services and transfers of -1.5 per cent of GDP to maintain a current account surplus of 5 per cent. A sustainable development with large net foreign assets thus tends to require a smaller surplus on the balance of goods and services.

Net foreign assets may act as a buffer reducing the risk of sudden large capital outflows. Moreover, they can contribute to ensuring a low interest rate spread to the euro area, cf. below. However, building up large foreign assets also entails a credit risk. A debt servicing problem for a country with a permanent current account deficit and large foreign debt will, of course, also be a problem for creditor countries like Denmark, which risk losing part of their foreign assets.

Furthermore, large foreign assets imply exposure to interest rate developments and to equity prices and exchange rates, and the ability to make the right choices when investing the funds becomes important. In Denmark's case, such placement decisions are made on a decentralised basis by the individual firms and pension funds, as opposed to countries like Norway, where most foreign assets are concentrated in the Government Pension Fund. As regards Denmark, non-resident investors hold a large part of Danish mortgage and government bonds, currently with low returns, while Danish investors have placed funds in foreign assets subject to higher risk and hence a larger expected return. In 2014, net assets of around kr. 860 billion thus yielded net investment income of just under kr. 75 billion, resulting in an implicit return of approximately 8.5 per cent. The high

⁵ If the surplus is x per cent of BNP and nominal growth is y per cent, foreign assets will converge at $x \times (1+y)/y$, e.g. $(0.05 \times (1+0.04)/0.04) \times 100 = 130$ per cent of GDP.

return partially reflects that Danes have built up very large gross balance sheets, i.e. substantial assets abroad and large foreign debt at the same time. Special focus has been on the large gross debt of households, which could increase their interest rate sensitivity and hence lead to more pronounced macroeconomic fluctuations. It may therefore be economically desirable to reduce gross debt, especially for households, but this may lead to an even larger current account surplus, cf. Box 3.

THE RETURN ON FOREIGN ASSETS HAS A LAGGED EFFECT ON THE DANISH ECONOMY

Direct household ownership of foreign assets is limited, so households' share of the return on net foreign assets is small in the first instance. This entails limited immediate effects on private consumption.

The return on net foreign assets goes mainly to large firms, pension funds and investment funds. This could perhaps boost investment in real capital to some extent, but in general investment is

Reduction of Danish households' large gross debt may lead to an even larger current account surplus

Box 3

Over a number of years, Danish firms and households have accumulated both considerable gross debt and substantial gross wealth. This is also reflected in debt and wealth vis-à-vis non-residents. In gross terms Danish residents' assets abroad and non-residents' assets in Denmark have both increased strongly, cf. the chart below (left). At the end of the 2nd quarter of 2015, Danish residents held assets abroad for kr. 6,070 billion, while non-residents held Danish assets amounting to kr. 5,210 billion. Consequently, Danish residents held net foreign assets of kr. 860 billion, or around 43 per cent of GDP.

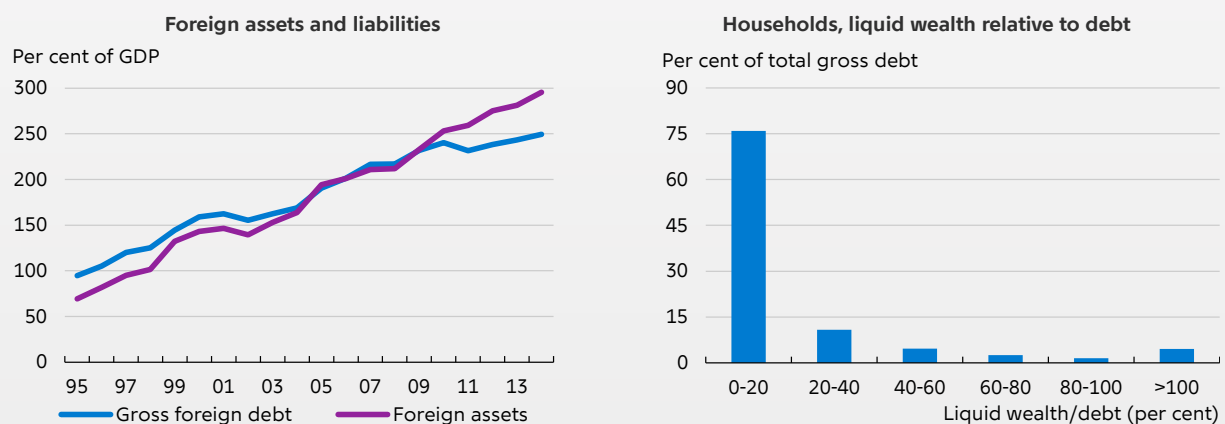
Observers of the Danish economy have focused extensively on the high gross debt of households in particular. However, it is difficult to envisage a reduction of gross debt – domestic or international – without a derived effect on the balance of payments, resulting in an even larger surplus.

Given the considerable net wealth of households, they could, in principle reduce their debt by divesting some of their assets, but this possibility is very limited in practice. A large share of household wealth is placed in pension schemes and housing, which cannot be sold immediately. Households have bank deposits for approximately kr.

600 billion and securities amounting to around kr. 1,700 billion. However, half of these are equity securities issued by firms fully owned by households, such as small craftsman's businesses, shops, dentists, etc. These assets are not easy to liquidate either. The remainder of the securities portfolio is held by a relatively small number of households. Most households thus have modest liquid wealth relative to their gross debt. The predominant share of total gross debt, around 75 per cent, is held by households with liquid wealth (bank deposits and securities in safe custody accounts) constituting less than 20 per cent of their gross debt, cf. the chart below (right). Overall, households thus have only limited opportunities to reduce their debt by divesting assets.

The large household gross debt reflects factors such as leveraged accumulation of wealth, especially in housing, but to a certain extent also in pensions and free financial wealth, cf. Isaksen et al. (2011). More symmetrical taxation of debt and wealth would give households less incentive to inflate their balance sheets. Alternatively, they may reduce debt through current savings, but higher savings easily lead to an even larger current account surplus.

Danes' assets and liabilities vis-à-vis non-residents and liquid wealth relative to debt



Source: Danmarks Nationalbank, Statistics Denmark and own calculations.

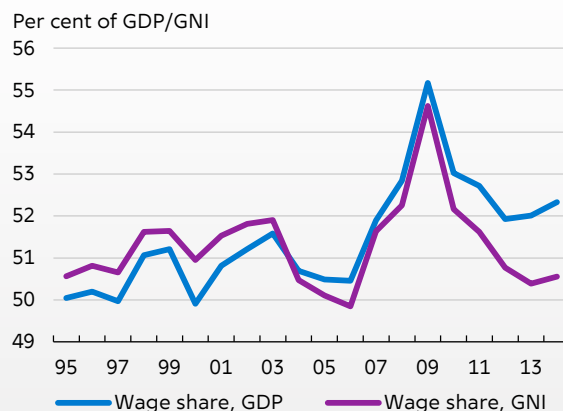
driven predominantly by demand in the economy. Part of this income is channelled on as dividend payments, but it is still only a limited share that goes to households, since many of the largest Danish firms are owned by foundations or families, cf. box 4. In addition, only very few wealthy households are shareholders on a large scale.

A share of the rising net investment income from foreign assets goes to the public sector via government debt reduction and resultant lower interest expenses. This improves fiscal sustainability.

Investment income from abroad is channelled on to household finances partly via pension wealth and hence higher pension pay-outs in the longer run, partly via higher wage increases. Experience shows that in the long run, wages account for a relatively constant share of the gross national product, GNP, in the economy, cf. Chart 7. A rise in GNP via the return on foreign assets leaves scope for higher wages.

Wage shares

Chart 7



Note: GDP stands for gross domestic product and GNI for gross national income.

Source: Statistics Denmark and Danmarks Nationalbank.

The largest Danish firms

Box 4

The largest Danish firms are predominantly owned by families or foundations, cf. the table. Consequently, the profit after tax is initially only to a limited extent channelled on to households in a broad sense. Conversely, corporate tax paid

contributes to financing public expenditure more broadly, as is the case for income taxation of the firms' employees in Denmark, and other direct and indirect taxes paid.

Largest Danish firms by operating profit in 2014

	Name	Type	Operating profit (kr. billion)	Equity capital, book value (kr. billion)	Equity capital, market value, end-2014 (kr. billion)	Total no. of employees (thousands)
1	A.P. Møller - Mærsk	Foundation	29	259	273	89
2	Novo Nordisk	Foundation	26	40	677	40
3	LEGO	Foundation	7	13	--	13
4	Nordea Bank Danmark	Public	6	45	--	6
5	Carlsberg	Foundation	5	56	73	47
6	Danske Bank	Public	4	153	167	18
7	TDC	Public	3	19	38	9
8	Pandora	Public	3	7	61	10
9	Jyske Bank	Public	3	28	30	3
10	Vestas Wind Systems	Public	3	18	50	18

Note: Foundation-dominated and family-owned firms are called "Foundation". Limited liability companies with more broad-based ownership are called "Public". Own breakdown.

Source: Børsen Analyse 2014 and Bloomberg.

From the mid-1990s to the mid-2000s, wage growth in industry was higher in Denmark than abroad. In the years leading up to the financial crisis in 2008, the capacity situation tightened as a result of overheating of the economy, driven by a leveraged housing bubble. Although the loss of wage competitiveness in those years has been regained, this pattern emphasises the importance of a steady process that is not forced.

Moreover, since the mid-1990s Denmark's terms of trade have improved continuously, as Danish firms have been able to sell their goods and services at constantly rising prices, while also benefiting from the downward pressure on import prices. Not all surplus countries have seen an improvement in their terms of trade. The terms of trade have deteriorated in Sweden, which has substantial production of products subject to strong downward price pressures, e.g. electronics.

Investment income from abroad increases the national product, but not domestic output, GDP. Consequently, the share of wages in domestic output has been rising. The increasing share of wages in GDP corresponds to current internal revaluation and thus deterioration of competitiveness. This has taken place at a steady, measured pace, except in the period of overheating. In a fixed exchange regime like Denmark's, this is the way to adjust (excessively) good competitiveness.

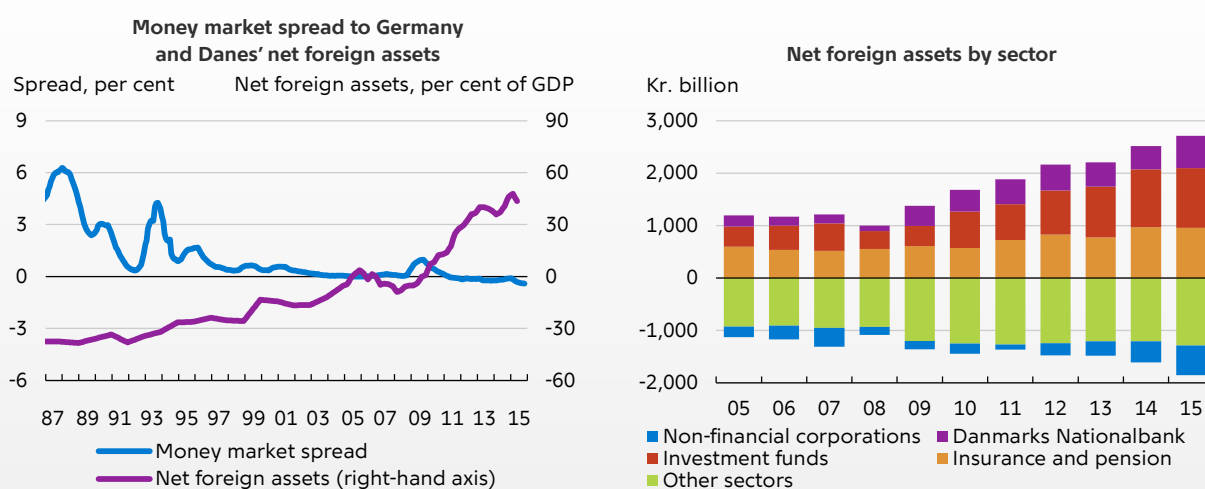
THE IMPORTANCE OF NET FOREIGN ASSETS TO INTEREST RATES AND FOREIGN EXCHANGE RESERVE

Denmark's current account surplus entails continuous capital exports, which has resulted in considerable net foreign assets, cf. Chart 8 (left). They are expected to rise further in the coming years. The assets are distributed on various sectors, and Denmark's total net foreign assets constitute the sum of net portfolios of foreign assets in all domestic sectors. Hence, net foreign assets are not a portfolio to be managed by an authority or an institution, which is the case for e.g. the central government debt or Denmark's Nationalbank's foreign exchange reserve. The individual households, investors, financial institutions and firms make their own investment choices.

In Denmark, three sectors in particular hold more foreign assets than liabilities, cf. Chart 8 (right). The insurance and pension sector holds net placements in foreign assets for approximately kr. 950 billion. This corresponds to slightly more than Denmark's entire net foreign assets. Investment funds also hold considerable foreign assets, since the holders of investment fund shares typically have a claim in kroner on the investment fund, while the fund may have invested the money in, say, foreign equities and

Net foreign assets and interest rate spread and net foreign assets by sector

Chart 8



Note: Left-hand chart: The interest rate spread is the spread between 3-month deposit rates in Denmark and Germany. The spread is a 12-month moving average. Net foreign assets have been calculated annually until 2004 and quarterly as from 2005. Right-hand chart: 2015 is for the end of the 1st half.

Source: Thomson Reuters Datastream and Danmarks Nationalbank.

bonds. Finally, Danmarks Nationalbank holds considerable net foreign assets, reflecting that the foreign exchange reserve is placed in foreign currency, while the liabilities are in Danish kroner. Conversely, mortgage banks in particular hold net foreign liabilities. The reason is that many non-resident investors purchase Danish mortgage bonds.

NET FOREIGN ASSETS MAY HAVE REDUCED INTEREST RATES

The increased net foreign assets have presumably contributed to reducing monetary policy interest rates in Denmark. This is because investors' investment choices are based on various factors, including expected return and the associated uncertainty, which potentially depends on the net foreign assets.

Until the mid-1990s, the interest rate spread between Denmark and Germany, expressed by the short-term money market interest rates, fluctuated strongly and was often several percentage points, cf. Chart 8 (left). In the subsequent period, until the outbreak of the financial crisis in 2008, the spread was very stable at a moderate positive level. After a temporary widening in connection with the financial crisis, the spread has been in negative territory for most of the time since 2012. This means that investors are currently willing to hold financial investments in Danish kroner, even though the return is a little lower than for investments in euro. The long-term interest rate spread between Denmark and Germany is positive, however.

INVESTORS OFTEN PREFER DOMESTIC ASSETS

The interest rate spread is influenced by "preferred habitat" premiums. They reflect that some investors wish to invest in specific assets. For example, they often prefer assets in their own currency. One possible reason could be the lower costs of data collection and current monitoring. Excess demand for certain assets will reduce the rate of interest on these assets via a preferred habitat premium.

The increase in net foreign assets has led to a larger need to place funds among Danish investors. In so far as they prefer domestic assets, the demand for krone assets has thus risen. This generates payment flows that reduce the equilibrium spread.

In terms of willingness to restructure currency exposures, other factors also play a role, namely the sectors that hold the net foreign assets, and where current savings are to be found. A considerable share of savings is in pension wealth, which is expected to rise until 2040-50, whereby the sector's need to place funds will continue to grow. The size of the sector makes it difficult to place all funds in krone assets without a high concentration risk. The sector's liabilities are pension payments in Danish kroner, while around half of the assets are in foreign currencies. A part hereof has been hedged to kroner, cf. Chart 9 (left). Due to the pension sector's size, its placement decisions have a strong impact on conditions in the krone market. This became evident in early 2015, when this sector was behind a substantial share of the demand for kroner.

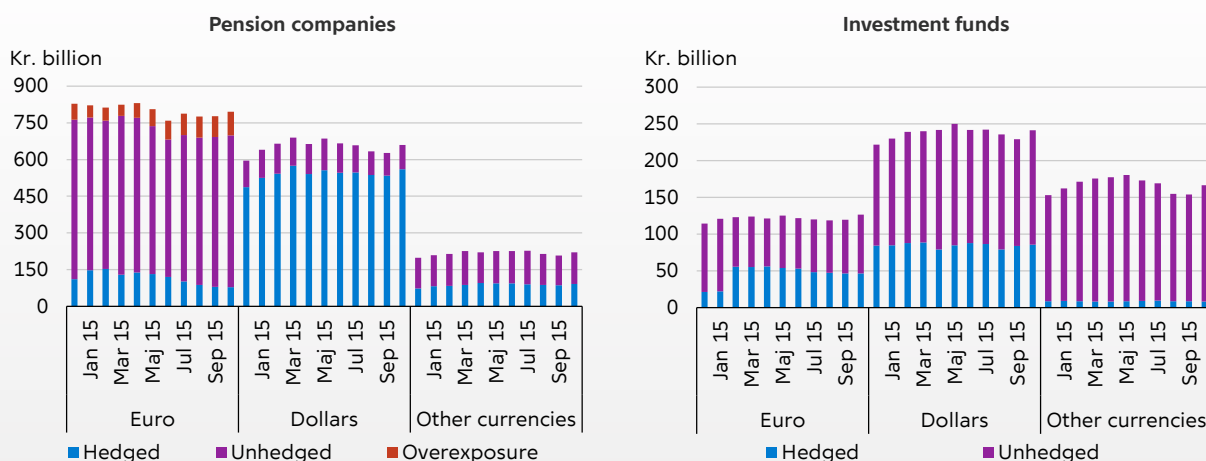
Investment funds also contributed to the demand for kroner, since this sector overall hedged a part of the exposure to euro, cf. Chart 9 (right). Both sectors continue to have very large exposures in euro and other currencies.

The accumulation of Danish net foreign assets is expected to be a long-term phenomenon. Consequently, there is reason to believe that the interest rate spread to the euro area will be narrower than in the years prior to the financial crisis. However, it is difficult to assess how large the interest rate spread to the euro area needs to be in order to balance Denmark's capital outflows and inflows. This will depend on several factors, such as confidence in the euro area, confidence in the krone rate and the Danish economy, as well as the general risk aversion and the extent of preferred habitat in the financial markets.

Recent years have been dominated by extraordinary events, including the sovereign debt crisis in a number of euro area member states, which induced some investors to use kroner as a "safe haven", cf. Jørgensen et al. (2013). Therefore, these years cannot be seen as a clear indicator of the situation in the longer term. Furthermore, the spread is currently positive for the longer-term forward interest rates, which reflects, however, that the ECB has pressed down the longer-term interest rates via its asset purchase programme. An equilibrium spread close to zero seems probable, meaning that in the long term, Danmarks Nationalbank's interest rates will be close to those of the ECB.

Foreign exchange exposure and hedging

Chart 9



Note: Left-hand chart: Overexposure means the foreign exchange exposures – typically dollar positions – which have been hedged to euro, but not to kroner. This increases the euro exposure beyond the exposure associated with euro assets.

Source: Danmarks Nationalbank.

FLUCTUATIONS IN NET FOREIGN ASSETS MAY INFLUENCE THE FOREIGN EXCHANGE RESERVE

The pressure on the krone in January-February 2015 reflected, inter alia, that a number of non-resident investors purchased kroner for large amounts. In that way they would reap a gain if the fixed exchange rate policy was abandoned and the krone appreciated against the euro, like the Swiss franc did. But another important factor behind the pressure on the krone was that various domestic investors, including parts of the insurance and pension sector, were less willing than previously to take on the exposure to fluctuations in the krone exchange rate that their investment portfolios entailed, viewed in isolation. This prompted them to increase their hedging, which strengthened the demand for kroner.

Non-resident investors have sold kroner in recent months, resulting in slightly lower portfolios of krone assets than at the start of the year. Domestic investors have also sold kroner, but at a more sluggish pace, and in net terms they have not returned to the January level.

Prolonged shifts in the willingness of domestic investors to hold unhedged positions in euro may lead to prolonged fluctuations in the size of Danmarks Nationalbank's foreign exchange reserve. For long periods at a time, the reserve may become considerably larger than previously, and the

interest rate spread to the euro area may become lower or negative.

Danmarks Nationalbank's main purpose of holding the foreign exchange reserve is to support the krone, should it come under pressure. In the event of an excessive supply of kroner, which tends to weaken the krone against the euro, Danmarks Nationalbank will intervene in the market by buying kroner for foreign exchange from the reserve. The only objective for the size of the reserve is therefore that it should be sufficient. The need for sufficient funds for intervention in support of the krone at any time means that the foreign exchange reserve has been invested in liquid assets in euro that are stable in value. Hence, the return on the reserve is relatively stable, but low.

Purchase of foreign exchange for the foreign exchange reserve is typically offset by an increase in debt to the banks. This means that Danmarks Nationalbank's net capital is generally not affected even if the balance sheet is increased in step with the reserve. A larger foreign exchange reserve does not entail a need to change its risk profile.

LITERATURE

Andersen, Henrik Yde (2015), Do tax incentives for saving in pension accounts cause debt accumulation? Evidence from Danish register data, *Danmarks Nationalbank Working Paper*, forthcoming.

Chetty, Raj, John N. Friedman, Søren Leth-Petersen, Torben Heien Nielsen and Tore Olsen (2014), Active vs. passive decisions and crowd-out in retirement savings accounts: Evidence from Denmark, *The Quarterly Journal of Economics*, No. 129 (3).

Danish Economic Councils (2008), Danish economy, Chapter 2, spring.

Isaksen, Jacob, Paul Lassenius Kramp, Louise Funch Sørensen and Søren Vester Sørensen (2011), Household balance sheets and debt – an international country study, *Danmarks Nationalbank, Monetary Review*, 4th Quarter, Part 2.

Jørgensen, Anders, Christoffer Christen and Lars Risbjerg (2013), Was the krone a safe haven during the sovereign debt crisis?, *Danmarks Nationalbank, Monetary Review*, 2nd Quarter, Part 1.

THE MONEY MARKET AT PRESSURE ON THE DANISH KRONE AND NEGATIVE INTEREST RATES

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Mark Strøm Kristoffersen and Lars Risbjerg,
Economics

INTRODUCTION AND SUMMARY

In a situation like the current one where the monetary policy counterparties' need to place funds with Danmarks Nationalbank exceeds the overall current account limit, the rate of interest on certificates of deposit (the CD rate) is key to Danish money market rates. The CD rate's move into negative territory has not affected its significance for the Danish krone, nor Danmarks Nationalbank's ability to manage the exchange rate of the krone.

The money market was impacted by the pressure on the krone at the beginning of the year. To prevent the krone from appreciating, Danmarks Nationalbank reduced the CD rate to -0.75 per cent. As banks' and mortgage banks' loans and deposits with Danmarks Nationalbank offer an alternative to money market loans and deposits, this caused money market rates to drop sharply.

Banks and mortgage banks can place liquidity in certificates of deposits or deposit funds in current accounts with Danmarks Nationalbank. The current account rate is zero. Therefore, the monetary policy counterparties generally prefer to place liquidity in their current accounts to avoid negative interest rates.

However, the overall placement need exceeds the limit for the monetary policy counterparties' total current account deposits. Consequently, the monetary policy counterparties overall must place part of their liquidity in certificates of deposit. An increase in total deposits with Danmarks Nationalbank will thus earn interest at the CD rate. Hence, the CD rate determines money market rates.

The reduction of the CD rate has increased the spread between the current account rate and the CD rate – and thus the scope for fluctuations in overnight money market rates. Volatility in unsecured overnight rates may also be affected by low market activity, entailing that interest rate fixing on a given day is based on few transactions and depends on the liquidity conditions on that day. Volatility does not change the effect of monetary policy rates on the krone exchange rate.

Turnover in the unsecured overnight money market has declined since Danmarks Nationalbank's introduction of negative interest rates. This especially reflects that banks' deposits with Danmarks Nationalbank have been large enough for the need for money market transactions to be low.

Activity in the euro area overnight money market has also decreased. Following the European Central Bank's (ECB) expansion of its asset purchase programme in March 2015, turnover in the euro area dropped to its lowest level since the launch of the euro, and banks' deposits with the ECB increased.

The level of activity in longer-term unsecured loans has fallen since the financial crisis. This is a global phenomenon, reflecting greater focus on liquidity and credit risks. During the period of pressure on the Danish krone at the beginning of the year, the level of activity in the FX swap market was stronger than during the rest of the year. More buoyant activity in the FX swap market reflected the substantial demand for Danish kroner.

MONEY MARKET RATES AND MONETARY POLICY RATES

The Danish money market comprises the inter-bank market for krone-denominated loan agreements and interest rate derivatives with a maturity of up to 1 year transacted between banks and mortgage banks, cf. Box 1. For the monetary policy counterparties – banks and mortgage banks – short-term loans and deposits with Danmarks Nationalbank provide an alternative to loans and deposits in the short-term money market. Thus, monetary policy rates are key to money market rates.

In a situation like the current one where the monetary policy counterparties need to place substantial funds with Danmarks Nationalbank,

the deposit rate of Danmarks Nationalbank determines Danish money market rates. Banks and mortgage banks can place funds in certificates of deposit or deposit funds in current accounts, cf. Box 2. The current account limits ensure that banks and mortgage banks invest sufficient funds in certificates of deposits for the CD rate to determine the level of money market rates. The banking sector's marginal position with Danmarks Nationalbank is in certificates of deposits at the CD rate, and thus an increase in total deposits with Danmarks Nationalbank will earn interest at the CD rate.

The overall need of monetary policy counterparties to deposit funds with Danmarks Nationalbank is impacted by Danmarks Nationalbank's interventions in the foreign exchange market.

The Danish money market and the annual money market survey

Box 1

Money market loans comprise unsecured loans, repos (loans against bonds as collateral) and FX swaps. A FX swap is a simultaneous agreement comprising a spot transaction and a forward contract in foreign exchange. Initially, foreign exchange is exchanged for kroner (the spot transaction) and, at a later date, the initial transaction is reversed at a price, the forward price, determined when the swap is entered into (the forward contract).

In addition, short-term securities and Danmarks Nationalbank's certificates of deposit are part of the money market.

Interest rate derivatives include e.g. CITA swaps and FRAs. A CITA (Copenhagen Interbank T/N Average) swap

is a short-term interest rate swap where a variable rate of interest (the T/N rate) is swapped for a fixed rate of interest determined at the commencement of the agreement. A FRA (Forward Rate Agreement) is an agreement to fix the interest rate for a future period. For further information about money market products, see Danmarks Nationalbank (2009).

Danmarks Nationalbank performs an annual survey of the Danish money market in the 2nd quarter with banks reporting data on turnover, etc. In the 2015 survey, data was also compiled for the 1st quarter in light of the pressure on the Danish krone at the beginning of the year. In this connection, Danmarks Nationalbank interviewed several market participants about developments in the money market.

Danmarks Nationalbank's monetary policy instruments

Box 2

Monetary policy instruments are the deposit and lending facilities made available by Danmarks Nationalbank for banks and mortgage banks, the monetary policy counterparties. The counterparties have access to two facilities at Danmarks Nationalbank: open market operations and current account deposits.

Current accounts are demand accounts in which the counterparties can deposit liquidity overnight. An overall limit has been determined for the counterparties' total current account deposits with Danmarks Nationalbank at the close of the day. If the counterparties' total current account deposits exceed the overall limit, the current account deposits will be converted into certificates of deposit. Monetary policy counterparties may exceed their individual limits, provided that the overall current account limit is not exceeded.

Through Danmarks Nationalbank's regular open market operations on the last banking day of each week, the coun-

terparties can borrow against collateral and invest the funds in certificates of deposit. If necessary, Danmarks Nationalbank also conducts extraordinary open market operations, in which it buys or sells certificates of deposit in order to manage liquidity in the money market. Extraordinary open market operations may be pre-announced. Announced open market operations in a given month are published on the penultimate banking day of the previous month. Determination of announced extraordinary open market operations is based on information on government payments included in Danmarks Nationalbank's liquidity projection. In addition, Danmarks Nationalbank may conduct unannounced extraordinary open market operations, for instance when Danmarks Nationalbank intervenes in the foreign exchange market, which cannot be predicted. These operations are announced at 10:00 a.m. on the day they are to be conducted.

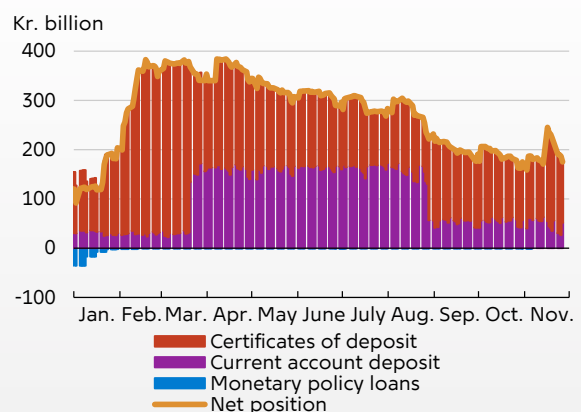
When Danmarks Nationalbank makes intervention purchases of foreign exchange from banks, as seen during the period of pressure on the Danish krone in January and February 2015, this is offset by increases in deposits with Danmarks Nationalbank, and the CD rate will pass through to interest rate fixing and pricing in the money and foreign exchange markets. When their need to deposit funds with Danmarks Nationalbank exceeds the total current account limit, the only option for the monetary policy counterparties overall is to place funds in certificates of deposit.

The individual counterparty may reduce its deposits with Danmarks Nationalbank, but this will be offset by other counterparties increasing their deposits. Thus, the counterparties' accounts with Danmarks Nationalbank represent a closed system. The monetary counterparties' total net account with Danmarks Nationalbank is referred to as the net position, cf. Chart 1.

Danish banks' total need to place funds with Danmarks Nationalbank increased sharply after Danmarks Nationalbank's intervention purchases in January and February, and, against this backdrop, Danmarks Nationalbank increased the current account limit in March. Danmarks Nationalbank subsequently conducted substantial intervention sales and reduced the current account

Use of Danmarks Nationalbank's monetary policy instruments in 2015

Chart 1



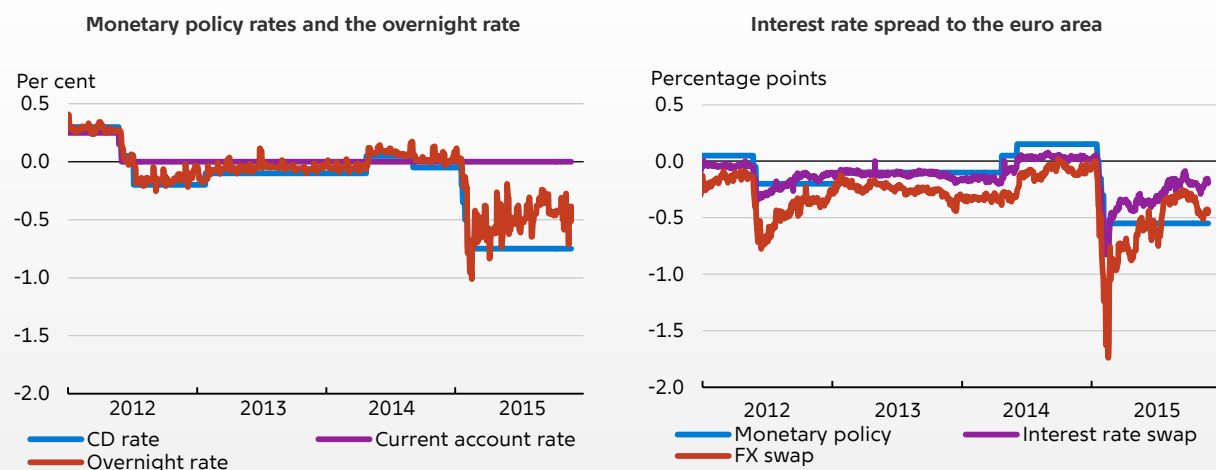
Note: The net position is defined as the counterparties' holdings of certificates of deposit and current account deposits less monetary policy loans. The most recent observations are from 26 November 2015.

Source: Danmarks Nationalbank.

limit in August to ensure the continued pass-through of the CD rate to money market rates. Periods of expectations of changes in interest rates may cause money market rates to fluctuate widely. In February 2015, after Danmarks Nationalbank's reduction of the CD rate to -0.75 per cent, money

Monetary policy rates, the overnight rate and interest rate spread to the euro area

Chart 2



Note: Left-hand chart: The overnight rate is a weekly average of the T/N rate. Right-hand chart: The monetary policy spread is the spread between Danmarks Nationalbank's CD rate and the ECB's deposit rate. The interest rate swap is the spread between the 3-month EONIA and CITA swap rates. The FX swap is the implied 3-month interest rate spread from FX swaps. The most recent observations are from 26 November 2015.

Source: Thomson Reuters Datastream, ECB and Danmarks Nationalbank.

market rates plunged, and, for a short period of time, short-term money market rates were lower than the CD rate, cf. Chart 2, reflecting market expectations of further interest rate reductions. The massive inflow of foreign exchange during this period also boosted banking sector liquidity, contributing to the drop in money market rates.

Low Danish money market rates caused the spread between money market rates in Denmark and the euro area to turn negative – even more negative than the monetary policy spread, cf. Chart 2. The negative interest rate spread made it less attractive to invest in kroner rather than in euro. Developments in the money market spread were important in alleviating the pressure on the Danish krone.

As an alternative to buying kroner against euro today and investing directly in the money market, investors can buy kroner forward. The implied interest rate spread between the two currencies involved in these transactions, the FX swap spread, dropped considerably more than the monetary policy spread and other money market spreads. Buying kroner forward became more expensive.

The lower implied interest rate spread reflected the strong demand from foreign investors and Danish insurance and pension companies interested in making forward purchases of kroner against euro, cf. Danmarks Nationalbank (2015). At the same time, the FX swap market for kroner is limited to few providers, which may also result in a deviation between the implied interest rate spreads and other money market spreads. When the pressure on the krone eased, the implied interest rate spread narrowed considerably.

LESS NEED FOR UNSECURED OVERNIGHT LOANS

Turnover in unsecured overnight loans, used by banks in their daily liquidity management, decreased from an already low level after Danmarks Nationalbank's reduction of the CD rate to -0.75 per cent, cf. Chart 3. On earlier occasions when the CD rate was in negative territory, turnover in the unsecured overnight market was also low. One explanation is that the CD rate is lower than the current account rate, giving banks and mortgage banks an interest rate incentive to increase

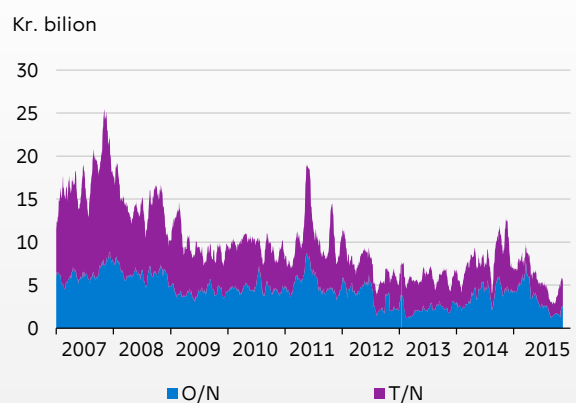
their current account deposits with Danmarks Nationalbank. At the same time, the institutions' access to deposit funds in current accounts was extended, since the current account limits were generally higher than when the CD rate was positive. The higher current account deposits have enhanced the institutions' ability to manage daily liquidity fluctuations without resorting to the unsecured overnight money market.

Turnover in tomorrow next loans, T/N, has been declining in recent years, while the share of overnight loans, O/N, of the unsecured overnight market increased from the beginning of 2013. O/N loans commence on the day they are agreed, while T/N loans commence on the following day. In a period of large current account deposits, banks may have less need to manage unforeseen liquidity fluctuations two days into the future. Moreover, the change from three to two days of settlement in the Danish bond market in October 2014 may have had an impact.

Traditionally, T/N loans have accounted for a large share of the turnover in the unsecured overnight market, reflecting, inter alia, that Danmarks Nationalbank does not have a marginal (daily) lending facility, as known e.g. from the ECB, to be used by counterparties in case of unforeseen liquidity needs, cf. Abildgren et al. (2010). There-

Daily turnover in unsecured overnight loans broken down by O/N loans and T/N loans

Chart 3

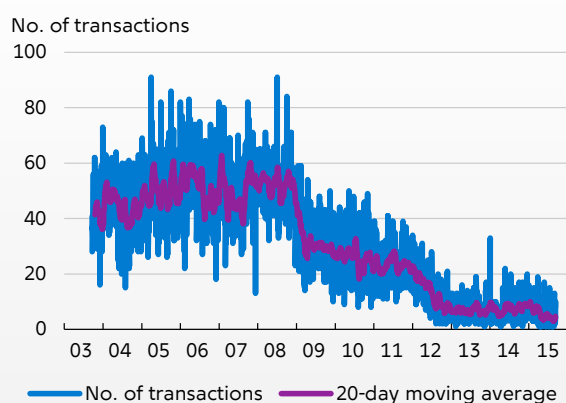


Note: 21-day moving average. Spot next loans, S/N, are also raised in the unsecured overnight market, but the volume is limited. The most recent observations are from 23 November 2015. The most recent observations are from 23 November 2015.

Source: Danmarks Nationalbank.

Number of transactions in the unsecured overnight money market

Chart 4

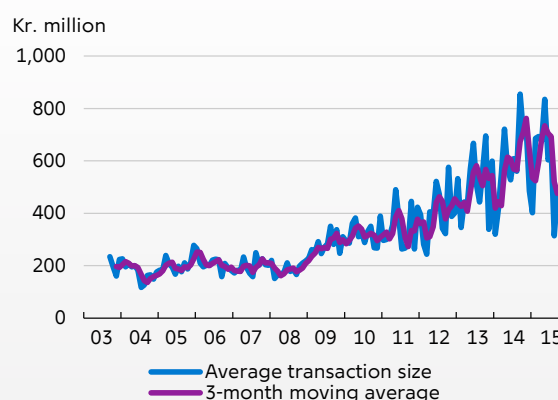


Note: Daily observations. Both O/N loans and T/N loans are included. The data period covers the period from 22 September 2003 to 11 September 2015. Only loans between the monetary policy counterparties are included. See Abildgren et al. (2015) for a detailed description of the data used.

Source: Danmarks Nationalbank.

Average transaction size for unsecured overnight loans

Chart 5



Note: Monthly averages. Both O/N loans and T/N loans are included. The data period covers the period from 22 September 2003 to 11 September 2015. Only loans between the monetary policy counterparties are included. See Abildgren et al. (2015) for a detailed description of the data used.

Source: Danmarks Nationalbank.

fore, banks in the Danish market have typically been using T/N loans to manage foreseen and planned liquidity movements, while the O/N market has been used to handle unforeseen fluctuations.

When the CD rate has been in negative territory, the average turnover in connection with days of open market operations has been higher than on other days. When a negative CD rate was first introduced in mid-2012, turnover in connection with days of open market operations increased relative to the turnover on other days. The relationship subsided when the CD rate moved back into positive territory from April to September 2014 and subsequently picked up again.

FEWER BUT LARGER TRANSACTIONS

The lesser need for unsecured overnight loans is also reflected in the number of transactions. The average daily number of unsecured overnight loans among monetary policy counterparties has decreased from approximately 50 in the pre-crisis years to the current level of less than 10 transactions on average per banking day, cf. Chart 4. Abildgren et al. (2015) perform a detailed analysis of the monetary policy counterparties' interbank trading with unsecured overnight loans at transaction level during the period from September

2003 to March 2015. The analysis shows, inter alia, that on average there have been very few T/N loans per banking day since the introduction of a negative CD rate. Thus, individual transactions could potentially have a relatively great impact on the overall T/N rate.

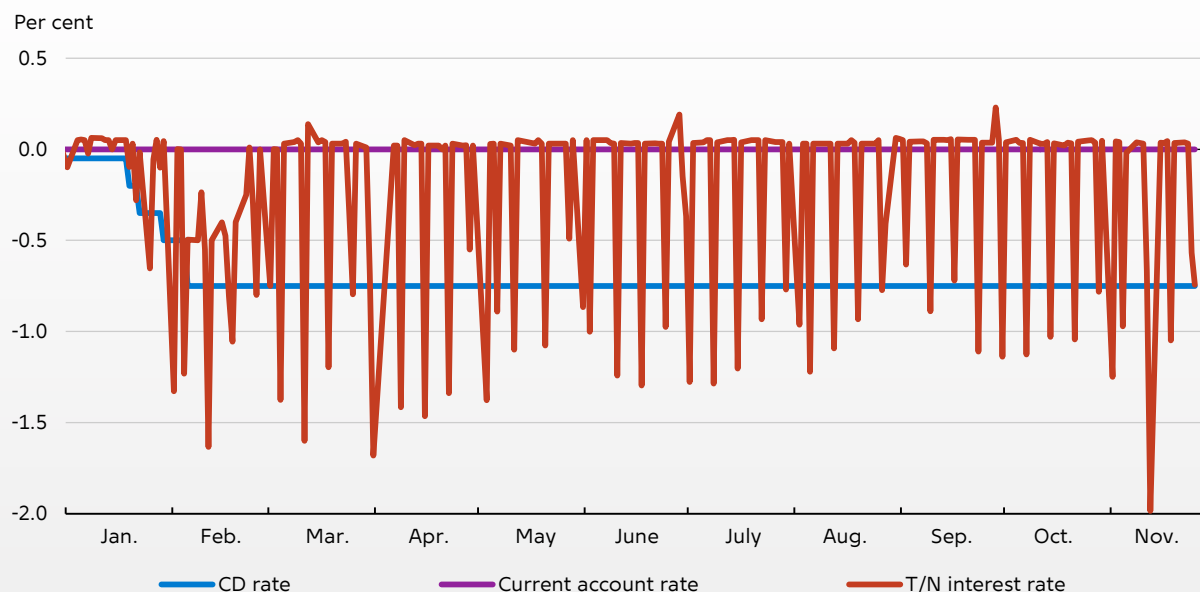
Since 2012, in particular, average transaction sizes in the unsecured overnight market have tended to increase, cf. Chart 5. This reflects, in part, the lapse of many very small transactions in response to generally ample liquidity, the reduction in the number of small banks, in particular, and increased focus on credit risk in the wake of the financial crisis, cf. Abildgren et al. (2015). The most frequent transaction size has been growing over time, from kr. 50 million before the financial crisis to kr. 200 million in the first three quarters of 2015.

GREATER FLUCTUATIONS IN THE OVERNIGHT RATE

The overnight rate fluctuates considerably on different days of the week, cf. Chart 6. Most of these fluctuations are of a technical nature, given that the overnight rate on any given day depends on whether Danmarks Nationalbank conducts

The CD rate, current account rate and T/N rate since the beginning of 2015

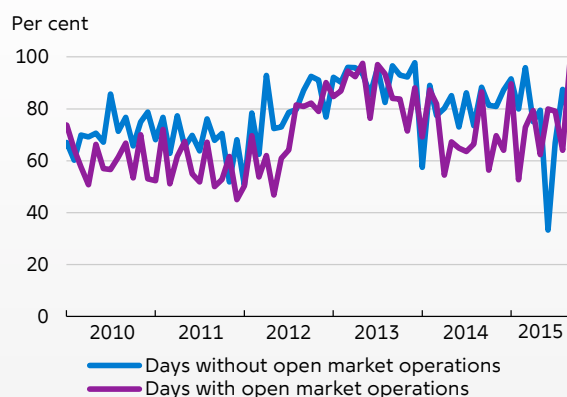
Chart 6



Note: The T/N rate is shown on the day the T/N loan commences. The most recent observations are from 26 November 2015.
Source: Danmarks Nationalbank.

Share of unsecured overnight turnover where the borrower has relatively more room in the current account

Chart 7



Note: Monthly shares. The data period covers the period from 1 January 2010 to 11 September 2015. Only loans between the monetary policy counterparties are included. See Abildgren et al. (2015) for a detailed description of the data used. The chart shows the share of turnover in unsecured overnight loans where the lender's current account utilisation exceeds that of the borrower, and the borrower's deposits are below the current account limit. The current account utilisation is calculated as the bank's current account balance as a percentage of its current account limit at the end of the monetary policy day, see also Box 4.

Source: Danmarks Nationalbank.

open market operations, cf. Box 3. Fluctuations increase with the spread between the CD rate and the current account rate. The technical volatility is unproblematic – it is systematic and well known by market participants.

In recent years, interest rate fixing on a given day has been based on few transactions and depends on liquidity conditions in the market on that day. In periods of negative interest rates, activity has been driven, to a greater extent than usual, by institutions with deposits below their current account limit borrowing from those exceeding their limit, cf. Chart 7. In periods of negative CD rates, interest rates on overnight loans have, on average, been higher when the borrower had relatively more room in the current account than the lender, cf. Box 4. This reflects that institutions with deposits below the current account limit have been willing to borrow at a higher rate of interest than the marginal rate for the market overall – the CD rate – because they have been able to deposit the funds in their current accounts at the current account rate.

Interest rate expectations can also impact the T/N rate, for instance during periods of pressure

Theoretical overnight rate

Box 3

When the banking sector's deposits with Danmarks Nationalbank exceed the current account limit, an increase in the sector's total deposits with Danmarks Nationalbank must be invested in certificates of deposit. Accordingly, the CD rate is the alternative interest rate for the rate of interest on money market investments and the key interest rate for Danish money market rates.

The structure of Danmarks Nationalbank's monetary policy instruments means that the overnight money market rate on any given day depends on whether Danmarks Nationalbank will be conducting open market operations. On days without open market operations, the theoretical overnight rate is the current account rate, since, for the individual institution, current account deposits constitute the alternative to overnight money market investments, provided the overall current account limit is observed. On days with open market operations, counterparties will assess the trade-off of the return on investment of funds in the overnight money market against the return on investment in certificates of deposit. The theoretical determination of the overnight rate applies in a situation of perfect competition, without market frictions and risk-neutral monetary policy counterparties and may thus deviate from the actual overnight rate.

The theoretical overnight rate on days with open market operations is determined so that the return from investing in the money market equals the CD rate until the next announced open market operation. If the CD rate is negative and lower than the current account rate, the theoretical overnight rate on days with open market operations must be more negative than the CD rate to offset that, on other days, the theoretical overnight rate equals the current account rate.

The calculation of the theoretical overnight rate can be illustrated by an example involving a Friday when a regular open market operation is carried out and with seven days until the next open market operation. The overnight rate on the Friday covers three days (Friday, Saturday and Sunday). On the following four days, the overnight rate is equal to the current account rate. The counterparty's assessment of the trade-off between investment in certificates of deposit or in the money market can thus be written as:

$$3 * \text{Overnight rate} + 4 * \text{Current account rate} = 7 * \text{CD rate}$$

At a current account rate of 0.00 per cent and a CD rate of -0.75 per cent this results in:

$$3 * \text{Overnight rate} + 4 * (0.00 \text{ per cent}) = 7 * (-0.75 \text{ per cent}) \Leftrightarrow$$

$$\text{Overnight rate} = \frac{7}{3} * (-0.75 \text{ per cent}) = -1.75 \text{ per cent}$$

On Fridays on which Danmarks Nationalbank has announced no further open market operations for the following week, the theoretical overnight rate will thus be -1.75 per cent.

The explanation above of the theoretical overnight rate does not distinguish between O/N loans and T/N loans. The O/N rate is affected on the day of the open market operation. T/N loans commence on the day after the loan is agreed. This means that the T/N rate agreed on the day before the announced open market operation is affected by open market operations, while the T/N rate is not affected by unannounced open market operations.

on the Danish krone, which may trigger expectations of changes in Danmarks Nationalbank's monetary policy rates. In February 2015, after the reduction of the CD rate to -0.75 per cent, the T/N rate was, on average, lower than the CD rate. Moreover, the T/N rate may be influenced by expectations of conversion of current account deposits into certificates of deposit.¹ After the introduction of a negative CD rate, the volume of conversions increased considerably. Danmarks Nationalbank converted current account deposits into certificates of deposit on 47 occasions from January to November 2015.

TOTAL TURNOVER IN THE DANISH MONEY MARKET

According to Danmarks Nationalbank's annual money market survey, total turnover in money market loans remained low in the 2nd quarter of 2015, cf. Chart 8. Increased focus on liquidity and credit risks after the financial crisis has brought about a shift from unsecured loans to secured loans, and loan maturities have generally been substantially reduced. Turnover in unsecured loans with a maturity of more than 1 day was virtually non-existent, cf. Chart 9.

1 For instance, if Danmarks Nationalbank purchases foreign exchange, as seen during the pressure on the Danish kroner at the beginning of 2015, the monetary policy counterparties' total deposits with Danmarks Nationalbank increase. As a result, Danmarks Nationalbank may convert current account deposits to certificates of deposits, which will reduce the expected return on deposits.

Borrowers with deposits below the current account limit borrow at a higher rate of interest

Box 4

This box presents the results of a regression analysis of the interest rate on unsecured overnight loans using data at transaction level, see Abildgren et al. (2015) for a detailed description of the data. Previous studies have shown that it is possible to provide a meaningful description of the overnight rate on unsecured loans in a simple regression model using aggregated data, cf. e.g. Mindested et al. (2013) and Christensen et al. (2014). The estimated model of the overnight rate can be summarised in the following equation:

$$r_t = \beta_0 + \beta_1 * \text{Current account utilisation}_t + \beta_2 * \text{Theoretical}_t + \beta_3 * \text{Current account deposit}_t + \beta_4 * \text{Current account allocation}_t + \beta_5 * \text{End of month}_t \quad (1)$$

where r indicates the rate of interest on the unsecured overnight loan as a spread to the current account rate. *Current account utilisation* is an indicator with the value of 1 if the lender's percentage utilisation of its current account limit is higher than that of the borrower, and the borrower has deposits below the current account limit, and otherwise 0.¹ *Theoretical* indicates the theoretical interest rate spread to the current account rate, cf. the explanation in Box 3. *The current account deposit* indicates the total current account deposit with Danmarks Nationalbank in billion kroner and is a measure of the total liquidity among the monetary policy counterparties. *Current account allocation* is a measure of the concentration of the current account deposit, calculated as the percentage of the total current account deposit with

Danmarks Nationalbank, held by the bank with the largest current account deposit, cf. Syrstad (2012). *End of month* is an indicator with the value of 1 on the last trading day of the month, and otherwise 0.

The focus of this box is on the coefficient β_1 . This coefficient can be interpreted as the spread on loans where the borrower has relatively more room in the current account than the lender, relative to other unsecured overnight loans. The estimation of the spread allows for a number of factors that are usually expected to affect the formation of interest rates in the unsecured overnight money market, cf. equation (1).

When the model is estimated for all days in periods of positive CD rates from September 2003 until September 2015, the estimated coefficient β_1 is negative, cf. the table. Conversely, the estimated coefficient β_1 is positive in periods of negative CD rates. The positive coefficient in periods of negative CD rates should be seen in the context that borrowers with deposits below their current account limit have been willing to borrow at a higher rate of interest than the marginal rate for the market overall – the CD rate – because they have been able to deposit the funds in their current accounts at a higher rate of interest (the current account rate is zero). The negative coefficient in periods of positive CD rates may reflect that lenders with ample liquidity are willing to lend funds to borrowers in the money market at a relatively low rate of interest to avoid having to deposit their excess liquidity at an even lower rate of interest (the current account rate).

The estimated coefficient β_1

	Periods of positive CD rates		Periods of negative CD rates	
	All days	Days with open market operations	All days	Days with open market operations
Borrower has relatively more room in the current account	-0.0181*** (0.0013)	-0.0345*** (0.0027)	0.0374*** (0.0079)	0.0721*** (0.0163)

Note: *, ** and *** denote levels of significance of 10, 5 and 1 per cent, respectively. Robust standard errors in parentheses. The table shows the coefficient of *current account utilisation* (an indicator that assumes the value of 1 if the lender's utilisation of its current account limit is higher than that of the borrower, and the borrower has deposits below the current account limit, and otherwise 0) in a regression model as described above. The data period covers the period from 22 September 2003 to 11 September 2015. See Abildgren et al. (2015) for a detailed description of the data used.

Source: Danmarks Nationalbank.

1. Ideally, the current account utilisation should be calculated when the loan agreement is signed, adjusted for expected liquidity fluctuations until the end of the monetary policy day on which the loan commences. However, this is not possible based on available data. Instead, the current account utilisation is calculated as the bank's current account balance as per cent of its current account limit calculated at the end of the monetary policy day on which the loan commences.

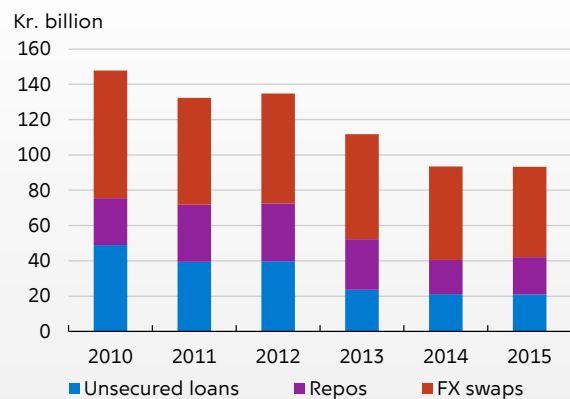
In January and February, increased demand for Danish kroner on forward terms translated into considerably higher turnover in FX swaps than in the other months of the 1st half of 2015. FX swap turnover is driven, to a great extent, by customers' and banks' foreign exchange positions and hedging of exchange rate risks.

THE OVERNIGHT MONEY MARKET IN THE EURO AREA

Following the ECB's launch of its expanded asset purchase programme in March 2015, the turnover in the unsecured euro area overnight money market dropped to its lowest level since the introduction of the euro, cf. Chart 10 (left). Moreover, there has generally been substantial excess liquidity in the banking sector since the ECB introduced full allotment of loans in its refinancing operations in October 2008. Similarly to the situation in Denmark, ample liquidity has reduced banks' need to resort to the overnight money market. Turnover in the overnight money market has tended to decline when excess liquidity increased and vice versa.

Average daily turnover for unsecured loans, repos and FX swaps

Chart 8

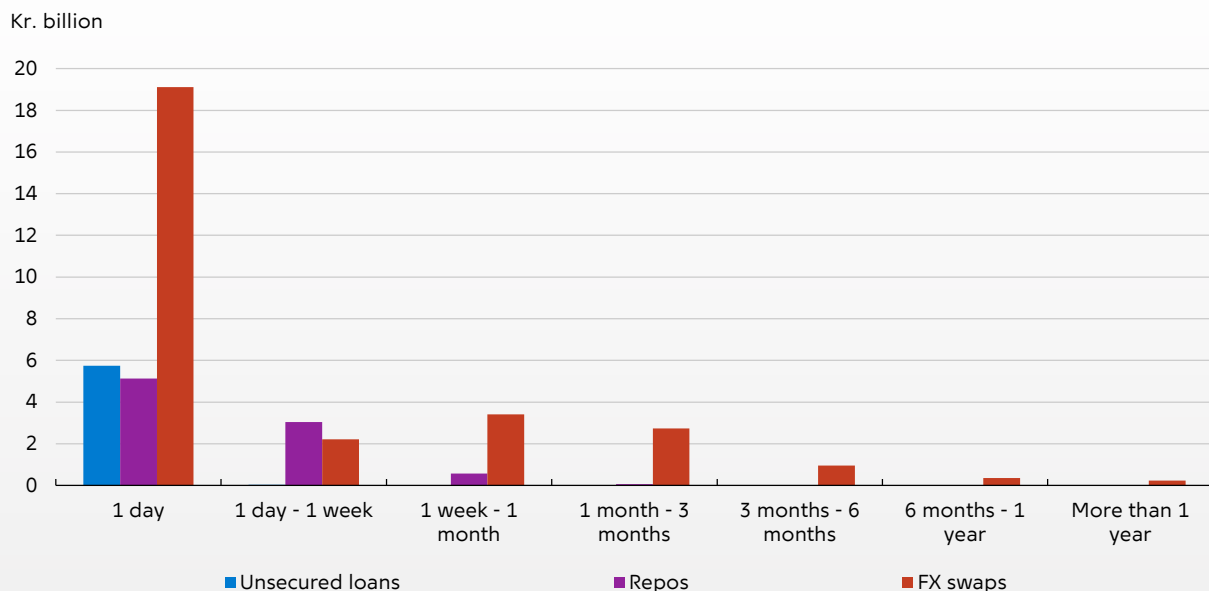


Note: Average daily turnover in both loans and deposits in April for 2010-11 and in the 2nd quarter of 2012-15. Total turnover in loans and deposits.

Source: Danmarks Nationalbank.

Average daily turnover in loans broken down by instruments and maturities in 2015

Chart 9

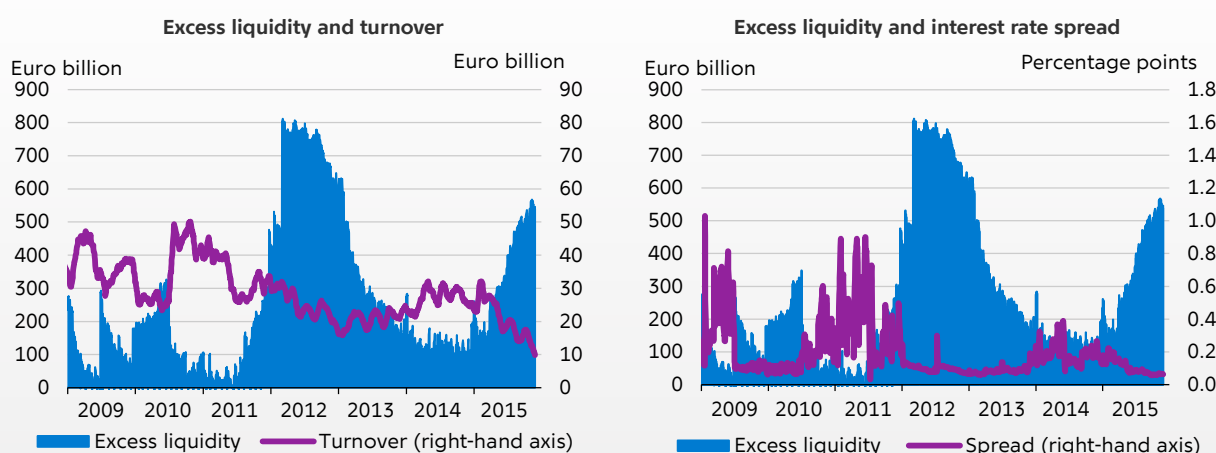


Note: Average daily turnover in loans in the 2nd quarter of 2015. The intervals cover the start of the interval and up to the end of the interval. For instance, "1 week - 1 month" covers loans with a maturity of more than 1 week up to and including 1 month. Since loans for a longer period of time can be obtained by renewing short-term loans during the period, the turnover will tend to be higher for short maturities than for long maturities.

Source: Danmarks Nationalbank.

Excess liquidity, turnover in the euro area overnight market and spread between the overnight rate and the ECB's deposit rate

Chart 10



Note: Left-hand chart: The 21-day moving average of the turnover in Eonia, the unsecured overnight money market rate in the euro area. Right-hand chart: The spread between the 5-day moving average of Eonia and the ECB's deposit rate. The most recent observations are from 27 November 2015.
Source: ECB and Bloomberg.

Similarly to the situation in Denmark, interest rates and volatility in the euro area money market depend on excess liquidity and the spread between the ECB's monetary policy rates, cf. ECB (2014) and ECB (2015). The overnight rate in the euro area fell and traded closer to the ECB's deposit rate as excess liquidity rose after the ECB's expansion of its asset purchase programme, cf. Chart 10 (right).

LITERATURE

Abildgren, Kim, Nicolaj Albrechtsen, Mark Strøm Kristoffersen, Søren Truels Nielsen and Rasmus Tommerup (2015), The short-term Danish inter-bank market before, during and after the financial crisis, *Danmarks Nationalbank Working Paper*, No. 99.

Abildgren, Kim, Bodil Nyboe Andersen and Jens Thomsen (2010), *Monetary history of Denmark 1990-2005*, Danmarks Nationalbank.

Christensen, Jonas Lundgaard, Palle Bach Mindested and Lars Risbjerg (2014), Recent money market trends, Danmarks Nationalbank, *Monetary Review*, 4th Quarter.

Danmarks Nationalbank (2009), *Monetary policy in Denmark*.

Danmarks Nationalbank (2015), The Danish krone under pressure in January-February 2015, *Monetary Review*, 1st Quarter.

ECB (2014), Recent developments in excess liquidity and money market rates, *ECB Monthly Bulletin*, January.

ECB (2015), *Euro money market study 2014*.

Mindested, Palle Bach, Lars Risbjerg and Martin Wagner Toftdahl (2013), Lower turnover in the Danish money market, Danmarks Nationalbank, *Monetary Review*, 4th Quarter, Part 1.

Syrstad, Olav (2012), The daily liquidity effect in a floor system – empirical evidence from the Norwegian market, *Norges Bank Working Paper*, No. 14.

CALCULATION OF OUTPUT GAP

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INTRODUCTION AND SUMMARY

The output gap measures how far Danish output (measured by the gross domestic product, GDP) is from its structural level, corresponding to normal capacity utilisation in the economy. It is regarded as an overall indicator of the current cyclical position and therefore plays a prominent role in the planning of economic policy. For this reason, the output gap should be available as early as possible, but at the same time be calculated as accurately and reliably as possible.

Since 2011, Danmarks Nationalbank has estimated potential output and an output gap for the Danish economy, cf. Andersen and Rasmussen (2011). This article revisits the method in order to assess the reliability of the output gap as an indicator of the cyclical position. Revisions of the output gap have been modest in recent years, indicating that the method provides a relatively reliable view of the economy in real time. This is partly attributable to the fact that the method is linked to economic theory, which reduces the uncertainty associated with estimating unobserved variables.

The Danish Ministry of Finance, the Danish Economic Councils and Danmarks Nationalbank all estimate an output gap. The three institutions generally agree on the cyclical position of the Danish economy, including that there are still spare resources, and also on the recommendations for the economic policy direction. But the as-

sessments differ in terms of the amount of spare resources available. This is particularly the case for spare labour outside the labour force.

The estimation of the output gap will always be subject to uncertainty and should be interpreted with caution. The assessment of the cyclical position should not be based on the gaps alone. The available labour market indicators suggest that there is still some spare capacity in the Danish economy. But increasing wage growth and the survey indicator of labour shortage, among other factors, indicate that the situation in the labour market is gradually being normalised. At the same time, the employment potential may be smaller now than before, because the age composition of the labour force has changed. This supports Danmarks Nationalbank's assessment that the output gap is around -1.5 per cent of GDP this year and will narrow in the coming years.

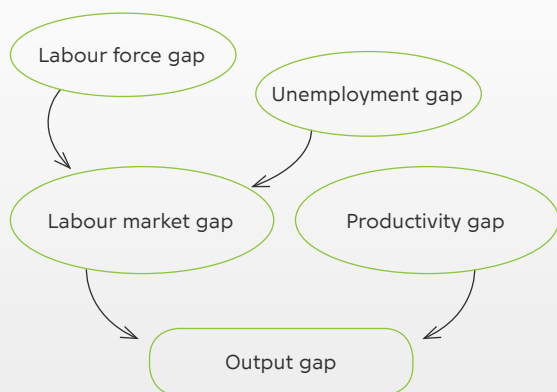
ESTIMATION OF THE OUTPUT GAP IS BASED ON THE PRODUCTION FACTORS

The calculation of the output gap is based on the production factors used in Danish output. For the sake of simplicity, two production factors are used, i.e. capital stock and labour. The capital stock is the buildings, machines and other equipment used in production, while labour is the number of people in employment.¹ In addition to the

¹ As such, labour input should be the total number of hours. The estimation of the output gap takes this into account, cf. Box 1.

The output gap is calculated on the basis of the gaps in labour and productivity

Chart 1



two production factors, output is also determined by productivity, i.e. the efficiency of utilisation of the two factors.

In principle, the output gap is estimated by calculating separate gaps for the production factors and productivity, cf. Box 1. However, the calculations assume that the capital stock is always at its structural level, e.g. because adjustments to the capital stock at the aggregated level are typically slow, cf. Andersen and Rasmussen (2011). In practice, the output gap is therefore calculated on the basis of gaps in productivity (the TFP gap²) and labour (the labour market gap). The labour market gap reflects spare capacity both in the labour force (the unemployment gap) and outside the labour force (the labour force gap), cf. Chart 1. Overall, the various gaps are referred to as cyclical gaps in the following sections.

Several other economic institutions, e.g. the Danish Economic Councils, the Ministry of Finance, the OECD and the European Commission, also calculate an output gap for Denmark based on the production factors. But even though the basic approach is generally the same, the assessments of potential output and the output gap may still be relatively different. For example, in the assessments of Danmarks Nationalbank and the Danish Economic Councils, the boom in the 2000s was somewhat stronger than assessed by the Ministry of Finance, cf. Chart 2. Similarly, in the Danish Economic Councils' assessment, the

output gap is currently considerably larger than it is according to Danmarks Nationalbank and the Ministry of Finance.

Even though the strength of the economy (measured by the size of the output gap) varies according to the institutions, there is generally agreement on the sign, i.e. whether output is above or below its structural level.

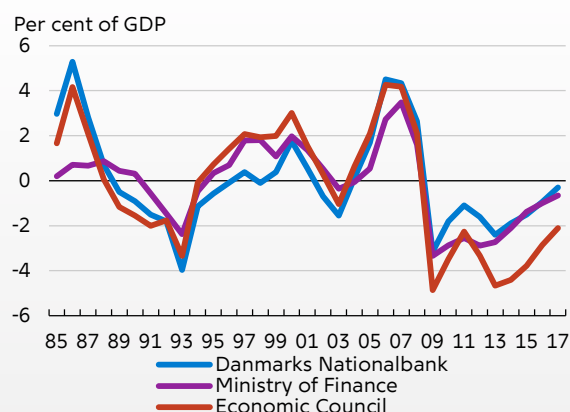
Recognising that the estimation of cyclical gaps in output and in the labour market is subject to considerable uncertainty is vital. While, in principle, it is possible to calculate uncertainty intervals for the individual gaps, the individual uncertainties cannot be directly combined into an overall uncertainty for e.g. the output gap. The uncertainty means that caution should be exercised in drawing firm conclusions about the exact size of the cyclical gaps.

ASSESSMENT OF THE CYCLICAL POSITION OVER TIME

Overall, the cyclical gaps constitute an indicator of the cyclical position and against that background they play a fundamental role in the planning of economic policy. For this reason, it is important that the cyclical gaps can be estimated so that they are available as early as possible, but at the same time are estimated as accurately and reliably as possible. There is particular focus on the esti-

Output gap estimates

Chart 2



Note: The Ministry of Finance has a technical projection for 2017.

Source: Danish Economic Councils (October 2015), Ministry of Finance (September 2015) and own calculations.

2 See Box 1 for a description of TFP.

Estimation of cyclical gaps

Box 1

The output, labour market and productivity gaps are referred to as cyclical gaps and reflect the difference between actual and structural levels. The structural levels reflect an unobserved, underlying potential from which the economy will not persistently deviate. If the economy deviates from its potential, there are forces that will bring it back. For example, if unemployment is below its structural level, shortages of labour may push up wages relative to productivity development. In time, this will have a negative impact on competitiveness and sales opportunities, thereby reducing output. Labour is adjusted to the lower output, and unemployment returns to the structural level.

The output gap, i.e. the difference between actual and structural unemployment, is composed of three gaps: the unemployment gap, the labour force gap and the TFP gap.

The unemployment gap reflects the spare capacity in the labour force, i.e. how much unemployment can fall without leading to unsustainable development in wages and prices. The development in wages and prices per se does not give an indication of labour market pressures, the reason being that in a longer perspective, growth in real wages will reflect labour productivity. Hence, the unemployment gap is estimated by using e.g. signals from the relative position and movement of real wages in relation to productivity. If real wages are substantially above productivity, and/or if growth in real wages exceeds productivity growth, this indicates that unemployment is below its structural level.

Information about the development in wages and prices is also included in the estimation of the labour force gap. In addition, Statistics Denmark's indicator of labour shortage is also used in the estimation. Together the unemployment gap and the labour force gap make up a labour market gap, which indicates how much employment can rise without causing wage and price pressures.

The total volume of labour input is also determined by the working hours of those in employment. It is difficult to identify cyclical fluctuations in working hours due to opposite cyclical effects. For example, many students will enter the labour market during booms, which will reduce the average number of working hours. On the other hand, the increased need for labour will push working hours up for full time employees. Moreover, calculation of the number of hours worked is subject to great uncertainty. Consequently, a specific working hours gap is not calculated. It is included in the estimated productivity gap instead.

Total factor productivity, TFP, is an overall expression of the production factors' utilisation efficiency in the production process. TFP captures the factors that contribute to increasing production, in addition to capital and labour, including any measuring errors in the calculations for capital and labour, respectively, and, as previously mentioned, also working hours.

For a complete review of the method, reference is made to Andersen and Rasmussen (2011).

mate of the current cyclical position when calculating the cyclical gaps, while the estimate of the output gap in earlier periods is less interesting for the planning of economic policy.

This section examines how the estimates of the cyclical position at various times have changed over time. This may give an indication of the accuracy of the first output gap estimates and hence their reliability.

RELIABILITY IN REAL TIME

The estimates of the output gap are typically revised over time – often related to new information that has become available after the first estimation of the output gap. New information may include revision of data as well as new data covering an extra period and may contribute two things. On the one hand, it may present a new picture of cyclical pressures. On the other hand, it may constitute information about another structural level or potential growth than previously assumed.

One example of new information that may change the perception of the current pressure is price and wage developments that differ from pre-

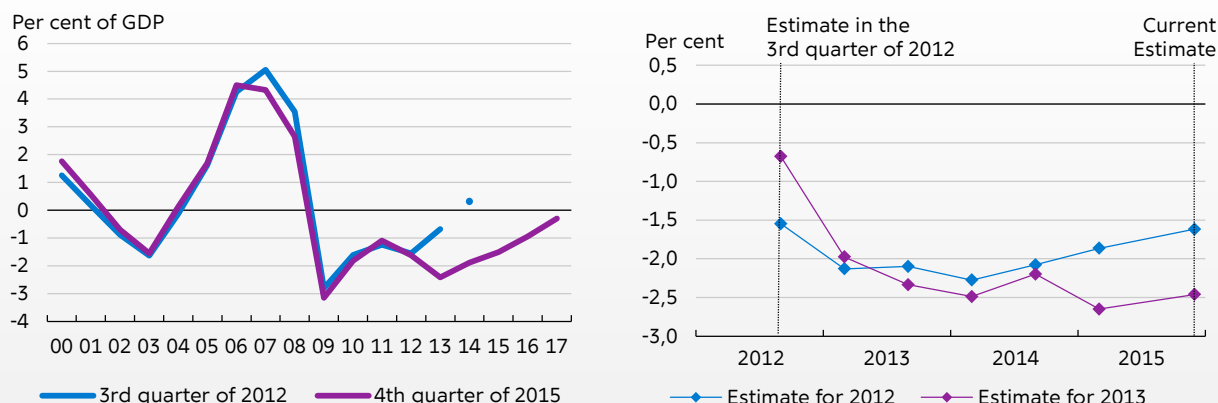
vious calculations. Since both price and wage developments are indicators of capacity utilisation in the economy, data revisions will point to a change in cyclical pressures. Weaker growth in GDP than expected and/or previously stated may also point to a change in cyclical pressures in the near term.

On the other hand, revisions of data that will not necessarily change the perception of cyclical pressures may present a different picture of the structures. For example, the major revision of the national accounts in 2014 did not generally contain new information on cyclical pressures, even though GDP growth was revised. This instead reflected e.g. that a number of definitions were changed, including that GDP now also contains output created through research and development. Basically, the revision does not reflect a different cyclical position, but a different definition of GDP and therefore also a different definition and calculation of structural GDP.

It can often be difficult to pinpoint whether new information reflects structural or cyclical changes. Hence, both the cyclical gaps and structural levels will typically be affected by new information in the estimation.

Output gap estimates in selected Monetary Reviews

Chart 3



Note: Left-hand chart: The output gap for 2014 from the 3rd quarter of 2012 has not been fully calculated. The dot indicates a technical projection. Right-hand chart: Time on the X axis denotes the time of forecast publication in the Monetary Review. For the sake of clarity, the output gaps are only shown in the 1st and 3rd quarters (and the 4th quarter for this Monetary Review).
Source: Own calculations.

The revisions of Danmarks Nationalbank's output gaps have been limited in recent years. This is reflected in the fact that the output gap in the period 2000-12 is virtually the same in this Monetary Review as it was in e.g. the Monetary Review for the 3rd quarter of 2012, cf. Chart 3 (left). At that time, the output gap for 2012 was forecast at -1.5 per cent, and it has only been adjusted marginally to -1.6 per cent in this Monetary Review. This indicates that the original estimate in the 3rd quarter of 2012 for 2012 was fairly accurate. The assessments of the output gap for 2012 in the subsequent Monetary Reviews were not markedly different either, cf. Chart 3 (right).

On the other hand, the assessment of 2013, which was part of the projection period in the 3rd quarter of 2012, changed considerably. The output gap was changed from -0.7 per cent to -2.0 per cent in the Monetary Review for the 1st quarter of 2013. The revision reflects exactly the two things that new information may contribute. Firstly, GDP was adjusted upwards in an intermediate publication from mid-2010 to early 2012, cf. Chart 4. The revision of the historical period does not present any immediate new picture of cyclical pressures during the period – for example, it does not affect the indicator of capacity utilisation in the industrial sector. Consequently, structural GDP has also been adjusted upwards. That revision enters the projection period and, viewed in

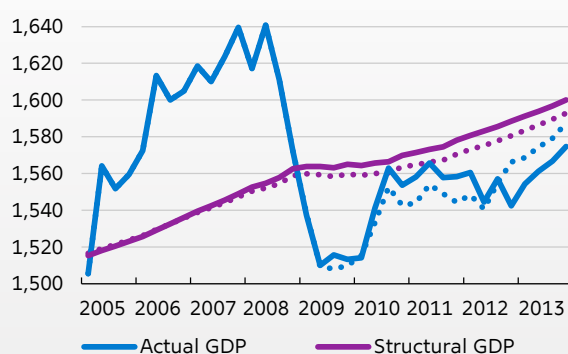
isolation, increases the output gap in 2013. At the same time, GDP growth is weaker than expected at the end of 2012. This shows that the economy is weaker than expected, so the forecast for GDP is adjusted downwards. Both of these factors contribute to the upward adjustment of the output gap.

Actual and structural GDP

Chart 4

The dotted lines indicate the Monetary Review for the 3rd quarter of 2012, while the solid lines indicate the 1st quarter of 2013

2010 prices, chained values, kr. billion



Source: Own calculations.

END-POINT DEPENDENCY

Econometric methods tend to place great emphasis on observations at the end of the estimation period, so the result may be affected by changes in the outlook, since the projection period is part of the estimation. This is the “end-point problem”, which is a well-known issue when attempting to determine unobserved variables.

The end-point problem can be illustrated by a negative change in the growth outlook abroad. Typically, this will also be reflected in lower expected growth in Denmark during the projection period due to lower foreign demand. Lower growth abroad as such does not reflect weaker structures in the Danish economy, so such downward adjustments will typically be an indication of a temporary, cyclically determined deterioration expressed by a widening of the output gap. Nevertheless, structural output may also be affected in the estimation, because the end point has changed.

The end-point problem cannot be completely avoided. Even though the method to estimate potential output is rooted in economic theory, it is unable to distinguish clearly between supply and demand shocks.³ However, statistical models based on economic theory contexts contribute to reducing end-point dependency. One reason is that the estimation is based on indicators containing information on cyclical pressures during the projection period.

In practice, a change in the growth pattern will therefore typically affect both potential output and the output gap – even if the change is attributable to a change in demand. This characteristic can be quite useful: In the light of the uncertainty associated with the estimation, it may also reflect that the original assumption about the structures was too optimistic or pessimistic.

But the method may be affected too greatly by the actual time series, e.g. if a change in the growth pattern is fully reflected in the output potential. While the method to estimate output gaps is end-point dependent, it is not dependent to such an extent that it will change the overall picture of the current cyclical position, cf. Box 2.

ABOUT THE EVALUATION OF OUTPUT GAPS

In principle, it is not possible to calculate the reliability of the output gaps, as the true value can never be known. Revisions of the output gaps may, for example, reflect both new information (indicating a different gap) and uncertainty, reflecting the (in)accuracy of the method. It is therefore not in itself a success criterion that the first assessment of the output gap is not subsequently revised. In fact this may indicate that the method is too rigid and that new information presenting a new picture of the cyclical position is not included in the assessment. The output gaps should therefore be seen against the backdrop of other cyclical indicators and preferably correspond to these.

On the other hand, major, frequent revisions may also indicate that the method is unable to capture the cyclical position sufficiently in real time, e.g. because the end point has too much of an impact on the method. At the same time, major, frequent revisions make it difficult to apply the output gaps when planning economic policy.

SPARE CAPACITY OUTSIDE THE LABOUR MARKET

The overall output potential is linked to e.g. employment. As a consequence, output and prosperity in Denmark depend crucially on how many people will return to the labour force in the coming years as the cyclical position normalises.

In the mid-2000s, the labour market showed clear signs of overheating with excessive wage increases relative to productivity development and a very high level of capacity utilisation. The cyclical reversal of employment in those years was characterised by strong fluctuation in the labour force and not just unemployment, which had primarily been the case previously.

The structural labour force is estimated on the basis of the participation rate, i.e. the number of persons aged 16-66 in the labour force. The difference between the actual and structural participation rates is currently assessed at -0.8 per cent,

³ Firstly, this would require that the impact on the signal from the wage share used in the estimation of the unemployment gap and the other indicators included in the estimation strictly corresponds to the model parameters. Moreover, the built-in smoothing of the statistical filter would prevent such a distinction.

End-point dependency of the method

Box 2

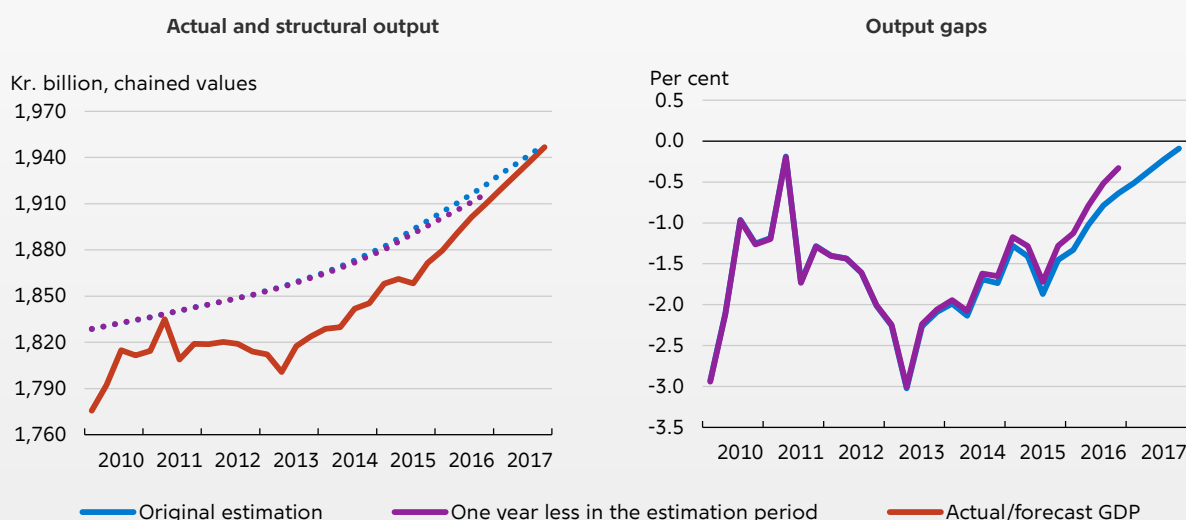
The end-point dependency can be assessed by mapping the properties of the method when adding an extra year to the projection period. This corresponds to estimating the output gap until and including 2016 and 2017, respectively, for the business cycle of this projection.

The Danish economy is projected to be close to normal in 2017. In principle, the year 2017 in the projection does not contribute new information about the preceding years, so, to all intents and purposes, potential output and the output gap should not be affected by the extra year in the projection.

The calculations show that potential output and the output gap are affected fairly evenly by the extra year, but to a relatively limited extent, cf. the charts below. Therefore, the overall perception of the economy is unchanged.

However, the attempt illustrates that the calculation of potential output and potential growth is subject to uncertainty, and that potential growth in the last projection year does not necessarily reflect potential growth in the medium and long term.

Actual and structural output and output gaps



Note: Left-hand chart: Dotted lines indicate potential output.
Source: Statistics Denmark and own calculations.

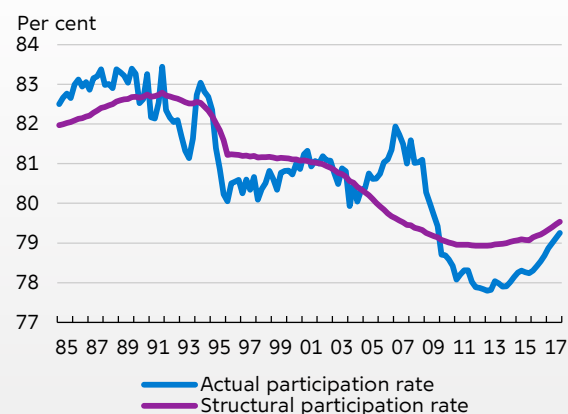
cf. Chart 5. This corresponds to a scope for employment of around 30,000 persons in the group of people outside the labour force.

Danmarks Nationalbank, the Ministry of Finance and the Danish Economic Councils have different assessments of the development in the structural labour force. While the Ministry of Finance and the Danish Economic Councils find that it increased from 2003 to 2013, it is virtually unchanged for the period as a whole according to Danmarks Nationalbank's forecast, cf. Chart 6.

The current cyclical gap in the labour force is primarily attributable to students, people receiving cash benefits, foreign employees and self-supporting individuals. These are among the groups outside the labour force, who can be assumed to be most closely attached to the labour market.

Actual and structural participation rate

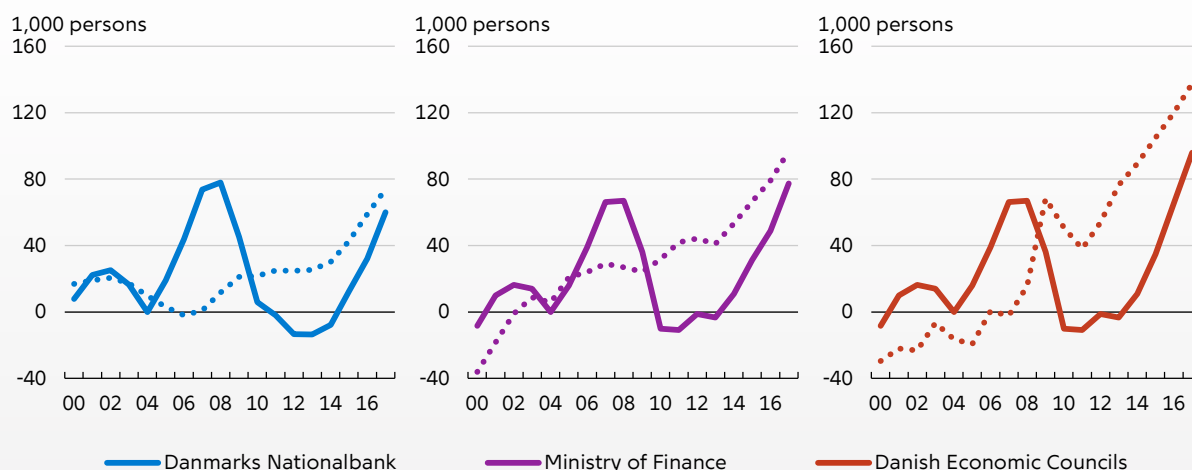
Chart 5



Source: Own calculations.

Actual and structural labour force (actual labour force equals 0 in 2004)

Chart 6



Note: The solid lines indicate actual labour force, while the dotted lines indicate structural labour force. The institutions use different definitions of the labour force, and for the sake of comparability they have been set at 0 in 2004. Danmarks Nationalbank calculates the labour force as the sum of employment and gross unemployment less people in subsidised employment who are included in both. The Ministry of Finance and the Danish Economic Councils calculate the labour force as the sum of employment and net unemployment. Hence, unemployed people in activation, who are not in subsidised employment, are included in Danmarks Nationalbank's labour force definition, while they are outside the labour force in the calculations by the Ministry of Finance and the Danish Economic Councils. The different definitions are of no significance to the assessment of the total number of spare resources in the labour market. Danmarks Nationalbank's calculations are based on the most recent national accounts, in which employment was adjusted downwards to between 5,000 and 9,000 people from 2012 to 2015. For the Ministry of Finance, a technical projection is applied in 2017.

Source: Ministry of Finance (September 2015), Danish Economic Councils (October 2015) and own calculations.

The next sections describe the development in the structural labour force on the basis of demographic factors and groups outside the labour force.

CHANGING AGE COMPOSITION AFFECTS THE OVERALL PARTICIPATION RATE

The decline in the participation rate in 2008-09 is not only cyclically, but also structurally determined. The changing age composition since the mid-2000s has played a role in this respect.⁴ One reason is the varied attachment to the labour market of the individual age groups, meaning that the age distribution in the labour market all things equal also affects the overall participation rate.

The decline in the participation rate applied to all age groups, except the 60-66-year-olds, whose participation rate has more or less continued to rise since the late 1990s. But the decline is particularly pronounced for the 16-29-year-olds, cf. Chart 7. This mainly reflects an increased intake

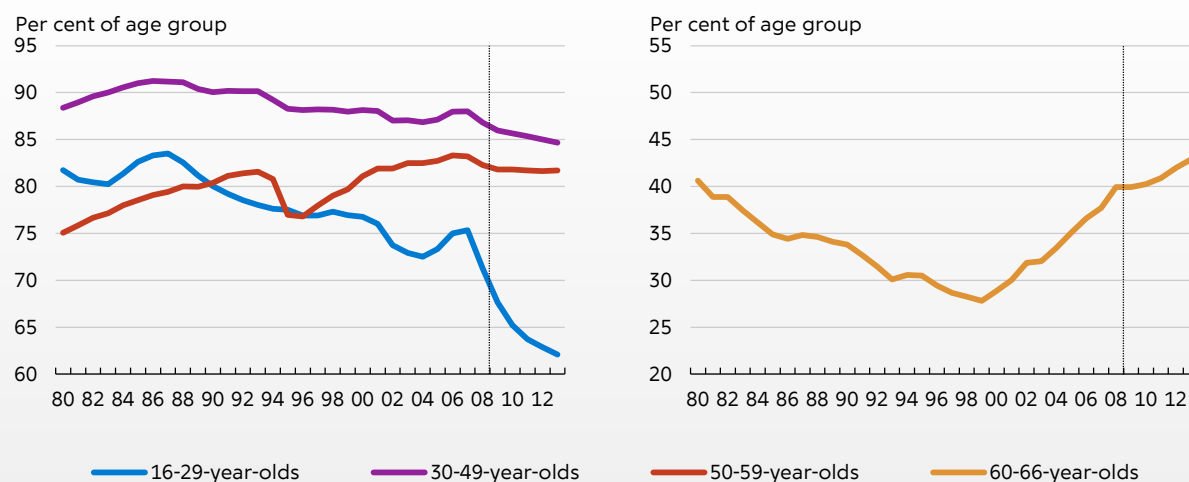
of students and that fewer students have student jobs due to the weak economy, cf. below.

The age composition of the labour force has changed a good deal from the mid-2000s until today. The share of 60-66-year-olds among people aged 16-66 rose during the period 2003-08, cf. Chart 8 (left). The 60-66-year-olds have less attachment to the labour market than the other groups. But since the participation rate of that age group rose during this period, the 60-66-year-olds have actually contributed to increasing the participation rate overall, cf. Chart 8 (right). On the other hand, the number of people aged 30-49, who have the highest participation rate, has declined since 2003, meaning that the overall demographic development has reduced the structural labour force over the crisis years. Viewed in isolation, the participation rate may be reduced by around 1.5 percentage points due to changes in the age composition of the population.

⁴ In addition, 2008 and 2009 in the statistics are subject to data breaks, with a downside effect on the employment level according to Statistics Denmark.

Participation rate for selected age groups

Chart 7



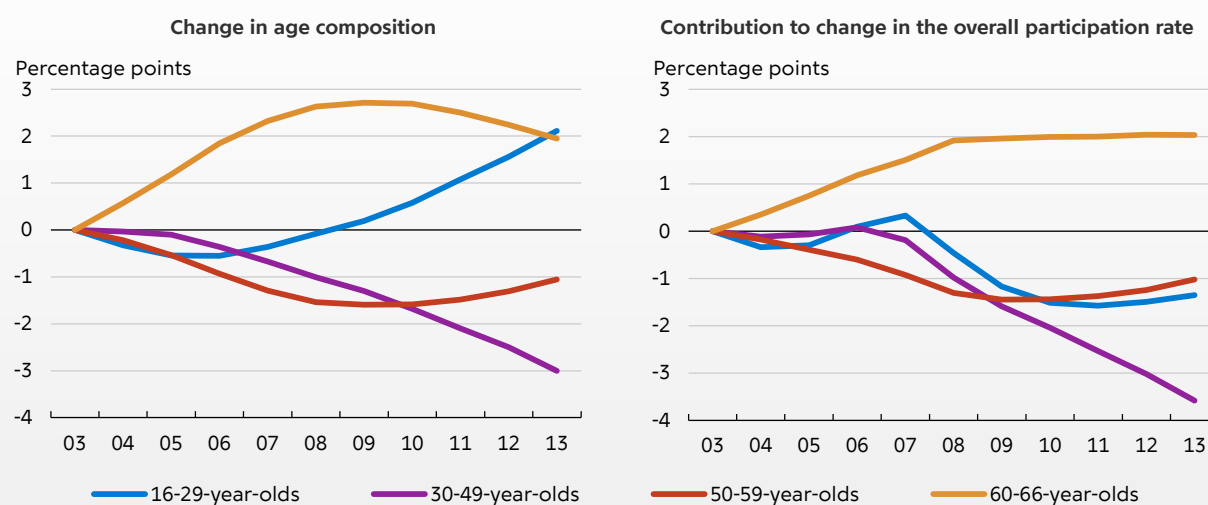
Note: Data from the register-based labour force statistics. Data break between 2008 and 2009.
Source: Statistics Denmark and own calculations.

Demographics thus play a role in the development of the labour market structures. Danmarks Nationalbank estimates the structural participation rate for persons aged 16-66 where the share of 60-66-year-olds is used as an explanatory variable. The purpose of the variable is to capture the effects of the lesser attachment of 60-66-year-olds to the labour market and, viewed in isolation,

it reduces the structural participation rate when the share of 60-66-year-olds increases, cf. Andersen and Rasmussen (2011). In light of the fact that older age groups increasingly remain on the labour market, e.g. as a result of the reforms on later retirement, it may be appropriate to explicitly allow for demographic shifts in the estimation of the structural labour force.

Change in age composition and contribution to change in the overall participation rate since 2003

Chart 8



Note: Left-hand chart: Changes in the age group's share of the 16-66-year-olds. The sum of the lines is therefore 0 every year. Right-hand chart: The lines add up every year to the change in the aggregated participation rate since 2003.
Source: Statistics Denmark and own calculations.

STUDENTS

Students played a large role in the most recent reversal of employment. Students only appear in the labour force when they are in employment, the reason being that students are rarely insured against unemployment and therefore withdraw from the labour force when their employment comes to an end. Students who are not in employment consequently constitute a potential labour reserve outside the labour force and are included in the labour force gap.

The share of people of working age who are students has increased considerably since the 1980s, cf. Chart 9 (left). This development reflects that young people are increasingly taking an education and that they are studying for longer periods of time, cf. Chart 9 (right). In addition, a growing share of 16-29-year-olds among people of working age has contributed to the development since 2007. Viewed in isolation, the larger share of students reduces the spare capacity in the labour force, while the potential outside the labour force increases.

Students have also to a large extent found jobs alongside their studies and constituted a growing share of total employment in Denmark. The share of students who find jobs is subject to substantial cyclical fluctuations, and the downturn in 2008 significantly affected young people with student jobs. As the number of students has risen and the share of students in employment has fallen in recent

years, students could make up a considerable labour reserve. Their employment potential may be limited, however, due to a number of factors, including the so-called “progress reform”, the purpose of which is to reduce students’ period of study and ensure that they study full time. The limited potential is supported by the labour-force survey (AKU), according to which the number of students actively looking for a job is only approximately 15,000 above the average in 2007-08, at the peak of the upswing. Moreover, students mainly have jobs with reduced working hours.

CASH BENEFIT RECIPIENTS

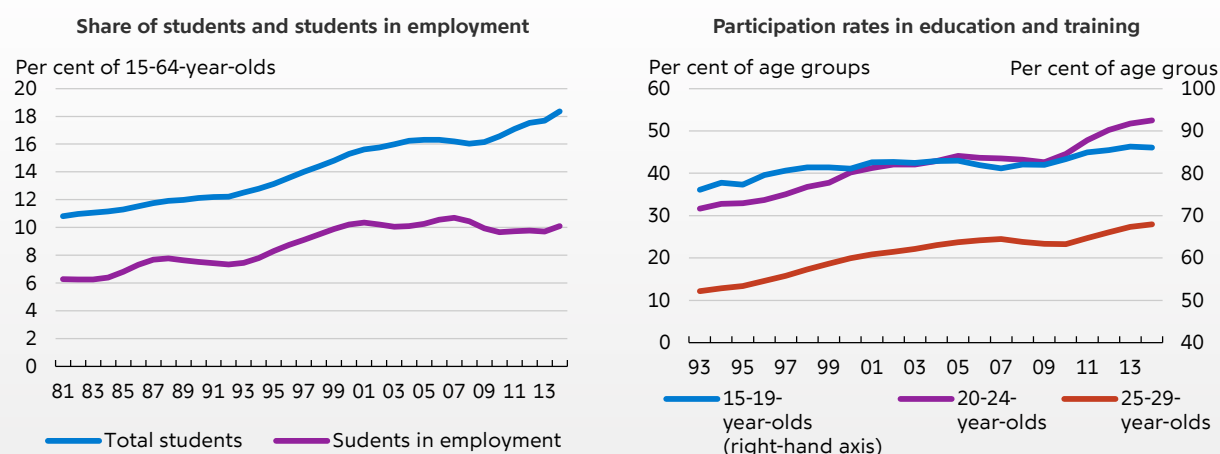
The number of cash benefit recipients varies with the cyclical position, because cash benefits for some people serve as income replacement for people without unemployment insurance. These people are required to be available for work and are therefore included in unemployment (and thus in the labour force).

But not all cash benefit recipients are available for work. In principle, these people should not be affected by cyclical changes, but the group shows a fairly clear cyclical trend in the period from 2004 to today, cf. Chart 10.

Therefore it is remarkable that the number of cash benefit recipients who are not ready to take a job continues to grow despite the fact that the labour market is picking up, employment is rising and unemployment is falling. This may indicate

Students and participation rate for selected age groups

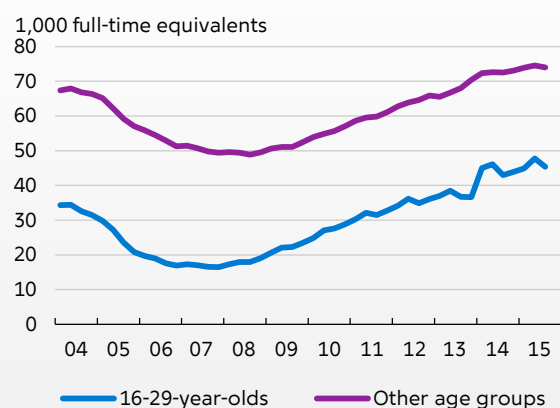
Chart 9



Source: Statistics Denmark.

**Cash benefit recipients
(excluding those in activation),
not ready to work**

Chart 10



Note: The figures includes people ready for education ("uddannelseshjælp") and also covers an unspecified visitation category.

Source: Jobindsats.dk.

that the development is more structural in nature and that, for this reason, they cannot be expected to return to employment in the near term. The development indicates that the cyclical contribution from cash benefit recipients to the labour force gap may be limited. For young people, however, the recent reform of the cash benefit system will contribute to more young people

under 30 starting an education or getting a job than before.

FOREIGN LABOUR AND CROSS-BORDER WORKERS

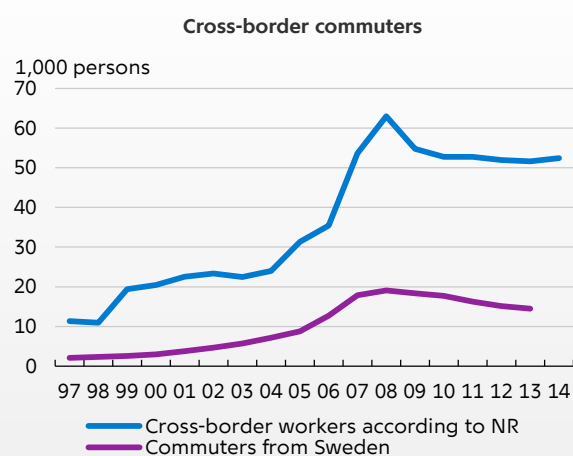
The freedom of movement for workers in the EU gives Danish firms access to a considerable reserve of foreign labour. This reserve increased markedly with the EU enlargements to include Eastern European member states in 2004 and 2007.

The mobility of labour among foreign employees turned out to be relatively high during the most recent boom. The influx of foreign employees contributed to easing the labour market pressure and they helped support the upswing. Recent developments in the labour market indicate that the mobility of foreign labour continues to be high, cf. Danielsen and Jørgensen (2015). In recent years, foreign employees have thus contributed to boosting employment in a period when the number of Danish citizens of working age declined.

The employment potential is not only made up of people who move to Denmark. People living outside Denmark may also contribute to Danish employment. The number of cross-border commuters has increased substantially since 2004, cf. Chart 11 (left). Part of the increase may reflect Danes who have moved to Sweden, but kept their jobs in Denmark. They should not be regarded as a structural contribution to employment in Denmark.

Cross-border commuters and unemployment gaps in neighbouring countries

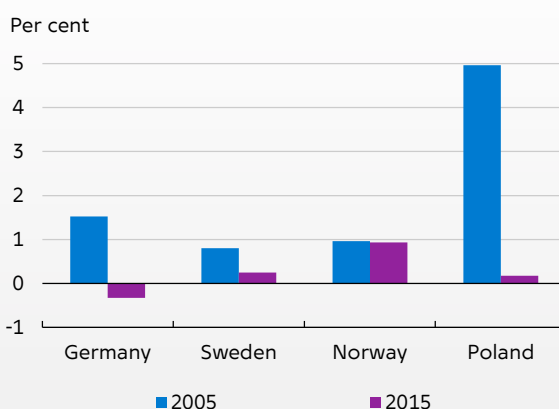
Chart 11



Note: The method and the definition of unemployment in the OECD's calculation of the unemployment gap both deviate from those used by Danmarks Nationalbank.

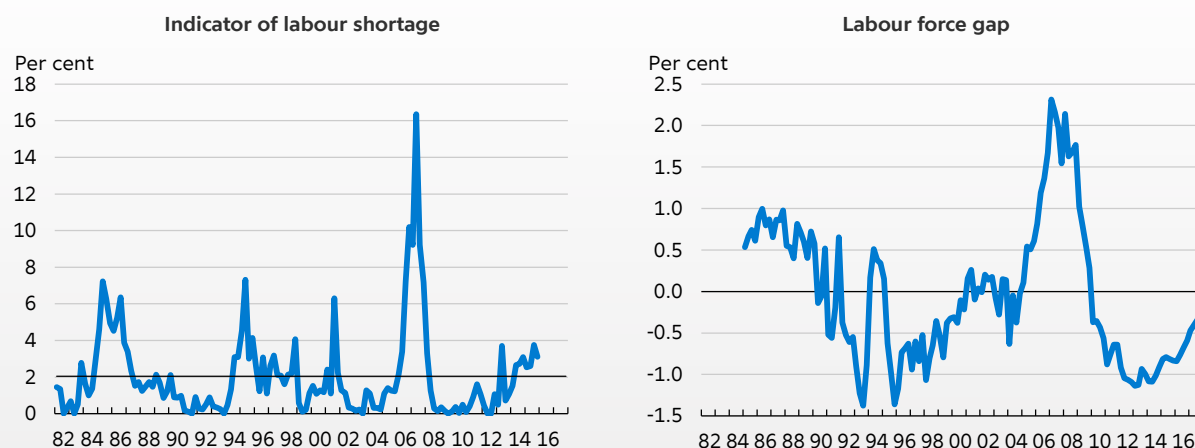
Source: Statistics Denmark, Ørestat and OECD.

Unemployment gaps in neighbouring countries (OECD)



Indicator of labour shortage in the industrial sector and the labour force gap

Chart 12



Note: The labour force gap is stated as the gap in the participation rate. Left-hand chart: The black line indicates averages over the period.
Source: Statistics Denmark and own calculations.

While the potential influx of foreign labour affects spare capacity outside the labour force, it may also contribute to improving labour force structures. By easing wage pressures at a given unemployment rate, the foreign labour reserve may have contributed to the decline in structural unemployment over the last 10 years.

Assessing the extent to which the foreign labour reserve will contribute to boosting employment in the coming years is difficult. It depends on a large number of factors, such as wage and working conditions in competing labour markets, including the cyclical position in other countries, and the institutions, cultural and language barriers, etc. of the various labour markets. These factors can be hard to model, so it is difficult to determine the exact contribution from foreign labour.

There are indications that the influx of foreign labour will not be able to support a new economic recovery to the same extent as before. The situation in the competing labour markets, measured by the unemployment gap, shows that the current demand for labour has increased compared with the mid-2000s, cf. Chart 11 (right), especially in Germany and Poland, but also in Sweden.

INDICATOR OF LABOUR SHORTAGE

One of the key indicators used in the method to estimate the structural labour force and the labour force gap is the survey-based labour

shortage in the industrial sector. The indicator measures the extent to which recruitment problems are an impediment to production and shows an extraordinarily large shortage of labour during the boom in the mid-2000s, cf. Chart 12 (left).

The indicator is one-sided in the sense that it measures only the strength of the labour shortage and not the opposite situation with no shortage of labour. This may involve a risk of the estimation overestimating the strength of upswings and similarly underestimating the strength of downturns – even though the labour force gap averages zero over the period.

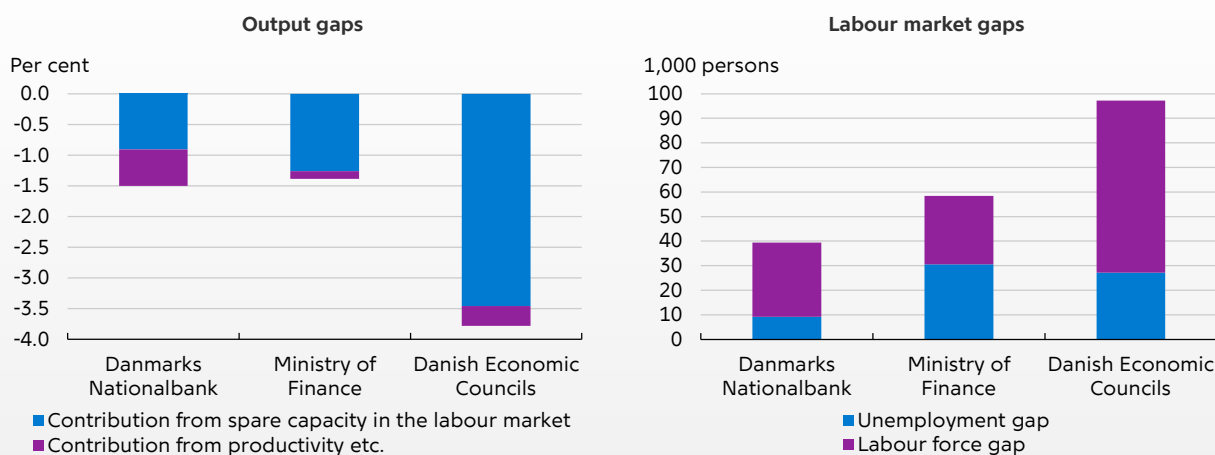
This indicator is not the only signal of the labour force gap, however. Wage pressures are also included in the estimation of the gap and help identify negative gaps in periods of economic slowdown, e.g. from around 2009 and ahead, cf. chart 12 (right). The strong overheating before that time also reflects that the structural participation rate was reduced somewhat at the same time due to changes in the age composition of the labour force, cf. above.

OTHER INSTITUTIONS' ASSESSMENTS OF POTENTIAL OUTPUT IN DENMARK

Danmarks Nationalbank, the Ministry of Finance and the Danish Economic Councils currently

Output and labour market gaps in 2015

Chart 13



Note: Left-hand chart: A positive figure indicates that actual output is above its structural level. Productivity refers to total factor productivity (TFP) in the calculations of the Ministry of Finance and Danmarks Nationalbank, and output per employee in the Danish Economic Councils' calculations. Right-hand chart: Danmarks Nationalbank and the Ministry of Finance apply gross unemployment in their unemployment gaps, whereas the Danish Economic Councils apply net unemployment.

Source: Ministry of Finance (September 2015), Danish Economic Councils (October 2015) and own calculations.

have different assessments of the size of output gap. Danmarks Nationalbank and the Ministry of Finance both forecast the output gap in 2015 to be around -1.5 per cent, but with different breakdowns on productivity and labour market gaps. In the Danish Economic Councils' assessment, the output gap is larger, i.e. just over -3.5 per cent, cf. Chart 13 (left).

Overall, the different assessments reflect different methods, data and forecasts. The Ministry of Finance estimates on e.g. gross value added, GVA, excluding raw materials extraction, while Danmarks Nationalbank estimates on GDP. The Ministry of Finance's model is particularly linked to the gaps by explicitly modelling the productivity gap, while parts of the models of Danmarks Nationalbank and the Danish Economic Councils aim to determine the structural levels.

The differences between the three institutions' assessments of spare resources in the labour market are particularly pronounced, cf. Chart 13 (right). Danmarks Nationalbank forecasts the labour market gap to be just under 40,000 per-

sons in 2015. Of this, 10,000 persons may come from gross unemployment, while approximately 30,000 persons may enter the labour force. In the assessments of both the Ministry of Finance and the Danish Economic Councils, more people can find employment from unemployment and from outside the labour force.

The Ministry of Finance estimates that approximately 60,000 persons may find employment without this leading to general pressures on the labour market. Around half of these persons can come from gross unemployment, which is a somewhat higher number than in Danmarks Nationalbank's forecast. The difference reflects that the structural unemployment estimate of the Ministry of Finance is lower than that of Danmarks Nationalbank.

In the assessment of the Danish Economic Councils, the volume of spare capacity in the labour market is considerably higher, especially outside the labour force. The labour market gap is forecast at 97,000, of which most can be attributed to the labour force gap⁵ of 70,000 persons. The

5 While the Danish Economic Councils' labour force gap comprises people in activation, they are instead included in the unemployment gap for Danmarks Nationalbank, cf. the note to Chart 6. This explains a small part of the difference in relation to Danmarks Nationalbank's labour force gap, but it cannot explain the difference in the labour market gap.

labour force gap is made up mainly by students and a residual group, including self-supporting individuals and cross-border workers as well as statistical discrepancy. Together the residual group and students make up approximately 55,000 persons of the Danish Economic Councils' gaps in 2015, cf. Andersen and Linaa (2015).

Unlike Danmarks Nationalbank and the Ministry of Finance, the Danish Economic Councils' estimate is based on the population and the groups outside the labour force rather than the labour force itself. The Danish Economic Councils thus estimate a structural level and a cyclical contribution from a number of the groups outside the labour market, including statistical discrepancy, and the structural labour force is achieved by deducting the structural levels of the groups outside the labour market from the population, which can be regarded as structural.

Estimations of output gaps are always subject to uncertainty, so in the assessment of the cyclical position, the gaps should be interpreted with caution and not stand alone. According to a number of indicators, there is currently some spare capacity in the Danish economy, cf. Danielsen and Jørgensen (2015). But they also indicate that the situation in the labour market is gradually being normalised. Nominal wage growth is increasing, albeit still from a low level, while real wages are rising substantially due to the low rate of inflation. The indicator of labour shortage is increasing and currently on a par with the second half of the 1990s and the mid-2000s, and capacity utilisation in the industrial sector is close to its historical average. This is consistent with Danmarks Nationalbank's assessment that the output gap is around -1.5 per cent of GDP this year and will narrow in the coming years.

LITERATURE

Andersen, Asger Lau and Morten Hedegaard Rasmussen (2011), Potential output in Denmark, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter, Part 2.

Andersen, Sofie and Jesper Linaa (2015), Beregning af strukturel arbejdsstyrke (Calculation of the structural labour force – in Danish only), Danish Economic Councils.

Danielsen, Troels and Casper Winther Jørgensen (2015), Spare capacity in the labour market, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter.

