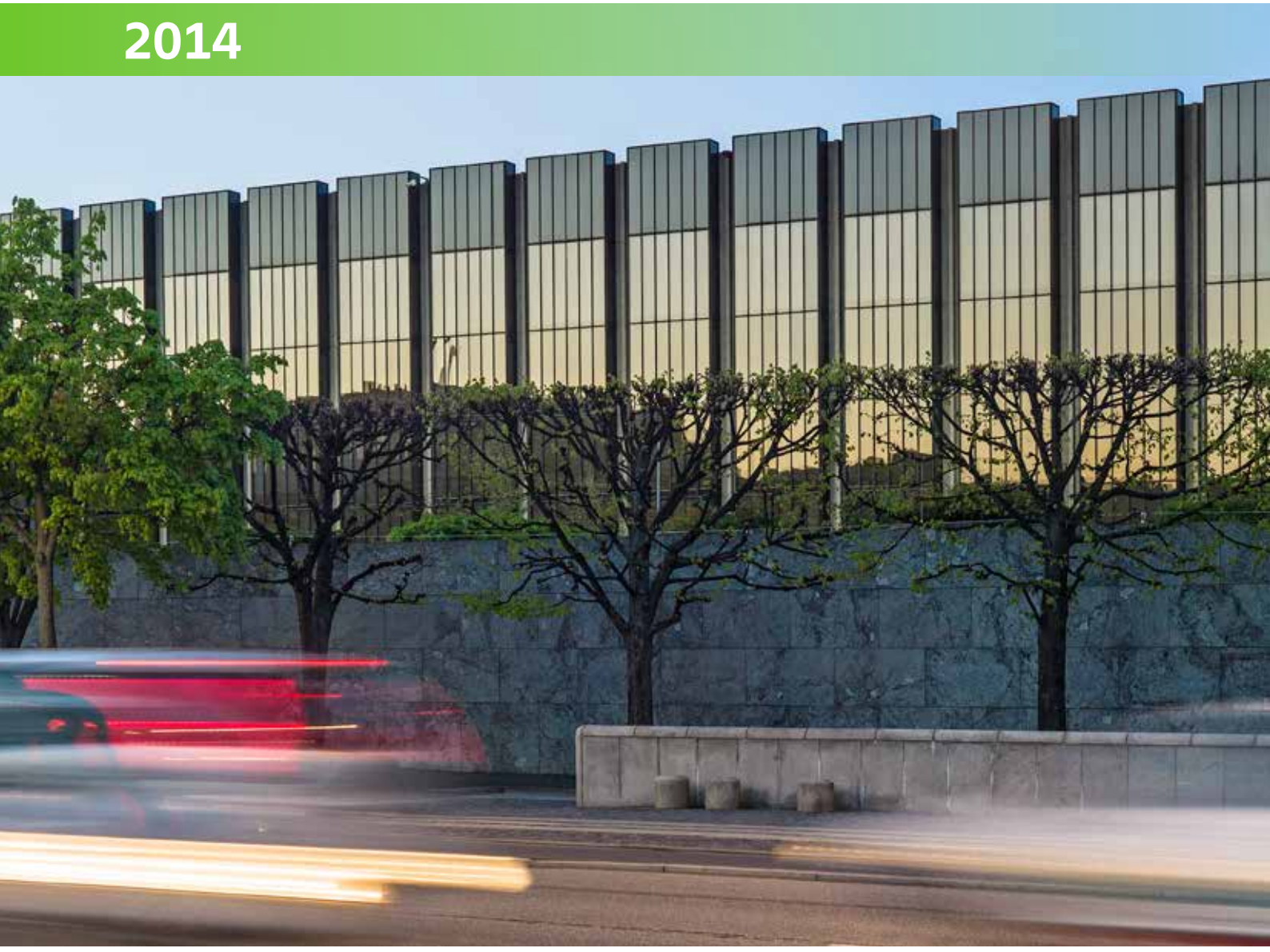
DANMARKS
NATIONALBANK

MONETARY REVIEW
1ST QUARTER

2014



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Managing Editor: Per Callesen
Editor: Niels Lynggård Hansen
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Enquiries can be directed to:

Danmarks Nationalbank,
Communications,
Havnegade 5,
DK-1093 Copenhagen K

Telephone +45 3363 7000 (direct) or +45 3363 6363.
Office hours: Monday-Friday 9.00 a.m.-4 p.m.
E-mail: kommunikation@nationalbanken.dk
www.nationalbanken.dk

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SUMMARY

The international economic situation is gradually improving. In the euro area, growth has been marginally positive in the last three quarters, and the recovery has become more broad-based. Relative to the euro area, the US and UK economies began to pick up sooner, and both economies are in an upswing. The recovery in the advanced economies is generally driven by growth in private investment and private consumption, supported by accommodative monetary policies, among other factors. At the same time, the pace of fiscal consolidation is slowing. In the emerging economies, activity has slowed down, partly as a result of weaker growth in domestic demand.

The benchmark US and European stock indices have risen as the economy has improved and tensions in the financial markets have eased. In the euro area, the government yield spreads between Germany and southern Europe have narrowed. Several emerging economies have been hit by financial turmoil, against the backdrop of a deteriorated growth outlook and internal imbalances, as well as the Federal Reserve's tapering of its quantitative easing.

Economic activity is picking up in Denmark. Unemployment is declining and employment is rising, primarily driven by the private sector. Private consumption has not recovered yet, but is expected to grow moderately in the coming years. Consequently, growth in the gross domestic product, GDP, has been forecast at 1.4 per cent this year, rising to 1.7 per cent in 2015 and 1.9 per cent in 2016.

A new analysis indicates that the link between gross household debt and household consumption aggravated the overheating of the Danish economy and the subsequent cyclical downturn. Households with high loan-to-value, LTV, ratios had higher consumption relative to income than other households in the years leading up to the financial crisis and reduced consumption more during the crisis. At the same time, the reduction in consumption at a given LTV ratio was most pronounced for households with the highest debt-to-income ratios.

High LTV ratios amplify cyclical fluctuations in the Danish economy. So it is important to ensure a more stable development in house prices, which is also vital for residential construction and housing wealth and hence for private consumption. This highlights the importance of restoring the link between property values and taxation. In their own interest, financial institutions should also be careful not to go to the limits of the statutory framework. A prudent approach can reduce the risk that home buyers stretch their budgets with little or no equity.

THE INTERNATIONAL ECONOMY AND THE FINANCIAL MARKETS

ECONOMIC DEVELOPMENT AND GROWTH OUTLOOK

The international economy is gradually improving. The USA is in an upswing, and the euro area economy grew in the last three quarters of 2013. In the emerging economies, economic activity has slowed down.

Euro area growth increased by 0.3 per cent in the 4th quarter of 2013, up from 0.1 per cent in the 3rd quarter, cf. Chart 1 (left). The recovery was weak, albeit broad-based. Economic growth was 0.4 per cent in Germany and 0.3 per cent in France, while the Dutch GDP rose by 0.7 per cent. Among the southern euro area member states, Italy saw marginal economic growth for the first time in two years, while the Spanish and Portuguese economies have been picking up in the last couple of quarters. The southern European member states are by no means back at the pre-crisis GDP level, cf. Chart 1 (right). Germany, on the other hand, has shown steady growth since 2009, and GDP was already back at the 2007 level in the 2nd half of 2010. These differences reflect the varying severity of the crisis impact in the individual member states, as well as their individual needs to reduce debt.

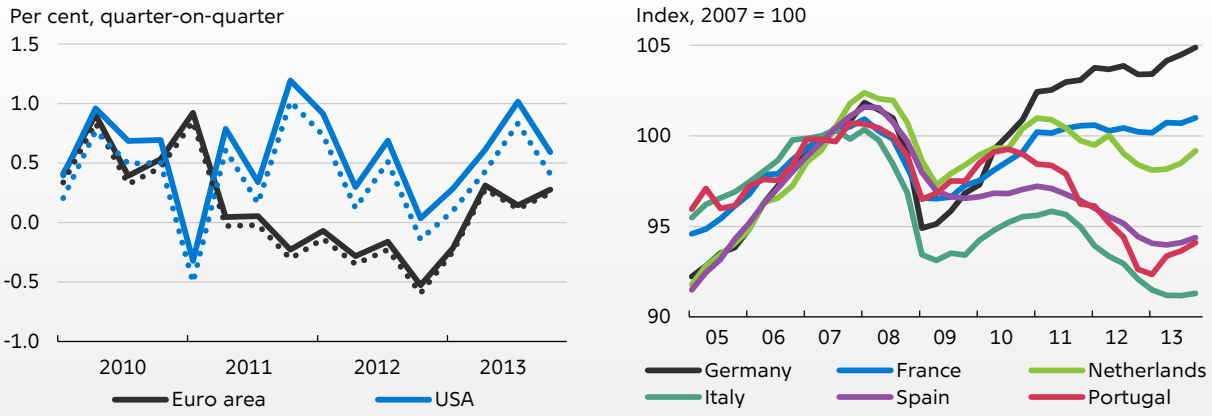
In the euro area, the slight recovery is based primarily on growth in private investment and consumption. This reflects that interest rates are generally low and financial conditions have become more expansionary as a result of falling interest rates, especially in southern Europe, and less tight credit standards. At the same time, the pace of annual fiscal consolidation is slowing, and there are also small indications that the housing market is picking up, as house prices in the euro area overall are rising slightly. In addition, rising stock indices are having a positive impact on household net wealth.

Following a strong rise in activity of 1 per cent in the 3rd quarter of 2013, US growth declined to 0.6 per cent in the 4th quarter, cf. Chart 1 (left), partly due to the shutdown of large parts of the federal administration in October. US domestic private-sector demand is supported by low interest rates, relatively accommodative credit standards, rising wage inflation and positive wealth effects from e.g. rising house and equity prices. Fiscal policy is tight, but will be less contractive in 2014 than previously expected due to the 2-year budget agreement concluded in December 2013. Viewed in isolation, GDP growth will be boosted by approximately 0.2 percentage point in 2014 as a result of this agreement. Economic growth is higher in the USA than in the euro area, not only because of the current cyclical factors but also for demographic reasons. For many years, annual growth in the population of working age has on average been 0.6 percentage point higher in the USA than in the euro area.

In the UK, the economy began to recover sooner than it did in the euro area. Hence the economy picked up throughout 2013, GDP rising by an average of 0.7 per cent per quarter. The Japanese economy is also picking up, partly as a result of the monetary and fiscal policy easing introduced in early 2013. However, growth in GDP declined to 0.2 per cent in both the 3rd and 4th quarters of 2013, having stood at around 1 per cent in the 1st and 2nd quarters.

The recoveries in the USA, Japan and the UK and to some extent also the euro area contrast with developments in the emerging economies, where economic activity has slowed down. The Purchasing Managers' Index, PMI, for manufacturing, which provides a good indication of where the economy is heading, points to more subdued activity in the emerging economies, while it indicates robust growth in the advanced economies, cf. Chart 2. The lower rate of growth in the emerging economies reflects, inter alia, weaker growth in domestic demand, which has been affected by tighter financial conditions and tightening of fiscal and monetary policies since the summer of 2013. Furthermore, structural problems, including poor infrastructures, impede potential growth in several countries. China's growth increased

GDP growth in the euro area and the USA (left) and development in real GDP in selected euro area member states (right) Chart 1



Note: The dotted lines in the left-hand chart indicate quarterly growth in GDP per capita.
Source: Reuters EcoWin.

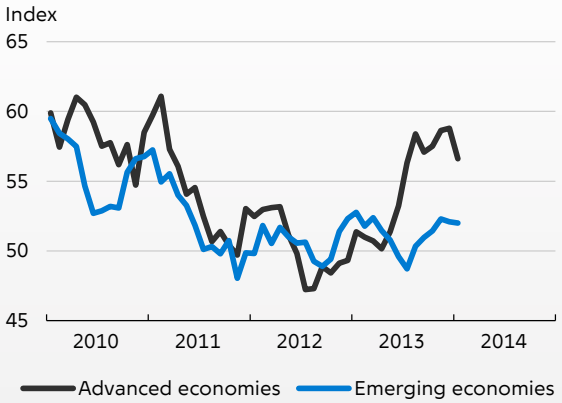
in the 2nd half of 2013, primarily due to higher investment, while the growth contribution from private consumption decreased.

Turning to emerging economies, Argentina, Brazil, South Africa and Turkey, among others, have been affected by turmoil. In January, capital outflows caused the currencies of these countries to weaken substantially, and several central banks raised their rates of interest. The capital outflows should be viewed against the backdrop of a deteriorated growth outlook and internal imbalances, as well as the Federal Reserve's tapering of its quantitative easing.

Overall, the global upswing is expected to gain momentum in 2014, cf. Table 1. US growth is expected to accelerate due to higher domestic demand. In the euro area, the upswing will gradually strengthen as domestic demand increases, so that growth will be positive for 2014 overall. The emerging economies are also expected to display stronger economic growth, but to varying degrees, partly as a result of growing exports to the advanced economies. However, China's growth will decline slightly due to e.g. the measures taken to dampen credit growth.

The euro area labour force has grown during the crisis. This reflects factors such as retirement reforms and the continued trend for more women to enter the labour market, cf. Box 1. These are structural improvements

PMI in the advanced and emerging economies Chart 2



Note: The index is the Purchasing Managers' Index, PMI, for manufacturing. The index for the advanced economies is the GDP-weighted average of the PMI indices for the USA, the euro area, Japan and the UK.
Source: Reuters EcoWin.

that will boost euro area growth in the longer term while in the short term bringing forward post-crisis economic adjustment. Technically, the slightly higher participation rate will increase euro area unemployment in the short term; viewed in isolation, the impact will be approximately 2 percentage points.

For the euro area as a whole, the rate of unemployment has been more or less constant at around 12 per cent over the last year, cf.

GDP growth forecasts for selected economies

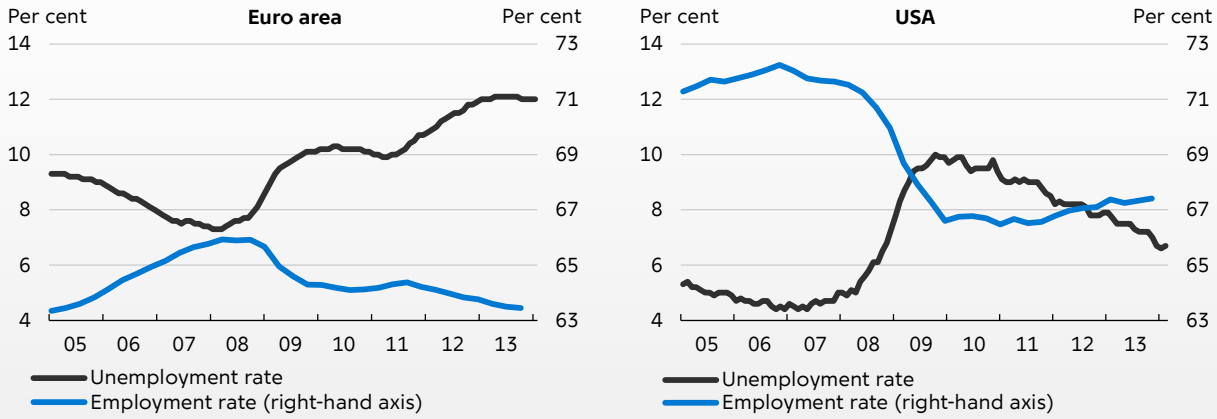
Table 1

Per cent	2012	2013	2014	2015	Change relative to October 2013: 2014	Change relative to October 2013: 2015
World[1]	2.5	2.4	3.1	3.4	0.1	-0.1
USA	2.8	1.9	2.8	3.0	0.2	-0.4
Euro area	-0.7	-0.5	1.0	1.4	0.1	0.1
Germany	0.7	0.4	1.6	1.4	0.2	0.1
France	0.0	0.2	0.9	1.5	0.0	0.0
Italy	-2.5	-1.9	0.6	1.1	-0.1	0.1
Spain	-1.6	-1.2	0.6	0.8	0.4	0.3
UK	0.3	1.9	2.4	2.2	0.6	0.2
Japan	1.4	1.5	1.7	1.0	0.4	-0.2
Brazil	1.0	2.3	2.3	2.8	-0.2	-0.4
Russia	3.4	1.5	2.0	2.5	-1.0	-1.0
India	3.2	4.4	5.4	6.4	0.2	0.1
China	7.7	7.7	7.5	7.3	0.3	0.2

Note: Figures for 2013 are forecasts for Russia, India and the whole world. Figures for 2014 and 2015 are forecasts for all countries.
Source: Eurostat and IMF, World Economic Outlook Update, January 2014.
1. GDP at market prices.

Unemployment and employment in the euro area and the USA

Chart 3



Note: Unemployment in per cent of the labour force, employment in per cent of the population of working age.
Source: OECD and Reuters EcoWin.

Employment in the euro area

Box 1

In recessions, there is normally a tendency for the labour force to shrink, e.g. because some of the unemployed give up the hope of finding work. Conversely, the labour force grows in good times when the chances of finding work are better. However, in large parts of the euro area the labour force increased during the economic crisis, reflecting labour market and pension reforms, among other factors. Only in Finland, Portugal and Ireland did the participation rate fall in the period 2007-13.

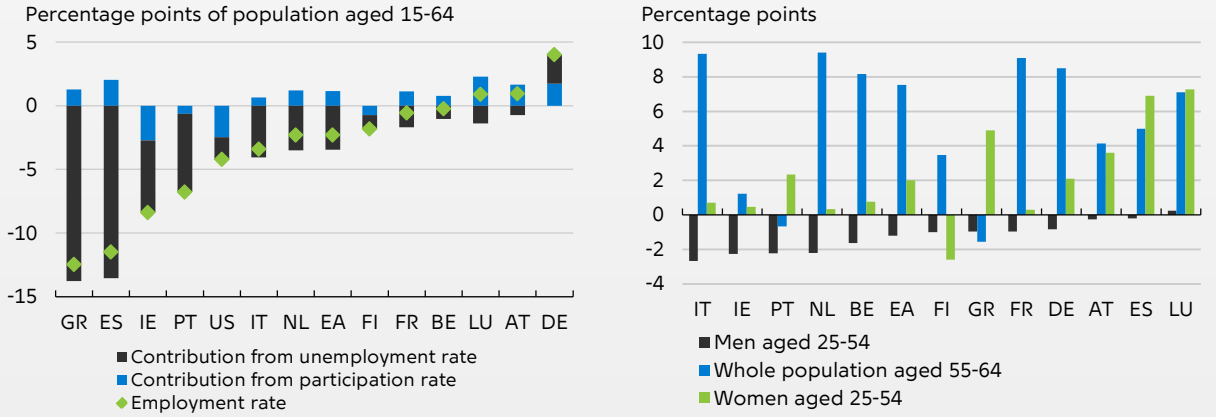
At a time when demand was low, the increase in the labour force made unemployment rise more sharply than the decline in employment would warrant, cf. the chart below (left). This means that unemployment rose more strongly in the euro area than in the USA, even though there was a greater fall in the number of people in employment as a share of the population of working age (the employment rate) in the USA. Above all, employment growth in Germany helped to limit the decline in the euro area employment rate.

The tendency for the participation rate to increase is particularly strong for those over 55 and for women, cf. the chart below (right). According to the OECD[1], people postpone retirement due to a combination of changes in the level of education, pension reforms and improved health. In addition, the OECD ascribes the higher participation rates in some southern European member states, e.g. Spain and to some extent Greece, to a breadwinner effect, whereby previously inactive members of a household enter the labour market to make up for loss of income in the household. Conversely, in many member states the participation rate has declined for men aged 25-54. This group typically has a very high participation rate, and hence the potential for structural increases is limited. So for this group it is not to the same extent possible to counter the cyclical effects via structural changes.

The participation rate for young people declined slightly for both genders during the crisis, the reason being that a larger proportion of young people in the euro area overall are in education. However, the effect varies considerably across member states. The crisis does not seem to have marginalised young people any more than other age groups, as their share of total unemployment fell from approximately 22 per cent in 2008 to just under 19 per cent in 2013.

Broken down by qualifications, the fall in employment has been most pronounced for unskilled workers, while employment among the highly-educated rose every year during the crisis. The number of unskilled workers in employment fell by 5.7 million during the crisis, while the number of highly-educated rose by 6.3 million. It is a well-known phenomenon that cyclical sensitivity is higher for low-skilled jobs than in the rest of the labour market.

Change in employment rate 2007-13 broken down by participation rate and unemployment rate (left) and change in participation rate 2008-13 for selected groups (right)



Note: A negative value for the unemployment rate means that unemployment has risen. Change from the 4th quarter of 2007 to the 3rd quarter of 2013. Seasonally adjusted figures.
Source: OECD and Eurostat.

1. OECD, *Employment Outlook*, 2013.

Chart 3 (left). But in a few member states it has begun to decline, including in Spain, Ireland and Portugal, which have some of the highest unemployment rates in the EU. In contrast, unemployment is still rising in Italy and the Netherlands.

Unlike that of the euro area, the US labour force has shrunk during the crisis. At the same time, employment has risen, so that unemployment has decreased since 2009, to 6.7 per cent in February, cf. Chart 3 (right). But at 67.4 per cent, the employment rate is still well below the 72 per cent or so seen before the crisis. Without the decline in the participation rate, US unemployment would have been just over 3 percentage points higher in 2013. A good

70 per cent of the decrease in the labour force during the crisis is attributable to more people retiring or receiving disability pensions or social pensions, cf. Table 2. Hence, most of the fall is structural. Looking ahead, this may have a negative impact on US growth, as a shortage of labour will arise sooner.

Among other factors, the high level of unemployment in the euro area is curbing wage pressures, cf. Chart 4. Above all, wage developments in the GIPS member states – Greece, Ireland, Portugal and Spain – have a downward impact. Before the crisis, wage inflation in these member states taken as one was higher than in the euro area overall, and considerably higher than in Germany, but in recent years the rate of increase has declined. This reflects factors such as considerable spare capacity in the labour markets, labour-market reforms and reductions of public-sector salaries. Wage inflation in Germany rose from 2009 to 2011, but fell back to 2 per cent in 2013 despite a low level of unemployment in Germany. The collective agreements already concluded in 2014 and the ongoing bargaining point to higher wage inflation in 2014.

In the USA, price inflation, measured by the deflator for private consumption (which is the Federal Reserve's preferred measure of price developments), declined from almost 3 per cent in mid-2011 to 1.2 per cent in January 2014. In the euro area, the increase in the aggregate consumer price index declined from 3 per cent at end-2011 to 0.8 per cent in February 2014. Core inflation has also declined in the euro area, standing at 1 per cent in February. Especially the member states that experienced large price increases before the crisis are now seeing low price inflation. Although inflation in the euro area is very low at present, the European Central Bank, ECB, does not see any risk of a prolonged period of negative price inflation, i.e. deflation, cf. Box 2. Deflation requires an extended period during which wage developments are very weak, the euro strengthens continuously and inflation expectations fall.

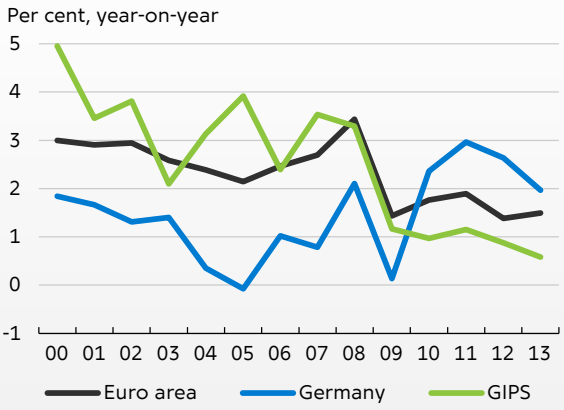
The subdued wage development is the main reason why the rate of inflation in the euro area has been low in recent years. At the same time, import prices have been squeezed. This is because the nominal effective exchange rate of the euro has appreciated since the summer of 2012, energy prices have fallen, and food prices have not risen as much as previously. In addition, a number of global factors, such as freer movement of labour, integration of the emerging economies in the global value chains and fiercer international competition, have continuously weighed down on import prices. Furthermore, the effects of e.g. previous tax increases are gradually fading away.

Breakdown of decline in the US labour force Table 2

	Millions
Retired	5.4
Disabled	3.4
In school	1.9
Wants a job, but is not searching	1.5
Do not want a job (taking care of house/family)	0.0
Total	12.3

Note: Changes in subcategories for people outside the labour force from the 4th quarter of 2007 to the 4th quarter of 2013.
Source: Bureau of Labor Statistics and Shigeru Fujita, Constructing the reason-for-nonparticipation variable using the monthly CPS, 2014.

Development in nominal wages Chart 4



Note: Nominal wages are average annual compensation rates per person in employment for the whole economy. The GIPS series is a GDP-weighted average of the annual growth rates for Greece, Ireland, Portugal and Spain.
Source: Reuters EcoWin.

Price developments in the euro area

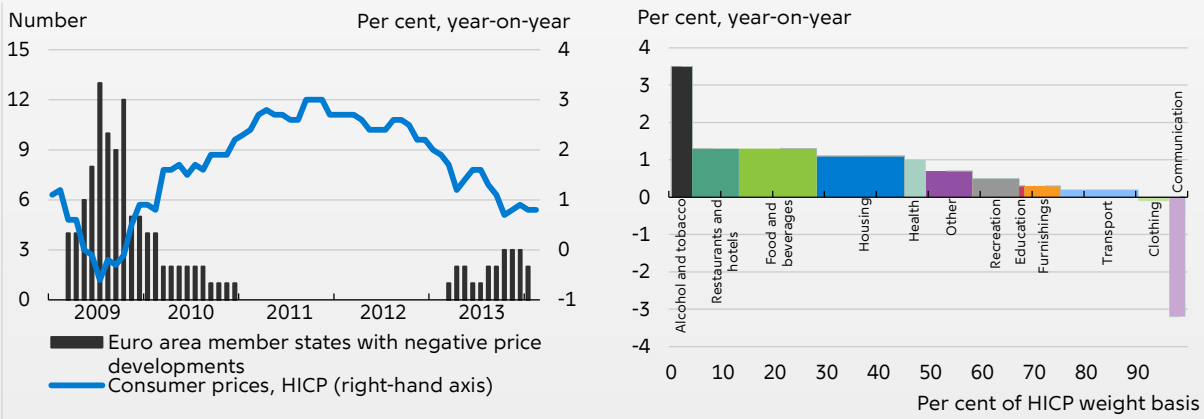
Box 2

The subdued price developments in the euro area have led to a debate about the risk of deflation. In that connection, the President of the ECB has stated that three conditions must be met before the economy can be said to be in deflation: Firstly, prices must fall in many of the member states. Secondly, prices must fall for many product groups, and thirdly, the price fall must lead to expectations of further price falls (self-fulfilling expectations).

Price developments were not negative in more than three euro area member states in any one month of 2013, cf. the chart below (left). By comparison, more than 10 member states saw prices fall in several months of 2009. So prices are not falling in large parts of the euro area at present. As regards product groups in the consumer price index, prices in January 2014 fell in one of the 12 overall categories, corresponding to around 3 per cent of the overall index, cf. the chart below (right). At a more detailed level, prices fell in 20 of the 94 underlying product groups, corresponding to approximately 23 per cent of the overall price index. Hence, prices fell for only a small share of the product groups. At times during 2009 and 2010, prices fell for more than 40 per cent of the product groups. As far as inflation expectations are concerned, both survey-based measures and implied inflation expectations (derived from swap rates) have in recent years shown a declining trend for inflation over a 1-3-year horizon. However, inflation expectations are well-anchored at around 2 per cent over a 5-year horizon.

Against this background, the overall assessment of the ECB is that there is no risk of deflation in the euro area.

Price developments in the euro area (left) and broken down by product groups in January 2014 (right)



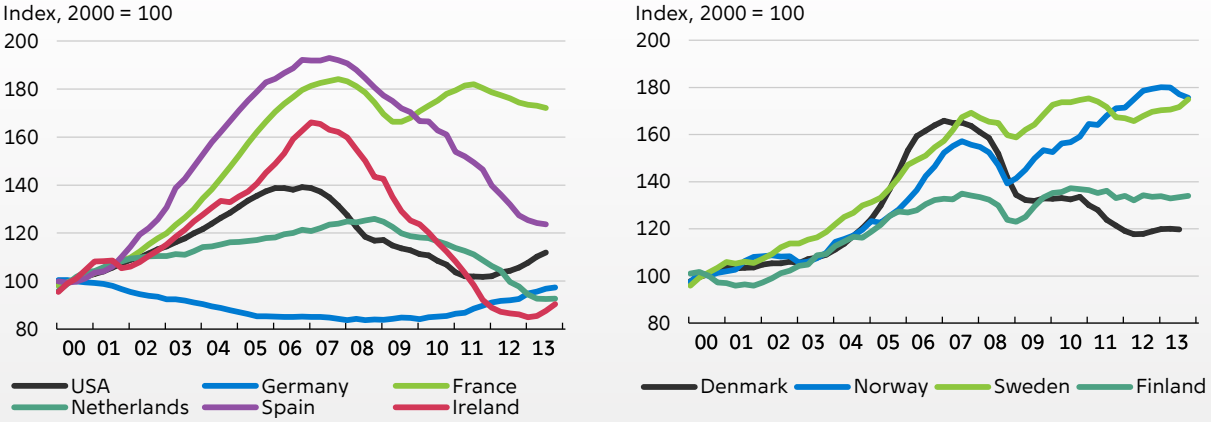
Source: Eurostat.

Housing markets are generally improving slightly, but still with large differences across countries. In the USA, real house prices have risen by approximately 10 per cent since the end of 2011, cf. Chart 5 (left). In the euro area, nominal house prices rose in the 3rd quarter of 2013; this was the first increase in two years. Real prices are still declining slightly. The euro area is very heterogeneous, however. In Germany, real house prices have risen by approximately 15 per cent since 2009, while prices are still falling in southern Europe. France has seen only minor house price adjustments in connection with the crisis. In Ireland, the housing market seems to have bottomed out, as real house prices rose in 2013 after a strong adjustment since 2007, and in the Netherlands prices in the 4th quarter of 2013 rose marginally for the first time in five years. House price developments in the GIIPS member states and the Netherlands reflect surging prices in the pre-crisis years. According to OECD, *Economic Outlook*, November 2013, house prices in Belgium, France and other member states are still high when compared with income development and prices in the rental market, while prices in Germany are still assessed to be low despite the increases in recent years.

In Norway, house prices have risen sharply during the crisis, cf. Chart 5 (right), while prices in Sweden have stabilised at a level that is more than 70 per cent higher than in 2000. Viewed in relation to income developments, prices in Norway and Sweden are high.

The development in residential investment reflects tendencies in house prices. In the USA, investment mirrored the recovery in the housing market, rising in both 2012 and 2013. The

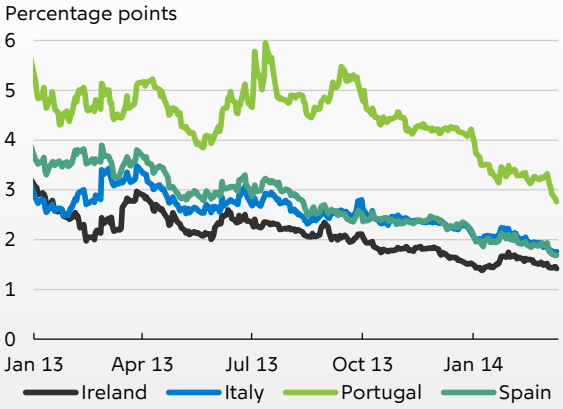
Development in real house prices, selected countries Chart 5



Source: OECD, Housing Prices database.

level is expected to rise further in the coming years, underlying reasons being that there are far fewer vacant homes on the market and that demand for housing is expected to rise strongly as the economy gathers steam. In the euro area overall, residential investment declined during the crisis. This mainly reflects developments in member states such as Spain and Ireland, whereas investment has remained more or less constant in Germany and France. The European Commission expects investments to begin to rise in the euro area overall in 2014-15 as house prices are expected to stabilise.

10-year government yield spreads to Germany, selected EU member states Chart 6



Source: Reuters EcoWin.

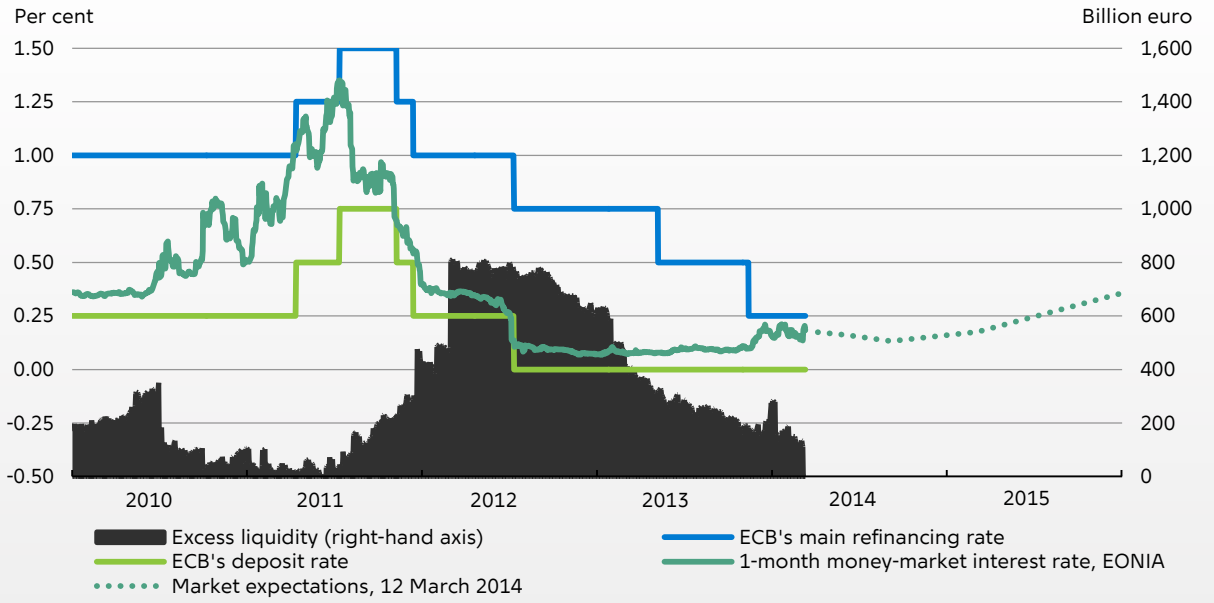
FINANCIAL CONDITIONS

In January, the Federal Reserve began to taper its asset purchases. From an original level of 85 billion dollars, monthly purchases were reduced to 65 billion dollars in February. The Federal Reserve has announced that it will reduce its monthly purchases after each meeting of the Federal Open Market Committee, FOMC, during the rest of the year, provided that the economy develops as assumed. Implied market expectations (measured by federal funds futures) show that monetary-policy interest rates are expected to remain at their current low levels for the rest of this year and not begin to rise in earnest before the 2nd half of 2015. This is in line with the expectations among FOMC members, which point to unchanged monetary-policy interest rates in 2014, followed by slight increases in 2015.[1]

In the euro area, risk premia in the government bond markets generally declined in 2013. Especially in Ireland, Italy, Portugal and Spain, yield spreads to Germany narrowed considerably, cf. Chart 6. This reflects more positive market sentiment and increasing risk appetite after the economy has begun to recover and the current-account deficits have made way for surpluses in several of these member states. In the case of Portugal, the yield spread also

1 The expectations of the FOMC have been calculated as the median (middle value) of the expectations of individual members.

The ECB's monetary-policy interest rates and the 1-month money-market interest rate Chart 7



Note: Market expectations have been calculated implicitly on the basis of forward contracts for the 1-month EONIA.
Source: Reuters EcoWin and Bloomberg.

narrowed considerably when the 2014 budget fell into place just before New Year. In late January, yield spreads to Germany widened slightly, mainly because the German government yield fell. The narrowing tendency has subsequently resumed.

In the last couple of years, money-market interest rates in the euro area have been close to the ECB's deposit rate, which is currently 0 per cent, cf. Chart 7. Over the last few months, both collateralised and uncollateralised lending rates have risen, however. The 1-month EONIA rose from some 8-10 basis points to around 18 basis points in early March, i.e. closer to the ECB's lending rate.

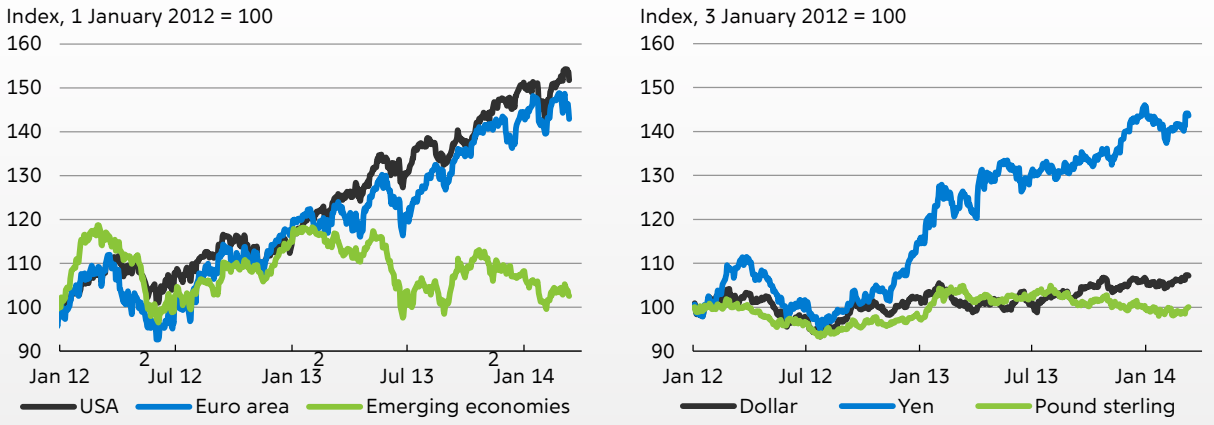
In August 2013, the Bank of England introduced forward guidance. It was communicated that interest rates would be kept at a low level until unemployment fell below 7 per cent, unless (i) inflation was expected to exceed 2.5 per cent 18-24 months ahead, (ii) medium-term inflation expectations no longer remained sufficiently well anchored, or (iii) the Financial Policy Committee[2] judged that the stance of monetary policy posed a significant threat to financial stability. In its Inflation Report from February 2014, the Bank of England presented updated forward guidance, emphasising that other factors will also influence its interest rates. The Bank of England expects unemployment to fall below 7 per cent during the spring. But with lower-than-expected inflation and spare capacity assessed at 1-1.5 per cent of GDP, the Monetary Policy Committee finds that it is still too early to raise interest rates. The new forward guidance indicates that the Bank will focus on closing the output gap over the next 2-3 years, while stabilising inflation around the target of 2 per cent.

The improved economic situation and the gradual stabilisation of the financial markets have caused the benchmark US and European stock indices to rise, cf. Chart 8 (left). In contrast, the weighted stock index for the emerging economies has fallen a little since early 2013. In Russia, equities dropped in late February and early March due to the threat of international sanctions in response to the conflict with Ukraine, and the Russian rouble weakened. After having strengthened by some 6-7 per cent against the dollar since the sum-

2 Independent committee at the Bank of England responsible for monitoring financial stability in the UK.

Stock indices (left) and exchange rate of the euro vis-à-vis selected currencies (right)

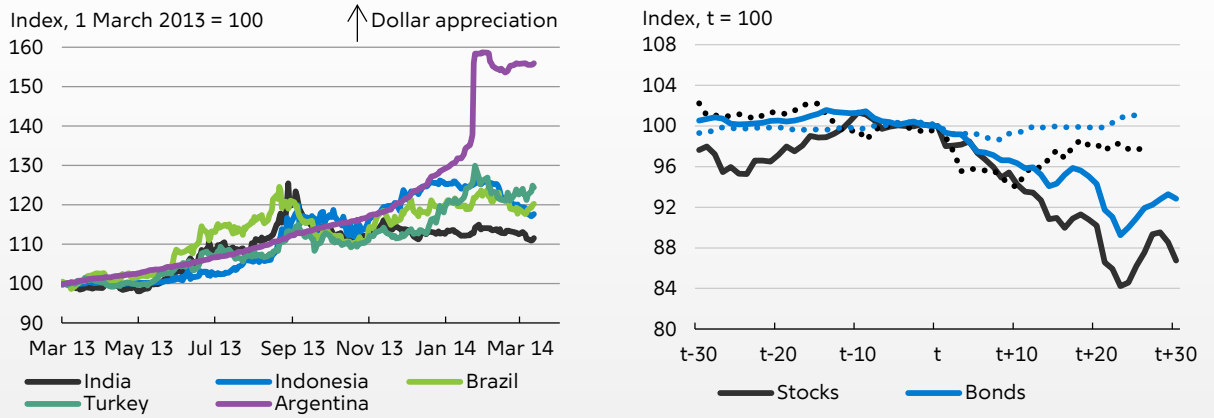
Chart 8



Note: Left-hand chart: The stock indices used are the S&P 500, Eurozone Stoxx Index and FTSE All Emerging All Cap Index. Right-hand chart: An increase indicates that the euro has strengthened against the currency in question.
Source: Reuters EcoWin and Bloomberg.

Exchange rates of selected emerging economies (left) and developments in equity and bond markets in the emerging economies in periods of financial turmoil (right)

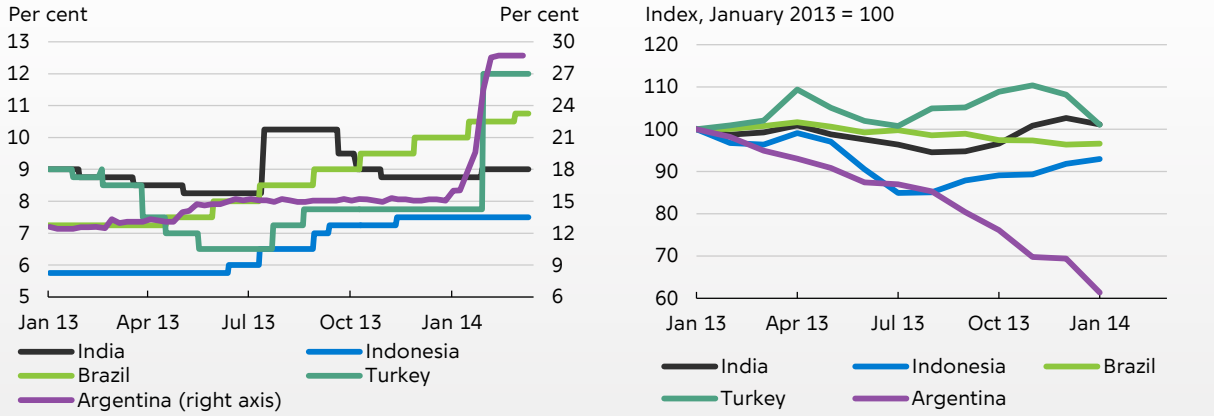
Chart 9



Note: Right-hand chart: The full lines indicate the development in the days around t = 22 May 2013, while the broken lines indicate the development in the days around t = 22 January 2014. The stock index used is the FTSE All Emerging All Cap Index. The bond index used is the JP Morgan EMBI Global Total Return Index.
Source: Reuters EcoWin and Bloomberg.

Monetary-policy interest rates (left) and foreign-exchange reserves (right) of selected emerging economies

Chart 10



Note: Foreign-exchange reserves stated in dollars.
Source: Reuters EcoWin and Bloomberg.

mer of 2013, the euro has been stable vis-à-vis the dollar and the pound sterling in the last couple of months, cf. Chart 8 (right). Conversely, the yen strengthened a little against the euro in January, but then fell back to the level seen at the turn of the year. Overall, the yen has weakened by some 26 per cent against the euro since the Japanese Prime Minister, Shinzo Abe, took office in late 2012. At that time, the Prime Minister said that he found the yen too strong, and subsequently the Bank of Japan has raised its inflation target from 1 to 2 per cent.

The price of gold has generally fallen over the last couple of years as the financial markets have stabilised. But since December the gold price has risen by approximately 12 per cent in the wake of the temporary financial turmoil in the emerging economies.

When the Federal Reserve in May and June 2013 announced the possibility of tapering its asset purchases, this led to considerable financial market turmoil in the emerging economies and depreciation of several currencies, cf. Chart 9 (left). When tapering commenced in January, it led to renewed capital outflows, and the currencies of some emerging economies weakened substantially. In general, the emerging economies affected by the turbulence have been those with large current-account deficits and high inflation. However, the turmoil in January was not as strong as that seen in the summer of 2013, when both equity and bond markets in the emerging economies dived sharply, cf. Chart 9 (right). The bond and equity markets fell by 10 and 15 per cent, respectively, in late May 2013. By comparison, the equity markets fell by only 6 per cent or so in late January, while the bond markets were stable.

The considerable weakening of exchange rates in late January led the central banks of, inter alia, India and Turkey to respond by raising interest rates, cf. Chart 10 (left). This helped to stabilise the financial markets. Moreover, central banks have regularly intervened to keep exchange rates stable. Argentina's foreign-exchange reserve was reduced by almost 40 per cent from January 2013 to January 2014, cf. Chart 10 (right). When the Central Bank of Argentina stopped intervening in the market, the Argentinian peso weakened by 13 per cent in a single day.

MONETARY AND EXCHANGE RATE CONDITIONS

In recent months, the krone has been stable vis-à-vis the euro at a level close to its central rate in ERM2, cf. Chart 11. In December and early January, the krone weakened slightly, one of the reasons being that the European money-market interest rates rose relative to the equivalent Danish interest rates.

Danmarks Nationalbank did not intervene in the foreign-exchange market from the end of January 2013 to the end of February 2014. That is the longest period of non-intervention since the introduction of the euro. If the exchange rate of the krone fluctuates a little, the fixed exchange rate policy entails that Danmarks Nationalbank seeks to iron out these fluctuations by intervening in the market to buy or sell foreign exchange against kroner. If there is a more prolonged tendency for the krone to strengthen or weaken, Danmarks Nationalbank adjusts its interest rates. Market participants have also contributed to stabilising the krone by taking positions in the expectation of a stable exchange rate, cf. the article "Fixed Exchange Rate Policy in Denmark" in this Monetary Review.

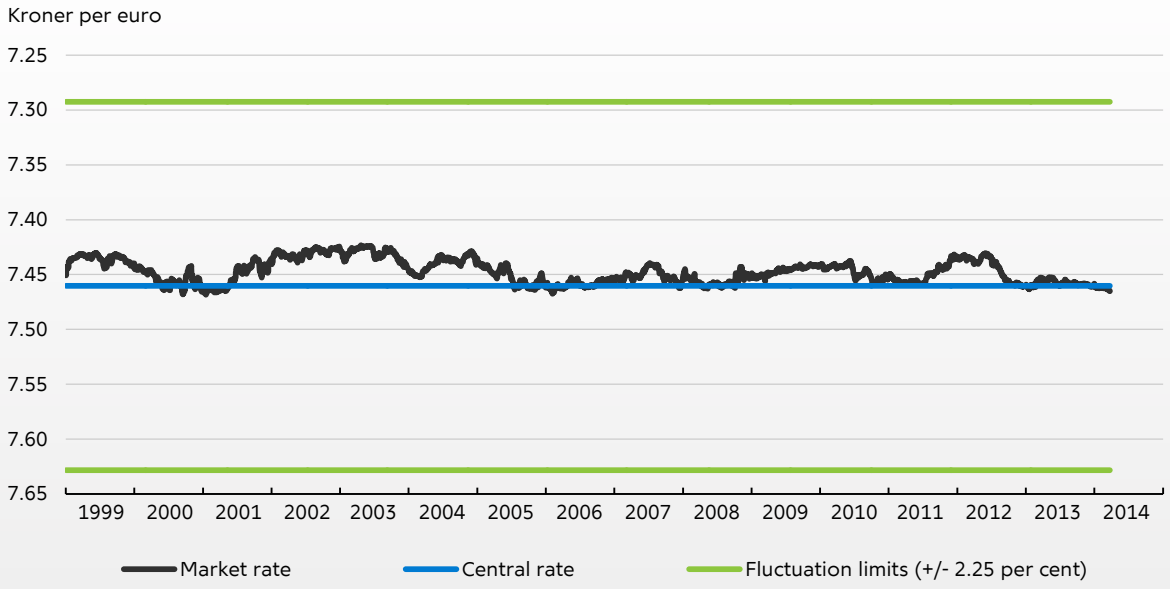
At end-February, the foreign-exchange reserve was kr. 475.4 billion, having decreased by kr. 14.0 billion since November 2013. The fall mainly reflected value adjustment of the foreign-exchange reserve for 2013.

Danmarks Nationalbank has not changed its monetary-policy interest rates since May 2013, when the lending rate was reduced.

Since early December, 3-year loans from Danmarks Nationalbank totalling kr. 5.3 billion have been redeemed prematurely, bringing the total loan volume down to kr. 6.7 billion. A small part of the outstanding volume matures in March 2015, the rest in September 2015.

Since October 2011, monetary-policy counterparties have been able to raise 6-month loans from Danmarks Nationalbank. This will no longer be possible from 1 July 2014. In Decem-

Exchange rate of the krone vis-à-vis the euro Chart 11



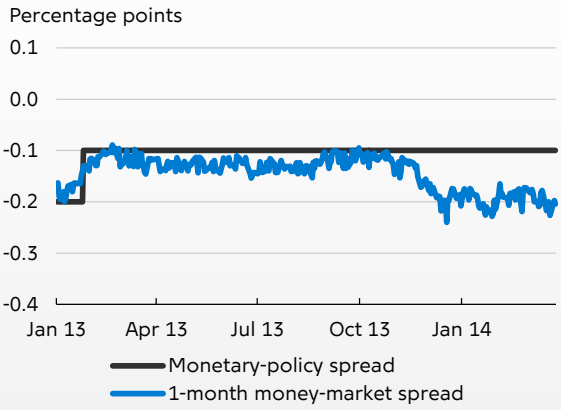
Note: Reverse scale. The most recent observation is from 10 March 2014.
Source: Danmarks Nationalbank.

ber, counterparties redeemed 6-month loans for kr. 3.4 billion, bringing the outstanding volume to zero. Overall, the monetary-policy counterparties still have a positive net position vis-à-vis Danmarks Nationalbank.

Danish money-market interest rates have been stable in recent months, whereas euro area money-market interest rates have risen, so that the spread to the euro area has widened and become more negative since mid-November, cf. Chart 12.

Developments in the euro area money-market interest rates have been closely linked to excess liquidity. In periods with ample excess liquidity, short-term money-market interest rates will be close to the ECB's deposit rate, which is the alternative to placement in the money market. Conversely, when excess liquidity is limited, short-term money-market interest rates will be close to the main refinancing rate, which is the alternative to borrowing in the money market. Since the beginning of 2013, euro area banks have had the option to redeem loans under the ECB's 3-year longer-term refinancing operations, LTRO, prematurely. This has led to a substantial decrease in excess liquidity, which in mid-November fell to a level that made money-market interest rates rise. In late November

Interest-rate spreads between Denmark and the euro area Chart 12



Note: 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 money-market spread is the spread between the CITA and EONIA swap rates. The most recent observations are from 10 March 2014.
Source: Reuters EcoWin.

and in December 2013, there was also upward pressure on money-market interest rates because the euro area banks wished to hold more liquidity over the turn of the year. That made them less willing to lend in the money market. The wish for a robust liquidity position at the turn of the year was strengthened by the ECB's comprehensive assessment of the largest banks

in the forthcoming banking union, which will be based on, inter alia, their balance sheets at 31 December 2013[3].

Turnover in the Danish money market increased in December, one of the underlying factors being the banks' wish to hold ample liquidity in connection with large settlements in the mortgage-credit market over the turn of the year.

THE CAPITAL MARKET

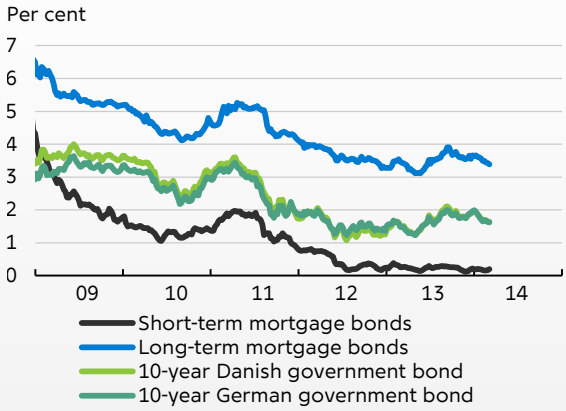
The yield on 10-year Danish government bonds was just under 1.7 per cent in early March, cf. Chart 13. During December, the 10-year government bond yield rose, but since New Year it has fallen back, which is in line with developments in a number of other European countries, cf. the section on the international economy. The 10-year German government yield has fallen a little more than its Danish counterpart since New Year, which has lifted the Danish-German yield spread from just under zero to a marginally positive level. On 27 February, an auction was held of 3- and 6-month T-bills. The sales volume in the auction totalled kr. 17.1 billion at interest rates of -0.17 and -0.09 per cent, respectively.

The yield on short-term mortgage bonds has been virtually unchanged in recent months and was 0.2 per cent in early March, while the yield on long-term mortgage bonds has fallen slightly to 3.4 per cent. The short-term mortgage yield has been close to 0.2 per cent since July 2012, cf. Chart 13.

In continuation of the government's proposal from November 2013, the Folketing (Danish parliament) on 11 March 2014 passed a legislative amendment to introduce contingent maturity extension for mortgage bonds with shorter maturities than the underlying loans. Their maturity is extended if a refinancing auction fails or if the yield on mortgage bonds with an original maturity of less than 2 years rises by more than 5 percentage points within one year, cf. the article "Maturity Extension of Mortgage Bonds" in this Monetary Review.

3 See the section on the international economy and the financial markets in Danmarks Nationalbank, *Monetary Review*, 4th Quarter 2013, Part 1.

Yields on government and mortgage bonds Chart 13



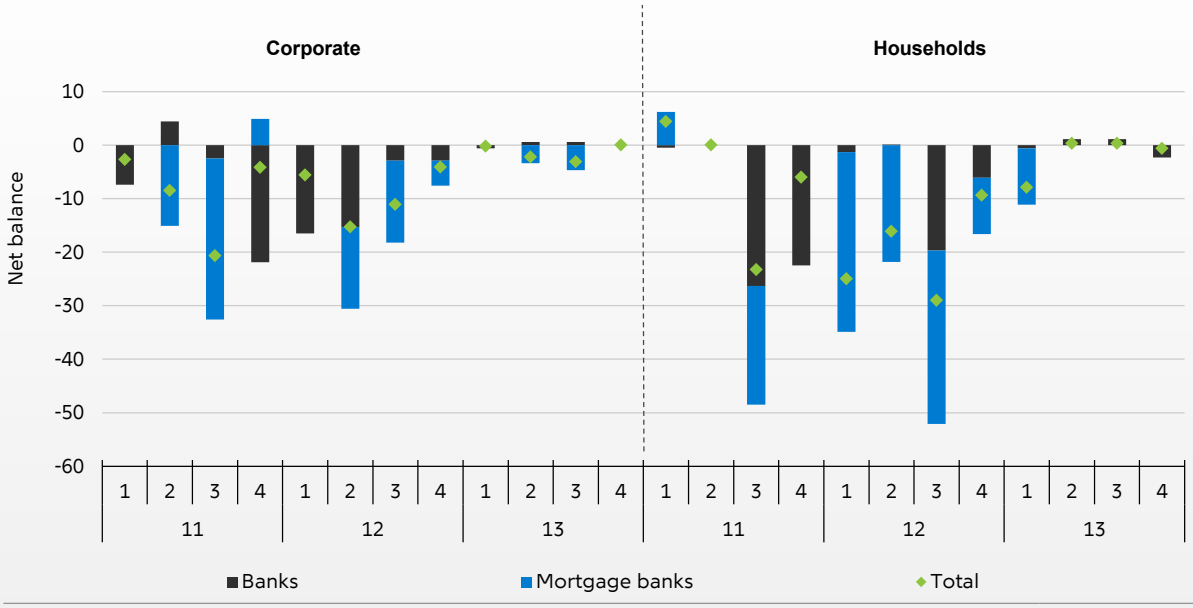
Note: Weekly data. The short-term yield is the 1-year yield based on fixed bullets. The long-term yield is an average yield to maturity for 30-year fixed-rate callable bonds. Mortgage yields are exclusive of brokerage fees and administration margins. The 10-year government bond yield is the par yield, i.e. the calculated yield on bonds maturing in exactly 10 years. The most recent observations are from calendar week 10 2014.
Source: Nordea Analytics and Association of Danish Mortgage Banks.

The banks' interest rates on outstanding loans to households remained unchanged from October 2013 to January 2014, while the rate of interest on corporate loans fell by 0.1 percentage point. Deposit rates were unchanged in the same period, so that the corporate interest-rate margin narrowed slightly. Due to the transition to new MFI statistics, minor changes have been made to the definition of the household sector, among others, cf. the article "New and More Detailed MFI Statistics" in this Monetary Review. This reclassification has not affected the interest levels calculated for outstanding loans to and deposits from households and the corporate sector materially.

CREDIT DEVELOPMENTS

In Danmarks Nationalbank's lending survey for the 4th quarter of 2013, the banks and mortgage banks stated that credit standards vis-à-vis both the corporate sector and households had remained unchanged in the 4th quarter. Overall, the institutions stated that demand for corporate loans had risen, especially among new customers. As regards households, demand for loans was practically unchanged among existing customers in the 4th quarter of

Changes in credit standards for the corporate sector and households Chart 14



Note: The net balance lies within the interval -100 to 100. A negative net balance means that the credit managers of the institutions in question have, overall, stated that credit standards have been tightened relative to the preceding quarter. Conversely, a positive net balance indicates easing. In the lending survey, corporate lending includes lending to non-financial corporations and sole proprietors, while sole proprietors are included in the household sector in the MFI statistics. In the lending survey, lending to households includes lending to wage earners and old-age pensioners, etc.
Source: Danmarks Nationalbank.

2013, while it rose slightly among new customers. During 2013, credit standards vis-à-vis both the corporate sector and households were virtually unchanged from quarter to quarter, which is in contrast to the tightening seen in the 2nd half of 2011 and in 2012, cf. Chart 14. This indicates that credit standards have been more stable over the last year. Danmarks Nationalbank introduced its quarterly lending survey in the 4th quarter of 2008, so it is relatively new compared with similar surveys conducted by other central banks. Hence, the Danish lending survey cannot form the basis of a systematic statistical assessment of developments in credit standards at the various stages of a business cycle. Experience from the US lending survey, which goes back to 1967, shows that credit standards have been tightened far more often than they have been eased[4]. Consequently, the results of the lending survey may show that credit standards are more restrictive than they actually are.

The banks expect credit standards vis-à-vis both the corporate sector and households to remain more or less unchanged in the 1st quarter of 2014, while the mortgage banks expect to tighten credit standards a little for both customer groups.

The banks' and mortgage banks' aggregate seasonally adjusted lending to households and the corporate sector has been virtually unchanged recently. From October 2013 to January 2014, lending by banks to households fell by kr. 3 billion, while lending to the corporate sector fell by kr. 1 billion. In the same period, lending by mortgage banks to households and the corporate sector rose by kr. 1 and 6 billion, respectively. The transition to the new MFI statistics has led to a minor downward adjustment of lending to households, while lending to the corporate sector has been adjusted upwards by an equivalent amount.

4 Cf. Kim Abildgren and Andreas Kuchler, Banks, credit and economic trends, Danmarks Nationalbank, *Monetary Review*, 2nd Quarter 2013, Part 2.

Key economic variables Table 3

Real growth on preceding period, per cent	2013	2014	2015	2016	2013 Q2	2013 Q3	2013 Q4
GDP	0.4	1.4	1.7	1.9	1.0	0.4	-0.5
Private consumption	0.0	1.4	2.0	2.0	-0.1	-0.2	-1.3
Public consumption	0.9	1.0	0.6	0.7	0.9	1.4	0.9
Residential investment	-5.0	3.3	2.6	2.2	0.7	-3.4	5.6
Public investment	-0.7	-1.1	-5.6	0.5	7.5	2.1	-11.4
Business investment	3.4	3.7	4.2	4.9	-0.8	3.8	-3.2
Inventory investment[1]	0.2	0.0	0.0	0.1	-0.4	0.4	-1.0
Exports	1.0	2.8	2.6	3.0	1.7	1.7	-0.1
Industrial exports	2.7	4.0	3.4	4.3	2.2	2.9	1.0
Imports	1.5	3.3	2.7	3.3	-0.4	3.2	-2.7
Employment, 1,000 persons	2,734	2,752	2,768	2,789	2,722	2,740	2,746
Gross unemployment, 1,000 persons	153	147	140	130	154	151	150
Net unemployment, 1,000 persons	117	114	110	102	117	117	116
Balance of payments, per cent of GDP	7.3	5.7	5.7	5.9	7.4	7.3	8.5
Government balance, per cent of GDP	-1.2	-1.1	-2.9	-2.4	-1.4	-1.5	0.6
Cash prices, per cent year-on-year	2.6	2.2	2.7	2.9	3.1	2.6	2.6
Consumer prices, per cent year-on-year	0.5	1.2	1.7	1.8	0.5	0.2	0.4
Hourly wages, per cent year-on-year	1.7	2.1	2.6	2.7	1.7	1.9	1.5

1. Contribution to GDP growth.

THE DANISH ECONOMY

The Danish economy grew by 0.4 per cent in 2013, driven by exports, public consumption and business investment, while private consumption was flat.

In the 4th quarter, activity fell by 0.5 per cent, adjusted for price developments and seasonal fluctuations. This should be seen in the context of frequent large quarter-on-quarter fluctuations in Denmark's GDP growth. In this context, growth was positive by 1.0 and 0.4 per cent in the 2nd and 3rd quarters, respectively.

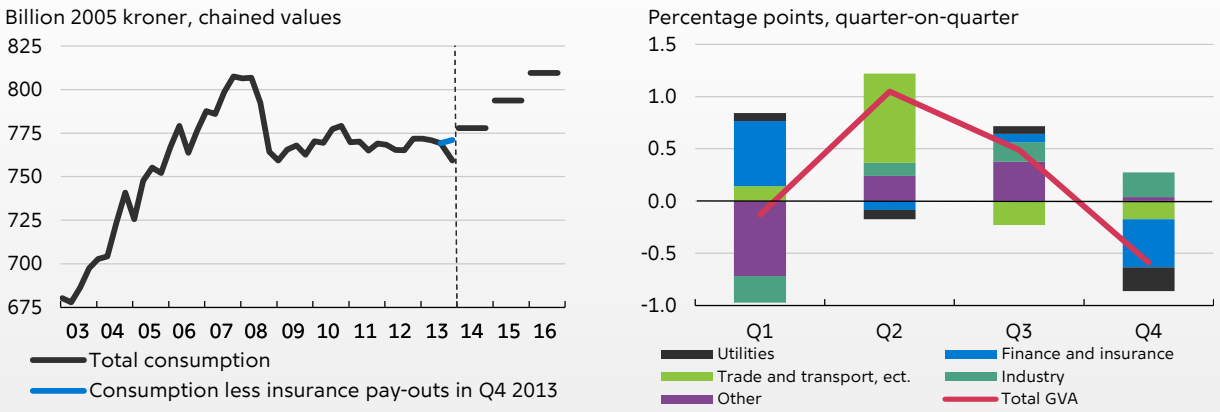
The decline in the 4th quarter reflects stock depletion, i.e. use of previously produced goods to meet demand, among other factors. On the other hand, activity was supported by higher public consumption and a substantial rise in residential investment.

The underlying private consumption rose by 0.2 per cent in the 4th quarter, but since insurance pay-outs after the two gales in the 4th quarter are deducted from private consumption of insurance services, the national accounts showed a fall of 1.3 per cent in private consumption, cf. Chart 15 (left).

Private consumption was positively affected by vehicle purchases in the 4th quarter. Passenger car sales have risen since the end of 2012, to one of the highest levels ever in February 2014. On the other hand, the mild weather in the 4th quarter reduced households' energy consumption. As a result, utilities companies made a negative contribution to gross value added, GVA, cf. Chart 15 (right). GVA growth was also reduced extraordinarily by finance and insurance due to the insurance pay-outs in connection with the gales. Con-

Private consumption (left) and contributions from various sectors of industries to gross value added in 2013 (right)

Chart 15



Source: Statistics Denmark.

versely, other sectors, such as industry, are still picking up.

In connection with the virtually flat development in consumption in 2013 it should be noted that the rise in household wealth since mid-2012 has to a large extent been driven by pension and equity wealth, which normally affects consumption less than e.g. housing wealth and bank deposits. Furthermore, disposable income has shown a weak trend, even when adjusted for the extraordinary tax payments on capital pensions.

The consumption ratio fell in 2013 and is currently below its historical average, taking into account the extraordinary tax payments on capital pensions, which reduce disposable income in 2013 and 2014, cf. Chart 16 (left).

The projection shows steady growth in private consumption of 1.4 per cent this year and 2 per cent the following two years. The point of departure is that consumer confidence has been robust for more than six months and that household disposable income increases in the projection due to rising wages.

Business investment in building and construction decreased by 1.7 per cent in the 4th quarter. The level is very low and reflects the considerable stock of vacant premises. Looking ahead, this is also expected to reduce the need to build when economic activity rises.

Investments in plant and equipment fell by 3.1 per cent in the 4th quarter. This is to a large extent because the 3rd quarter's sizeable investments in imported ships have dropped out of the statistics in the 4th quarter. Exclusive of ships, investments in plant and equipment rose by approximately 6 per cent in the 4th quarter. In this context, it should be remembered that the special investment window with favourable depreciation for tax purposes closed at the turn of the year 2013/14. In the coming years, investments in plant and equipment are expected to grow at more or less the same rate as value added in the non-agricultural sector, i.e. the investment ratio will show a virtually flat trend, cf. Chart 16 (right).

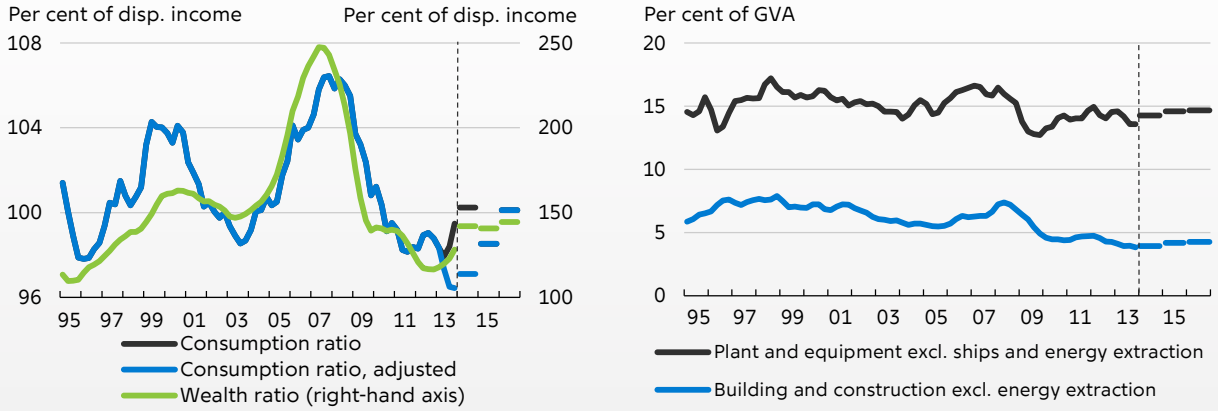
In volume terms, exports fell by 0.1 per cent in the 4th quarter, while imports fell by 2.7 per cent. Imports of goods declined because the large imports of ships in the 3rd quarter were no longer included in the 4th quarter, and imports of services were reduced due to negative imports of insurance services from Danish insurers' reinsurance abroad in connection with the gales in the 4th quarter. Adjusted for these temporary factors, imports grew by around 0.5 per cent.

On account of the improved outlook for Denmark's largest export markets, cf. the assumptions in Appendix 1, export growth is expected to be between 2.5 and 3 per cent p.a. in the coming years.

There are positive signs in the labour market and parts of the housing market, and confi-

Households' consumption and wealth ratios (left) and private non-agricultural sectors' investment ratios (right)

Chart 16



Note: Left-hand chart: Ratios shown as 4-quarter moving averages. Household disposable income as stated in the national accounts. "Consumption ratio, adjusted" adjusts the disposable income for the extraordinary tax payments resulting from the restructuring of capital pensions. Wealth is the households' weighted, consumption-determining wealth, cf. Jens Bang-Andersen et al., Consumption, income and wealth, Danmarks Nationalbank, *Monetary Review*, 2nd Quarter 2013, Part 2. Right-hand chart: Ratios shown as 2-quarter moving averages. GVA is gross value added in the private non-agricultural sectors.
Source: Statistics Denmark and own calculations.

dence among both consumers and firms has improved since the spring of 2013. Combined with the low level of interest rates and a substantial savings surplus in the private sector, especially among firms, this provides a basis for a self-sustaining upswing with continued growth in domestic demand. Overall, GDP growth is expected to be 1.4 per cent this year, rising to 1.9 per cent in 2016. So for all practical purposes the growth forecasts for this year and next year are unchanged compared with Danmarks Nationalbank's projection from December 2013, cf. Appendix 2.

The risks to the projection are assessed to be balanced. If the positive signals in the housing and labour markets continue, this may lead to a more rapid and stronger increase in private consumption than projected. Conversely, a new downturn abroad could delay the economic recovery in Denmark. Growth could also be dampened if monetary policy abroad is normalised sooner than assumed.

FOREIGN TRADE AND BALANCE OF PAYMENTS

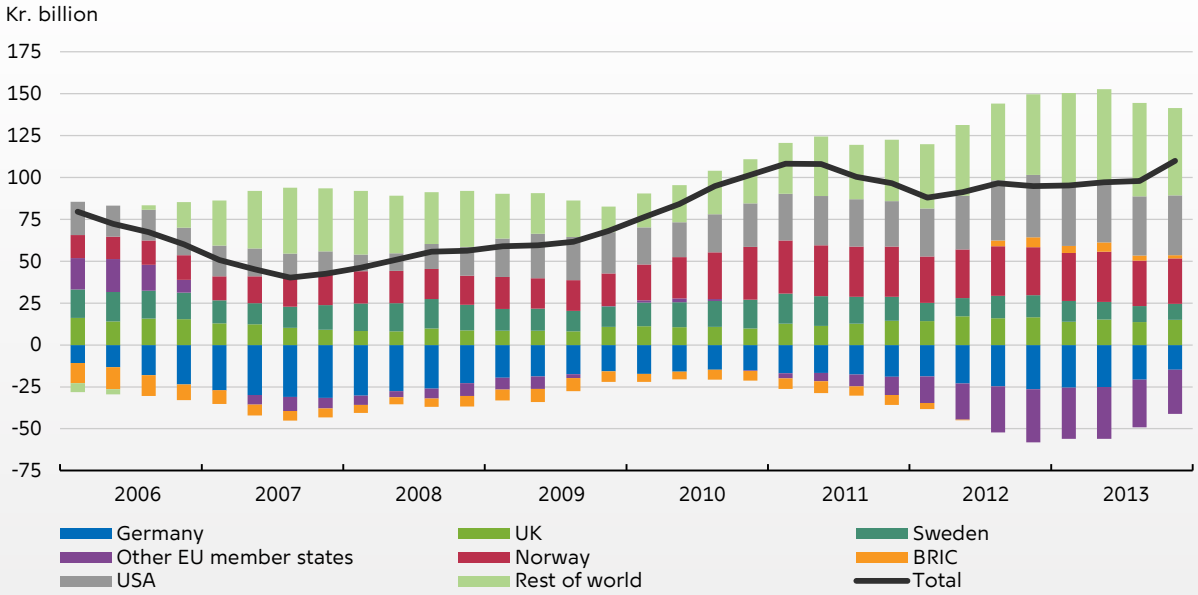
The seasonally adjusted value of exports of goods, excluding ships and aircraft, fell by 0.3 per cent in the 4th quarter, while imports grew by 1.0 per cent. As a result, the trade surplus decreased by kr. 1.8 billion to kr. 20 billion.

Full-year exports of goods were 1.0 per cent higher in 2013 than in 2012. This mainly reflects a broad-based increase in industrial exports. Exports of chemical products, including pharmaceuticals, continued the solid upward trend seen in recent years. Exports of machinery, transport equipment and intermediate goods rose after a small decline in the preceding year. Agricultural exports also continued to grow, as they have done for some years. These factors more than offset the small decline in energy exports due to lower North Sea production and lower oil prices.

Exports of services grew by 2.4 per cent in 2013, while imports of services were virtually flat. Exports of sea freight rose by 3.3 per cent in 2013 and were the primary factor behind the increase in service exports.

In the 4th quarter, the current-account surplus was kr. 40.3 billion, which was kr. 12.6 billion higher than the year before. For 2013 as a whole, the surplus was kr. 135.4 billion. That is the highest surplus ever and just over kr. 26 billion higher than in 2012. The large surplus, which is equivalent to 7.3 per cent of GDP, is attributable to a steady increase in investment income over the last couple of decades, in which Denmark has gone from being a debtor to a creditor nation, with net foreign assets of approximately 40 per cent of GDP.

Denmark's balance of goods and services broken down by geographical counterparties Chart 17



Note: 4-quarter moving sums. The definition of goods from the balance of payments has been applied. The BRIC countries are Brazil, Russia, India and China.
Source: Statistics Denmark.

The current-account surplus is expected to fall back a little this year. In the projection, the surplus from investment income is forecast to decrease. This is because the return on Denmark's net foreign assets has been higher in recent years than what could, viewed in isolation, be expected in an international comparison, cf. the article "Development in and Return on Net Foreign Assets" in this Monetary Review.

Recent years' large current-account surpluses are also attributable to large surpluses on the balance of goods and services since 2010, cf. Chart 17. This reflects more subdued domestic demand – and hence imports. At the same time, Denmark's exports are less cyclically sensitive than those of most other countries, which has to some extent cushioned the impact of the weak development in the export markets.

Like the preceding couple of years, 2013 saw a deficit on the balance of goods and services vis-à-vis the EU, despite solid surpluses vis-à-vis Sweden and the UK. Norway and the USA still contributed substantially to the Danish surplus, while exports to and imports from the BRIC countries virtually cancelled each other out.

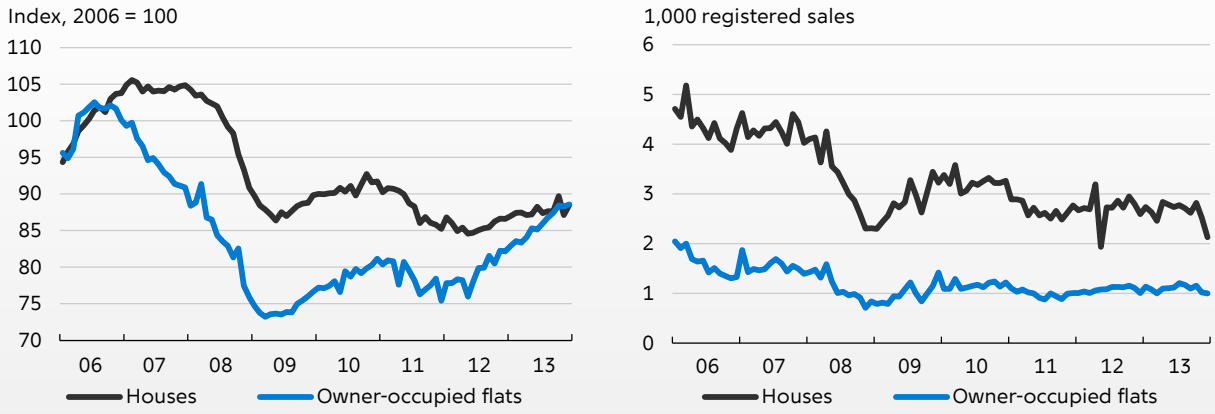
THE HOUSING MARKET

The housing market showed signs of a recovery in late 2013. The number of announced enforced sales has declined, and this continued in early 2014. House prices have risen since the spring of 2012, but the curve has flattened in recent months, cf. Chart 18 (left). In December 2013, house prices were 2.1 per cent higher than in December 2012, while flats had risen by almost 8 per cent. Price increases have been strongest in the cities, while other parts of Denmark have not seen any price increases yet.

Since early 2012, the spread between the initial asking price and the final sales price has narrowed for Denmark overall. This indicates that sellers and buyers find it easier to agree on a price. In the 3rd quarter of 2013, the average price reduction for houses was just under 11 per cent, which is 1.5 percentage points lower than one year earlier. For flats the reduction had decreased to 6 per cent.

Trading activity remains modest, cf. Chart 18 (right). For houses it has fluctuated around the same low level for the last three years, although the number of transactions in the Copenhagen area has risen somewhat in the last few

Development in house prices (left) and number of sales registered in land register (right) Chart 18



Note: Seasonally adjusted data. For the most recent month, the number of registered sales normally comprises around 75 per cent of the final number of transactions, so this number can be expected to be adjusted upwards for the last few months.
Source: Statistics Denmark and own seasonal adjustment.

quarters. The supply of houses for sale is high. Combined with modest turnover, this results in long time on market. The national average is almost 300 days after seasonal adjustment, but again there is a considerable geographical spread. The shortest time on market is less than 200 days in the Capital Region.

Since mid-2012, the number of sales of owner-occupied flats registered in the land register has fluctuated around a level slightly below the average for the last eight years. The supply has declined a little in recent months, despite a small rise in Copenhagen, where price increases have also been strongest.

During the 2nd half of 2013, the housing burden rose due to higher interest rates and house prices. However, the point of departure was low. The housing burden is a stylised calculation of the financing costs, including property taxes, when buying a single-family house as a share of average income. If the home is financed via a fixed-rate loan with amortisation, the housing burden in the 4th quarter of 2013 was just over 1 percentage point lower than the average since 1981.

The recovery in the housing market in Copenhagen and other cities is expected to continue over the projection horizon, but at a slower pace, as more people find it attractive to move to the surrounding areas. Combined with higher employment and incomes, this will provide a basis for higher house prices, which is to some extent assumed to be offset by rising interest rates. Against that background, house prices are expected to rise by 2-3 per cent p.a. towards 2016.

PUBLIC FINANCES

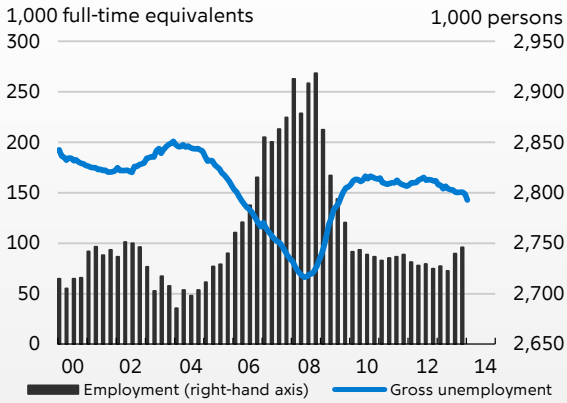
Real public consumption is expected to rise by 1.0 per cent this year and 0.6 and 0.7 per cent in the next two years. This is within the agreed spending limits. The relatively high growth this year reflects lower-than-planned public consumption in 2013, which leaves scope for increasing growth this year without exceeding the expenditure ceilings.

Public investment is forecast to be reduced this year and next year. After that, it will stabilise at a level of just over 2 per cent of GDP, which is fairly high in a long-term perspective.

The government deficit is estimated at kr. 22 billion in 2013, equivalent to 1.2 per cent of GDP. Without the one-off tax revenue from restructuring of existing capital pensions, the deficit would have been kr. 28.5 billion higher and would have constituted 2.7 per cent of GDP. The tax restructuring will also have a positive impact in 2014, resulting in a forecast deficit of 1.1 per cent of GDP. This extraordinary revenue will cease in 2015, and the deficit is expected to reach 2.9 per cent of GDP, falling to 2.4 per cent of GDP in 2016.

In 2010, the European Commission issued a recommendation to Denmark to reduce its excessive deficit by 2013 at the latest. This meant that the structural balance was to be improved by at least 1.5 per cent of GDP in the period 2011-13 and that the government budget deficit should not exceed 3 per cent of GDP in 2013. Both conditions seem to have been met. If the excessive deficit procedure is to be abrogated for Denmark, it is a precondition that the Commission in its spring forecast 2014 assesses that, looking ahead, Denmark is not likely to exceed the 3-per-cent limit. According to Danmarks Nationalbank's projection, this criterion will be met, albeit only just.

Employment and unemployment Chart 19



Note: Employment according to the national accounts. The most recent observations are from the 4th quarter of 2013 for employment and from January 2014 for gross unemployment.
Source: Statistics Denmark.

LABOUR MARKET AND CAPACITY

According to the national accounts, employment continued to rise in the 4th quarter, cf. Chart 19. This applied to both the private and public sectors. Hence, employment has risen by 21,200 over the last year, or 0.8 per cent, primarily driven by the private sector. Statistics for waged employment indicate a certain shift from full- to part-time employment in recent quarters.

Gross unemployment has declined steadily since mid-2012, standing at 142,800 in January (seasonally adjusted), or 5.4 per cent of the labour force. This is the lowest level since August 2009. According to Statistics Denmark, the measured unemployment figure may, however, be too low, as the January figure is subject to considerable uncertainty. This is because a number of institutional changes resulting from the reforms of the unemployment benefit and social benefit systems affect the classification of individuals in relation to the administrative registers on which the unemployment figures are based.

Labour market indicators point to a modest recovery. The number of announced lay-offs has shown a downward trend since August 2013, and at approximately 850 the annual average for 2013 was the lowest since 2007. The number of jobs advertised on the Internet has also been rising slightly since the autumn of 2013; this applies to both public- and private-sector jobs. In addition, employment expectations in the business sector are generally improving.

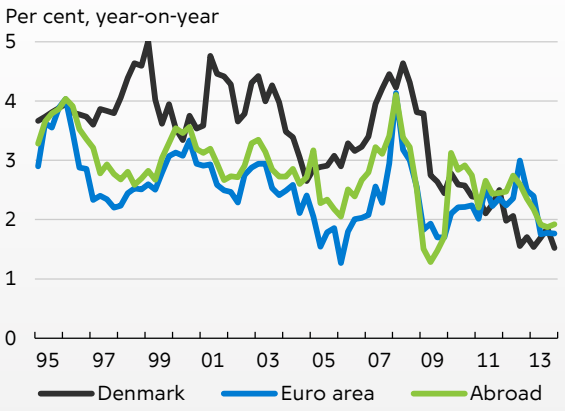
Employment growth is expected to be subdued this year, after which it will accelerate as the economic recovery gains momentum. As a result, unemployment will fall, but not at the same pace, as the labour force is forecast to rise slightly, one reason being the later retirement age.

Danmarks Nationalbank estimates the output gap at a little more than -2 per cent of potential GDP in the 2nd half of 2013. In the projection, the gap gradually narrows towards the end of 2016. The output gap is a measure of capacity pressures in the economy and indicates the gap between actual output and the output level which the economy can sustain without inflationary pressures arising.

WAGES

According to Statistics Denmark, the private-sector labour market saw average annual wage increases of 1.2 per cent in the 4th quarter. Wage growth in the competitive manufacturing sectors fell to 1.5 per cent year-on-year, cf. Chart 20. This means that industrial wages rose a little more slowly in Denmark than among Denmark's trading partners, weighted using the weights from the krone-rate index. However, the improvement in Denmark's wage competitiveness seen since 2010 seems to be

Wage growth in manufacturing in Denmark and abroad Chart 20



Note: The most recent observations are from the 4th quarter of 2013. Wage growth in Denmark is given by Statistics Denmark's calculation. "Abroad" is a weighted figure for wage developments in manufacturing industry among Denmark's 25 largest trading partners using the weights from the effective krone-rate index.
Source: Statistics Denmark, Confederation of Danish Employers and OECD.

ceasing. Before that, pronounced excess wage increases were seen during the overheating of the Danish economy in 2005-08.

In the 4th quarter, wages rose by 0.3 per cent year-on-year in both local and regional government and by 0.5 per cent in central government. Public-sector wage inflation declined during 2013, and wages rose less than in the private sector. This reflects collective agreements and the regulatory mechanism. The latter ensures a virtually parallel, but lagged wage development in the public and private sectors. So, as wage increases were higher in the public than the private sector in 2012, the regulatory mechanism ensured that they were low in 2013.

In the private-sector labour market, a number of collective agreements have been concluded but not yet adopted. They provide for wage increases until 2017 that are slightly higher than under the last two collective agreements, cf. Box 3. Moreover, pressures in the labour market are assessed to be low and to rise only little in the coming years. This provides a basis for slightly higher, but still subdued wage increases.

Collective agreements for the private-sector labour market Box 3

In February and March, a number of 3-year collective agreements were concluded for the private-sector labour market. The agreements cover areas such as industry, retail trade and transport. They must now be approved in membership ballots.

The industrial agreement includes a rise in the minimum rate of kr. 1.50 from 1 March this year and a further kr. 1.65 and kr. 1.80 from 1 March of the next two years. In addition, it has been agreed that the contribution to the Free Choice Wage Account will increase by 1 per cent of wages with holiday entitlement. Wage earners may use funds in this account either for payment in connection with time off or for extra pension contributions. With a minimum rate of kr. 108.70, this increases costs by 5.6 per cent over the 3-year agreement period, corresponding to approximately 1.9 per cent p.a. Add to this the other elements of the agreement, which have a limited impact on percentage cost increases.

Industry is a minimum-wage sector. This means that the collective agreement lays down the minimum rate and various general conditions, while the actual wage increase is negotiated locally at firm level. Hence, specific conditions can be taken into account. Most wage earners receive more than the minimum rate, but the rise in the minimum rate is an indicator for local bargaining. Industry is usually the benchmark for other collective agreements in the minimum-wage area, which covers some 85 per cent of all employees in the area covered by the Danish Confederation of Trade Unions/the Confederation of Danish Employers. The rest are employed within the normal-wage area.

In the normal-wage area, there is no local bargaining. Instead, wages are negotiated centrally. The transport sector is usually the benchmark. In this sector, agreed wages increases are kr. 2.10 from 1 March this year, kr. 2.25 next year and kr. 2.40 in 2016. In addition, the contribution to the Special Savings account, which more or less corresponds to the industrial Free Choice Wage Account, will also increase by a total of 1 percentage point over the 3-year period. With normal hourly wages of kr. 113.15, this – combined with the agreed wage increases – results in an increase of approximately 7 per cent in costs over the term of the collective agreement, corresponding to an average annual increase of around 2.3 per cent.

PRICES

Inflation, measured as the annual rate of increase in the EU Harmonised Index of Consumer Prices, HICP, was 0.3 per cent in February, cf. Table 4. Core inflation, which excludes price developments for energy and unprocessed food, was 0.6 per cent.

The low level of HICP inflation reflects factors such as the falling price of energy in recent months, as well as falling import prices during 2013. Domestic market-determined inflation, IMI, which excludes, inter alia, taxes and input

Consumer prices Table 4

Per cent, year-on-year	Weight[1]	2013	2014	2015	2016	2013/2014 Q4	Q1	Q2	Feb.	Mar.	Apr.
HICP		0.5	1.2	1.7	1.8	0.4	0.6	1.3	0.3	0.7	1.2
Index of net retail prices	100.0	0.9	1.3	1.6	1.8	0.8	0.8	1.3	0.6	1.0	1.4
Exogenous:											
Energy	7.5	-1.1	-0.1	0.3	0.1	-1.0	-2.2	1.4	-4.0	-1.0	2.2
Food	4.7	2.1	-0.7	1.8	2.0	-0.3	-1.9	-0.6	-2.1	-2.4	-0.7
Adm. prices	4.4	2.8	2.6	2.3	2.9	3.2	3.1	2.9	3.1	3.1	3.1
Rent	26.1	2.3	2.6	2.3	2.4	2.4	2.6	2.7	2.6	2.7	2.8
Excl. exogenous:	57.3	0.6	1.1	1.4	1.5	0.8	0.9	0.9	0.4	0.7	0.8
Imports	18.0	-0.8	-0.3	1.2	1.3	-2.3	-2.0	-0.6	-2.0	-1.5	-0.9
IMI	39.2	1.1	1.6	1.5	1.6	1.9	2.0	1.5	1.6	1.7	1.6

Note: The most recent actual figures are from February 2014.
1. Weight in the index of net retail prices, per cent. The weights are from January 2014.

prices, was 1.6 per cent and thus higher than HICP inflation. Since wage inflation has been subdued, this indicates that firms have raised their profit margins. It is normal for IMI to rise when input prices fall as firms do not immediately change their sales prices. This results in an increase in the firms' profit margins that does not necessarily reflect more favourable demand conditions. Conversely, if input prices begin to rise, profit margins – and hence IMI – may rapidly fall again.

A breakdown of HICP inflation by components shows that since the beginning of 2013 price increases have virtually only been seen in the service sectors, cf. Chart 21. And in 2013 prices rose at a slower-than-normal pace in these sectors, which was in line with the dampened domestic wage developments.

The price index for the domestic supply of goods, the wholesale price index, illustrates prices in the first link of the sales chain and is stated net of taxes. This index fell by 0.1 per cent from December to January, when it was 1 per cent below the level in January one year earlier. Underlying factors include a price fall of 0.4 per cent year-on-year for goods produced in Denmark, while imports fell by 2.5 per cent year-on-year.

According to the consumer survey, expectations regarding the coming year's prices have been more or less unchanged since the end of 2010. Hence, recent years' low price increases do not seem to have led to any substantial change in consumer expectations regarding the coming year's prices.

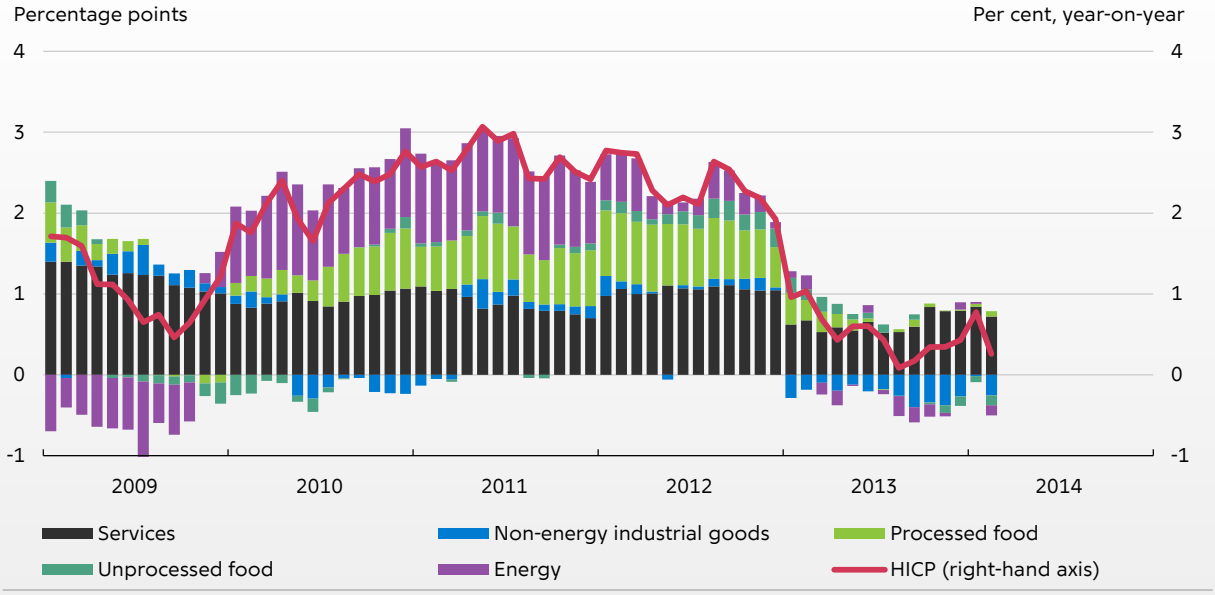
Overall, there are only limited inflationary pressures in the Danish economy, which is in accordance with the existence of spare capacity. Against this background, the annual rate of increase in HICP is forecast at 1.2 per cent this year, rising to 1.7 per cent in 2015 and 1.8 per cent in 2016.

REGIONAL DEVELOPMENTS

Since 2008, economic growth has been unevenly distributed across Denmark. Growth has increasingly taken place in the cities, especially Copenhagen, cf. Chart 22 (left). This has been the trend for quite a while, but the differences have been accentuated in recent years. In Copenhagen and environs, GDP is now higher than before the crisis, while this is not yet the case for Denmark overall.

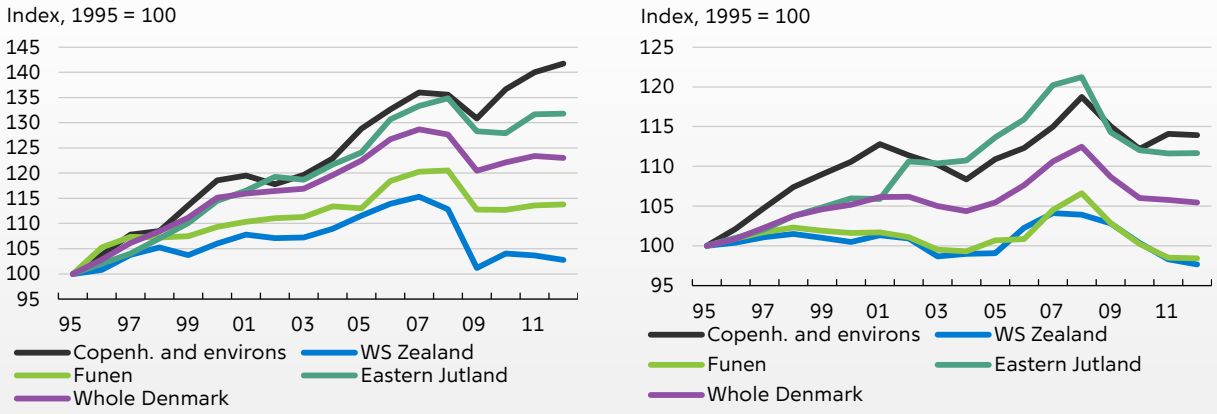
This development is also reflected in the labour market. Since 2008, the smallest declines in employment have been seen in and around

Contributions to price increases from various groups of goods and services Chart 21



Note: The breakdown is in accordance with Eurostat's main components of HICP. Non-energy industrial goods include e.g. clothing, furniture, household equipment, cars and electronics.
Source: Statistics Denmark.

Development in real GDP (left) and employment (right) Chart 22



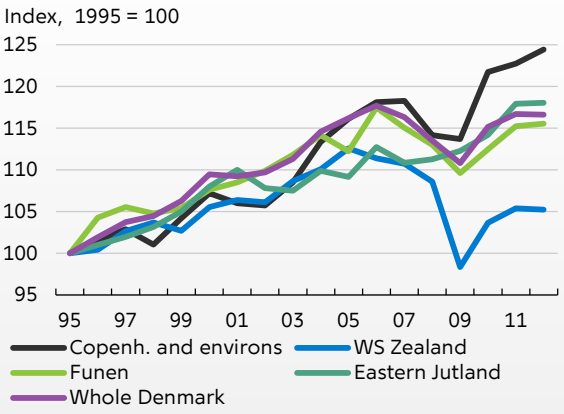
Note: WS Zealand is Western and southern Zealand.
Source: Statistics Denmark.

Copenhagen and in eastern Jutland, while the largest numbers of jobs have been lost in western and southern Zealand, Funen and western Jutland, cf. Chart 22 (right). There are also considerable spreads within the individual areas, with urban districts generally performing better than rural districts.

Since the crisis, productivity has shown a sound trend in Copenhagen and environs and has more than made up for the fall in 2008-09. Conversely, areas such as western and southern Zealand have seen far weaker productivity developments, also in the boom years, cf. Chart 23.

This means that GDP per capita varies substantially across Denmark. In 2012, Copenhagen topped the list at kr. 472,000, while Bornholm was lowest at kr. 226,000. However, the spread in income available for consumption and savings is far smaller. This is attributable to

Productivity Chart 23



Note: WS Zealand is Western and southern Zealand. Productivity is given by GDP divided by the number of people in employment.
Source: Statistics Denmark.

factors such as commuting from rural to urban areas, as well as considerable redistribution via taxes and transfers.

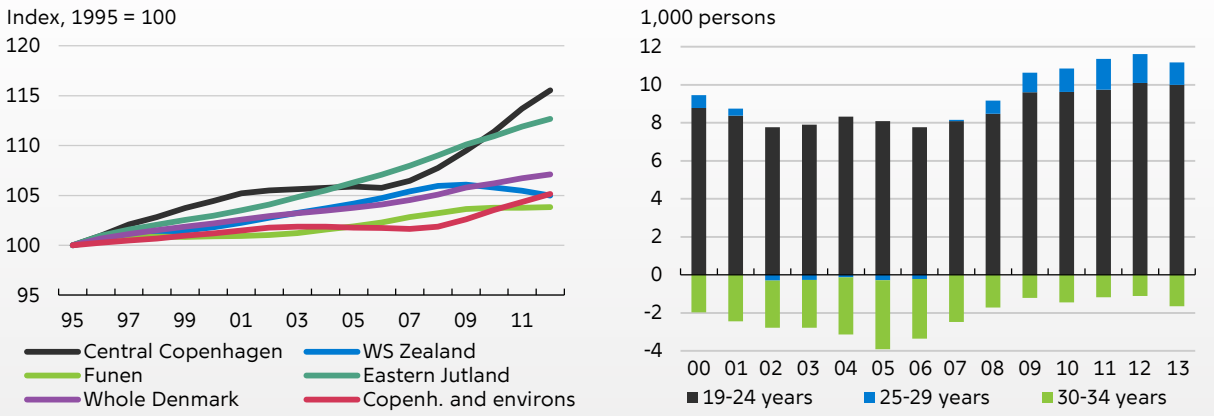
Parallel with the differences in regional economic growth, a corresponding development has been seen in population growth. Urbanisation is an international phenomenon and has taken place in Denmark for several decades. But in recent years the speed of urbanisation seems to have been fairly high, cf. Chart 24 (left). Since 2008, there has been a strong influx of mainly young people and people with jobs to the cities, while pensioners and unemployed people have moved out. Especially the 19-24-year-olds move to the cities, often in connection with education or training. They then remain in the cities, and have increasingly done so in recent years. This development is particularly pronounced in Copenhagen and environs, cf. Chart 24 (right).

Recent years' recovery in both activity and employment has mainly taken place in industries such as consultancy, research, IT and information services and pharmaceuticals. These are knowledge-intensive industries primarily located in cities. At the same time, employment has stagnated or declined within more traditional sectors such as agriculture and the parts of the industrial sector that employ relatively many low-skilled workers. These industries are also found outside the cities. This trend in the business structure has been seen for many years and is not a specific Danish phenomenon.

As a result, growth in employment has to a large extent taken place in the well-educated population groups. People in these groups typically have high incomes, and many of them are city dwellers. As the populations of the cities have grown, with still more people living in an area of a virtually given size, this has contributed to pushing up land prices in the cities.

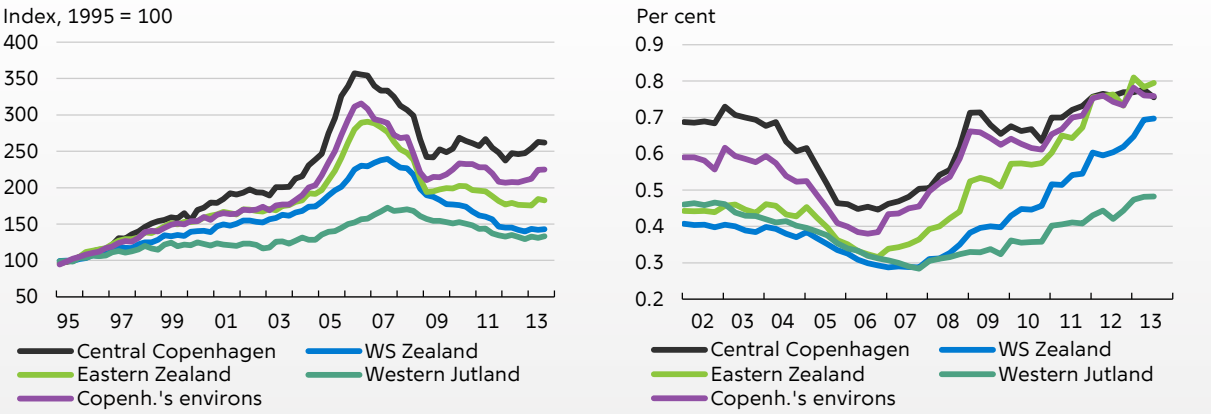
House prices are generally more cyclically sensitive in the cities than in the rest of Denmark, cf. Chart 25 (left). Since the price of building a house is almost the same throughout the country, it is, in effect, land prices that

Population growth (left) and migration to Copenhagen and environs (right) Chart 24



Note: WS Zealand is Western and southern Zealand.
Source: Statistics Denmark.

Development in real house prices (left) and average effective land tax rates (right) Chart 25



Note: WS Zealand is Western and southern Zealand. Left-hand chart: Price development for single-family house according to the Housing Market Statistics until 2006 and from then according to Statistics Denmark. Right-hand chart: The effective land tax rate is the average land tax as a share of the cash price calculated for new sales of 140 sq.m houses.
Source: Statistics Denmark, Housing Market Statistics, Skat and own calculations.

are very cyclically sensitive. Housing taxes have not helped to dampen price fluctuations in recent years, particularly since there has been a freeze on property value taxes. Moreover, the effective land tax rate fell when house prices rose and, conversely, rose when house prices fell, cf. Chart 25 (right). This is because land tax increases have been capped. Finally, the land appraisals on which land tax is based are up to three years old.

Higher house prices in the cities often ripple through the surrounding areas eventually. During the boom in the mid-2000s, prices in Copenhagen soared. This increased the price spread between Copenhagen and the rest of Denmark. As a result, more people moved from Copenhagen to the rest of Zealand, which pushed up prices and led to construction of more housing. When prices in Copenhagen reversed, the outflow stopped and made way for a renewed inflow. This has had a particularly severe effect on the housing markets in western and southern Zealand, where the number of enforced sales has been proportionally higher than anywhere else in Denmark.

ECONOMIC POLICY

The Danish economy has bottomed out, and economic activity is picking up. Unemployment is declining, and employment is rising, primarily driven by the private sector. The recovery has been unevenly distributed across the country, with highest growth in the cities, primarily Copenhagen. This is also where house prices have risen most strongly, which should be viewed in the light of the higher cyclical sensitivity of house prices in the cities than in the rest of Denmark.

During the most recent boom, borrowing by households surged, rising more sharply than previously seen. The surge went hand in hand with an even stronger rise in housing wealth, which increased homeowners' opportunities to raise loans against the home as collateral. For many families, the higher price level also meant that they took out larger loans to get onto the housing ladder. When house prices subsequently began to fall, loan-to-value, LTV, ratios increased substantially. Analyses have previously shown that Danish households would, nevertheless, still be able to service their debts, even during an economic downturn, and the high gross debts do not pose a serious threat to financial stability, one reason being that the households also have considerable financial assets.

A new analysis indicates that the link between gross household debt and household consumption aggravated the overheating of the Danish economy and the subsequent cyclical downturn. Households with high LTV ratios had higher consumption relative to income

than other households in the years leading up to the financial crisis and reduced consumption more during the crisis, cf. the article "Household Debt and Consumption during the Financial Crisis" in this Monetary Review. At the same time, the reduction in consumption at a given LTV ratio was most pronounced for households with the highest debt-to-income ratios.

High LTV ratios amplify cyclical fluctuations in the Danish economy. So it is important to ensure a more stable development in house prices, which is also vital for residential construction and housing wealth and hence for private consumption. This highlights the importance of restoring the link between property values and taxation.

In principle, stricter rules, imposing lower LTV limits and requiring subsequent amortisation when buying a home, would be another way to reduce LTV ratios in boom periods, thereby preventing them from becoming excessive in recession periods. But with open and well-developed financial markets such instruments cannot be expected to be particularly effective. In their own interest, financial institutions should be careful not to go to the limits of the statutory framework. A prudent approach can reduce the risk that home buyers stretch their budgets with little or no equity.

By international standards Danish households have a very high level of debt relative to income, but also considerable financial assets in the form of both pension savings and other assets such as bank deposits and shares. This is attributable to the institutional framework, including the pension and mortgage-credit systems, but also to tax incentives to have large debt and financial wealth at the same time. The inflated balance cannot be reduced in the short term, and as pension savings continue to build up, gross debt may even increase further. But in the long term it is worth considering whether it is economically efficient to administer loans and wealth of this magnitude at the same time, and particularly whether it is expedient to continue to have this asymmetry in the taxation of debt and investment of financial assets.

It is important to continue along the path of economic policy reform pursued in recent years. The government is planning to reform employment measures with a view to increasing structural employment. This requires that the level of ambition, quality and incentives of the employment measures remain unchanged or are strengthened. It is positive that the government, in response to the Productivity Commission's recommendations, envisages introducing reforms to increase productivity.

The political negotiations on an EU banking union are in the final phase. In the autumn of 2013, the European Parliament and the Council adopted the legal basis for the Single Supervisory Mechanism, SSM, and a Single Resolution Mechanism, SRM, is now being negotiated. From November this year, the ECB will assume responsibility for the supervision of credit institutions within the banking union, and preparations are well underway. In this connection, the ECB will conduct an asset quality review of these banks, as well as a stress test. The aim is to map the credit institutions' soundness and to address any issues prior to the establishment of the banking union. On the basis of the ECB's review, the Danish Financial Supervisory Authority will perform a similar review of the largest Danish banks.

The banking union is an important and natural step towards strengthening the single market for financial services and hence cross-border competition. It will be of major significance to Denmark, whether or not Denmark chooses to participate.

In Danmarks Nationalbank's opinion, Denmark's interests are best served by participating in the banking union. The standard of supervision set by the SSM under the ECB can be expected to be the benchmark for the member states participating, as well as for those opting out. If Denmark participates, it will be easier to adapt the standards to Danish conditions and experience. Presumably, the SSM will be perceived as a quality stamp, as more and also external eyes will be focused on the supervision of banks and the key supervisory decisions. Other things being equal, this will give the banks in question a competitive edge over the banks of "outsider" member states – even if they have credible national supervisory authorities

as in Denmark's case. If Denmark does opt out, this may require tighter supervisory practices. Likewise, investors can be expected to require more ambitious levels of excess capital and liquidity than for banks within the union. It is also in the clear interests of Denmark that a shared practice is established for crisis management of banks, and the single resolution mechanism will make it easier to perform crisis management of cross-border banks. When fully phased-in, the SSM and the SRM will act as a single insurance scheme for financial enterprises and provide a better guarantee of equal treatment of the creditors of distressed banks across the EU.

APPENDIX 1: ASSUMPTIONS IN THE PROJECTION FOR THE DANISH ECONOMY

The projection has been produced using the macroeconometric model MONA[5] and is based on available economic statistics, including Statistics Denmark's preliminary quarterly national accounts for the 4th quarter of 2013. The projection is based on a number of assumptions concerning the international economy, financial conditions and fiscal policy.

THE INTERNATIONAL ECONOMY

The international organisations expect moderate growth in global activity this year and slightly stronger growth the next few years. Euro area growth is expected to be subdued, while growth among Denmark's most important trading partners, including Germany and Sweden, is expected to be more robust. Against that background, the market for Danish exports is assumed to grow by 4.2 per cent this year, after which the rate of growth will increase to 5.2 per cent and 5.7 per cent in 2015 and 2016, respectively, cf. Table 5.

Foreign prices are expected to increase by 1.7 per cent this year, rising to 1.8 per cent in 2016. Export market prices will follow more or less the same trend. Throughout the projection period, wage growth abroad is expected to be low due to continued weak labour markets in most countries.

INTEREST RATES, EXCHANGE RATES AND OIL PRICES

Developments in short- and long-term interest rates in the projection are based on the expectations of future developments that can be derived from the financial markets. Short-term Danish interest rates are expected to mirror money-market interest rates in the euro area. The 3-month money-market interest rate, measured by the CITA swap rate, was just under 0 per cent in early March 2014 and is expected to rise slightly towards 2016.

The average bond yield is defined as an average of the yields to maturity on outstanding government and mortgage bonds. It was just under 1.5 per cent at the beginning of March and is expected to rise to 2.6 per cent towards the end of 2016.

The effective krone rate has been more or less unchanged in recent months. In the projection, the dollar rate and the effective krone rate are assumed to remain constant at the level from early March.

At the time of forecasting, the oil price was 109 dollars per barrel. In the projection, the oil price is assumed to develop in line with futures prices, falling to approximately 99 dollars per barrel by 2016.

FISCAL ASSUMPTIONS

The fiscal assumptions in the projection are based on the planned fiscal policy, including the Finance Act for 2014, local and regional government budgets for 2014 and the government's convergence programme.

It is assumed that the option to pay tax on existing capital pension schemes at a reduced rate will yield kr. 30 billion in early tax revenue in 2014.

Real public consumption is assumed to rise by 1.0 per cent this year. Consumption growth is estimated at 0.6 and 0.7 per cent in 2015 and 2016, respectively. Public investment is expected to decline by 1.1 per cent this year. In 2015, public investment is forecast to decline further.

5 The model is described in Danmarks Nationalbank, *MONA – a quarterly model of the Danish economy*, 2003.

Overview of projection assumptions

Table 5

	2013	2014	2015	2016
International economy:				
Export market growth, per cent year-on-year	1.5	4.2	5.2	5.7
Export market price[1], per cent year-on-year	0.8	1.6	1.6	1.8
Foreign price[2], per cent year-on-year	0.8	1.7	1.7	1.8
Foreign hourly wages, per cent year-on-year	1.9	2.0	2.2	2.3
Financial conditions, etc.:				
3-month money-market interest rate, per cent p.a.	0.0	-0.1	0.0	0.0
Average bond yield, per cent p.a.	1.6	1.6	2.1	2.6
Effective krone rate, 1980 = 100	102.4	103.8	103.8	103.8
Dollar exchange rate, DKK per USD	5.6	5.4	5.4	5.4
Oil price, Brent, USD per barrel	108.7	107.4	102.3	98.7
Fiscal policy:				
Public consumption, per cent year-on-year	0.9	1.0	0.6	0.7
Public investment, per cent year-on-year	-0.7	-1.1	-5.6	0.5
Public-sector employment, 1,000 persons	828	833	837	842

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

Compared with the December projection, growth in GDP has been adjusted downwards by 0.1 percentage point for this year and upwards by 0.1 percentage point for 2015, to 1.4 and 1.7 per cent, respectively, cf. Table 6, which shows a breakdown of the revisions to GDP and consumer prices by key components.

Economic growth this year will be positively affected by recent months' falling interest rates, which give a lower level of interest rates over the projection period than assumed in December. Lower interest rates stimulate growth via higher private consumption and increased business investment. This is offset by a slightly stronger exchange rate of the krone, which will dampen growth. In addition, GDP landed at a lower level at end-2013 than forecast in December; the weaker point of departure in 2014 is weakening annual growth, which is included in the *other factors* item. The lower interest rates will have a stronger impact on growth in 2015, but this effect is partially offset in the projection, one of the reasons being that a considerable stock of vacant premises will reduce the potential for further non-residential construction.

Consumer price inflation (HICP) turned out to be 0.1 percentage point lower in 2013 than forecast in December, and the forecast for this year has been adjusted notably downwards, from 1.8 to 1.2 per cent, and revised slightly from 1.8 to 1.7 per cent for 2015. A key factor behind the lower rate of inflation is a larger fall in import and energy prices around the turn of the year than expected in December.

Revisions in relation to the previous projection Table 6

	GDP			Consumer prices, HICP		
Per cent, year-on-year	2013	2014	2015	2013	2014	2015
Projection, December 2013	0.4	1.5	1.6	0.6	1.8	1.8
Contribution to revised forecast from:						
Export market growth	0.0	0.0	0.0	0.0	0.0	0.0
Interest rates	0.0	0.1	0.3	0.0	0.0	0.0
Exchange rates	0.0	-0.1	0.0	0.0	0.0	0.0
Oil prices	0.0	0.0	0.0	0.0	0.0	0.0
Other factors	0.0	-0.1	-0.2	0.0	-0.6	-0.1
This projection	0.4	1.4	1.7	0.5	1.2	1.7

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

MATURITY EXTENSION OF MORTGAGE BONDS

INTRODUCTION

Danmarks Nationalbank is pleased to note that on 11 March 2014, the Folketing (Danish Parliament) adopted a legislative amendment[1] introducing contingent maturity extension for mortgage bonds with shorter maturities than the underlying loans. The extension takes effect if a refinancing auction fails, or if the interest rate on mortgage bonds with an original maturity of less than 2 years rises by more than 5 percentage points within one year. The latter mechanism is called the "interest-rate trigger".

From the point of view of Danmarks Nationalbank, this legislative amendment fulfils two objectives. Firstly, it represents a robust way of managing refinancing risk for mortgage banks. It leaves no doubt as to what will happen if an auction fails or interest rates suddenly rise very sharply. The refinancing risk is shifted to the investors, and the interest-rate trigger makes it possible to calculate a price for possible maturity extension of the bonds.

Secondly, the legislative amendment re-establishes a credible resolution model for mortgage banks. The prevalence of mortgage bonds with shorter maturities than the underlying loans has made it difficult to identify a clear procedure for resolution of a mortgage bank because the need for ongoing refinancing is difficult to meet during bankruptcy proceedings. The possibility of maturity extension enables the bankruptcy trustee to wind up a mortgage bank in accordance with loan agreements and bond terms until all mortgage loans have been redeemed.

Bonds with the possibility of maturity extension will automatically become the market standard, since this is a statutory requirement. At the same time, the elements introduced by way of the legislative amendment are already known in the Danish mortgage-credit market. The market for short-term mortgage bonds should thus be expected to continue to attract a broad group of investors demanding short-term, highly liquid bonds with low credit risk, e.g. for liquidity management purposes. In this connection, Danmarks Nationalbank expects the liquidity of mortgage bonds with contingent maturity extension to be so high that they can be classified as extremely high quality liquid assets under the forthcoming European liquidity regulations. Moreover, short-term mortgage bonds can be pledged as collateral for loans from Danmarks Nationalbank – even if the maturity has been extended.

This structure does not affect Danmarks Nationalbank's role as lender of last resort for mortgage banks, but it ensures that the mortgage banks' business model does not rely on Danmarks Nationalbank as back stop.

1 Act No. 89 of 11 March 2014 to Amend the Act on Mortgage-Credit Loans and Mortgage-Credit Bonds, etc. and the Financial Business Act (Regulation of the refinancing risk inherent in mortgage-credit bonds, covered mortgage-credit bonds and covered bonds, etc.)

BACKGROUND

The mortgage-credit system plays a key role as a supplier of credit in Denmark. This was highlighted during the financial crisis, when substitution from bank lending to mortgage bank lending contributed to ensuring a stable supply of credit. Whereas some financial markets ceased to function, the mortgage bond market remained in operation throughout the financial crisis and the subsequent European sovereign debt crisis. A key factor was fundamental investor confidence in the creditworthiness and liquidity of mortgage bonds.

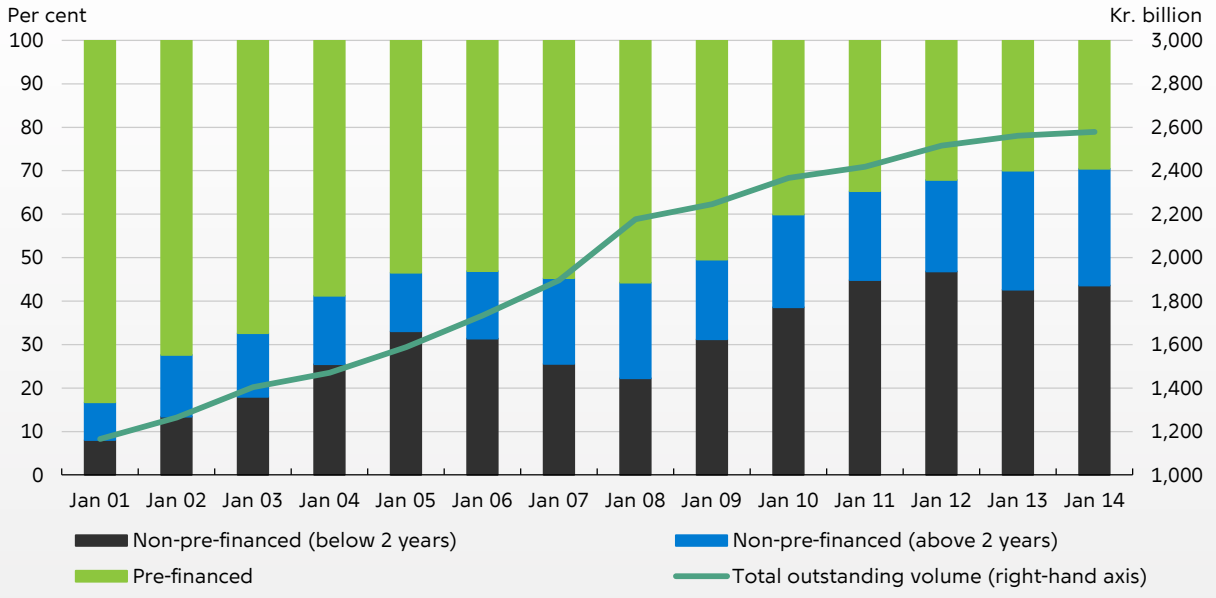
Traditionally, the Danish mortgage-credit model has been characterised by symmetry between the maturities of the bonds issued by mortgage banks and the underlying loans, i.e. the loans were pre-financed. As the mortgage banks also have an obligation to observe the balance principle, they had virtually no other risk than the credit risk on the borrower. This changed in step with the increasing prevalence of mortgage bonds with shorter maturities than the underlying loans. The mismatch is most pronounced when mortgage banks use 1-year bonds to finance 30-year loans. From the investor's point of view, this is a 1-year fixed-rate bond. But for the borrower, this is a 30-year variable-rate loan with annual interest-rate fixing.

The volume of non-pre-financed loans has increased steadily since the mid-1990s, accounting for around 70 per cent of all mortgage loans, or around kr. 1.800 billion, today, cf. Chart 1.

For non-pre-financed loans, the difference in maturity between the bonds and the underlying loans entails a requirement for continuous refinancing, typically by auction. No auction of Danish mortgage bonds has failed yet, but the situation cannot be ruled out entirely. The probability is very small, but the consequences might be very serious.

On several occasions, Danmarks Nationalbank has called attention to the refinancing risk and recommended that the mortgage banks take steps to reduce it. To some extent, the mortgage banks have tried to follow the recommendation by spreading the refinancing

Mortgage bonds broken down by pre-financed and non-pre-financed loans Chart 1



Note: An accurate calculation of the volume of non-pre-financed loans is not possible since the maturities of the underlying loans are unknown. The volume of non-pre-financed loans has been estimated on the basis of bonds with an original maturity of up to 20 years. The non-pre-financed loans have been subdivided into terms to maturity of below and above 2 years. The chart contains both fixed-rate and variable-rate bonds.
Source: Danmarks Nationalbank.

auctions over the whole year in order to avoid refinancing of all bonds at the same time. This risk has also prompted credit rating agencies to tighten the requirements for mortgage banks. As a result, the mortgage banks have incurred costs which must be assumed to have been covered wholly or partly by the homeowners.

The introduction of contingent maturity extension addresses the refinancing risk. It applies to all mortgage bonds used to finance non-pre-financed loans. The legislative amendment is the output of a working group established in the autumn of 2013, with participants from the Ministry of Business and Growth, the Ministry of Finance, Danmarks Nationalbank, the Ministry of Economic Affairs and the Interior and the Danish Financial Supervisory Authority.

Since the legislative amendment comprises new bond issuances only, existing bond holders will not be affected. As regards the underlying loans, there are no changes to the principal, redemption profile or maturity. Consequently, the borrowers will automatically be covered by the new rules, without having to conclude new agreements with their mortgage banks.

MATURITY EXTENSION

The legislative amendment introduces contingent maturity extension for bonds issued by Danish mortgage banks with shorter maturities than the underlying loans, cf. Box 1. Based on the distribution of loan types as at 31 December 2013, the legislative amendment, when fully phased in, will comprise around two thirds of the mortgage banks' total issuance. The interest-rate trigger will apply only to bonds with an original maturity of up to 2 years, which require the most frequent refinancing.

The legislative amendment also addresses the refinancing risk in connection with compulsory liquidation. During bankruptcy proceedings for a mortgage bank, the bankruptcy trustee will be able to extend the maturities of bonds with shorter maturities than the underlying loans, cf. Box 2.

MATURITY EXTENSION ON ACTIVATION OF THE INTEREST-RATE TRIGGER

Fixed-rate bonds with an original maturity of up to 1 year used to finance non-pre-financed loans will be subject to requirements of maturity extension if the effective interest rate on refinancing is more than 5 percentage points higher than the interest rate on the previous refinancing. For fixed-rate bonds with maturities of 1-2 years, the change in the effective interest rate on refinancing should be compared with the effective interest rate on a corresponding bond one year earlier. Consequently, maturity extension takes effect only in the event of an increase in interest rates by more than 5 percentage points over the 12 months up to the refinancing.

When the trigger is activated, the maturity will be extended by 1 year. During the extension period, the interest rate on the bond will correspond to the interest rate on the last refinancing plus 5 percentage points. For bonds with an original maturity of more than 1 year, the rate of interest in the extension period is fixed at the effective interest rate on a corresponding bond one year earlier plus a premium of 5 percentage points. On expiry of the 1-year extension period, the extended bonds must be refinanced. The interest rate on refinancing may be the rate clearing the auction, irrespective of the general level of interest rates. If, after 1 year, it is possible to conduct an auction with sufficient demand, the interest-rate trigger will thus not constitute a permanent cap on interest rates. If the refinancing on expiry of the 1-year extension fails, the maturity will be extended by another year at a time, while the interest rate remains unchanged. If the refinancing fails repeatedly, this will probably be due to mortgage bank-specific problems with credit quality, and at some point the mortgage bank will become subject to resolution under the relevant rules regarding fixing of interest rates, cf. Box 2.

The various scenarios for maturity extension and interest-rate fixing are illustrated for a 1-year fixed-rate bond in Box 3.

Variable-rate bonds with an original maturity of up to 2 years will also be subject to an interest-rate trigger. The maturity is extended

Who and what are covered? Box 1

When the Act enters into force, bonds issued by the mortgage banks listed below will be subject to contingent maturity extension if the maturities of the bonds are shorter than the maturities of the underlying loans:

	Total outstanding bonds, kr. billion	Of which for "non-pre-financed" loans, kr. billion.	Per cent
Nykredit (including Totalkredit)	1,136	824	73
Realkredit Danmark	728	497	68
Nordea Kredit	364	239	66
BRFkredit	201	135	67
DLR Kredit	135	113	84
LR Realkredit	15	8	55
Total	2,579	1,817	70

Note: Calculated as at end-January 2014. An accurate calculation of the volume of non-pre-financed loans is not possible since the maturities of the underlying loans are unknown. The volume of non-pre-financed loans has been estimated on the basis of bonds with an original maturity of up to 20 years.
Source: Danmarks Nationalbank.

The bonds will be subject to contingent maturity extension irrespective of whether they are classified as mortgage bonds, covered mortgage bonds or covered bonds. Bonds for which the maturity is identical to that of the underlying loan are not included. This applies to both fixed-rate and variable-rate bonds.

Several of the mortgage banks have currently issued junior covered bonds, JCB. JCB issued after 1 April 2014 will also be subject to contingent maturity extension requirements. If a mortgage bond issued by the capital centre associated with the JCB in question is extended, and the ordinary expiry of the JCB falls within the extension period, the maturity of the JCB will be extended accordingly.

At the same time, a new provision means that banks can only issue covered bonds with an original maturity of at least 2 years. In practice, banks only use covered bonds as a stable long-term source of financing, since short-term financing requirements are covered by other sources, e.g. deposits, unsecured senior debt or money-market loans. Danske Bank is currently the only Danish bank issuing covered bonds. According to the associated political agreement, the legislative amendment is not intended to alter the competitive relationship between banks and mortgage banks. Hence, the Minister for Business and Growth will appoint a working group to monitor whether the regulation leads to shifts in competition.

The conditions for maturity extension for various types of mortgage bonds are summarised in the table below. The legislative amendment will enter into force in two stages, on 1 April 2014 and 1 January 2015. Bonds issued before 1 April 2014 will not be comprised by the new requirements.

Original maturity	Coupon	Maturity extension if an auction fails	Interest-rate trigger	Applies to bonds issued after
1 year	Fixed	Yes	Yes	1 April 2014
1 year	Variable	Yes	Yes	1 January 2015
2 years	Fixed/variable	Yes	Yes	1 January 2015
3 years and above	Fixed/variable	Yes	No	1 January 2015

if the effective interest rate on refinancing is more than 5 percentage points higher than the interest rate on the last interest-rate fixing. The maturity is extended by 1 year at a time. The legislative amendment also introduces a temporary interest-rate cap for this type of bonds, meaning that interest rates cannot rise by more than 5 percentage points between two interest-rate fixings.

MATURITY EXTENSION IN THE EVENT OF FAILED AUCTION

Bonds with shorter maturities than the underlying loans will be subject to a requirement for maturity extension if there are not enough buyers at a refinancing auction. The maturity will be extended by 1 year at a time until refinancing can take place with buyers for all the necessary bonds.

Resolution models

Box 2

There are special rules governing the management of a mortgage bank in bankruptcy proceedings. These rules have never been applied in practice.

The collateral for bond holders' claims on a mortgage banks consists of the mortgage bank's loans secured on real property. The collateral is linked with the bonds in special capital centres, bond holders ranking before unsecured creditors. The administration of capital centres is subject to special rules in order to provide a high degree of protection for the bond holders if a mortgage bank fails.

If a mortgage bank fails, its capital centres are separated from the bankruptcy estate. As far as possible, the centres will be continued as normal mortgage banks in order to ensure resolution with minimal losses for the bond holders. A mortgage bank subject to bankruptcy proceedings may not issue new loans.

There is no acceleration, either on the bond side or on the loan side, when a mortgage bank becomes subject to bankruptcy proceedings. Consequently, the bond holders may not demand early redemption of their bonds; neither may the mortgage bank demand early redemption from the borrowers. This enables, to the highest possible degree, normal payment flows to and from a mortgage bank in bankruptcy proceedings. In order to protect bond holders' priority regarding the collateral in the capital centres, it is not possible to transfer funds between the individual capital centres after the mortgage bank has been declared bankrupt.

During the bankruptcy proceedings, the mortgage bank should, whenever possible, continue to meet its payment obligations in the form of interest and redemptions to the bond holders. The mortgage bank may conclude contracts on financial instruments, or raise loans, pledging collateral for the loans, if this is required in order to raise liquidity.

If there is a need for ongoing refinancing of existing mortgage loans, the bankruptcy trustee may issue "refinancing bonds" on condition that there is deemed to be full dividend for all creditors, irrespective of the maturities of their investments. Before the legislative amendment it was not clear what the possible consequences would be for borrowers and bond holders if this could not be achieved or if the trustee found it impossible to issue refinancing bonds without violating the principle of equal treatment of creditors.

After the legislative amendment, the maturities of existing bonds may be extended by 1 year at a time if refinancing is unsuccessful, or if the trustee finds it impossible to issue refinancing bonds without violating the principle of equal treatment of creditors. The interest rate on the extended bonds is fixed by the trustee as a variable reference rate plus a premium of up to 5 percentage points. Maturity extension by 1 year at a time may continue for the whole remaining term to maturity.

Without any current need for refinancing the loans in the market the mortgage bank may, as far as possible, be wound up in accordance with loan agreements and bond terms until all mortgage loans have been redeemed.

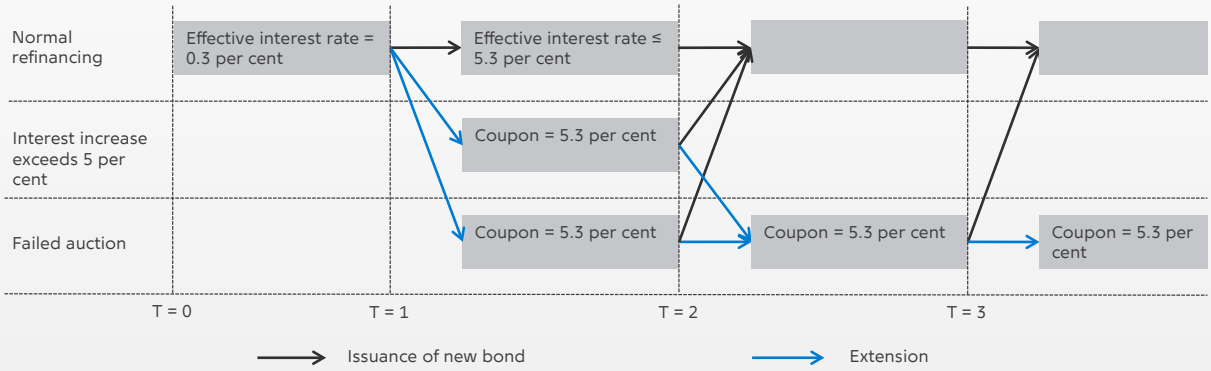
Example: 1-year bond with contingent maturity extension

Box 3

Assume that a mortgage bank at time 0 sells a 1-year bond with an effective interest rate of 0.3 per cent. One year later, at time 1, the mortgage bank attempts to issue a new bond to replace the bond issued at time 0. One of the following three situations may arise:

1. The mortgage bank succeeds in issuing a new bond with an effective interest rate of less than 5.3 per cent.
2. The mortgage bank receives sufficient bids to issue a new bond, but with an effective marginal rate above 5.3 per cent.
3. The mortgage bank does not receive sufficient bids to issue a new bond.

In both case 2 and case 3, the maturity of the bond issued at time 0 is extended by 1 year at a coupon of 5.3 per cent, cf. the chart.



If case 2 or case 3 has been realised at time 1, one of the following two situations may arise at time 2: either the mortgage bank receives a sufficient number of bids to sell a new bond, and it then sells a new bond at this marginal rate, or it does not receive a sufficient number of bids, so the maturity of the bond issued at time 0 is extended by another year at a coupon of 5.3 per cent.

If it is assumed that the auction fails at time 2, there are, again, two possibilities at time 3: normal refinancing or failed auction.

During the extension period, the interest rate on the bond will be equivalent to the interest rate on the last refinancing (fixed-rate bonds with an original maturity of up to 1 year) or interest-rate fixing (variable-rate bonds to be refinanced) plus a premium of 5 percentage points. For fixed-rate bonds with an original maturity of more than 1 year, the rate of interest in the extension period is fixed at the effective interest rate on a corresponding bond on year earlier plus a premium of 5 percentage points. The interest rate is fixed in connection with the first maturity extension for the bond. The interest rate is maintained at this level in the event of further maturity extensions.

EFFECTS OF THE INTEREST-RATE TRIGGER

The interest-rate trigger clearly defines when the maturity of a bond will be extended. The trigger makes it clear what investors can expect if interest rates go up by more than 5 percentage points. In the absence of an objective criterion, determination of when an auction fails requires a discretionary decision. With the introduction of the interest-rate trigger, it is not up to the authorities, in practice, to decide whether or not an auction has failed. Consequently, the interest-rate trigger works as an automatic stabiliser that takes effect without any need for active (political) decision-making.

The interest-rate trigger entails maturity extension for a bond if interest rates rise by 5 percentage points, i.e. at a level where there is normally no significant doubt about the borrower's ability to service the loan.[2] Investors know in advance that the borrowers will be protected by the trigger in a short-lived crisis. This allows investors to focus on modelling the probability of activation of the trigger – rather than a total market collapse.

In this connection, it is worth noting that the probability of an interest-rate increase by 5 percentage points within one year is very low. In Denmark, such an increase has been seen only a few times within the last 150 years.

MODELLING PRICE AND INTEREST-RATE SENSITIVITY (DURATION)

The interest-rate trigger will impact on the price and duration of bonds. To illustrate this, a 1-year bond with an interest-rate trigger is compared with a corresponding bond without an interest-rate trigger (existing short-term fixed-rate bonds). These model calculations are based on historical experience. The actual market reaction also depends very much on investor behaviour, which may be driven by other factors than financial value, such as risk management, regulation and expectations. While some investors will want to sell bonds with interest-rate triggers in the event of sharply increasing interest rates, others will demand short-term securities – given the rising interest rates – and in this connection 1-year and 2-year bonds with interest-rate triggers will still be regarded as relatively short-term securities. Moreover, the market reaction will also be affected by borrower behaviour. A unique feature of the Danish mortgage-credit model is that borrowers may redeem their loans by buying back the underlying bonds. If the borrowers find that the market has overreacted in the pricing of the possibility of extension, they will have an incentive to buy back bonds with an interest-rate trigger, taking out loans financed by new bond issuances or bank loans instead.

Both the 1-year bond with an interest-rate trigger and the corresponding bond without an interest-rate trigger are observed six months before the next refinancing. If the interest rate increases by 5 percentage points at the next refinancing auction, it is assumed that the maturity of the bond with an interest-rate trigger is extended by 1 year and then replaced by a new bond sold by auction. In other words, investors are not concerned about the possibilities

2 Danmarks Nationalbank has calculated the households' ability to service their debts in a scenario where interest rates rise by 5.7 percentage points, while unemployment increases by 4 percentage points, and house prices fall by 14 per cent. Even in this very negative scenario, arrears on housing loans from mortgage banks remain at a low level, according to Danmarks Nationalbank's calculations, cf. Asger Lau Andersen and Charlotte Duus, Danish families in mortgage arrears, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 2013, Part 2.

of refinancing the bond in eighteen months. Similarly, it is assumed that the bond without an interest-rate trigger can be continuously refinanced on expiry.

In the event of maturity extension, the investor receives a 1-year bond with a lower coupon than the market rate. At the time of auction, this will result in a loss on recovering the principal. The calculated price of the bond reflects the difference between the trigger interest rate and the market rate at the time of auction. Correspondingly, the price of traditional callable bonds implies a loss for the investor if interest rates fall and the borrower opts for conversion.

Initially, it is assumed that interest rates have not risen since the most recent refinancing six months ago. Hence, the prices of the two bonds are virtually identical, since the probability that interest rates will rise by 5 percentage points within the next six months is negligible.[3] The low probability of the interest-rate trigger taking effect – with resultant maturity extension – is also reflected in the expected duration of around 6 months for both bonds.

Conversely, in the event of a strong interest-rate increase since the last auction, the price of the bond with an interest-rate trigger will fall by more than the price of the bond without a trigger. This is because higher interest rates imply an increased probability of maturity extension. A substantial interest-rate increase will also entail higher interest-rate sensitivity (longer duration) for the bond with an interest-rate trigger. The price and duration of the two bonds will, however, diverge, depending on whether there is a parallel shift or twist in the yield curve.

At first a *parallel shift* in the yield curve is considered, cf. Chart 2, top. Not until the yield curve has risen by almost 4 percentage points is the probability of activating the interest-rate trigger so high that the duration increases and the price falls for the bond with a trigger. The prices of the two bonds even continue to be rather close in the event of an interest-rate increase by up to 5 percentage points. When the yield curve has risen by around 6 percentage points, the duration of the bond with an interest-rate trigger is by and large 1.5 years, since the probability of maturity extension is almost 100 per cent. If that happens, it will take 1.5 years for the investor to recover the investment. At higher interest rates, the interest-rate sensitivity is greatest for the bond with a trigger, since it is gradually beginning to look like a bond with a term to maturity of 1.5 years. However, its price is considerably more stable than that of e.g. a 5-year fixed-rate bond, cf. Chart 3.

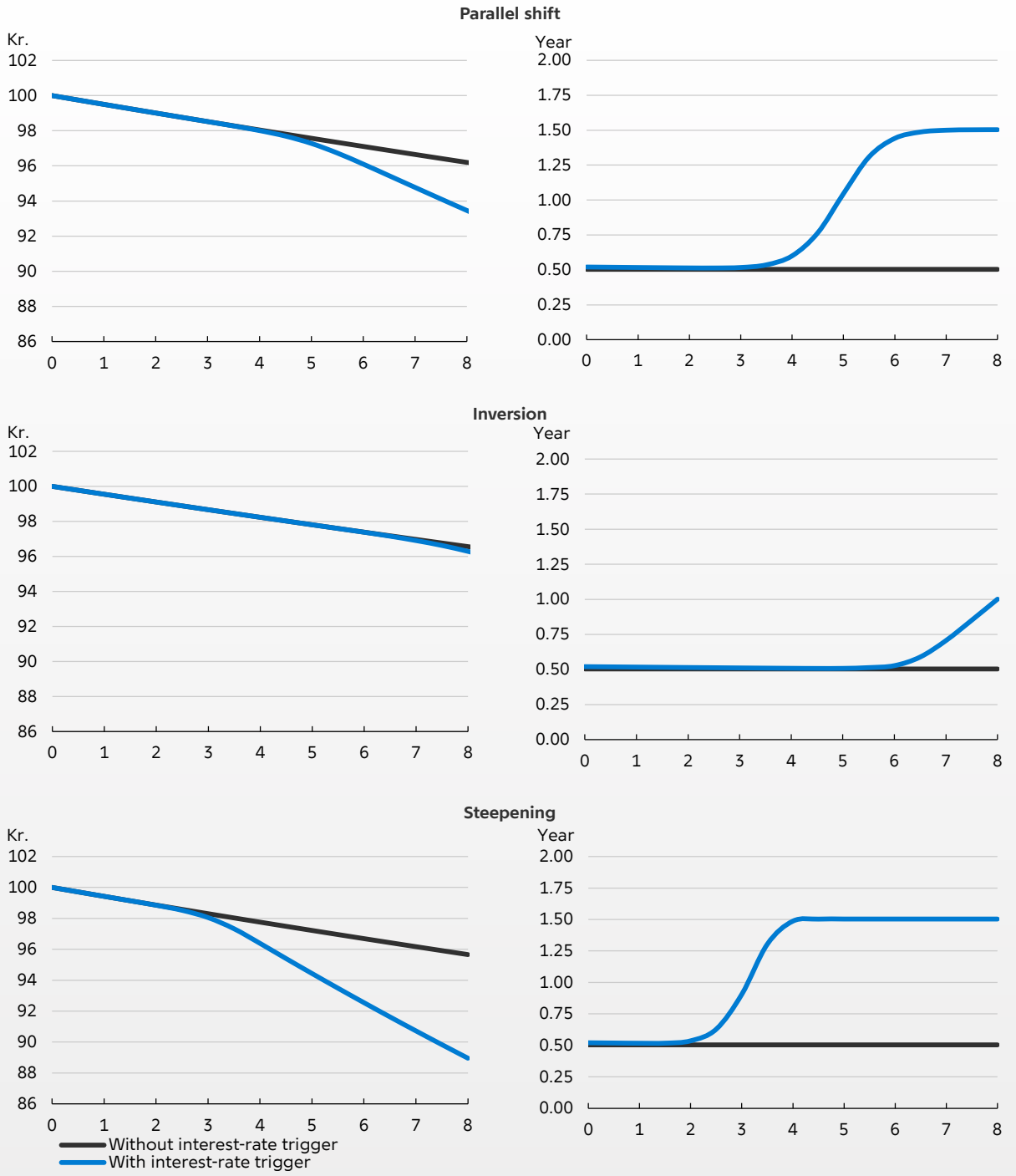
Then *inversion* of the yield curve is considered, with a stronger increase in short-term than in long-term interest rates. Specifically, when the very short-term interest rate, i.e. the spot rate – as shown in the x-axis in Chart 2, middle – rises by e.g. 8 percentage points, the 1.5 year term interest rate is assumed to rise by only 5.6 percentage points. In this scenario the spot rate must increase by almost 6 percentage points before the duration of the bond with an interest-rate trigger begins to rise. This reflects that the spot rate must be higher than the trigger before it begins to be probable that the trigger will be activated in six months. Even if the spot rate increases by 8 percentage points, the expected duration will increase to only around 1 year – corresponding to a 50 per cent probability that the trigger will be activated.

In the event of inversion, the two bond prices will be almost identical. The spot rate has to increase by more than 7 percentage points for a small difference to emerge. The small difference in price sensitivity reflects two factors, i.e. that the probability of maturity extension is small, and that the investor's loss on maturity extension is very limited. The reason is that the interest rate at the next auction is not likely to be very much higher than the interest-rate trigger, making major losses less probable.

The example of inversion of the yield curve is interesting, because it is probably the most obvious scenario that can result in sharp and sudden interest-rate increases, e.g. as a result of a short-lived liquidity crisis in the financial system or speculation against the fixed-exchange-rate policy.

3 The calculations are based on interest rates on 30 January 2014. A one-factor Vasicek model has been applied, using CITA rates as the underlying term structure. The calculations have been performed using the RIO system supplied by Scanrate Financial Systems A/S.

1-year bond in various interest-rate scenarios, price (left) and duration (right) Chart 2

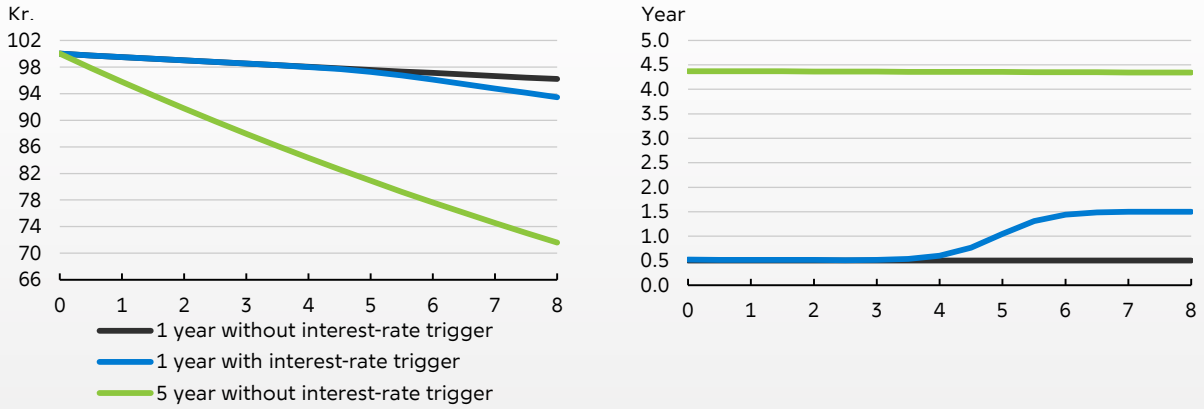


Note: The x-axis shows increases in the spot rate in percentage points. The calculations are based on interest rates on 30 January 2014. A one-factor Vasicek model has been applied, using CITA rates as the underlying term structure. The calculations have been made on a bond 6 months from maturity.
Source: Own calculations on the RIO system from Scanrate.

Finally, *steepening* of the yield curve is considered, long-term interest rates being assumed to rise more strongly than short-term interest rates. Specifically, it is assumed than an increase in the spot rate of e.g. 8 percentage points leads to a rise of 11.6 percentage points in the 1.5 year term interest rate. In this scenario the spot rate needs only to increase by around 2 percentage points for the expected duration to grow and the price of the bond with an interest-rate trigger to start declining, cf. Chart 2, bottom. Compared with the parallel

1-year bond with and without interest-rate trigger and 5-year bond without interest-rate trigger on parallel shift in the yield curve, price (left) and duration (right)

Chart 3



Note: The x-axis shows increases in the spot rate in percentage points. The calculations are based on interest rates on 30 January 2014. A one-factor Vasicek model has been applied, using CITA rates as the underlying term structure. The calculations have been made on bonds 6 months and 4.5 years, respectively, from maturity.
Source: Own calculations on the RIO system from Scanrate.

shift scenario, this scenario requires a smaller increase in the spot rate before the probability of the trigger being activated rises markedly. This reflects that slightly longer-term interest rates tend to rise more than very short-term interest rates, increasing the probability of the trigger being activated. The steepened yield curve implies an expectation of a further increase in interest rates. Hence, it begins to be probable that the trigger will be activated already before the spot rate reaches the level of the interest-rate trigger. An increase in the spot rate by 4 percentage points means that it is almost 100 per cent certain that the trigger will be activated.

As appears from Chart 2, the two bond prices diverge most strongly when the yield curve steepens. The divergence is clear already when the spot rate has increased by 3 percentage points. The divergence reflects partly that maturity extension is regarded as highly probable, partly that investors risk more substantial losses on extension. The reason is that in the extension period interest rates may be somewhat higher than the trigger level.

Considerable steepening of the yield curve should be regarded as an extreme scenario: A situation with not only a marked increase in short-term interest rates, but also expectations of a further increase. This situation may arise if market participants expect both high and accelerating inflation. Alternatively, the marked steepening may be mortgage-bank specific and related to concerns about gradual deterioration of a mortgage bank's credit quality (i.e. investors feel less certain about credit quality and the ability to service loans in 1.5 years than in six months).

Besides changes in the interest-rate level, the pricing of the possibility of maturity extension also depends very much on turbulence in the market – interest-rate volatility. In a very volatile market, the price of the bond with an interest-rate trigger falls because there is a higher probability of the trigger being activated. But it would take quite strong volatility fluctuations for the price to be markedly affected. A doubling relative to the current level implies a price fall of 0.2 per cent, at most, relative to the calculations shown. The maximum effect is obtained when the interest rate is close to the trigger.

OVERALL ASSESSMENT

Overall, the legislative amendment on contingent maturity extension re-establishes a sound financing model for the mortgage banks, irrespective of whether the loans are pre-financed.

The interest-rate trigger clearly defines when the maturity of a bond will be extended. This enables the investor to calculate a price for the possibility of maturity extension. At the time of issuance, the price effect is expected to be very small, given the very low probability of a 5 percentage point increase in interest rates. In Danmarks Nationalbank's assessment, the interest premium will not exceed 0.1 percentage point. The interest-rate trigger heightens interest-rate sensitivity in the event of substantial interest-rate increases, but for a solvent mortgage bank enjoying investor confidence in its long-term credit quality, the effect is expected to be limited.

The price effect may be stronger for a mortgage bank facing rising interest rates due to waning investor confidence in its long-term credit quality. Any uncertainty as to whether the next, as well as future auctions can be carried out may indeed impact investor behaviour already at the next auction. But the same dynamics may also be seen in the current system without maturity extension.

The interest-rate trigger is designed to address temporary liquidity problems, but not solvency problems caused by poor credit quality. It is therefore essential for the mortgage banks to maintain sound credit policies also after the legislative amendment. If the problem is related to credit quality and the mortgage bank is failing and has to be wound up, the key factor is the bankruptcy trustee's scope for meeting the refinancing need – and not the interest-rate trigger. In other words, the interest-rate trigger provides clarification in a situation with short-lived market turmoil, in which investors continue to have confidence in the long-term credit quality of mortgage bonds, but interest rates rise for other reasons.

ARTICLES

FIXED EXCHANGE RATE POLICY IN DENMARK

By Morten Spange, Economics, and
Martin Wagner Toftdahl, Banking and Markets

INTRODUCTION AND SUMMARY

The purpose of Denmark's monetary policy is to ensure price stability. To this end Denmark has pursued a fixed exchange rate policy since 1982 – first against the D-Mark and from 1999 against the euro. This is done within the framework of the European Exchange Rate Mechanism, ERM II. In keeping with the fixed exchange rate policy, Danmarks Nationalbank maintains a fixed exchange rate against the euro. In the euro area, the purpose of monetary policy is to keep inflation below, but close to, 2 per cent in the medium term. Keeping the krone stable against the euro provides a framework for low inflation in Denmark. For many years, the overall economic policy – the fixed exchange rate policy and the stability oriented fiscal policy – has provided the basis for a stable economic development. This has been analysed by Christensen and Hansen (2014), among others, and will not be discussed in further detail here. This article reviews the main practical aspects of implementing the fixed exchange rate policy.[1]

It is a characteristic of Denmark's fixed exchange rate policy that the krone is kept stable within a narrow band. Officially, the krone may fluctuate by up to 2.25 per cent on either side of its central rate, but in reality the fluctuations are far smaller. This reflects the high credibility of the fixed exchange rate policy, but also the fact that Danmarks Nationalbank takes consistent action in response to deviations from the central rate. The fixed exchange rate policy entails that monetary policy is used solely to keep the krone stable against the euro, while other considerations – such as the cyclical development in Denmark – are not taken into account.

As a result of the fixed exchange rate policy, Danish monetary policy interest rates initially track euro area interest rates, which are set by the ECB. If the krone weakens by a certain amount, Danmarks Nationalbank's first response will normally be to intervene in the foreign exchange market by buying kroner to strengthen the currency. Danmarks Nationalbank holds a considerable foreign exchange reserve for intervention purposes. The only requirement for the size of the reserve is that it should be ample. If intervention in the foreign exchange market is not sufficient to stabilise the exchange rate of the krone against the euro, Danmarks Nationalbank will adjust its monetary policy interest rates.

Danmarks Nationalbank's reaction function is well-known to participants in the foreign exchange market for Danish kroner. The credibility of the regime means that market participants take positions which in themselves stabilise the exchange rate of the krone. However, it is vital that Danmarks Nationalbank has room for discretion in any given situation.

1 For a broader review of Danish monetary policy, see Danmarks Nationalbank (2009). Drejer et al. (2011) analyse the impact of monetary policy on households and firms.

Consequently, the level of the exchange rate at which Danmarks Nationalbank's intervenes in the foreign exchange market is not fixed, nor is it given how much intervention is needed to prompt an adjustment of Danish interest rates. This reason is that Danmarks Nationalbank regularly assesses which intervention measures are appropriate in the given foreign exchange market situation.

The monetary policy instruments applied by Danmarks Nationalbank to conduct monetary policy have been basically unchanged since April 1992, reflecting that these instruments have proved to be adequate to keep the krone close to its central rate. Moreover, the instruments have proved to be sufficiently robust to handle extraordinary situations such as, most recently, the implications of the 2008 financial crisis and the subsequent sovereign debt crisis in several euro area member states on the exchange rate of the krone, as well as the implications of the European currency crisis in 1992-93. The fixed exchange rate policy considerations also entail that the Danish monetary instruments are fairly unique in an international context and differ from the instruments applied by countries pursuing other monetary policy strategies, including the euro area.

Danmarks Nationalbank's reaction function is described in the following section. The reaction function consists partly of intervention in the foreign exchange market, partly of changes in monetary policy interest rates. Each of these parts will be elaborated on in the following sections, which include descriptions of both the construction of the regime and its implications, e.g. for developments in money market interest rates. In the last section, the particular elements of the instruments that reflect the fixed exchange rate policy will be emphasised.

DANMARKS NATIONALBANK'S REACTION FUNCTION

Danmarks Nationalbank conducts a fixed exchange rate policy within the framework of the European Exchange Rate Mechanism, ERM II. This entails that the exchange rate of the krone may fluctuate by up to 2.25 per cent on either side of its central rate, which is kr. 7.46038 per euro. In periods of calm foreign exchange markets, the exchange rate of the krone against the euro depends mainly on the relationship between slightly longer-term money market interest rates in Denmark and the euro area. Danmarks Nationalbank's interest rates have an impact on Danish money market interest rates and, hence, the spread to money market interest rates in the euro area.[2]

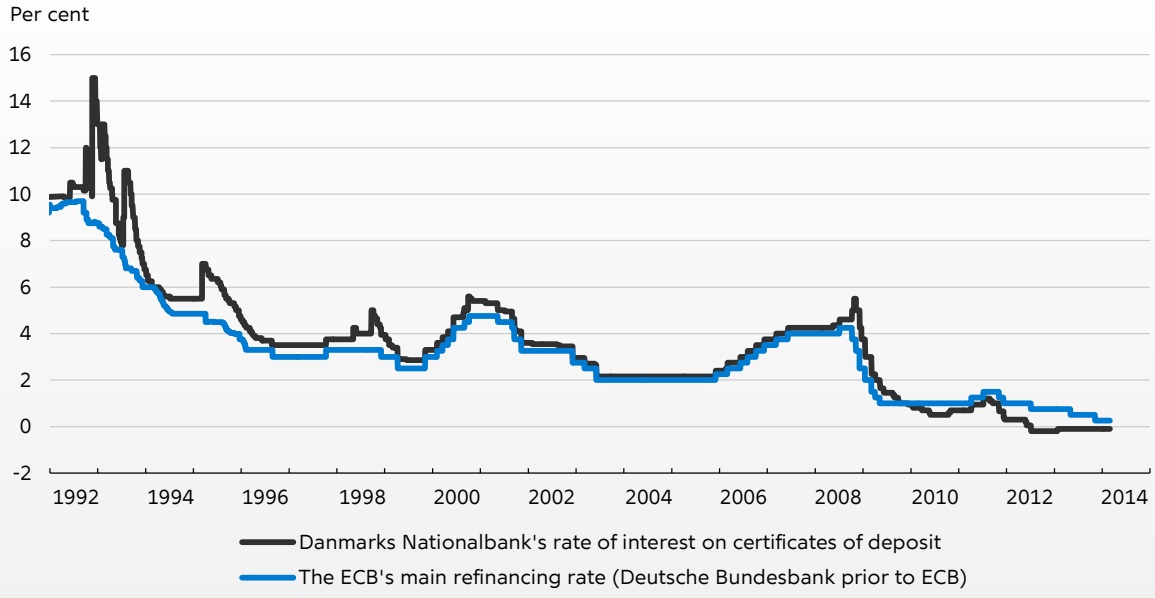
When the ECB changes its monetary policy interest rates, Danmarks Nationalbank typically responds by making similar changes. Danish interest rate changes are typically announced in the afternoon on the same day that the ECB announces its changes. Since the introduction of the euro in 1999, money market interest rates in Denmark have correlated closely with those of the euro area, cf. Chart 1.

In spite of the close correlation between monetary policy interest rates in Denmark and the euro area, a unilateral Danish response may be needed on some occasions. Danmarks Nationalbank regularly assesses whether the development in the exchange rate of the krone against the euro requires a response by Danmarks Nationalbank. For example, if the krone tends to weaken, Danmarks Nationalbank will initially seek to counter this by purchasing kroner against foreign exchange. For this purpose, Danmarks Nationalbank holds a sizable foreign exchange reserve.

If intervention in the foreign exchange market does not stabilise the exchange rate of the krone sufficiently against the euro, and if this appears to be a persistent trend, Danmarks Nationalbank will unilaterally adjust its monetary policy interest rates, i.e. without the ECB having done the same. For example, a persistent weakening of the krone may require a unilateral Danish interest rate increase, which results in an increase in Danish money market interest rates compared with those of the euro area. This will make it more attractive to invest in Danish

2 See Mindested et al. (2013).

Monetary policy interest rates in Denmark and the euro area Chart 1



Note: Danmarks Nationalbank's rate of interest on certificates of deposit is used in the chart because this has been the governing rate since 8 June 2009, when Danmarks Nationalbank introduced a spread between the lending rate and the rate of interest on certificates of deposit. For the euro area, the ECB's minimum bid rate in the main refinancing operations is used until 14 October 2008 and subsequently the fixed rate in the ECB's main refinancing operations is used. Deutsche Bundesbank's monetary policy rate is used for the period prior to the introduction of the euro on 1 January 1999. Since the ECB introduced fixed-rate tenders with full allotment in its main refinancing operations in October 2008, there has been a tendency for European money-market interest rates to be governed by the ECB's deposit rate in some periods.
Source: Danmarks Nationalbank.

assets and boost demand for the Danish krone, which is therefore strengthened.

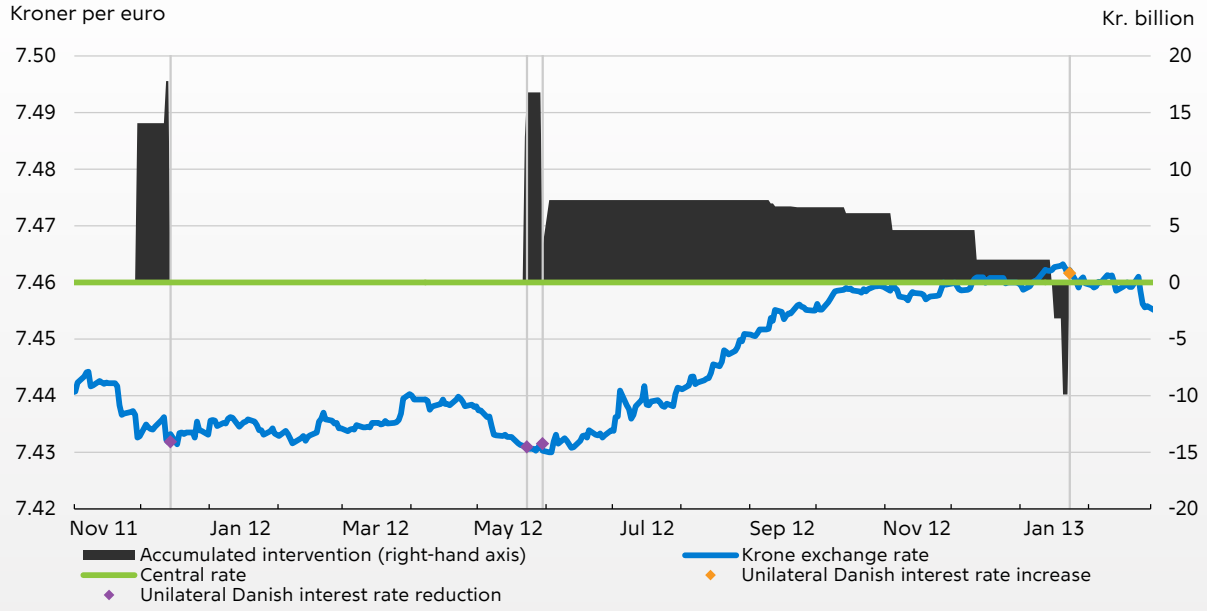
Chart 2 shows an example of Danmarks Nationalbank's response to deviations from the central rate. In November 2011, the krone gradually strengthened, and on 1 December it reached an exchange rate of kr. 7.4330 per euro. To counter this, Danmarks Nationalbank made intervention purchases for around kr. 14 billion in the market, that is, Danmarks Nationalbank bought euro for kr. 14 billion. This slowed the strengthening temporarily. Following intervention purchases for another approximately kr. 4 billion, and with the krone having strengthened to kr. 7.4326 per euro, Danmarks Nationalbank on 15 December decided to lower its monetary policy interest rates.[3] Similarly, in May 2012 Danmarks Nationalbank announced two unilateral interest rate reductions as a result of intervention. This was enough to prevent the krone from strengthening further.

Although Danmarks Nationalbank's reaction function is known by market participants, some room for discretion is required. For example, the exchange rate at which Danmarks Nationalbank intervenes in the foreign exchange market is not known in advance and there are no specific rules for how much intervention is needed to prompt a change of Danish interest rates. Nor are there any specific rules for how much interest rates are adjusted, if need be. This is because Danmarks Nationalbank regularly assesses which measures are appropriate in the given foreign exchange market situation.

Even though the formal framework for the Danish fixed exchange rate policy entails that the krone may fluctuate by up to 2.25 per cent on either side of its central rate, it has in reality stayed within a significantly narrower range for many years, cf. Chart 3. This reduces the risk incurred by Danish households and firms in connection with payments in euro and thereby

3 Danmarks Nationalbank's lending rate and the rate of interest on certificates of deposit were reduced by 10 basis points and the current-account rate by 5 basis points.

Accumulated intervention and unilateral interest rate changes Chart 2



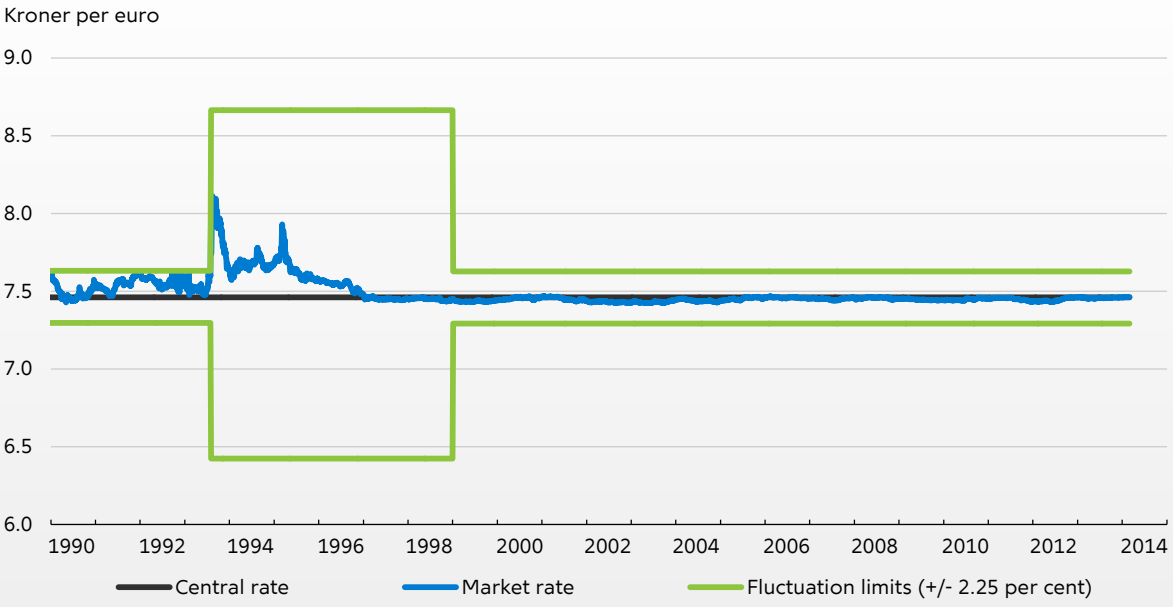
Note: The accumulated intervention is reset to zero in the chart in connection with unilateral Danish interest rate changes. A positive value for accumulated intervention means that Danmarks Nationalbank has sold kroner and bought foreign exchange. As illustrated in the chart, in addition to making unilateral interest rate changes, Danmarks Nationalbank followed the ECB's interest rate reduction on 5 July 2012. The rate of interest on certificates of deposit was reduced to -0.20 per cent, resulting in a weakening of the krone against the euro.
Source: Danmarks Nationalbank.

the need for obtaining hedging in the financial markets. Moreover, since the mid-1990s, the krone has stabilised on the strong side of its central rate.

CREDIBILITY

Having succeeded in keeping the krone stable for many years, Danmarks Nationalbank has earned strong credibility in its handling of mon-

Exchange rate of the krone against the euro Chart 3



Source: Danmarks Nationalbank.

etary and foreign exchange policies. Participants in the financial markets are confident that the exchange rate of the krone will continue to fluctuate within a narrow band around the central rate. This means that in a weak krone scenario, the market will be expecting that the potential for further weakening is smaller than the potential for strengthening, while the opposite will be the case in a strong krone scenario. Market participants have tended to take positions on the basis of these expectations. In a weak krone scenario, positions are typically taken in expectation of a strengthening, which has contributed to stabilising the exchange rate of the krone close to the central rate.

The stabilising positions taken by market participants have reduced the need for intervention by Danmarks Nationalbank. However, Danmarks Nationalbank cannot base its monetary policy on the assumption that the positions always have a stabilising effect. The effect will occur only as long as market participants are confident that Danmarks Nationalbank has the will to stabilise the exchange rate of the krone around the central rate, and that the conditions for this exist.

The importance of credibility in respect of attaining the monetary policy objective is not unique for the fixed exchange rate policy. This also applies to countries where monetary policy is designed with a direct view to managing inflation. Here, credibility contributes to ensuring that, in the medium term, inflation expectations reflect the central bank's inflation target. Formation of expectations is a key element in the determination of prices and wages. If inflation is expected to exceed its target, wage earners will demand higher wages as compensation. As a result, expectations of higher inflation will in themselves drive up inflation.

Monetary policy credibility is obtained by demonstrating, over a long period, the will to do what it takes to attain the announced objectives. Since 1996, Danmarks Nationalbank has kept the krone within a very narrow band around the central rate.

ECONOMIC POLICY: DISTRIBUTION OF RESPONSIBILITIES

In Denmark, monetary policy is not conducted with a view to stabilising the business cycle. Instead, because of the fixed exchange rate policy, Denmark mirrors the monetary policy stance of the euro area. Since the Danish business cycle to some extent reflects that of the euro area, monetary policy will usually match the domestic economic development, although that is not always the case. Consequently, it is important that fiscal policy takes the business cycle into account. It is particularly important that it does not contribute to intensifying an economic boom, to the effect that a subsequent downturn becomes similarly strong.

Danmarks Nationalbank provides regular assessments of the fiscal policy stance. For instance, in the mid-2000s, Danmarks Nationalbank cautioned that fiscal policy was too accommodative in view of the lack of spare capacity in the economy.[4] The loose fiscal policy fuelled the economic boom and in this way intensified the subsequent downturn. This was harmful for both households and firms but did not spur the market to question the fixed exchange rate policy.

An inappropriate fiscal policy that amplifies cyclical fluctuations – and results in periods of strongly eroded competitiveness and high unemployment – involves the risk that the market questions the political support for the fixed exchange rate policy. Such a scenario may put downward pressure on the krone and, in consequence, necessitate a unilateral Danish interest rate increase. Such interest rate increases result in further weakening of the economy.[5]

In addition, appropriate use of macroprudential instruments can reduce the risk that the economic downturn is intensified by financial turmoil. As opposed to fiscal policy, macroprudential policy is aimed mainly at preventing imbalances in the financial system rather

4 See e.g. Monetary Review, 3rd Quarter 2006, in which it is recommended that in 2007 public finances should dampen domestic activity by around 0.5 per cent, cf. Danmarks Nationalbank (2006).

5 Moreover, like any other monetary policy regime, the fixed exchange rate policy is at risk of being undermined if fiscal policy is outright unsustainable.

than stabilising the economy on an ongoing basis.

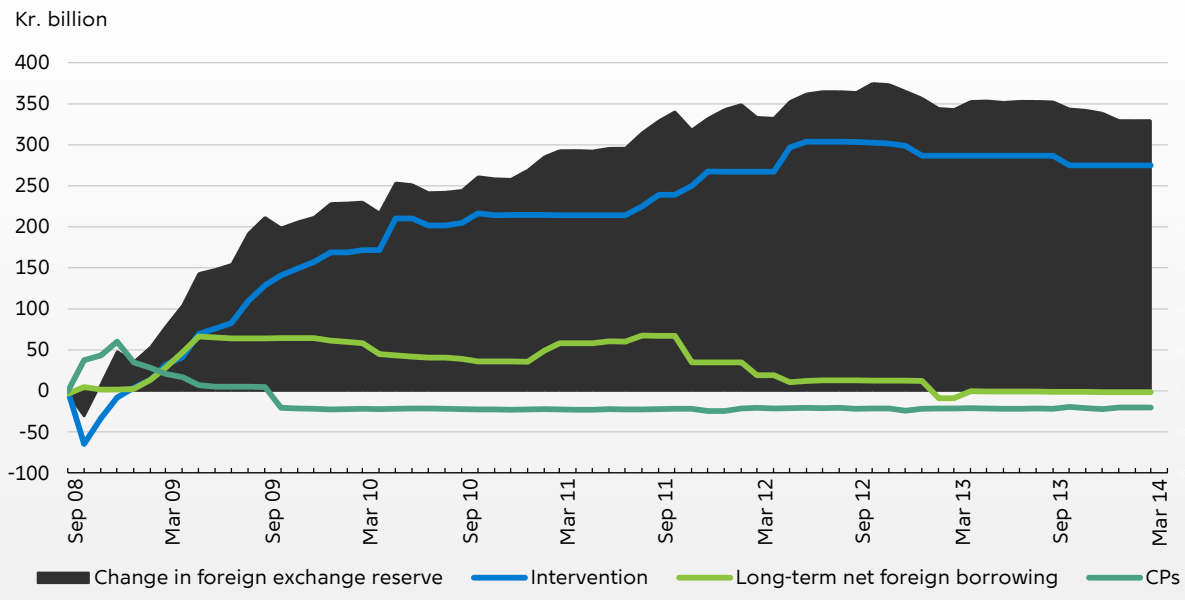
INTERVENTION AND FOREIGN EXCHANGE RESERVE

As a result of the high credibility in the fixed exchange rate policy, transactions between market participants will typically be sufficient to keep the krone close to its central rate. However, situations regularly occur that require a response from Danmarks Nationalbank. Usually, the first step is to intervene in the foreign exchange market. Intervention is undertaken by Banking and Markets, which has unlimited authority to intervene to the extent necessary. The Board of Governors is regularly informed about the intervention.

Danmarks Nationalbank holds a considerable foreign exchange reserve for intervention purposes. At the beginning of 2014, the value of the foreign exchange reserve was close to kr. 500 billion, mainly held in euro and largely consisting of deposits in foreign banks and foreign securities that can be sold or pledged as collateral. Danmarks Nationalbank has not set a target for the size of the foreign exchange reserve. The only requirement is that it should be ample. An insufficient reserve would limit Danmarks Nationalbank's scope for intervention, entailing that it would have to resort to interest rate increases sooner in the event of pressure on the krone. Moreover, a small reserve could signal that Danmarks Nationalbank was not sufficiently poised to defend the krone in case of pressure. This would weaken credibility and could in itself fuel the risk of speculation against the krone.

If the reserve is deemed to be insufficient, Danmarks Nationalbank has options for building up a larger reserve. This was seen in connection with the currency unrest in the autumn of 2008, when the central government resorted to foreign borrowing, cf. Chart 4. Initially, short-term loans were raised within the framework of the central government's Commercial Paper (CP) programmes in order to quickly boost the foreign exchange reserve. The purpose of these programmes is to ensure a liquidity contingency for rapid adjustment of the level of the foreign exchange reserve or

Development in the foreign exchange reserve after the outbreak of the financial crisis Chart 4



Note: The difference between the total change in the foreign exchange reserve and the sum of the changes in intervention, long-term foreign borrowing and CPs covers, inter alia, value adjustment of the gold stock, interest income on the foreign exchange reserve and the central government's net foreign exchange payments.
Source: Danmarks Nationalbank.

the central government's account at Danmarks Nationalbank. However, the central government's opportunities for raising loans abroad depend on well-functioning markets. When the crisis peaked, it was not possible to raise loans abroad for a brief period of time.

In the 1st half of 2009, the central government raised a considerable volume of medium--term and long-term debt denominated in foreign currency.

While foreign borrowing is the most efficient way to quickly increase the foreign exchange reserve during periods of pressure on the krone, the reserve can be built up in the longer term by market intervention. For example, in the period following the currency unrest in 2008, Danmarks Nationalbank maintained a relatively wide interest rate spread to support an inflow of foreign exchange, and then gradually built up the foreign exchange reserve again through intervention.

The cost of maintaining an ample foreign exchange reserve is assessed to be moderate compared with the advantages of a credible fixed exchange rate policy. Roughly, the cost is given as the difference between short-term interest rates in Denmark and the euro area multiplied by the size of the reserve. In the current situation, with Danish short-term interest rates being the lowest, the return is positive, while in situations with a moderately positive interest rate spread to the euro area it will be negative.

ADJUSTMENTS OF MONETARY POLICY INTEREST RATES

The fixed exchange rate policy entails that Danmarks Nationalbank's monetary policy interest rates are used solely to keep the krone close to its central rate. If intervention in the foreign exchange market is not sufficient to stabilise the exchange rate of the krone, Danmarks Nationalbank's next move will be to adjust its monetary policy interest rates, comprising the lending rate, the rate of interest on certificates of deposit, the current account rate and the discount rate. This is also usually done in connection with the ECB's interest rate adjustments.[6] Danmarks Nationalbank's monetary policy instruments – the lending and deposit facilities made available by Danmarks Nationalbank to its monetary policy counterparties – accrue interest at the monetary policy interest rates.[7]

THE SIGNIFICANCE OF SECTOR LIQUIDITY TO MONEY MARKET INTEREST RATES

The pass-through from monetary policy interest rates to the exchange rate of the krone takes place through money market interest rates. Which of the monetary policy interest rates that governs the money market interest rates depends on the net position of the banks[8] vis-à-vis Danmarks Nationalbank. In the event of a large positive net position the sector as a whole will have a need to deposit funds with Danmarks Nationalbank, and in this situation short-term money market interest rates usually follow the rate of interest on certificates of deposit. This has been the general trend in the last few years, cf. Chart 5.

In periods when the net position is declining, money market interest rates tend to approach Danmarks Nationalbank's lending rate. The reason is that the volume of krone liquidity decreases and, as a result, the price of krone liquidity rises. In the event of a negative net position, money market interest rates will typically be governed by Danmarks Nationalbank's lending rate.

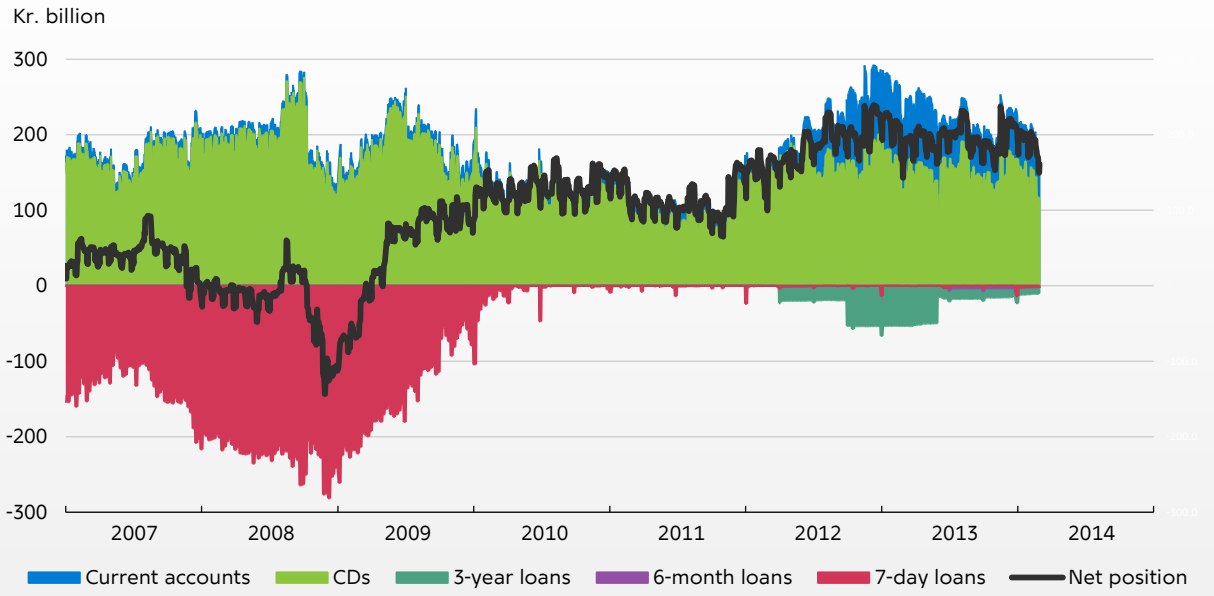
The net position is impacted by the autonomous factors in Danmarks Nationalbank's balance sheet. Payments to and from the central government's account at Danmarks Nationalbank and intervention by Danmarks Nationalbank make the greatest impact. For example, the net position declines when Danmarks Nationalbank buys kroner in the market in order to counter the weakening of the krone. This has a tendency to push up money market

6 The discount rate does not refer directly to monetary policy facilities but acts as a signal rate.

7 See e.g. Danmarks Nationalbank (2009) for a more detailed description of the monetary policy instruments.

8 The net position is calculated as the monetary policy counterparties' deposits in current accounts and certificates of deposit less their loans from Danmarks Nationalbank.

Monetary policy counterparties' net position vis-à-vis Danmarks Nationalbank Chart 5



Note: Until June 2009, the lending rate and the rate of interest on certificates of deposit were identical. Consequently, the monetary policy counterparties to a greater extent built up gross positions vis-à-vis Danmarks Nationalbank by raising monetary policy loans and placing liquidity in current accounts and certificates of deposit (CDs). The larger gross positions contributed to expanding Danmarks Nationalbank's balance sheet.
Source: Danmarks Nationalbank.

interest rates, which has a further stabilising effect on the exchange rate of the krone on top of the direct effect of intervention.

In addition to the net position, the daily volume of current account liquidity is also of significance to the pass-through from monetary policy interest rates to short-term money market interest rates. Money market interest rates tend to display a negative correlation with the daily liquidity balance in current accounts, cf. Chart 6. The latter depends on the difference between the rate of interest on certificates of deposit and the current account rate, among other factors. The monetary policy counterparties have a greater incentive to buy certificates of deposit than to place funds in current accounts when the rate of interest on certificates of deposits is higher than the current account rate. Other things being equal, the wider the spread, the smaller the current account deposits. A wider spread will encourage the counterparties to increasingly exchange liquidity among themselves, but will also result in higher money market interest rates.[9]

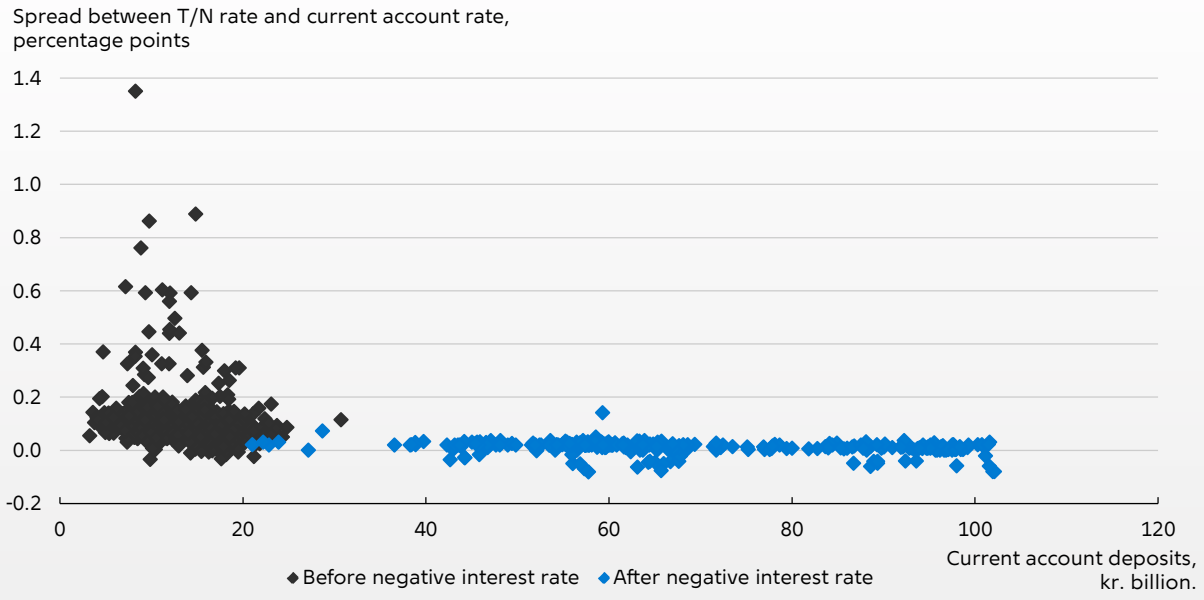
SIGNIFICANCE OF MONETARY POLICY INSTRUMENTS TO MONEY MARKET INTEREST RATES

The impact of monetary policy interest rates on the overnight rate is the first step in the transmission to the longer-term money market interest rates, which govern the exchange rate of the krone. The overnight rate fluctuates considerably, cf. Chart 7. Most of the fluctuations are technical and relate to the design of Danmarks Nationalbank's monetary policy instruments. Fluctuations occur in connection with Danmarks Nationalbank's open market operations. On days when Danmarks Nationalbank is open

9 After the introduction of a negative rate of interest on certificates of deposit, which is lower than the current-account rate, the counterparties have both an interest incentive and a liquidity incentive to place funds in current accounts rather than in certificates of deposit. Moreover, the expansion of the current-account limits increased the opportunity to do this. The larger current-account deposits entail that the difference between the overnight rate and the current-account rate is smaller on days without open market operations. See e.g. Mindested et al. (2013) for a more detailed explanation.

Correlation between current account deposits and spread between T/N rate and current account rate

Chart 6

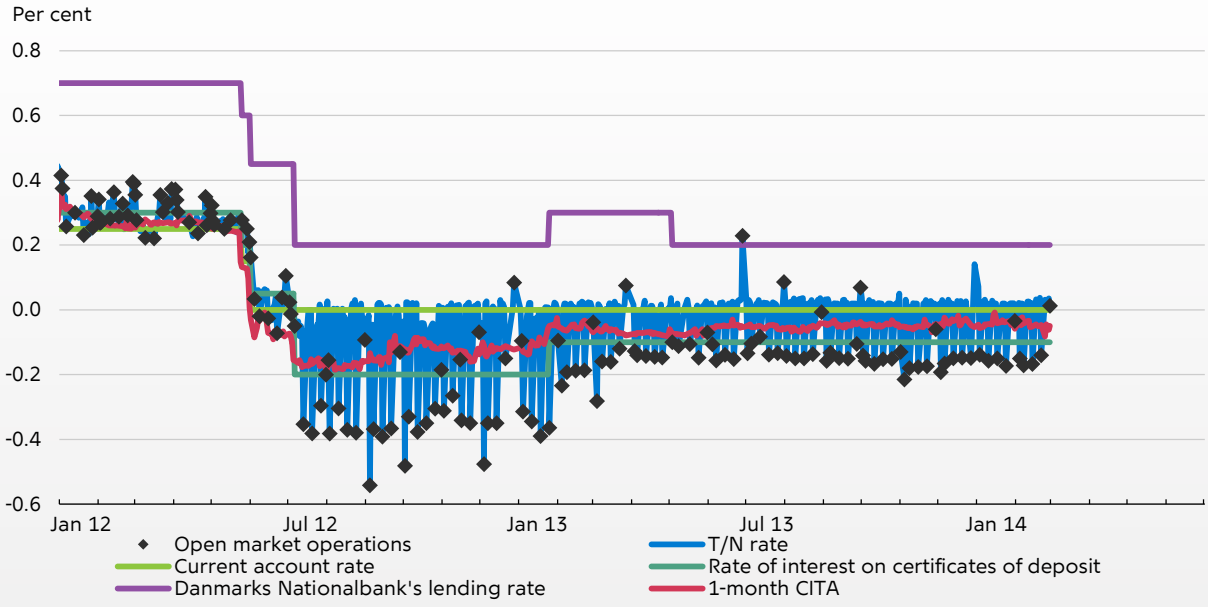


Note.: Daily observations for the period 2 July 2007 – 18 February 2014. Observations from days when Danmarks Nationalbank does not carry out open market operations.
Source: Danmarks Nationalbank.

for sale of certificates of deposit, the monetary policy counterparties can place funds in certificates of deposit at a different interest rate and with longer maturities than on days with-

Monetary policy interest rates and market rates

Chart 7



Note: The T/N rate is affected on the day prior to Danmarks Nationalbank's open market operations. The reason is that T/N loans are overnight loans which start the day after conclusion. As a result, open market operations denote the value of the T/N rate the day before the open market operation is takes place. CITA swaps (Copenhagen Interbank T/N Average) are short-term interest rate swaps. A variable rate of interest (the T/N rate) is swapped for a fixed rate of interest determined at the start of the agreement. On expiry of the agreement, the difference between the agreed fixed rate and the average T/N rate over the term of the agreement is settled.
Source: Danmarks Nationalbank and Reuters.

out open market operations, when the current account rate is the alternative rate.[10]

The technical volatility of the overnight rate is predictable and known by market participants and does not translate into volatility for the longer money market interest rates, cf. Chart 7. This predictability ensures a clear pass-through from Danmarks Nationalbank's monetary policy interest rates to the longer-term money market interest rates and, hence, the exchange rate of the krone.

THE INSTRUMENTS ARE DESIGNED WITH A VIEW TO THE FIXED EXCHANGE RATE POLICY

The monetary policy instruments are designed with a view to ensuring a flexible and robust implementation of the fixed exchange rate policy. This objective has been met. Within the framework of the current instruments, Danmarks Nationalbank has, for example, been able to introduce a negative rate of interest on certificates of deposit in order to keep the krone stable against the euro.[11] Moreover, maintaining the framework for the implementation of monetary policy on the introduction of a negative interest rate makes the instruments robust in respect of a future normalisation of monetary policy interest rates.

The fixed exchange rate policy considerations entail that Danmarks Nationalbank's instruments differ from those of other central banks, including those of the ECB (see Table 1 for a comparison). Danmarks Nationalbank typically mirrors the monetary policy measures of the ECB, not only its interest rate changes but

Overview of Danmarks Nationalbank's and the ECB's main monetary policy instruments Table 1

Main refinancing operations	ECB	Danmarks Nationalbank
Collateralised lending[1]	• Full allotment[2] • 1-week maturity • Weekly open market operations	• Full allotment • 1-week maturity • Weekly open market operations
Purchase and sale of certificates of deposit	Not part of main refinancing operations[3]	• Full allotment • Expiry on last banking day of the week • Weekly ordinary market operations supplemented with extraordinary operations as required
Standing facilities[4]		
Marginal lending facility[1]	• Unlimited access • 1-day maturity	Not part of Danmarks Nationalbank's instruments
Deposit facility	• Current account • Minimum reserve requirements	• Current account • Current account limits cap total current account deposits

Note: Only the main refinancing operations and facilities of Danmarks Nationalbank and the ECB are included. Extraordinary facilities such as collateralised lending with longer-term maturities and liquidity adjusting instruments are not included.
Source: Danmarks Nationalbank and ECB.

1. All monetary policy lending by Danmarks Nationalbank and the ECB is collateralised.
2. As one of a number of extraordinary measures taken in connection with the financial crisis, the ECB began to carry out its main refinancing operations with full allotment from 15 October 2008. The ECB will continue to carry out its weekly main refinancing operations with full allotment for as long as deemed necessary and at least until 7 July 2015, cf. ECB (2014). Prior to October 2008 allotment took place via tender.
3. As part of its structural operations, the ECB can issue certificates of deposit, cf. ECB (2012). However, these operations are not used at the moment.
4. Standing facilities may be used at any time during the central banks' opening hours.

10 See Mindested et al. (2013).

11 See e.g. Jørgensen and Risbjerg (2012) for a detailed description of the introduction of a negative rate of interest on certificates of deposit.

also the introduction of unconventional measures such as 3-year loans. This is done in order to ensure the stability of the krone against the euro by creating interest rate and liquidity conditions comparable to those in the euro area. However, given the differences between Danmarks Nationalbank's and the ECB's monetary policy instruments and the implementation of monetary policy, Danmarks Nationalbank does not mirror the ECB's monetary policy measures at all times.

OPEN WINDOW IN OPEN MARKET OPERATIONS

Danmarks Nationalbank uses an "open window" in its open market operations. This means that Danmarks Nationalbank determines the rate of interest in its monetary policy operations while the monetary policy counterparties determine the volume. This applies both to lending and to certificates of deposit. However, Danmarks Nationalbank limits the monetary policy counterparties' current account deposits.

As one of a number of extraordinary measures taken in connection with the financial crisis, the ECB began to carry out its weekly main refinancing operations as fixed rate tenders with full allotment in October 2008. Prior to that, the ECB managed the volume of liquidity allotted in its lending operations via weekly tenders. This has made the weekly open market operations of Danmarks Nationalbank and the ECB more comparable. The ECB will continue to carry out its weekly main refinancing operations with full allotment for as long as deemed necessary.

CURRENT ACCOUNT LIMITS

While the ECB via reserve requirements determines the average deposit that the Eurosystem banks *must* hold in their deposit facility, Danmarks Nationalbank determines the maximum deposit that banks and mortgage banks *may* hold in their current accounts.

The purpose of the current account limits is to prevent the build-up of large current account deposits with Danmarks Nationalbank that may be used for speculation against the krone. The current account limits do not restrict the amount that can be used for speculation, but enables Danmarks Nationalbank to manage the price of the liquidity that the banks can make available to customers for speculation. Danmarks Nationalbank can set a sufficiently high rate of interest on liquidity to eliminate any speculative gains. This was seen in connection with, for instance, the currency crisis in 1992-93, cf. Box 1.

STANDING FACILITIES

While the ECB has two standing facilities – a deposit facility and a marginal lending facility – Danmarks Nationalbank only has a deposit facility in the form of current accounts. A marginal lending facility caps the potential rise in short-term money market interest rates, since the banks can always raise loans from the central bank instead of in the money market at the

Speculation against the krone in 1993 Box 1

In connection with the currency crisis of 1992-93, speculative pressures were building up against the Danish krone in early 1993 amid extensive speculation against the ERM. This created a need for extensive intervention in support of the krone against the D-Mark, the Dutch guilder and the Irish pound. In order to counter the speculative pressure, the Danish government at the time made a firm statement about its determination to continue to pursue the fixed exchange rate policy.

Irrespective of the government's statement, the krone continued to be under substantial pressure, and on 3 February 1993 intervention purchases of kr. 24 billion were made in support of the krone, accounting for around half of Danmarks Nationalbank's foreign exchange reserve. On 4 February 1993, the discount rate was raised by 2 percentage points to 11.5 per cent and, as agreed with the central banks of Belgium, France, the Netherlands, Spain and Germany, coordinated intervention in support of the krone was carried out within the intervention limits. The concerted action took the market by surprise. The krone was stabilised and strengthened further when on the same day Deutsche Bundesbank announced an interest rate reduction. The banks' additional need for krone liquidity as a result of the outflow of foreign exchange was covered by Danmarks Nationalbank via collateralised loans with a maturity of 17 days at an interest rate of 40 per cent. Towards the end of the month, Danish 3-month money market interest rates had dropped to 14 per cent, the krone had strengthened and a significant inflow of foreign exchange took place. In the latter part of February, Danmarks Nationalbank began to reduce its interest rates again.

1. See Abildgren et al. (2010) for a detailed description of the monetary history of Denmark 1990-2005.

marginal lending rate. The fact that Danmarks Nationalbank does not have a marginal lending facility implies that money market interest rates can rise freely when the krone weakens against the euro. A situation may occur in which Danmarks Nationalbank intervenes to buy kroner in order to prevent the krone from weakening against the euro. This absorbs krone liquidity, which may cause money market interest rates to rise and thereby contribute to stabilising the krone against the euro.

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HOUSEHOLD DEBT AND CONSUMPTION DURING THE FINANCIAL CRISIS

Asger Lau Andersen, Economics, Charlotte Duus and
Thais Lærkholm Jensen, Financial Markets

INTRODUCTION AND SUMMARY

Danish households' gross debt rose sharply in the years leading up to the financial crisis. A high level of debt may affect households' response when the economy is hit by a financial crisis. House prices dived during the most recent crisis. Combined with the high level of debt this meant that homeowners' loan-to-value (LTV) ratios reached an unusually high level. This may have created a need for consolidation among households, which has contributed to dampening private consumption and thus aggregate demand and economic activity.

This article presents an analysis of the relationship between the LTV ratios among Danish homeowner families before the most recent financial crisis and the families' consumption patterns during the crisis. The analysis is based on register-based microdata for Danish homeowner families in the period 2003-11. The methodology and results are described in detail in a recent working paper, cf. Andersen et al. (2014). Our analysis shows a clear negative relationship between a family's LTV ratio in 2007 and the change in its consumption in the following years. This also applies if a number of family-specific conditions are taken into account, including developments in the family's income and the value of its home(s). The negative relationship is broad-based and exists in all parts of Denmark and among homeowner families in all age groups and income brackets. Consequently, the analysis indicates that the high debt level among households contributed to amplifying the drop in private consumption during the financial crisis.

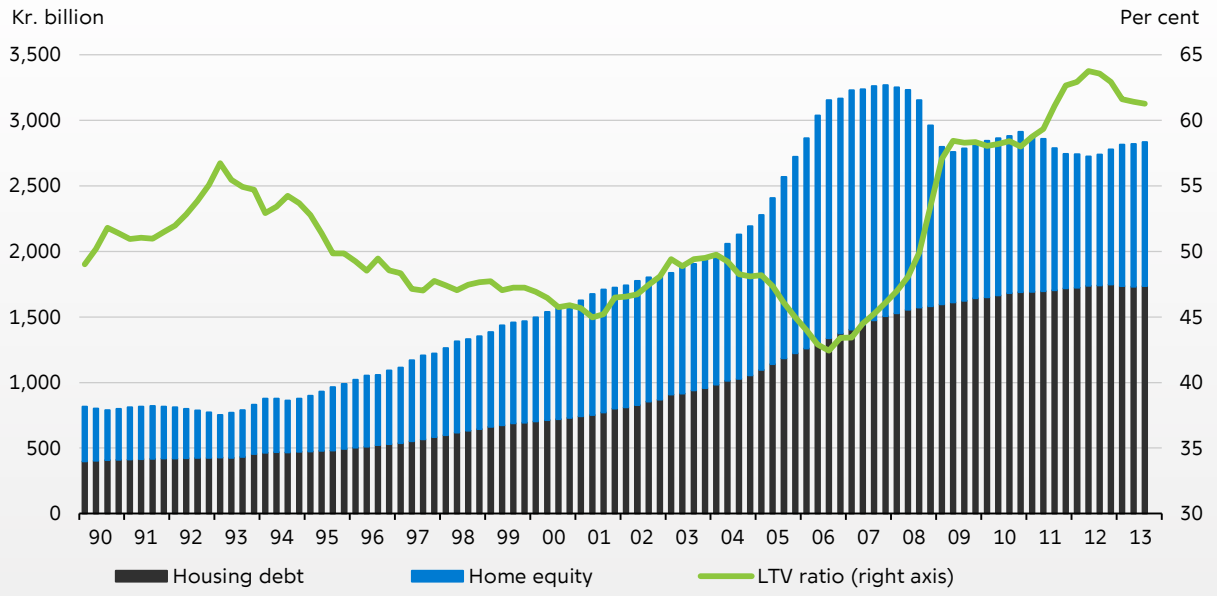
In previous analyses, Danmarks Nationalbank has investigated the impact of the high level of debt on the ability of households to service their debts and on financial stability in Denmark, cf. Andersen et al. (2012a, 2012b, 2013). The overall conclusion of these analyses is that the vast majority of Danish homeowner families have robust finances, and even in the event of considerable financial adversity they will be able to service their debts. Hence, the high level of debt among Danish households is not a serious threat to financial stability in Denmark.

This article addresses another aspect of the issue concerning the high level of debt among Danish households, which has not been the direct focus of the previous analyses, namely the consequences for consumption and *macroeconomic* stability in periods of financial turmoil. The results indicate that the high level of debt among Danish households contributed to making the Danish economy more vulnerable in the boom years just before the financial crisis, presumably causing more pronounced fluctuations in consumption and economic activity in the years around the financial crisis than would have been the case if household indebtedness had been lower.

The rise in household debt in the years before the financial crisis is closely linked to the development in house prices. Higher house prices improve homeowners' opportunities

Household housing debt, home equity and LTV ratio

Chart 1



Note: Here, the LTV ratio is defined as the total housing debt of households as a percentage of the total value of their homes. Housing debt includes all debt raised against a home as collateral.
Source: Danmarks Nationalbank, Statistics Denmark and own calculations.

to raise loans against the home as collateral. For many families, a higher price level also means that they must take out larger loans to enter the housing market. It is therefore likely that the surging house prices in the pre-crisis years contributed to a strong increase in gross household debt during that period – thus also being a factor behind the high LTV ratios experienced by many families when house prices subsequently fell. In our assessment, based on the results in this article, more subdued house price developments in the years before and after the financial crisis would have resulted in a less pronounced fall in private consumption during the crisis. This emphasises that a stable development in house prices is a key condition for stable macroeconomic development.

MACROECONOMIC BACKGROUND

The total housing debt of households rose sharply over the past decade, cf. Chart 1. The rise was particularly pronounced in the pre-crisis years. But the rapidly increasing housing debt was offset by even greater price rises in the housing market during that period, and the LTV ratio, i.e. the ratio of mortgage debt to housing value, declined. Just before the outbreak of the financial crisis, the situation in the housing market reversed, however, and when the crisis erupted, the increases of previous years were replaced by large price drops. Combined with the already high level of debt this meant that homeowners' LTV ratios reached an unusually high level.

This article examines the relationship between a family's pre-crisis LTV ratio and its consumption response during the crisis. The LTV ratio reflects the *relative* relationship between the family's assets and debt.[1] Net wealth, i.e. the *absolute* difference between the value of assets and liabilities, is a closely related concept. A high LTV ratio will often coincide with low or negative net wealth. But it is also possible to increase the LTV ratio without changing net wealth . This can be done by increasing the holdings of both assets and liabilities, i.e. balance-sheet expansion.

1 The LTV ratio is calculated as the ratio of the family's total debt to banks and mortgage banks and its mortgage deed debt to the value of its home(s). The calculation is explained in more detail in the next section. Net wealth, on the other hand, is calculated as the difference between total assets and liabilities.

This article focuses on just that form of variation in the families' LTV ratios. The purpose of the analyses in this article is thus to compare the consumption developments during the crisis for families who had different LTV ratios immediately before the crisis, but who are otherwise comparable in many other dimensions, including net wealth. Box 1 presents a hypothetical example illustrating the question we seek to answer in this article.

There are sound theoretical arguments that the LTV ratio may affect the consumption of a household: Loans secured on the home are the most important source of credit for most homeowners. If the debt exceeds the value of the home, obtaining further credit via this channel is not possible, however, and this may cause the household to reduce its consumption. The risk of this situation arising may be sufficient to affect household consumption decisions. Hence, some households can be expected to want to insure themselves against unexpected events by creating a buffer with a suitable distance to any upper limits for the LTV ratio. Accordingly, a high LTV ratio may affect consumption negatively long before these upper limits are reached, cf. Carroll (1997).

There is also empirical evidence of a negative relationship between debt on the one hand and consumption and/or economic activity on the other. Such a relationship has been found in a number of different countries using very different methodologies and data sources as described in Andersen et al. (2014).

A hypothetical example Box 1

Take two families, Family A and Family B, with the same income. The two families are also identical as regards size and age, and they purchased their homes in the same year. Furthermore, the families have the same *net wealth*, i.e. the absolute difference between assets and liabilities is the same in both families. The balance sheet of Family A exceeds that of Family B, however, so Family A has larger *gross wealth*, but also larger *gross debt*. Family A may live in a home worth kr. 2 million, in which its debt amounts to kr. 1.5 million, while Family B lives in a home worth kr. 1 million in which it owes kr. 500,000. Family A thus has an LTV ratio of 75 per cent, while Family B's LTV ratio is 50 per cent.

Enter the financial crisis: House prices drop, credit standards are tightened, and uncertainty about the families' future income increases. This article seeks to answer the question of whether the difference in the LTV ratios of the two families in itself induces Family A to respond more strongly to the changed circumstances than Family B and reduce its consumption more substantially.

DATA

The data used in the analyses in the article consists of register-based individual-level data from Statistics Denmark for the period 2003-11. Information on income, wealth and debt comes from the personal income register. The main source of this register is information from the Central Tax Administration (SKAT). Information on e.g. age, residence and family relations is retrieved from the population register. Using the latter, all income, wealth and debt information is aggregated at family level, and measures of the family's consumption, LTV ratio and other background variables are constructed.

A key challenge for the analysis is that register-based information on consumption is not available at individual or family level. For this reason, consumption is calculated residually using information on disposable income and wealth, cf. Box 2.

The LTV ratio for a given homeowner family is calculated as the family's total bank and mortgage debt as well as its mortgage deed debt at the end of the year as a percentage of the total value of the family's properties at that point in time. It should be emphasised that this relates to the family's *gross debt*, so any holdings of financial assets, pension wealth, etc. have not been deducted. The value of the family's properties is estimated at approximated market prices by multiplying the public property valuations by a scaling factor reflecting the relationship between public valuations and actual sales prices for the relevant combination of the type of property, geographical area and year. The method is described in more detail in Andersen et al. (2012a). Unfortunately, the data does not allow us to distinguish between bank loans secured on the home and other bank debt, so all debt to banks is included in the calculation of the LTV ratio.

Imputing consumption from income and wealth data

Box 2

Statistics Denmark's personal income register contains information on each citizen's disposable income, assets and liabilities. This information can be aggregated at family level by adding up the data for the individual members of each family. Based on these variables, we construct an imputed measure of the family's consumption (excluding housing consumption) by observing the family's total disposable income in a given year and comparing it with the change in the family's net wealth.[1] This method follows the approach described in Browning and Leth-Petersen (2003) and later applied in Leth-Petersen (2010).

A family's consumption in year t, c_t, is imputed using the following accounting identity:

$$c_t = y_t - s_t$$

where y_t denotes the family's disposable income, and s_t denotes the family's net saving over the year. While information about the family's disposable income is available from the personal income register, no precise information is available about net saving. The latter is therefore approximated as the change in the family's net wealth from the beginning to the end of the year. The rationale behind the approximation is that if the amount of the family's net wealth is smaller at the end of the year than at the beginning, this indicates that the wealth reduction was used for consumption. Conversely, an increase in net wealth would indicate that part of the disposable income was saved and consequently not used for consumption.

The imputation results in a noisy measure of the family's consumption. The primary source of noise is that, as a main rule, changes in net wealth attributable to saving (i.e. changes in the physical holdings of assets and liabilities) are non-separable from changes attributable to positive or negative capital gains (i.e. changes in the prices of assets and liabilities).

The most important type of capital gains is changes in the families' housing wealth as a result of house price fluctuations. In this particular case, however, capital gains can be separated from saving. The reason is that it is possible, using register data, to identify the families that were involved in property transactions in a given year. These families are excluded from the analysis. For the remaining families, who were not involved in property transactions, changes in their housing wealth from the beginning to the end of the year must then be attributable to capital gains.[2] Hence, for these families changes in housing wealth do not reflect actual saving, and such changes are therefore not included in the imputation of consumption.

Fluctuations in stock prices are another important source of capital gains. Unfortunately, capital gains are non-separable from saving in this case, since the data used does not include information about the families' purchases and sales of stocks. Instead, we make use of a crude adjustment for capital gains on the families' stock portfolios. This is done by multiplying the value of the family's stock portfolio at the beginning of the year by the average stock price development over the year. The result is taken to reflect the capital gain from the family's stocks.

One of the most important ways for Danish families to save is via contributions to pension schemes. Here, we are favoured by having access to exact data for the saving component in the form of annual contributions to the schemes, so in this case no approximation is required. Contributions to employer-administered pension schemes are pre-deducted in the calculation of disposal income, so it is only necessary to deduct contributions to privately administered schemes in the consumption imputation.

Even after these adjustments, the imputed measure of consumption is fairly noisy. This is evident from the fact that for some families the method results in extreme values. To minimise the impact of such outliers we impose an additional restriction on our analysis sample: In each year, the families are ranked by the ratio of their imputed consumption to their disposable income, and the bottom and top 5 per cent of the families are then excluded.

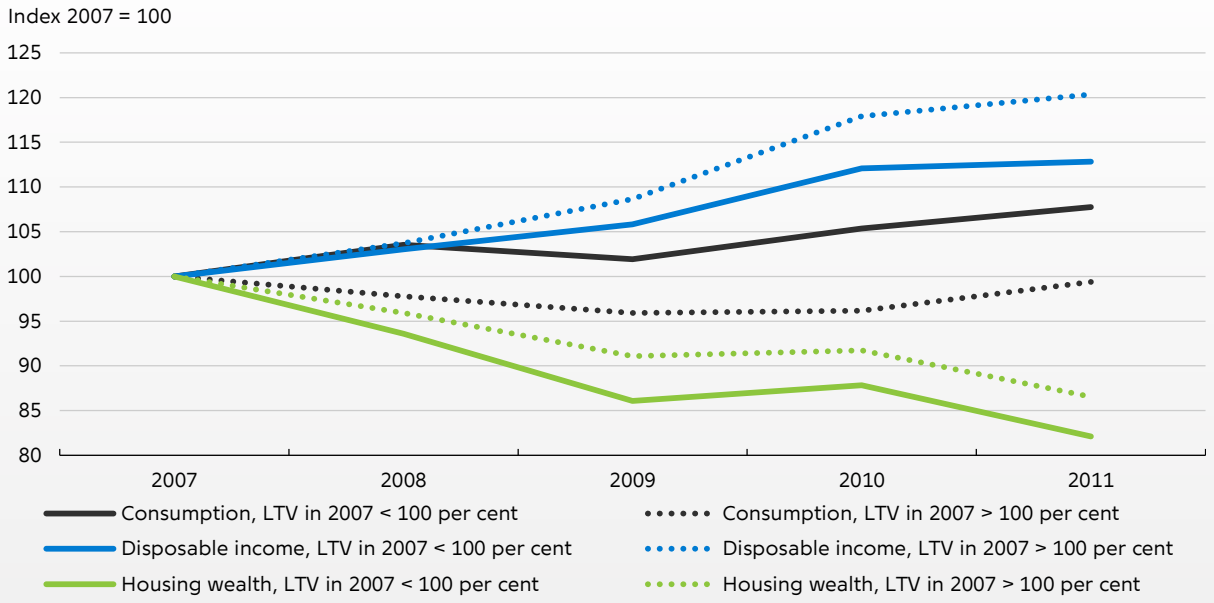
1. See Andersen et al. (2014) for more details.
2. The changes may also be attributable to investments in a home that the family already owns, e.g. in the form of additions or renovations, but our data does not allow us to identify the families who make such investments. Using our method, the increase in value resulting from these investments will consequently be regarded as a capital gain, while the investment costs will generally be registered as consumption in the year they are incurred.

Initially, the sample comprises all homeowner families in Denmark that include minimum one person aged 15-99. We then add a number of restrictions: Families with members who are self-employed or non-taxpayers are excluded.[2] The same goes for families who have moved or been involved in property transactions during the period analysed, cf. Box 2. Another restriction is that the composition of adult members of the family must remain the same throughout the analysis period. This excludes families that have been exposed to divorce, a death in the family, etc. Finally, we exclude families whose estimated consumption is either extremely high or extremely low relative to their disposable income as described in Box 2. After these restrictions, the analysis sample comprises almost 800,000 families.

2 Non-taxpayers are persons who are not liable to pay tax in Denmark. They include e.g. foreigners with a provisional residence permit in Denmark.

Development in disposable income, housing wealth and consumption: families with high LTV ratios versus other homeowner families

Chart 2



Note: The chart shows the nominal developments in disposable income, housing wealth and consumption, indexed relative to 2007, for two different groups: 1. Homeowner families with LTV ratios of less than 100 per cent in 2007 (solid lines). 2. Homeowner families with LTV ratios above 100 per cent in 2007 (dotted lines). Indexations are made for each family, i.e. relative to the 2007 level for the same family. The median value of the three indexed variables within each group is shown for every year. The chart only includes families that existed in every year of the period 2007-11 and were not involved in property transactions during the period under review.
Source: Own calculations based on register data from Statistics Denmark.

LTV RATIO AND CONSUMPTION RESPONSE DURING THE FINANCIAL CRISIS

The purpose of the analyses in this article is to illustrate how a high level of debt among Danish homeowner families has affected the families' consumption decisions in the years since the outbreak of the financial crisis. One way of answering this question is to divide the homeowner families into groups according to their LTV ratios at end-2007 – i.e. immediately before the financial crisis – and then to compare consumption developments since 2007 across those groups.

A SIMPLE COMPARISON

Chart 2 illustrates a simple version of such a comparison. Here, the homeowner families are divided into two groups: The first group consists of the homeowner families with LTV ratios of less than 100 per cent in 2007, while the second group consists of the highly indebted homeowner families with LTV ratios above 100 per cent at end-2007. The chart shows developments in disposable income, housing wealth and consumption (excluding housing consumption) since 2007 for the median family in each of the two groups.

The group of families with high LTV ratios experienced a stronger relative development in disposable income than the other homeowner families in the period 2007-11. One underlying factor is the drop in mortgage rates during that period, which has mainly benefited the highly indebted families. Housing wealth decreased in the period under review for both groups of homeowner families, reflecting the drop in house prices.[3] In relative terms, the drop was less pronounced for the group of highly indebted families than for the other families, however. Nonetheless, consumption showed a weaker development among the families with high LTV

3 Families that have been involved in property transactions during the period under review are not included in the chart. Hence, changes in the housing wealth of an individual family are attributable only to changes in house prices and any improvements to or wear and tear on the family's home(s).

Descriptive statistics Table 1

	LTV ratio in 2007				
	0-40 per cent	40-60 per cent	60-80 per cent	80-100 per cent	Over 100 per cent
Number of families	363,142	162,821	127,161	73,145	65,975
Number of children, mean	0.3	0.8	1.0	1.1	1.3
Age of oldest person, mean	64.6	52.5	47.9	45.1	44.0
Number of years since the family took up residence at the address, mean	29.2	15.9	12.2	10.3	9.6
Disposable income, mean, kr.	278,437	330,971	337,230	337,058	343,236
Net wealth, mean, kr.	2,450,028	1,337,761	763,072	319,295	-169,659

Note: Descriptive statistics for the families included in the analysis sample. The families are grouped according to their LTV ratios in 2007, and the variable means are calculated on the basis of data for 2007.
Source: Own calculations based on register data from Statistics Denmark.

ratios than among the other homeowner families. For the median family in the former group, consumption in 2009 was almost 5 per cent below the 2007 level, while the median family in the group of other homeowner families experienced consumption growth of just under 2 per cent from 2007 to 2009. The difference in consumption growth between the two groups widened further in 2010 and continued to exist in 2011, when consumption among the highly indebted families remained below the 2007 level.

Hence, the above comparison shows that homeowner families with high LTV ratios prior to the financial crisis reduced their consumption more than other homeowner families during the crisis, even though they experienced a more favourable development in both disposable income and housing wealth during the same period. This simple comparison does not take into account that families with high LTV ratios also differ from the other homeowner families in a number of other areas. For instance, families with high LTV ratios in 2007 are generally younger than families with low LTV ratios, cf. Table 1. At the same time, they have more children and higher incomes, whereas average net wealth, including pension wealth, is lower the higher the LTV ratio. These differences alone may have contributed to families with different LTV ratios in 2007 showing different consumption developments in the subsequent years, so it is important to take them into account.

ECONOMETRIC ANALYSIS OF LTV RATIO AND DEVELOPMENT IN CONSUMPTION

Andersen et al. (2014) present an econometric analysis of the relationship between the LTV ratio in 2007 and the subsequent development in consumption which controls for the above differences between families with different LTV ratios, among other factors. The econometric method is outlined in Box 3. The main findings are illustrated in Chart 3, which shows the estimated relationship between the LTV ratio in 2007 and the subsequent development in consumption in a given period. The first year of the period is 2007 in all the cases shown, while the time horizon of the period varies from 1 to 4 years. The chart shows no clear relationship between LTV ratios and the development in consumption as long as the LTV ratio in 2007 is below approximately 40 per cent. But at higher LTV ratios there is a clear negative relationship: The higher the LTV ratio in 2007, the weaker the development in consumption in the subsequent years. This applies whether the period under review is 1, 2, 3 or 4 years.

In terms of size, the differences are considerable. For an average family, an LTV ratio of 100 per cent in 2007 would, according to our esti-

Regression analysis of LTV ratio and subsequent change in consumption

Box 3

In Andersen et al. (2014) we set up and estimate an econometric model in which the development in a family's consumption since 2007 is modelled as a function of the family's LTV ratio in 2007. The model is inspired by the method in Dynan (2012) and is given as the following equation:

$$\Delta C_{i;07\text{-}s} = \alpha + F(\boldsymbol{\beta}, LTV_{i;07}) + \delta_1 \ln(Y_{i;07}) + \delta_2 NW_{i;07} + \delta_3 LA_{i;07} + \delta_4 \Delta Y_{i;07\text{-}s} + \delta_5 \Delta H_{i;07\text{-}s} + \delta_6 \Delta kids_{i;07\text{-}s} + \delta_7 \Delta C_{i;06\text{-}07} + \boldsymbol{\gamma X}_{i;07} + \varepsilon_{i;s}$$

where the variable on the left-hand side denotes the change in consumption from 2007 to an end-year s for family i. The end-year may be 2008, 2009, 2010 or 2011. To facilitate comparison across families, the change in consumption is measured as a percentage of the family's total income before tax in 2007.

The central explanatory variable on the right-hand side of the equation is the LTV ratio in 2007. To allow for any non-linear effects, this variable is represented by a parametric function F, which is assumed to be continuous and piece-wise linear. Specifically, it is assumed that the function is linear in each of the LTV ratio intervals [0;20],]20;40],]40;60],]60;80],]80;100],]100;120] and]120;∞[, but with the possibility of different slopes in different intervals. The slopes in each interval are given by the parameter vector β.

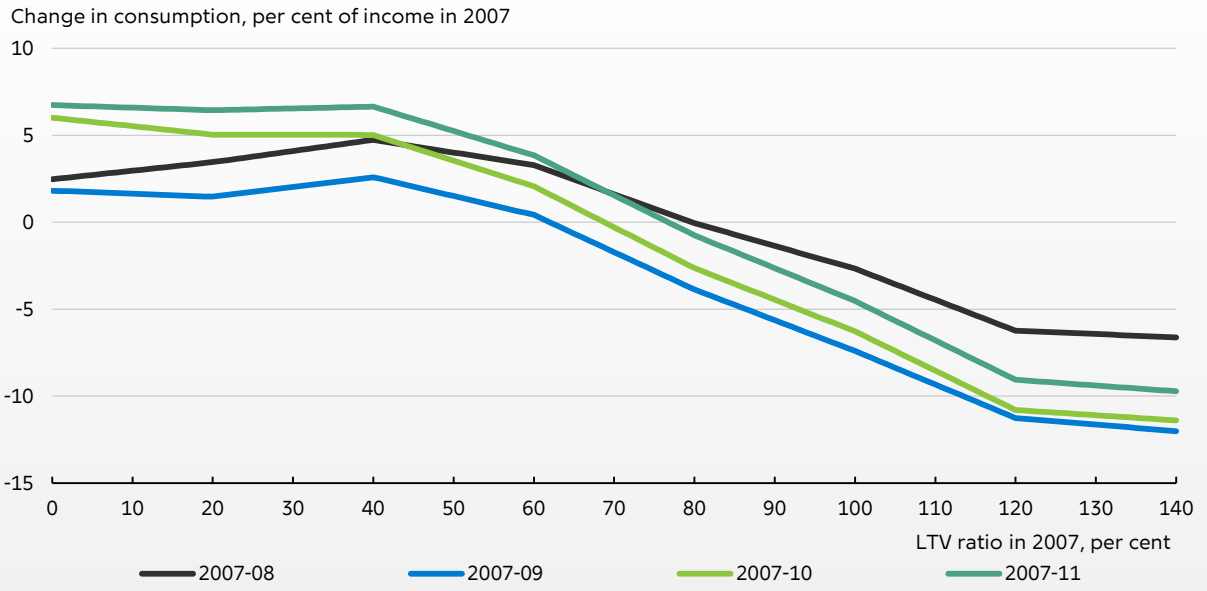
The family's disposable income in 2007, $Y_{i;07}$, net wealth in 2007, $NW_{i;07}$, and the family's holdings of liquid assets in 2007, $LA_{i;07}$, are included as control variables. Disposable income is measured logarithmically, while net wealth and the holdings of liquid assets are measured as percentages of the family's total income before tax in 2007. In addition, we control for the changes in disposable income, $\Delta Y_{i;07\text{-}s}$, housing wealth, $\Delta H_{i;07\text{-}s}$, and the number of children in the family, $\Delta kids_{i;07\text{-}s}$, from 2007 to the last year of the period. The changes in disposable income and housing wealth are measured as percentages of the family's income before tax in 2007.

The variable $\Delta C_{i;06\text{-}07}$ denotes the change in consumption from 2006 to 2007, given as a percentage of income before tax in 2007. This variable is included to allow for any extraordinary fluctuations in consumption in 2007. For instance, if the family bought a car in 2007, this will appear as a substantial increase in consumption in that year – and a subsequent major decline from 2007 to 2008. If the purchase of the car is loan-financed, it will also, all else equal, lead to a higher LTV ratio in 2007. If this is not taken into account, a negative correlation may be found between the LTV ratio and the subsequent development in consumption, driven solely by random, extraordinary fluctuations in consumption in 2007.

Finally, $\boldsymbol{X}_{i;07}$ denotes a vector of the family's characteristics in 2007 which may affect the subsequent development in consumption: the age of the family's oldest member, the age of the family's youngest child, the number of years since the family took up residence at the address, the number of pensioners in the family, the number of family members with higher education, and the family's municipality of residence. For a more detailed description of all variables and estimation results, see Andersen et al. (2014).

LTV ratio in 2007 and subsequent change in consumption

Chart 3



Note: The chart is based on an estimation of the econometric model described in Box 3. The curves indicate the average model-predicted changes in consumption over the time horizon stated for various values of the LTV ratio in 2007. For a given value of the LTV ratio in 2007, the average model-predicted change in consumption is calculated as follows: First, the model-predicted change in consumption at the relevant LTV ratio for each family in the sample is calculated, given the family's other characteristics. The average is then calculated for all the families in the estimation sample.
Source: Own calculations based on register data from Statistics Denmark.

mates, result in a fall in consumption from 2007 to 2011 of 4.5 per cent of its income before tax in 2007. Conversely, a comparable family with an LTV ratio of 60 per cent in 2007 would have experienced an *increase* in consumption from 2007 to 2011 of 3.8 per cent of its income before tax in 2007. Hence, the difference in consumption growth from 2007 to 2011 between a family with an LTV ratio of 100 per cent in 2007 and a comparable family with an LTV ratio of 60 per cent in 2007 is estimated at -8.4 per cent of its income in 2007. Accordingly, if a family with an LTV ratio of 100 per cent in 2007 had an income before tax of kr. 500,000 in that year, the change in consumption from 2007 to 2011 would, all else equal, be approximately kr. 42,000 lower than for a comparable family with an LTV ratio of 60 per cent in 2007.

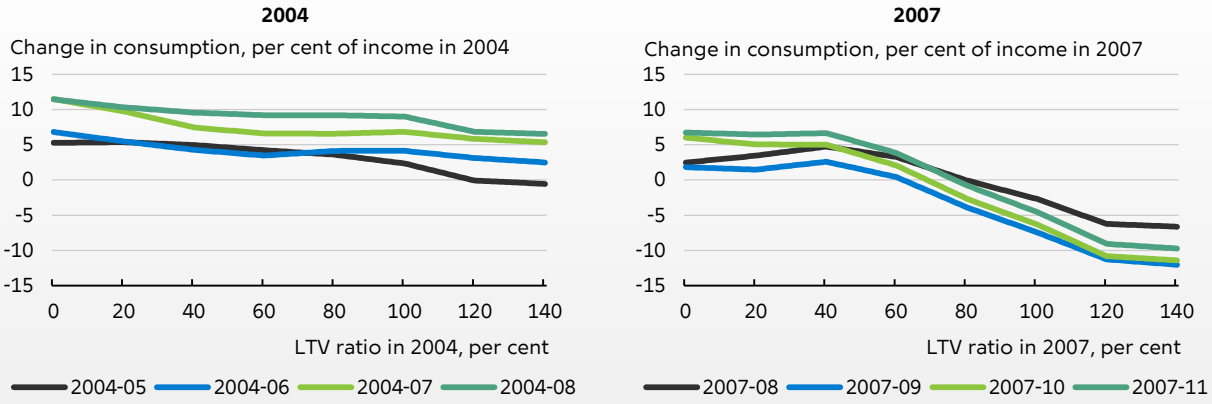
HOW SHOULD THE RESULTS BE INTERPRETED?

The above results can be interpreted to mean that the marked indebtedness among Danish homeowner families before the financial crisis contributed to amplifying the drop in private consumption during the crisis. One reason may be that a sudden tightening of credit conditions forced the highly indebted families to reduce their consumption more than other homeowner families. Another reason may be that increased crisis awareness and uncertainty about future financial conditions induced the highly indebted families to reduce consumption on their own initiative. Whatever the exact mechanism, according to this interpretation it was the *combination* of a high level of gross debt and a financial crisis that led to the substantial reduction of consumption among the families with high LTV ratios. The high level of debt among Danish households thus contributed to amplifying the effects of the financial crisis.

This interpretation of the results is supported by the fact that the relationship between the LTV ratio and the development in consumption is much more pronounced in the years around the financial crisis than in the preceding years, cf. Chart 4. In the left panel of the chart we consider the relationship between the LTV ratio and the subsequent development in consumption in the period *before* the financial crisis. The chart is constructed in exactly the same way as Chart 3, only with 2004 as the base year instead of 2007. To facilitate comparison of the two charts, the chart with 2007 as base year is presented in the right panel of Chart 4 on the same scale as in the left panel. There are clear differences between the two panels: Firstly, there is a distinct level difference between the the two sets of curves, reflecting that consumption growth was higher in the period 2004-08 than in the period 2007-11. More importantly, however, the slopes of the curves differ considerably in the two panels. Both panels show a negative relationship between the LTV ratio and the subsequent development in consumption, but the relationship is much stronger in the financial crisis period 2007-11 than in the period 2004-08. This indicates that the negative relationship between the LTV ratio and the development in consumption in the financial crisis period is related to the special economic circumstances during that period. The development in house prices may have played a particularly important role in that perspective: Families with high LTV ratios already in 2007 must, all other things being equal, have had *even* higher LTV ratios in 2009 due to the subsequent pronounced drop in house prices. This probably contributed to amplifying the drop in consumption. But in the period 2004-08, the development in house prices had the opposite effect: For families with high LTV ratios in 2004, the subsequent price increases contributed to lower LTV ratios and thus a weaker impact on consumption.

The contrast between the right-hand and left-hand sides of Chart 4 may also be seen as an argument against a number of other interpretations of the negative relationship between the LTV ratio and the subsequent development in consumption. For instance, one alternative interpretation is that the observed divergence in consumption development between families with high and low LTV ratios, simply reflects ordinary consumption and saving patterns: Families that, for some reason, had relatively high levels of consumption in the period until 2007 typically had high LTV ratios in 2007 for the

LTV ratio and subsequent change in consumption, 2004 and 2007 Chart 4



Note: See the note to Chart 3.
Source: Own calculations based on register data from Statistics Denmark.

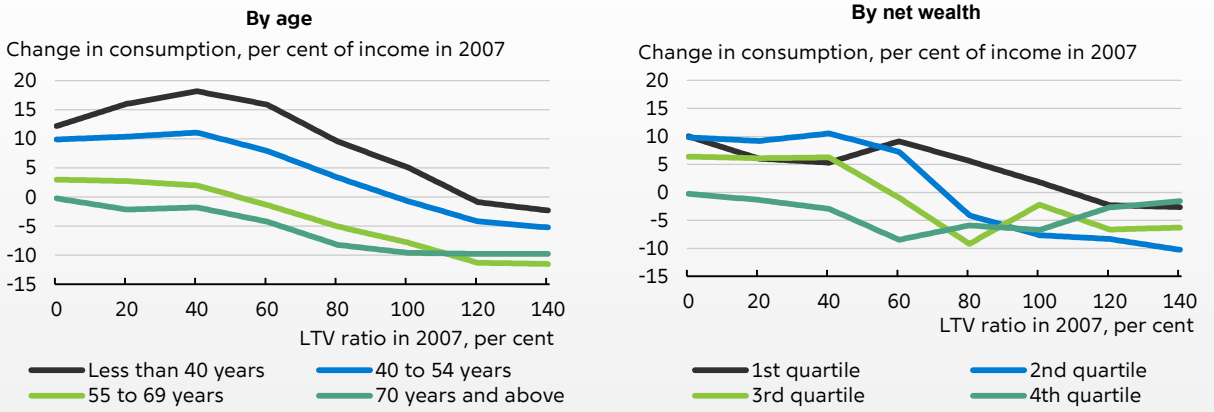
same reason. After a period of high consumption financed by borrowing, their consumption has to decline again at some point (in relative terms), so the consumption growth of those families should typically be more subdued in the period after 2007 than that of other families. So according to this interpretation there is no direct linkage between the LTV ratio and the subsequent development in consumption. But if the observed relationship between the LTV ratio and the development in consumption were attributable to such normal, planned consumption patterns alone, such relationship should be just as pronounced in other time periods. Chart 4 shows that this is not the case.

DOES THE RELATIONSHIP EXIST AMONG ALL GROUPS OF FAMILIES?

The negative relationship between the LTV ratio in 2007 and the development in consumption in the subsequent years applies to all age groups, although it is somewhat less pronounced among the oldest families, cf. Chart 5 (left). A similar pattern is seen if families are grouped according to net wealth in 2007, cf. Chart 5 (right): Among the one fourth of the families with the largest net wealth, the relationship between the LTV ratio and the subsequent development in consumption is not quite clear. This group differs somewhat from the others, however: A relatively clear negative relationship is thus found among all other groups. It is particularly worth noting that the one fourth of the families with the smallest net wealth does not differ substantially from the other groups. This emphasises that the results in the preceding sections apply not only to the families that have borrowed so much that the value of their liabilities significantly exceeds the value of their assets. Similar conclusions are reached if the families are grouped according to e.g. geographical region of residence, income or holdings of liquid assets in 2007, meaning that the negative relationship is broad-based across various groupings.

This gives us some idea of the mechanism behind the observed relationship between the LTV ratio in 2007 and the subsequent development in consumption. If the weaker development in consumption among the highly indebted families were attributable solely to a tightening of credit conditions, the negative relationship should have been particularly evident among families with small holdings of liquid assets in 2007, since those families can be expected to be more affected by credit constraints than other families. That is not the case, however. The results therefore indicate that factors other than restrictions on the access to credit play a role. One possible explanation of the results is that events during the financial crisis led to widespread crisis awareness, inducing the highly indebted families to reduce their consumption to avoid further debt. Such crisis

LTV ratio and change in consumption 2007-11, broken down by age and net wealth in 2007 Chart 5



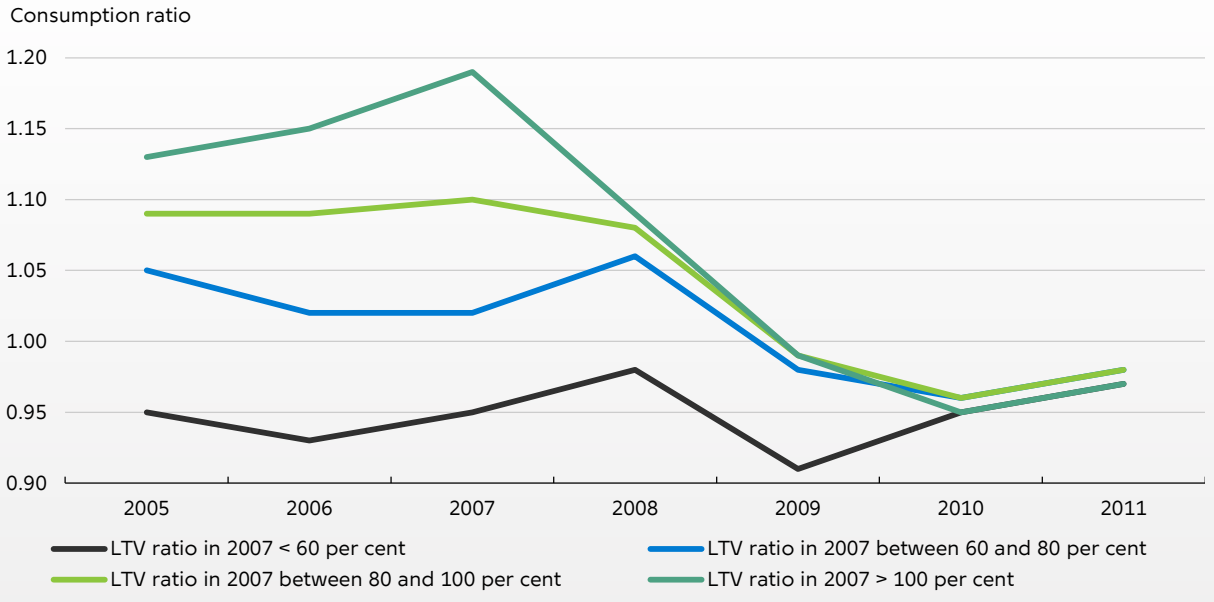
Note: The chart shows the average model-predicted changes in consumption over the period 2007-11 for different values of the LTV ratio in 2007 (see the note to Chart 3). In the left-hand side of the chart, the families are grouped according to the age of their oldest member in 2007. In the right-hand side of the chart, the families are divided into four groups of equal size, ranked according to the size of their net wealth in 2007. The families in the 1st quartile have the smallest net wealth, while the families in the 4th quartile have the largest net wealth.
Source: Own calculations based on register data from Statistics Denmark.

awareness may have affected a wide range of indebted families across differences in age, income and wealth, etc.

LTV RATIOS AND LEVELS OF CONSUMPTION

In the previous sections we have concentrated solely on the relationship between a family's LTV ratio immediately before the financial crisis and the *change* in its consumption pattern during the crisis. But it is also relevant to look at the relationship between the LTV ratio and the *level* of consumption before and during the crisis. Families with high LTV ratios at end-2007 generally had higher consumption-to-dispos-

Development in families' consumption ratios, broken down by LTV ratio in 2007 Chart 6



Note: The consumption ratio is calculated as consumption divided by disposable income. The chart shows the median consumption ratio within each group of families. The chart only includes families that existed in every year of the period 2005-11 and were not involved in property transactions during the period under review.
Source: Own calculations based on register data from Statistics Denmark.

able-income ratios before the crisis than families with lower LTV ratios, cf. Chart 6. As also shown in the previous sections, it was precisely those families who reduced their consumption the most when the financial crisis began. Looking at the level of the consumption ratio in 2010 and 2011, on the other hand, there is no clear correlation with the LTV ratio in 2007. In those years, the highly indebted families are at the same level as the other homeowner families.

So the results in this article only document a negative relationship between the LTV ratio before the financial crisis and the subsequent *change* in consumption. On the other hand, there is no direct basis for concluding that the *level* of consumption would have been higher in recent years if the indebtedness of Danish homeowner families had been lower before the crisis. Rather, the pattern in Chart 6 seems to indicate that the heavy indebtedness before the crisis contributed to a very high level of consumption in that period among some homeowner families. When the crisis erupted, those families reduced their consumption substantially, thus contributing to a marked decline in aggregate demand and activity in the Danish economy.

It is difficult to determine whether the observed reduction of consumption among the families with high LTV ratios should be viewed as an adjustment to an excessive level of consumption during the crisis, or whether it is in fact the lower level of consumption in the subsequent years that deviates from the norm. The analysis in this article provides no definitive answer to that question. One of the reasons is that the analysis only includes data from a single business cycle, thus making it difficult to predict the development of consumption among the highly indebted families in the coming years. The results in this article indicate, however, that a high level of debt among homeowners may contribute to larger fluctuations in consumption when the economy is hit by financial turmoil.

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DEVELOPMENT IN AND RETURN ON NET FOREIGN ASSETS

Paul Lassenius Kramp and Maria Hove Pedersen, Economics, and Lasse Nørgård Vogelius, Statistics

INTRODUCTION AND SUMMARY

Over the last more than 20 years, Danish residents have moved from having a foreign debt of just under 30 per cent of the gross domestic product (GDP) in the mid-1990s to having net foreign assets of almost 38 per cent at the end of 2012. As a result of this development, Danish households and firms are today receiving considerable net foreign investment income. This article examines the development in net foreign assets and investment income over time and across countries, including the effects of the financial crisis and the extraordinarily low interest rates.

Changes in prices and exchange rates entail capital gains or losses on financial assets. Although they seem to net out over time in the measurement of a country's net foreign assets, they may have a rather marked impact on net foreign assets in some periods. Developments in equity and bond prices and exchange rates in the period 2008-12 have indicated capital losses on net foreign assets in countries with high credit ratings, although this masks some variation due to country-specific factors. In Denmark, one contributing factor has been the substantial pension wealth, as falling interest rates have generated large capital gains especially for the pension sector. In the period from end-2008 to end-2012, Danish residents thus received net capital gains exceeding kr. 300 billion on foreign assets. If interest-rate levels were to normalise, this is expected to partially reverse the countries' capital gains and losses accumulated since the onset of the financial crisis – including parts of Danish investors' capital gains on their foreign assets.

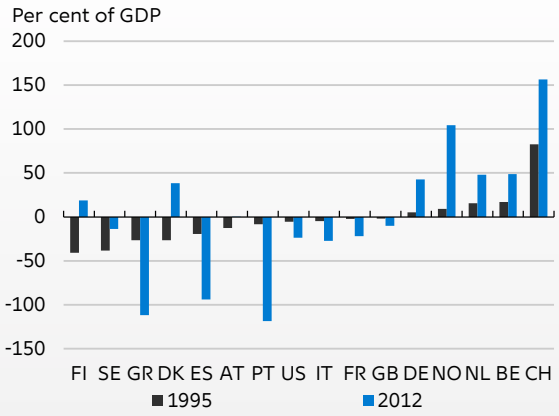
Net foreign assets generate investment income in the form of interest and dividend payments, which thus increase in step with the net foreign assets. Moreover, investment income is also influenced by the composition of the net foreign assets. The financial crisis has resulted in lower return on all asset types, given the decline in both interest rates and return on equities. Nevertheless, the impact on net investment income has been limited, reflecting lower income and expenditure, among other factors. This indicates that normalisation of the return on foreign direct investment (FDI), equities, bonds, etc. will have only a limited effect on investment income in most countries.

In recent years, the return on Danish residents' net foreign assets has been higher than what could be expected in an international comparison, viewed in isolation. One of the reasons is that interest-rate levels have decreased slightly more in Denmark than the average fall abroad, entailing a more pronounced decline in Danish residents' interest payments to non-residents than vice versa. Normalisation of the return on equities and FDI – entailing positive net wealth for Danish residents – will, however, have the opposite effect. All in all, interest and dividend payments to abroad have decreased slightly more than income. As a result, investment income would tend to decline in the event

of normalisation of interest rate and dividend levels, although this development is subject to uncertainty.

However, Danish residents' foreign investment income is determined especially by the size of the net foreign assets, so it can be seen as the result of prudent economic policy – generating current-account surpluses – over the last 30 years. Consequently, continued current-account surpluses and thus growing net foreign assets will ensure that considerable investment income can be expected in future, notwithstanding a possible slight increase in Danish residents' interest payments to abroad.

Net foreign assets in 1995 and 2012 Chart 1



Note: Ireland and Luxembourg have been excluded from the chart due to their very large balances. For three countries observations for 1995 are missing. Instead, observations for 1998 have been applied as regards Greece and Norway and observations for 1996 regarding Portugal.
Source: IMF.

NET FOREIGN ASSETS

At the end of 2012, Danish residents – defined as all domestic sectors taken as one, i.e. households, firms, the public sector and Danmarks Nationalbank – held assets abroad for kr. 5,130 billion, while non-residents held Danish assets amounting to kr. 4,440 billion. Consequently, Danish residents held net foreign assets of kr. 690 billion, or just under 38 per cent of GDP. In gross terms both Danish residents' assets abroad and non-residents' assets in Denmark have increased strongly in step with the growing integration of the global economy and the financial markets. The same trend is seen in other countries.

But not only gross amounts have grown. Over the last 10-15 years, net foreign assets have generally increased in a number of advanced economies.[1] Countries with foreign debt in 1995 typically had larger foreign debt in 2012, whereas countries with net foreign assets in 1995 had more pronounced net foreign assets in 2012, cf. Chart 1. Only in Denmark, Finland and Austria has net foreign debt been changed to net foreign assets, while Sweden has reduced its net foreign debt.

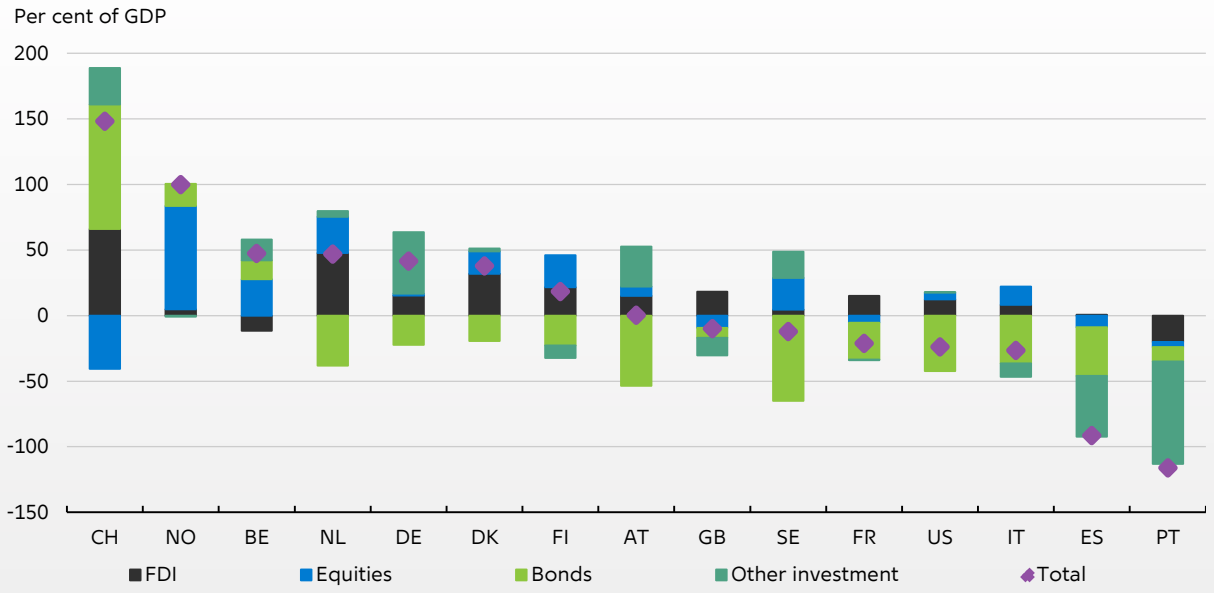
Net foreign assets comprise various types of financial instruments, the main categories being FDI (i.e. the investor has an ownership share with controlling influence), portfolio investment in equities and bonds as well as derivatives and other investment (particularly loans and deposits and central banks' foreign-exchange reserves), cf. Chart 2.[2] The composition of the net foreign assets of a given country has great influence on both the return on net foreign assets and the size of capital gains and losses. In countries where the net equity portfolio is positive, capital gains will, all else equal, be achieved over time due to rising equity prices. Danish residents have large positive net portfolios of FDI and equities, but a negative net portfolio of bonds.

The key driver of the long-term trend in the countries' net foreign assets is their accumulated current-account surpluses and deficits. In the event of a current-account surplus, i.e. a savings surplus, net foreign assets tend to grow. Moreover, there may be capital gains and losses on the net foreign assets. Although they seem to net out over time, they may have a rather strong impact on net foreign assets in certain periods.

1 In this article, the definition of net foreign assets implies that foreign debt is measured as negative net foreign assets.

2 The individual instruments are described in more detail in Wederkinck (2011).

Net foreign assets in 2012 Chart 2



Source: IMF.

CAPITAL GAINS AND LOSSES

Capital gains (losses) on residents' net foreign asset arise if the price – in local currency – of the foreign assets increases (decreases), or if the price of domestic assets held by non-residents falls (rises). Globally, the sum of capital gains should be zero, since a gain in one country is always offset by a corresponding loss in other countries. In practice, capital gains and losses do not always net out due to errors and omissions in the measurements.

It should be noted that if, for instance, the value of Danish equities held by non-residents increases, Danish residents will generally suffer a capital loss. If, for instance, the ownership of a Danish firm is distributed as half foreign investors, half Danish households, a rising equity price will result in capital gains for both non-residents and Danish households. In the measurements of Danish residents' net foreign assets, this will entail a higher value of Danish equities (assets) held by non-residents, thus – all else equal – reducing Danish residents' net foreign assets. This implies that Danish residents have to pay more to buy Danish equities held by non-residents. On the other hand, it cannot be interpreted as a loss of welfare, since the firm in question has not become poorer in reality; only the value of its equity has risen. Actually, rising equity prices in Denmark reflect expectations of higher future income, i.e. strong economic performance in Denmark.

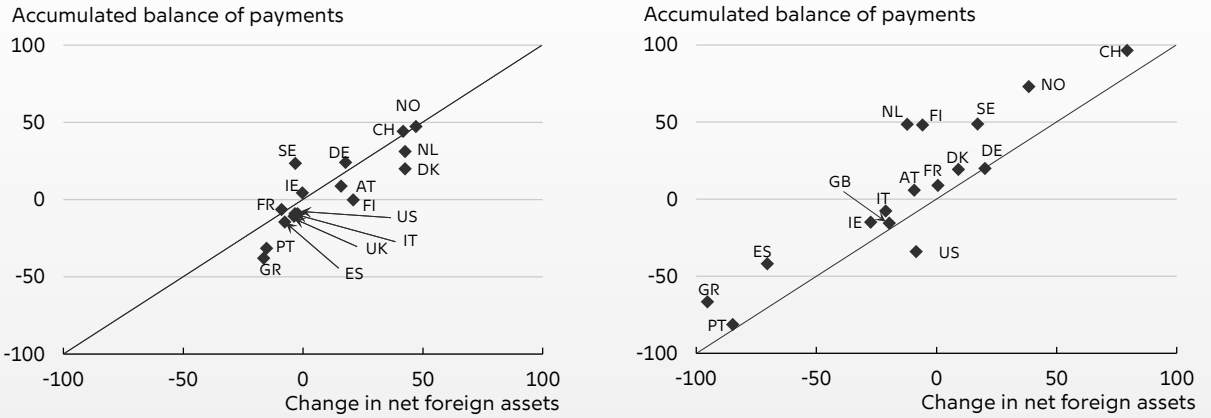
Since 2008, net foreign assets have generated substantial capital gains for the residents of a number of countries, such as Denmark, Finland, Portugal and Greece, but capital losses for the residents of other countries, particularly Sweden, cf. Chart 3 (left).[3]

The sovereign debt crisis – which escalated strongly in 2011 – entailed capital inflows into countries with high credit ratings, such as Denmark, Norway, Switzerland and Sweden. As a result, the Norwegian krone, the Swedish krona and the Swiss franc strengthened, illustrated by the nominal effective exchange rate of the Swedish krona, which was approximately 18 per cent stronger in 2012 than in 2008. The development in the Danish krone was far more stable due to the fixed-exchange-rate policy. A

3 Besides capital gains/losses, the difference between accumulated balances of payments and changes in net foreign assets is also attributable to errors and omissions, i.e. the divergence between the measure of the current account and the financial account of the balance of payments. Errors and omissions can arise because the payment for a product or service is not necessarily executed at the same time as the actual transaction, among other factors.

Changes in net foreign assets and accumulated balance of payments, percentage of GDP, 2008-12 (left) and 1995-2007 (right)

Chart 3



Note: Countries above the 45-degree line have had accumulated capital losses, while countries below the line have had accumulated capital gains. The accumulated balance of payments has been calculated as the accumulated nominal balance of payments normalised using GDP in 2012. Changes in net foreign assets are nominal changes over the period normalised using GDP in 2012. Right-hand chart: For Greece, Ireland, Italy and Norway the observations are for 1998-2007, for Portugal the observations are for 1996-2007.
Source: Eurostat, IMF and own calculations.

strengthening of the currency tends to reduce the value of net foreign assets in local currency and hence entail net capital losses. Sweden is a case in point, in that the appreciation of the Swedish krona reduced the value of Swedish residents' net foreign assets measured in Swedish kronor.

Capital gains/losses are influenced by exchange rates, but also by the relative price developments in domestic and foreign assets, especially equities, although bond prices may also play a role in the event of substantial interest-rate increases. Equity price developments in a number of southern European countries, including Greece, Italy and Portugal, have been very weak in recent years due to the severe recession in these countries, while equity prices in countries with higher credit ratings – including Denmark – have performed relatively well during the crisis. This has led to net capital losses in countries with high credit ratings, as the value of their outward FDI has risen only slightly or perhaps even decreased, while the value of inward FDI in highly-rated countries has risen. However, Finland is an exception, due to non-residents' considerable capital losses generated by the strong drop in the value of Nokia equities, which has increased Finnish residents' net foreign assets. It should be noted that this cannot be interpreted as a welfare gain for Finnish residents; it only means that it has become cheaper for them to buy non-residents' Nokia equities.

Government bond prices have shown almost the same pattern as equity prices, i.e. a decline in southern Europe due to higher interest rates, and an increase in countries with high credit ratings as a result of falling interest rates. This directly entails capital gains in lower-rated countries and capital losses in higher-rated countries. Sweden is a case in point. Denmark and to some degree the Netherlands stand out from other highly-rated countries, because the drop in interest rates has also yielded considerable capital gains. As regards Denmark, the main reason is that Danish pension funds have achieved large capital gains on interest-rate hedging particularly with non-resident counterparties. This is mirrored in the Netherlands, where pension wealth is also very substantial.[4]

Consequently, effects of the financial crisis are the main factor behind the capital gains and losses observed since 2008. To get a picture of a more normal situation it is useful to compare with the period 1995-2007, i.e. the period leading up to the financial crisis, cf. Chart

4 It should be noted that for most Danish pension funds these capital gains are offset by corresponding losses on pension obligations (liabilities), although the latter are predominantly domestic accounts with no effect on net foreign assets.

3 (right). It is notably different from the period since 2008, because all the countries shown, except the USA, recorded capital losses.

As regards the USA, it is well known that the patterns of the balance of payments and foreign debt have diverged, entailing continuous capital gains for the USA. There are several possible explanations, e.g. that US firms obtain capital gains on their foreign subsidiaries to a higher degree than firms in other countries.[5] Another possible explanation is the high risk profile of US investment abroad.

The capital losses in the other countries may be due to inflation differentials between the relevant country and abroad. For instance, higher inflation in Brazil relative to the euro area should entail a weakening of the Brazilian real against the euro over time. Consequently, a European investing in Brazilian bonds will suffer a capital loss on the principal, measured in euro, but in return achieve a high investment income. Since all of the countries shown have low inflation compared with countries in e.g. South America or Asia, their nominal exchange rates have generally strengthened during the period, resulting in capital losses.

The comparison of capital gains and losses in the periods 1995-2007 and 2008-12 justifies the view that some countries will record capital gains, while others – including Denmark – will record smaller capital losses in step with the subsiding effects of the financial crisis on exchange rates, interest-rate levels and equity prices. However, the net effect in Denmark is subject to uncertainty, since derivatives and bonds will probably generate losses, while equities will generate gains, as described in more detail below. All in all, the relative capital gains and losses on the various instruments indicate that the net effect on all Danish sectors taken as one will be a small capital loss.

CAPITAL GAINS IN DENMARK

In recent years, Denmark has differed from the other countries with net foreign assets and current-account surpluses by recording considerable net capital gains on foreign assets. The total accumulated price and exchange-rate regulations have increased Danish residents' net worth by around kr. 350 billion from end-2008 to end-2012. The largest positive value adjustments stem from exchange-rate gains on FDI (due to the strengthening of the Swedish krona, among other factors), bonds and derivatives, but also from the foreign-exchange reserve.[6] The key driver of the capital gains on bonds and derivatives is the generally lower interest rates, resulting in substantial capital gains in the insurance and pension sector in recent years, cf. Box 1.

The value of Danish residents' portfolio equities abroad rose from end-2008 to end-2012, but the value of FDI in Danish equities rose even more. This has entailed a negative net impact on the international investment position. Non-residents' equity investments are primarily concentrated in liquid Danish equities, including in the pharmaceutical industry, which have performed relatively well during the financial crisis.

It should be noted that the choice of period has a strong influence on the size of capital gains on net foreign assets. The reason is that the gross portfolios are very large, so that even minor changes in interest-rate levels or exchange rates can lead to large capital gains or losses. For example, in the period from end-2005 to end-2008, Danish residents' capital losses on net foreign assets totalled almost kr. 200 billion, and in the period from November 2007 to March 2008 alone, the total net capital loss amounted to around kr. 90 billion.[7]

5 One possible reason is that US firms have transferred knowledge to their foreign subsidiaries, e.g. in China. This knowledge transfer is not part of the current account of the balance of payments, but it increases the value of the foreign subsidiaries, generating capital gains for US firms, see e.g. Bureau of Economic Analysis (2006).

6 Most of the accumulated capital gains from FDI are attributable to exchange-rate regulations, but price changes in connection with purchases and sales have also been positive in net terms.

7 The main reason for the capital loss is that Danish residents recorded substantially larger losses on their portfolio investments in foreign equities compared with non-residents' losses on Danish equities.

Danish residents' capital gains on net foreign assets

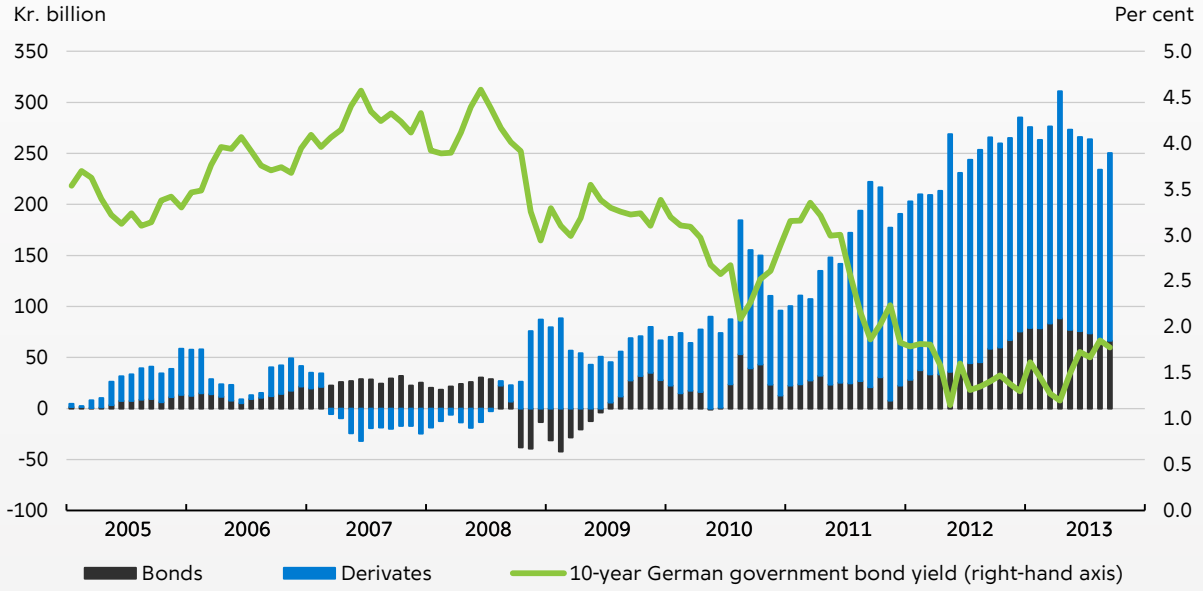
Box 1

At the end of 2012, Danish residents held foreign bonds for kr. 1,160 billion, and non-residents held Danish bonds for kr. 1,514 billion. Consequently, Danish residents' net foreign assets are negative by kr. 353 billion for bonds alone. The insurance and pension (I&P) sector's investments in foreign bonds account for more than half of the total investments in foreign bonds.[1]

The I&P sector typically invests in long-term bonds (with a maturity of more than 5 years), or concludes derivative contracts increasing the duration of their assets. The purpose is to hedge the interest-rate risk on their liabilities.[2] On the other hand, non-resident investors hold mainly Danish short-term bonds (less than 5 years), which should be viewed in the light of the markedly higher growth in the supply of short-term Danish bonds compared with the supply of long-term bonds.

The difference in maturity (duration) between Danish residents' assets and liabilities in bonds has resulted in large capital gains on both bonds and derivatives due to falling interest rates. From January 2005 to September 2013, the accumulated price and exchange-rate adjustments have increased Danish residents' net foreign assets by kr. 66 billion on bonds and kr. 184 billion on derivatives, cf. Chart 4, of which value adjustments on derivatives held by the I&P sector alone account for kr. 119 billion.

Accumulated price and exchange-rate adjustments bonds and derivatives, net



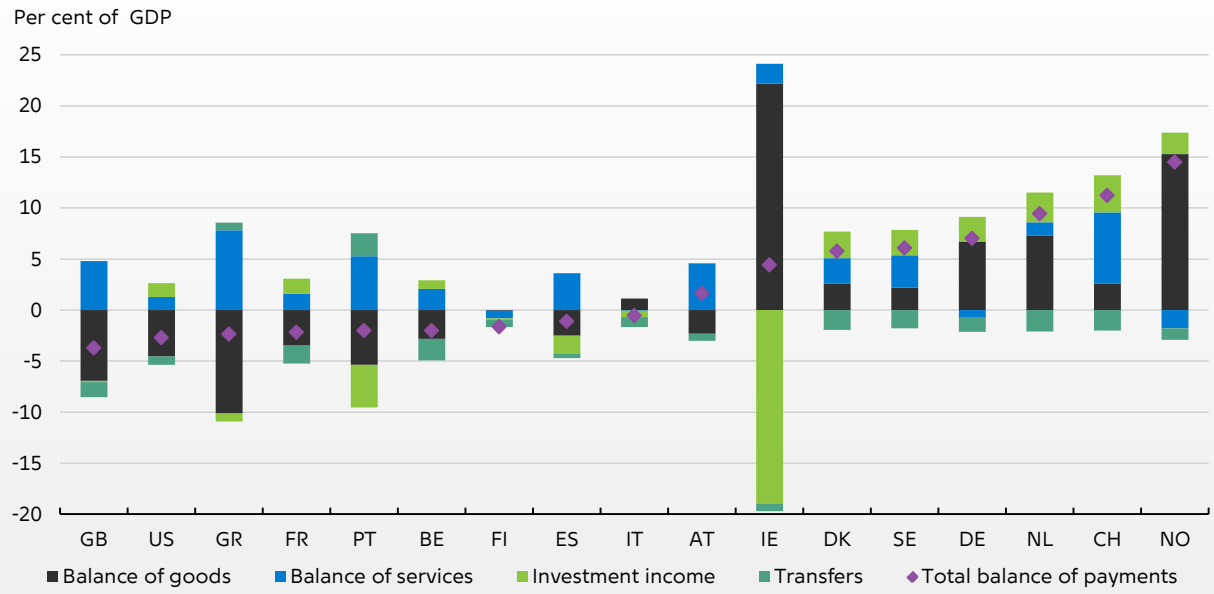
Source: ECB and Danmarks Nationalbank.

The I&P sector's interest-rate hedging generated losses in 2013 due to rising interest rates. Continually increasing interest rates will, all things being equal, lead to further losses on both derivatives and bonds. On the basis of reporting from the I&P sector, the Danish Financial Supervisory Authority calculates the expected losses/gains on the sector's holdings of bonds and derivatives in a scenario involving a change in long-term interest rates of 0.7 percentage points.[3] In 2012, the expected loss attributable to such an interest-rate increase was around kr. 75 billion. The calculation covers the whole I&P sector's accounts with both Danish and foreign counterparties, so it cannot be used directly for assessment of capital losses on net foreign assets. However, the counterparties for most of the derivative contracts are non-residents, while the counterparties for most of the bond holdings are Danish residents. If long-term interest rates abroad rise to the 2006 level, i.e. around 4 per cent, it can be expected that the gains on derivatives will be more or less reversed, but the capital loss strongly depends on the I&P sector's hedging strategy. Should the level of interest rates remain lower than before the financial crisis, e.g. due to lower structural growth in the advanced economies, only a minor part of the capital gains on derivatives will be reversed, however.

1. Investment funds in which the I&P sector has an ownership interest of more than 90 per cent are included in the sector.
2. The I&P sector's commitments consist of pension provisions and guarantees, typically with long duration. The purpose of interest-rate hedging is to ensure that the expected future income corresponds to the future pension commitments, and that the value of assets follows the commitments, should the level of interest rates change. The I&P sector typically hedges interest rates by ensuring a fixed rate on their investments irrespective of the course of the general level of interest rates. This can be achieved by e.g. buying fixed-rate bonds with very long maturities and by concluding derivatives contracts. If the level of interest rates declines, the market value of the I&P sector's hedging portfolio will rise (capital gain) and, conversely, an increase in interest rates will result in a lower market value of the hedging portfolio (capital loss). Given that most counterparties for I&P interest-rate-hedging derivatives are non-residents, the drop in the general level of interest rates in recent years has generated large capital gains on the I&P sector's net foreign assets. See e.g. ATP (2012).
3. See Danish Financial Supervisory Authority (2012) and (2007).

Balance of payments, 2012

Chart 4



Source: IMF.

THE CURRENT ACCOUNT AND ITS COMPOSITION

As mentioned earlier, a current-account surplus or deficit is the main driver of changes in countries' net foreign assets. The current account of the balance of payments is the sum of three components: the trade balance for goods and services, investment income and transfers, e.g. contributions to the EU and development assistance. For the large majority of countries, trade in goods and services plays the most important role, cf. Chart 4.

For a few countries, however, investment income is important. Switzerland's investment income is substantial due to considerable net foreign assets. At the other end of the spectrum, Ireland has high expenses as a result of dividend payments to non-resident corporate owners.

Investment income can be expected to gain importance for a number of countries as their net foreign assets or net debts grow.

INVESTMENT INCOME

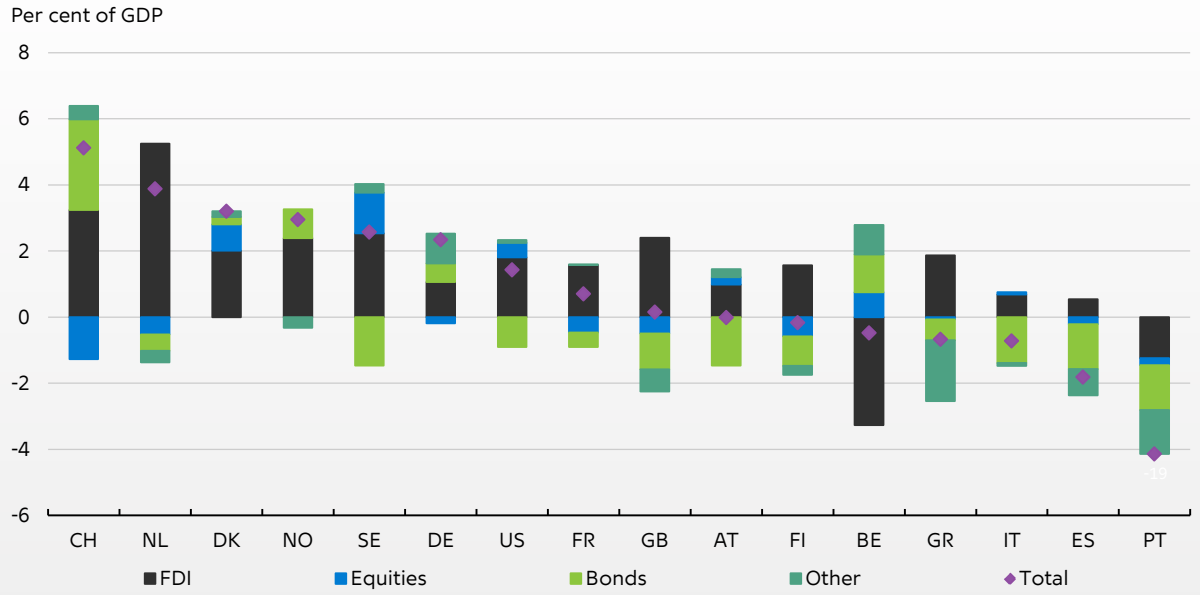
Investment income in the national accounts consists of interest and dividends received and paid, thus changing in step with the size of net foreign assets. Positive investment income increases a country's income and hence the scope for consumption and investment. In 2012, investment income accounted for more than 3 per cent of GDP for several countries, including Denmark, cf. Chart 5. Investment income thus makes a positive contribution to Denmark's overall prosperity.[8]

Besides being affected by the size of the net foreign assets, investment income is also influenced by fluctuations in returns, i.e. the percentage return, and by the composition of net foreign assets. Returns are typically higher during boom periods, because corporate earnings are higher, resulting in higher dividend payments, and because interest rates are higher. Moreover, returns are determined by risk profiles; the return on FDI is typically higher than the return on other instruments, as a case in point. This contributes to the fact that most of the investment income in the majority of countries is generated by FDI.

8 The gross national product, GNP, includes wage and investment income to and from abroad, thus usually providing a more accurate picture of a country's level of prosperity. On the other hand, the relationship between GNP and employment is weaker than the relationship between GDP and employment.

Net investment income in 2012

Chart 5



Note: No data about equity income in Norway. Income from Other thus contains income from both equities and other investments..
Source: IMF.

RETURNS ON NET FOREIGN ASSETS OVER TIME AND ACROSS INVESTMENT CLASSES

The declines in both corporate earnings and interest rates in the wake of the financial crisis have impacted considerably on the returns on net foreign assets. The returns on interest-bearing assets have decreased, returns on bonds have almost mirrored the development in longer-term interest rates, while returns on other investment, mainly loans, have largely followed money-market interest rates, cf. Chart 6.

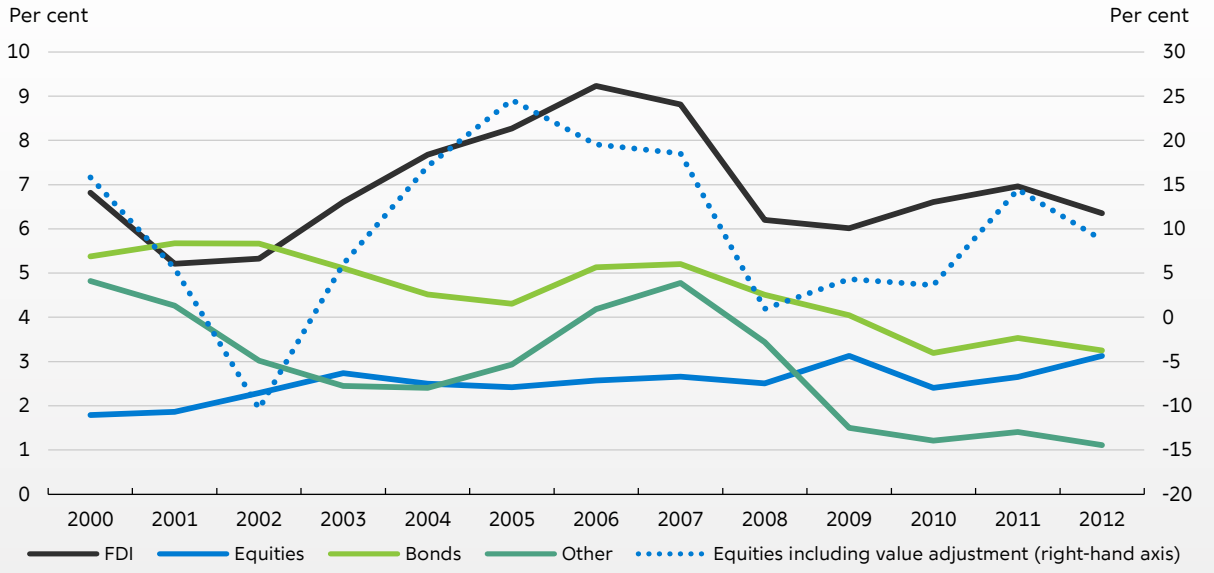
The return on FDI across countries fell from around 9 per cent in 2007 to 6 per cent in 2012, probably reflecting the decline in corporate earnings in the period. The compilation of investment income from equities in the national accounts, i.e. dividend return, differs from the return on FDI in that it does not include firms' retained profits (reinvested earnings). This results in a low registered return in the national accounts. Instead, retained profits will increase the equity price, generating a capital gain for the owners. Hence, corporate owners may choose to retain the firm's profits or pay out the profit – or parts thereof – as dividend or as buy-back of own equities or a combination of the two. The method of disbursement of profits to the owners depends on tax-related factors, among other factors. The return on equities has been relatively stable and low – stable because dividends have fluctuated in step with the firms' market values, and low because parts of the profits have not been paid out as dividend.

To an investor, it is more relevant to look at the overall return on equities including capital gains. The total return on equities is highly volatile, but on average it has been slightly higher than the return on FDI.

CROSS-COUNTRY VARIATIONS IN RETURN

In the last 10 years, a number of countries have recorded higher returns than warranted by their net foreign assets viewed in isolation – especially France, Sweden (but with capital losses), the UK and the USA. Returns have been lower in other countries, particularly Belgium and Norway, cf. Chart 7 (left). Both Norway and Belgium are characterised by a large share of their net foreign assets being placed in portfolio equities, for which only the dividend return is registered as investment income, whereas countries with high returns have a relatively large share of FDI, which generally yields higher investment income.

Average annual return on assets Chart 6

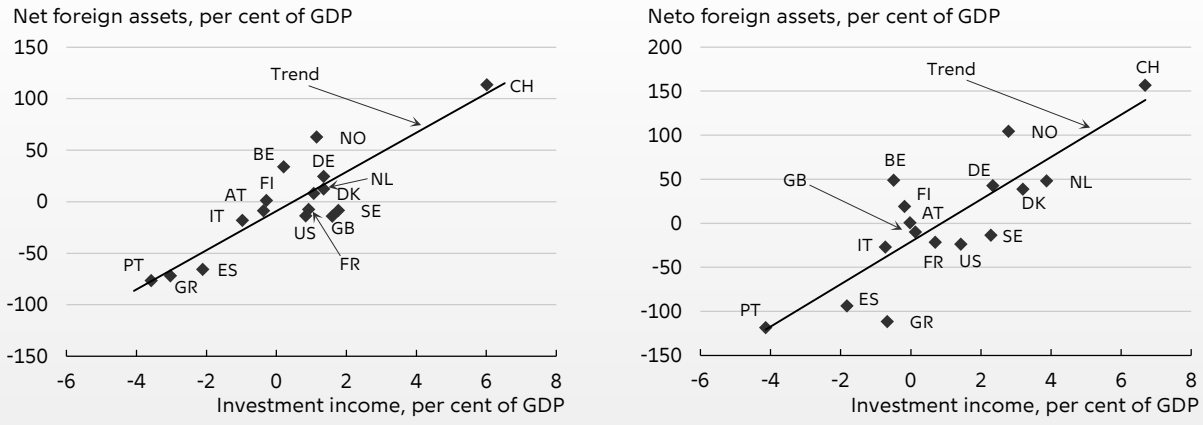


Note: The annual return is in US dollars, calculated as an aggregate for all of the countries. No observations for return on equities in Norway. No observations for Ireland before 2001 or for Belgium before 2002. Equities including value adjustments are 3-year moving averages..
Source: IMF.

Given the weak cyclical position in 2012 – entailing very low interest rates and relatively moderate corporate earnings – net foreign assets could be expected to be lower than normal. But this does not seem to be the case, cf. Chart 7 (right). The average rate of return was around 4.5 per cent in 2012, which was only slightly lower than the level of 5.3 per cent in the period 2002-12. This indicates that normalisation of the return on FDI, equities, bonds, etc. across countries will have only a relatively limited effect on total investment income, reflecting both lower income and expenditure, among other factors. The total return for a single country is thus the sum of several individual factors.

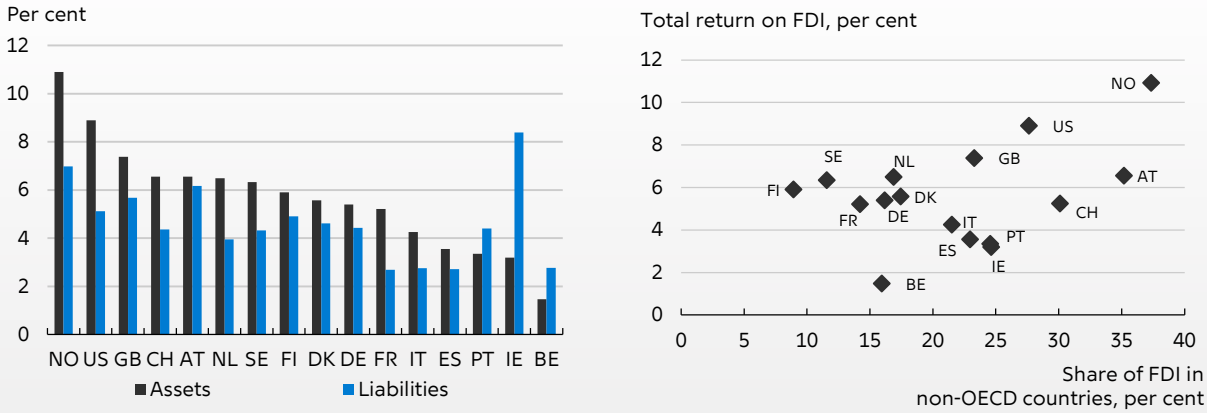
In Denmark, the return on bonds on the liabilities side has declined more than on the assets side since 2008, mainly reflecting the

Net investment income and net foreign assets, average for 2002-12 (left) and 2012 (right) Chart 7



Note: Ireland has been omitted, since both net foreign assets and investment income differ markedly from those of the countries shown.
Source: IMF.

Return on FDI, 2012 (right), and FDI in non-OECD countries, and return, 2012 Chart 8



Source: IMF and OECD (observations for the share of FDI in non-OECD countries).

stronger fall in interest rates compared with the average fall abroad. Investment income from bonds has actually been positive since 2010 despite Danish residents' net debt in bonds. The underlying factors are e.g. that non-residents' investment in Danish bonds is primarily in short-term government and mortgage bonds associated with low interest payments, while Danish residents have invested in longer-term foreign bonds. Viewed in isolation, an increase in interest rates will thus reduce investment income from bonds and loans, especially if Danish interest rates rise relatively more than interest abroad, cf. Staghøj and Jensen (2013).

Conversely, normalisation of the return on equities and FDI may increase investment income, given Danish residents' net worth in these instruments. The total net effect on the return on Danish residents' net foreign assets and hence the investment income from normalisation of all returns is thus subject to uncertainty. Rising interest rates will reduce investment income, while increasing returns on equities and FDI will probably lead to higher income.

However, Danish residents' foreign investment is determined especially by the size of the net foreign assets, so it can be seen as the result of the prudent economic policy – generating current-account surpluses – over the last 30 years. Consequently, continued current-account surpluses and thus growing net foreign assets will ensure that considerable investment income can be expected in future, notwithstanding a possible slight increase in Danish residents' interest payments to abroad.

Return on FDI across countries

The return on FDI varies strongly across countries, cf. Chart 8 (left). In the majority of the countries reviewed, assets have yielded far higher returns than liabilities. One possible reason is that the risk on outward FDI is greater than that on inward FDI, e.g. if parts of the investment are placed in emerging markets where the return is often higher than in the advanced countries.

Part of the cross-country difference in returns indeed reflects the volume of investment in emerging market economies. There is thus a certain tendency for the return on FDI to be higher in countries with more investments in non-OECD countries, cf. Chart 8 (right). The return on FDI may also be affected by a number of other factors, such as variation in corporate age (younger firms typically have lower profits), deferred tax, etc.[9]

In Denmark, net investment income from FDI has been positive and rising since 2003, mainly due to increased investment abroad. The return on both assets and liabilities varies year on year, but has been higher, on average, for assets than for liabilities over the last 13 years. With the exception of Danish pharmaceutical

9 See e.g. Curcuru et al. (2013).

companies, which have posted strong returns on their outward FDI, returns on assets and liabilities have been almost the same in recent years, cf. Andersen et al. (2013).

Denmark's outward FDI is concentrated geographically on its principal trading partners, i.e. the USA and the EU member states, which together accounted for 69 per cent of Denmark's outward FDI at the end of 2012. In 2005-12, the average rate of return was 4.7 per cent on investment in EU member states and the USA. By comparison, Danish investment in the BRIC countries (Brazil, Russia, India and China) yielded an average return of 8.5 per cent in the same period.

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VIRTUAL CURRENCIES

Anders Laursen and Jon Hasling Kyed,
Payment Systems

INTRODUCTION AND SUMMARY

In a modern market economy, money is used to pay for goods and services, either in the form of cash, i.e. banknotes or coins that are transferred directly from the buyer to the seller, or alternatively in the form of a bank transfer through the payments infrastructure, typically after the buyer has initiated the payment using a payment instrument such as a card.

The growth of the Internet has spawned a variety of networks, from online games to social networks, where Internet users meet and interact with one another according to a common set of rules. Some of these networks have introduced their own units of payment – or virtual currencies – for participants' transactions. As long as these units are used only in the closed online environment, their economic significance is limited.

Other, more interesting, types of virtual currencies are those with wider application – virtual currencies that can potentially be bought and sold in exchange for traditional currencies like kroner, euro or dollars. The best-known example is Bitcoin, which has recently attracted considerable attention from both the media and regulators. A number of similar, less widespread solutions with the same characteristics also exist.

Bitcoins are created through a decentralised network of Internet users in a process called mining, which has often been compared to the mining of gold. Bitcoins can be bought and sold on various online exchanges and, unlike national currencies, they have no central issuer. Therefore, they do not represent a claim against a company in the same way as, for example, a bank deposit. Unlike bank deposits, bitcoins are not protected by any form of guarantee.

Virtual currencies such as bitcoins are not regulated, either at the European level or in Denmark. Consequently, bitcoins are not subject to the normal protective measures for payments based on bank deposits, and consumers are not entitled to claim compensation for losses caused e.g. by hacker attacks. Recently, this has prompted several regulators to issue warnings about virtual currencies.[1]

In spite of the considerable focus on bitcoins, their use as a means of payment remains very limited, and few Danish retailers accept them as payment. Against that backdrop, the risks linked to the use of Bitcoin and other virtual currencies are currently assessed to be limited to the individual user and they are not deemed to pose a threat to financial stability in Denmark.

MONEY AND VIRTUAL CURRENCIES

Throughout history, various assets have had the same characteristics as present-day money.

1 See e.g. the Danish Financial Supervisory Authority's warning on virtual currencies, posted (in Danish) on its website, www.finanstilsynet.dk, on 17 December 2013.

Irrespective of their form, they have filled three basic functions:

- They have been widely accepted as a means of payment, i.e. they have been used for the purchase and sale of everyday goods and services.
- They have been used as a unit of account for determining prices of goods and services.
- They have been used as a storage of value, meaning that the purchase and sale of goods and services did not need to coincide in time.

Earlier, assets serving as money had an intrinsic value to the owner. For instance, gold and silver coins could be used in the manufacture of jewellery. Today, money in the form of banknotes and coins has no value in itself and its function as a means of payment is based on trust that others will accept it in payment.

A primary factor in this trust is that money is defined by law. In Denmark, Danish banknotes and coins are legal tender under the Danmarks Nationalbank Act and the Danish Coinage Act. Except in special cases provided by rules under these Acts, buyers are entitled to use Danish banknotes and coins in exchange for goods and services or for release from a payment obligation in Denmark.

Moreover, other legislation and public administration affirm the Danish krone as the national currency of Denmark. For instance, reference is made to amounts in Danish kroner in acts, and Danish kroner are also used for the collection of taxes, etc. in Denmark. Between them, these factors support the use of the Danish krone as the unit of payment – also in other contexts.

Trust in a country's currency is usually strengthened by giving its central bank the monopoly on issuing banknotes and coins. A primary objective of central banks is to maintain price stability, which ensures the purchasing power of banknotes and coins issued. This is also the case in Denmark, and it is done by pursuing a fixed-exchange-rate policy against the euro.

An alternative to money which has recently attracted increasing attention is virtual currencies. There is no clear definition of virtual currencies, but, in broad terms, they may be defined as units of payment that are not issued by a central bank and are not denominated in a national currency with the status of legal tender. Another characteristic of virtual currencies is that they typically exist in electronic form only.

Many of the payment units designated as virtual currencies are used in online social networks and online games. Some of these networks and games have introduced special means of payment used in peer-to-peer trading in the virtual environment. As these types of currencies can typically be used only in the narrow environment for which they were designed, they have no de facto significance for the real economy.

Another example of a payment unit with limited application, which, in principle, complies with the definition above is bonus points earned from the issuer when purchasing services, e.g. points earned from airlines. Points can typically be used only for purchasing more services from the issuer and possibly a few partner companies, and consequently points are of limited economic significance.

Another type of virtual currency with potentially broader perspectives is virtual currencies with wider application, which can typically be bought and sold for national currencies. They can be seen as more of a monetary alternative, but, unlike money, they typically have no central issuer. This category includes Bitcoin and a number of similar, although less widespread virtual currencies, such as Ripple, Litecoin and Peercoin.[2]

REGULATION OF VIRTUAL CURRENCIES

In Europe, the payments area is regulated by the Payment Services Directive[3] and the E-Money Directive. The former provides rules for payment services, while the latter contains provisions on the issuance of electronic money, i.e. a prepaid monetary value stored on a medium such as a card or a server, which can be used

2 See e.g. the website www.coinmarketcap.com.

3 For a description of the Payment Services Directive, see Anders Mølgaard Pedersen, The Directive on Payment Services, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter 2007.

for purchasing goods and services from others than the issuer.

In Denmark, the two directives are transposed into Danish law in the Payment Services Act, which came into force in 2009. The former Danish act also regulated a number of electronic systems for the payment of goods and services that were not covered by the two directives, e.g. electronic vouchers that represent a claim for a number of services rather than a monetary amount. Since Denmark wanted to continue regulating these systems, the concept of payment substitutes was introduced, cf. Box 1.

Virtual currencies as defined above are usually regulated by Danish law if they have an issuer. In that case, they are normally either electronic money or payment substitutes. Whether they belong in one category or the other generally depends on whether they can be used with others than the issuer. If this is the case, they are usually defined as electronic money.

Conversely, bitcoins and similar solutions with no central issuer are covered neither by European legislation nor by the Danish Payment Services Act. When virtual currencies are characterised as unregulated, this is the type referred to. The absence of regulation reflects that there is no issuer against whom statutory claims can be made. Both at the national and the international level, several regulators, e.g. the European Banking Authority, EBA, are analysing the need for regulating this type of virtual currencies and the possibilities of doing so.[4]

Payment substitutes Box 1

Payment substitutes are defined in section 102 of the Danish Payment Services Act. The Act states that a payment substitute means "the following electronic systems to the extent that they can be used to acquire goods or services without this constituting a payment service:

- Cards and other physical means of proof of identity which are linked to specific users and which are intended for electronic reading.
- Codes and biometric values intended as proof of identity of the user.
- Electronically registered claims which the issuer is obliged to pay at the request of the user."

The Consumer Ombudsman must be notified of payment substitutes before they are put into operation, while providers of payment services and e-money must be authorised by the Danish Financial Supervisory Authority. According to the Consumer Ombudsman's practice, the following are examples of payment substitutes:

- Electronic vouchers for a single legal entity, e.g. a fitness centre, laundromat or transport operator.
- Electronic gift cards or credit vouchers to be used only for purchases of goods and services from the issuer.
- Prepaid electronic accounts for online gaming to be used only for purchasing services from the provider of the website.
- SIM cards for registration and invoicing of telephone calls.
- Electronic loyalty or discount programmes, the bonus points of which can be used for purchasing goods or services.

Issuers of payment substitutes are required to comply with a number of provisions set out in the Payment Services Act, including requirements for information to be provided to users and liability regulations, charges and redemption of any remaining balance.

According to several providers, the definition of payment substitutes is subject to some uncertainty, reflecting that the definition is open-ended, i.e. referring to electronic systems that are *not* payment services. As a result, providers may have to spend resources clarifying their legal position, potentially causing them to refrain from offering the respective payment solutions. The Consumer Ombudsman has announced that, in partnership with the Danish Financial Supervisory Authority, he will prepare a guide on payment substitutes, payment services and e-money.

BITCOIN

Bitcoin is often referred to as the world's first digital currency and payment system that can be used without the involvement of traditional payment service providers such as card companies and banks. Bitcoin payments can be used for cross-border transactions and they usually have very low or no transaction fees.

HOW DOES BITCOIN WORK?

Bitcoin was invented by Satoshi Nakamoto in 2009[5], but has undergone several changes since then. The bitcoin mining process and the rules and formats for transactions are described in the *Bitcoin Protocol*. The protocol is updated

4 European Banking Authority, *EBA Consumer Trends Report 2014*, 28 February 2014.

5 Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System, www.bitcoin.org, 2009.

and amended regularly by developers in a *peer-to-peer* network, i.e. a computer network without a central server.

Bitcoins are created through an online network, open to everyone, in a process called *mining*. Participants have downloaded a special program for the purpose and contribute their computer processing power to the mining process. Mining can be seen as a form of network maintenance for which the reward is new bitcoins.

In practice, mining involves solving complex mathematical algorithms which requires much computing power. Participants compete to verify the most recent transactions by finding the solution for the algorithm. The first participant to offer the correct solution is rewarded with a number of new bitcoins. This method is designed to prevent double-spending of the same bitcoin.

The reward received for solving the algorithm is defined in the protocol. The original reward was 50 bitcoins, but approximately every four years the reward is halved, and the current reward is 25 bitcoins. In practice, this means that the total number of bitcoins is finite, 21 million which will be reached in 2140, cf. Chart 1 (left). At the beginning of March, approximately 12.4 million bitcoins had been mined, equivalent to about kr. 40 billion.

A bitcoin *wallet*, installed on a computer or smartphone, is needed to make and receive bitcoin payments. The wallet is a small program that provide access to a number of *addresses*, each with its own balance of bitcoins. Alternatively, a wallet can be stored online and be accessed through various providers.

A bitcoin address is a string of numbers and letters, e.g. 1LmHSKLndRdrfkX12AuTsqA3aEpwuPU9Jg. If a user wishes to pay by bitcoin, he needs to know the payee's address – just as it is necessary to know the payee's registration and account numbers to make an ordinary online bank transfer. The transfer is done from the user's wallet, which broadcasts it to the network for verification. Once verified by the network, the transaction is considered to be final.

TRADING AND USE

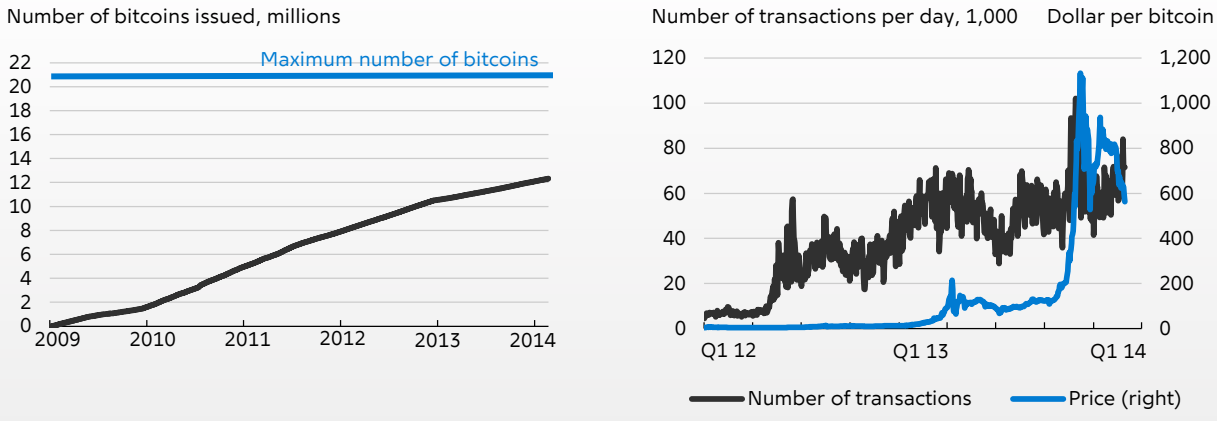
As mentioned earlier, bitcoins can be mined, but currently mining is extremely computing power intensive and, in practice, only specially designed hardware can be used for mining. For users who do not contribute their computer's processing power to the network, there are other ways to acquire bitcoins. For example, they can buy bitcoins directly from another user or via a bitcoin exchange.

A number of companies offer to exchange bitcoins for national currencies, including a few for Danish kroner. Moreover, some websites specialise in bringing private buyers and sellers together, and a few major cities have Satoshi Squares, which are open-air marketplaces for bitcoins.

The bitcoin price has been fluctuating considerably in recent months, cf. Chart 1 (right).

Volume issued, number of transactions and price

Chart 1



Source: www.blockchain.info and www.bitstamp.net.

One reason is that the market volume is relatively limited, another that, on several occasions, news about government intervention and hacker attacks on exchanges has caused sudden price changes. Most recently, Mt.Gox, the world's largest bitcoin exchange at the time, suspended withdrawals after a number of system failures, causing a sharp price fall in February. In early March 2014, the value was slightly above 600 dollars.

Although recent years have seen an increase in bitcoin use for payments, cf. Chart 1 (right), the overall use remains relatively modest. Globally, an average of some 62,000 bitcoin transactions are processed daily in 2014 relative to about 3 million daily Dankort payments in Denmark, reflecting that relatively few retailers accept bitcoin payments. According to an estimate, bitcoins are currently accepted by just under 3,500 retailers worldwide, including about 30 in Denmark.[6]

Bitcoin has often been referred to as being pseudonymous, as the address for receiving bitcoins cannot necessarily be connected to the holder of the address. This feature has opened up the possibility of using bitcoins for illegal purposes. Thus, on several occasions, Bitcoin has been associated with illegal activities, for instance when the Silk Road website (used as a venue for buyers and sellers of e.g. illegal drugs and weapons to trade and settle in bitcoins) was closed down by US authorities in October 2013.

BITCOINS AS A MEANS OF PAYMENT

According to the developers of the Bitcoin Protocol, the system was originally intended as an alternative to money to be used broadly as a means of payment. As already mentioned, bitcoins are still accepted only by a small number of payees. In addition, a number of aspects make bitcoins less suitable as a means of payment than national currencies.

It is generally accepted that a core characteristic of money is that its value is stable, i.e. that its purchasing power is constant. This helps to provide a framework for sound economic development with appropriate use of society's resources. However, the value of the bitcoin, and thus its purchasing power, has turned out to fluctuate widely against national currencies, cf. Chart 2 (left).

Moreover, it has been stated that the finite bitcoin supply may exert an underlying upward pressure on its price. This could give bitcoin holders an incentive to hold on to their bitcoins as an investment rather than spending them. In a bitcoin-based economy, this would have deflationary effects, i.e. a trend of declining prices.[7]

Many people will also tend to see bitcoin payments as more cumbersome than cash or card payments, and most people will probably find it simpler to pay using e.g. the banks' new mobile payment solutions. Moreover, the complex process of generating bitcoins could make people insecure about using them.

Furthermore, bitcoins have often been heralded as a free alternative to traditional online payments. This could prove difficult to maintain in the longer term, since the computing power needed to mine bitcoins has increased exponentially over the last six months, cf. Chart 2 (right). Increasing computing power costs will presumably lead to a demand for higher compensation for bitcoin mining. In practice, the price may go up further or costs may be covered in other ways, e.g. through fees. In 2014, an average transaction fee of just under kr. 1 has been paid per transaction.[8]

RISKS OF USING BITCOINS

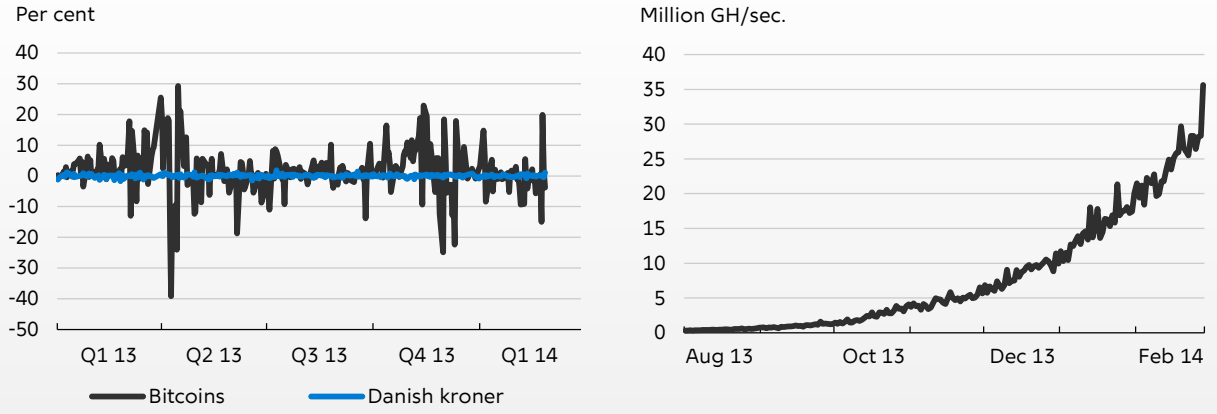
The use of bitcoins is associated with a number of risks that are not relevant to transactions based on bank deposits, reflecting primarily that bitcoin transactions are not regulated by law. Accordingly, users are not covered by the

6 See the website www.coinmap.org, as of 28th February 2014.

7 See e.g. http://krugman.blogs.nytimes.com/2011/09/07/golden-cyberfetters.

8 According to the website www.blockchain.info/charts, 10-30 bitcoins are paid in transaction fees per day.

Daily price change and hash rate Chart 2



Note: The daily percentage change in bitcoins and Danish kroner measured in terms of US dollars. The hash rate indicates the total computing power of the network. A GH – gigahash – expresses the number of potential solutions to the algorithm calculated by the network per second.
Source: www.blockchain.info, www.bitstamp.net and Danmarks Nationalbank.

provisions of the Payment Services Act on misuse, etc. and the use of bitcoins for payments is at the user's risk.

For instance, if the user's bitcoin wallet is subject to hacker attacks, he is not entitled to compensation. Conversely, bank deposit losses are subject to compensation, less deductible, after an online bank theft. Another risk of bitcoin loss is if the user loses his private key to his bitcoin wallet e.g. as a result of computer failure.

Moreover, there are examples of bitcoin exchanges and wallet providers that have closed down e.g. due to hacker attacks. Losses resulting from such events are not protected by law either. This is opposed to losses on bank deposits, which, in addition to being very rare, are covered by a depositor guarantee of a relatively large amount, in Europe up to 100,000 euro.

Furthermore, bitcoin transactions are not covered by other consumer protection provisions under the Payment Services Act, e.g. the special Danish chargeback rules for online purchases of goods and services. Under these provisions, online consumers paying by card have chargeback rights for merchandise that is not delivered or is defective. This does not apply to bitcoin transactions.

Overall, bitcoin transactions pose a number of risks for consumers that, as already mentioned, do not exist for regulated payment instruments. At the end of 2013, this prompted the EBA to issue a warning to consumers on virtual currencies, including bitcoins. The Danish Financial Supervisory Authority backed up this warning.

NEW AND MORE DETAILED MFI STATISTICS

Jens Uhrskov Hjarsbech
and Andreas Kuchler, Statistics

INTRODUCTION AND SUMMARY

Danmarks Nationalbank has published new MFI statistics that are based on new and more detailed reporting. This will contribute to a more accurate and faceted picture of the activities of the financial sector and of the financing patterns of Danish firms and households.

Breaks will occur in both balance sheet and interest rate series due to changed measurement methods and quality improvements in the MFI statistics. The changes concern sectoral classification of MFI counterparties in particular.

This article describes the main changes from the previous version of the MFI statistics, and the most important data breaks are explained. In addition, new analysis opportunities offered by the changes are outlined.

CHANGES IN METHODOLOGY AND DATA BREAKS

In some respects, the new MFI statistics deviate from the previous version as regards the data collection and processing method. Methodology changes and quality improvements have resulted in substantial shifts in levels in both interest rate and balance sheet statistics, particularly in terms of the sectoral distribution of deposits and loans. But the changes have not entailed any considerable impact on developments in the relevant series.

DATA BREAKS AND CHANGES IN THE BALANCE SHEET STATISTICS

The primary reason for data breaks is changes in the sectoral classification of MFI customers. This can be attributed to several factors. Firstly, banks' and mortgage banks' increased use of business register data ensures a higher degree of consistency in sectoral classifications across banks. Secondly, Statistics Denmark has revisited the sectoral classification in the business register, which will impact the MFI statistics as from the transition to the new statistics. Finally, non-profit institutions serving households (e.g. unemployment insurance funds and the Red Cross) are no longer included in the household sector. Box 1 outlines the sectoral classifications.

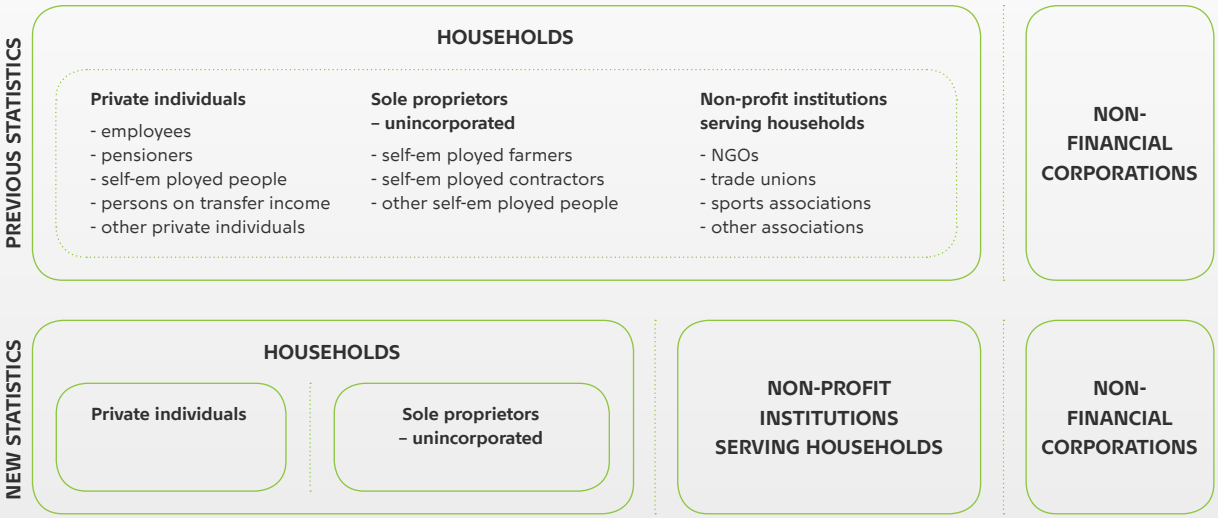
Overall, the sectoral classification changes have brought about an increase of kr. 17 billion in banks' lending to households, relative to the previous figure, and a reduction of kr. 16 billion in lending to corporations. Conversely, lending by mortgage banks to corporations has increased by kr. 53 billion, while lending to households has decreased by kr. 54 billion, cf. Chart 1.

An important methodology change is that small institutions now – like the largest ones – report considerably more details than previously[1]. However, there is still an element of grossing-up in some of the published data series,

1 The largest institutions, which at any time account for at least 96 per cent of the MFI sector's total balance sheet, have a monthly reporting frequency. Other institutions have an annual reporting frequency.

Breakdown of the private non-financial sectors in the previous and new statistics Box 1

The classification of the private non-financial sectors has been changed from the previous to the new statistics. Previously, non-profit institutions serving households were included in the household sector. Moreover, the household sector was not consistently divided into the three subsectors private individuals, sole proprietors and non-profit institutions serving households, cf. the chart. In the new statistics, non-profit institutions serving households are no longer included in the household sector. Private individuals and sole proprietors are now consistently separated, but still under the umbrella of households, cf. the chart.



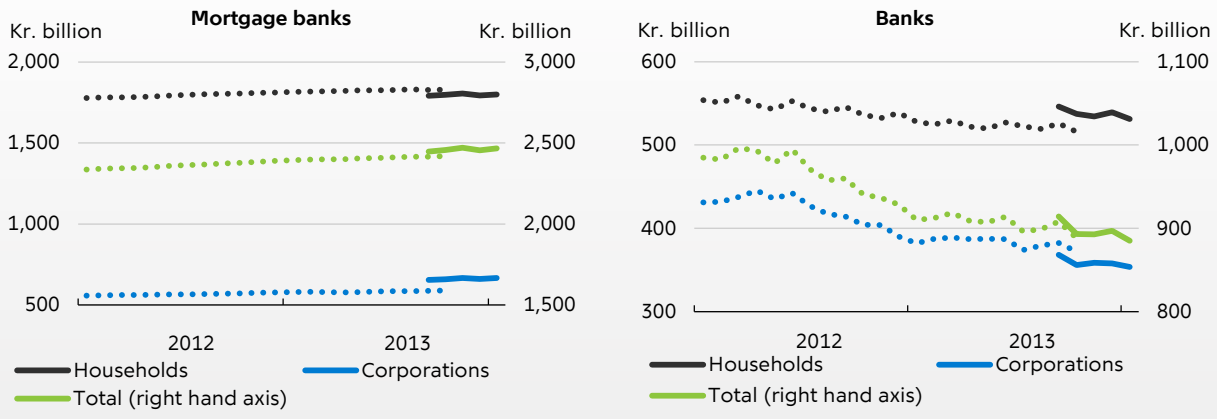
either because they are not reported by the smallest institutions, or because the smallest institutions' reporting frequency is lower than that of larger ones.

For example, the complete breakdown by industry of the institutions' loans and deposits is now available once a year, while the development in the smallest institutions in the remaining months is estimated on the basis of the monthly development in the largest institutions.

DATA BREAKS IN THE INTEREST RATE STATISTICS

In the interest rate statistics, the detailed annual reporting of loan and deposit balances from smaller institutions is now used to estimate their influence on interest rates for the MFI sector overall. The strongest impact of this relates to differences in the composition of loans and deposits of different categories between smaller and larger institutions. Together with

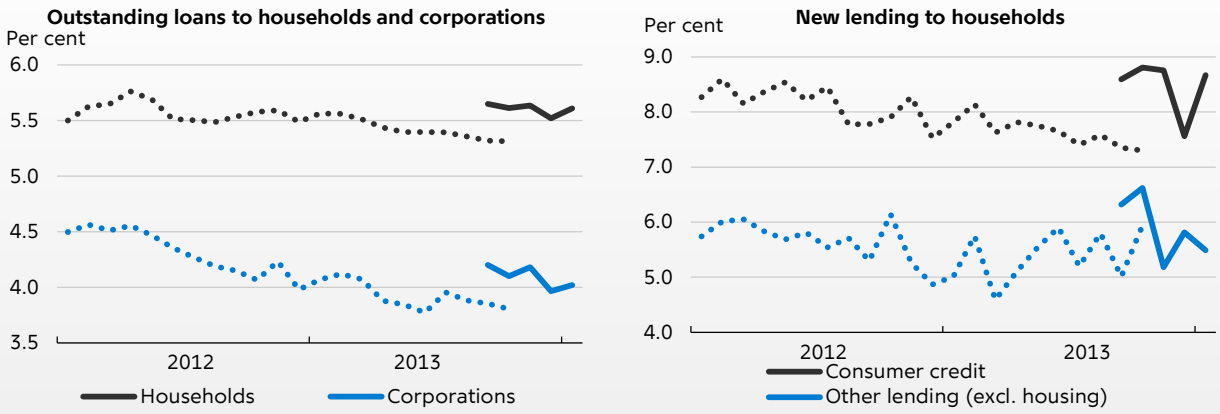
Shifts in the sector classification of domestic loans from banks (left) and mortgage banks (right) Chart 1



Source: Danmarks Nationalbank.

Banks' interest rates on new lending by purpose (left) and outstanding loans by sector (right)

Chart 2



Note: The charts are based on loans in Danish kroner to Danish residents.
Source: Danmarks Nationalbank.

New elements of the MFI statistics

Box 2

The new MFI statistics entail collection and publication of new information in several respects:

- A new index of notional stocks, which is changed only in terms of the contributions from net transactions to growth in the outstanding amount
- Information on movements (but not outstanding volumes) in mortgage lending at regional level
- More detailed sectoral classification with the opportunity to combine the sector with more dimensions than previously
- New opportunities for analysing the financing patterns of individual industries
- More detailed breakdown by loan size and possibility of separating repos in the interest rate statistics
- Compilation of mortgage loans at both nominal and market value
- Compilation of loans by original maturity and remaining maturity
- Banks' customer funding surpluses and concentration indices on a monthly basis
- Breakdown of loans by whether the interest rate mirrors a reference rate or whether the loan is fully or partially collateralised. This information is not yet available to the public due to insufficient quality assurance.

the changed sectoral classification, the new method of grossing up is the principal explanation of the shifts in the main interest rate series, cf. Chart 2. Moreover, the method of measuring interest rates on outstanding amounts has been changed. The result is that the published series of aggregate interest rates – especially as regards repos – are not fully comparable between the previous and the new compilations.

MORE INFORMATION THROUGH A HIGHER DEGREE OF DETAIL

The new MFI statistics are collected on a far more granular basis. This uncovers a host of new information and combinations and more details are collected. Box 2 describes the key new elements. Following the presentation of the new dimensions in the box, the new analysis opportunities are illustrated by way of examples.

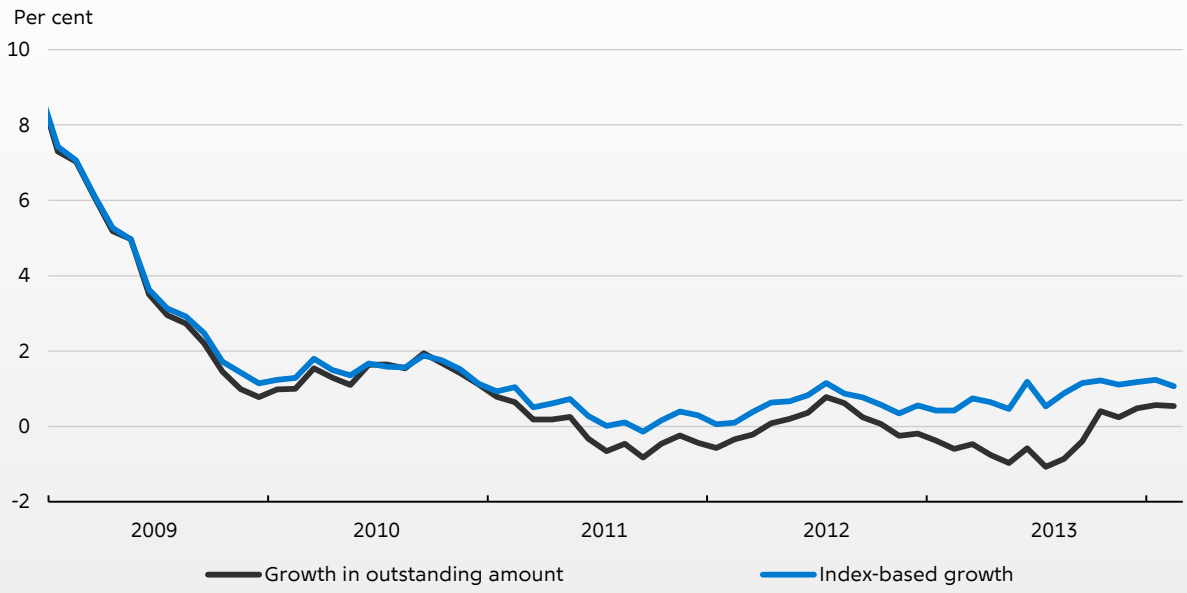
INDEX OF NOTIONAL STOCKS

The transition to the new MFI statistics entails publication of an index of notional stocks, providing a better method of analysing developments in the individual balance sheet items. The index is based solely on the contributions of net transactions[2] to monthly growth in the

2 Net transactions in loans are defined as the sum of new lending and increases of outstanding loans less the sum of instalments and redemptions of outstanding loans.

Annual growth in lending by banks and mortgage banks to Danish households and corporations on the basis of outstanding amount and an index of notional stocks, respectively

Chart 3



Source: Danmarks Nationalbank.

outstanding amount[3]. The index can thus be used for calculations of monthly and annual growth rates for e.g. deposits and loans on the basis of net transactions.

Since the index is based on the contributions of net transactions to the balance sheet change, it has been adjusted for e.g. exchange rate fluctuations and losses as well as transfers of loan portfolios to and from abroad. To some extent it has also been adjusted for loans transferred to units without a banking licence under the Financial Stability Company. Although the previous version of the MFI statistics also enabled compilation of the index, the data of the new MFI statistics is more targeted to the index, given the full coverage of the components of changes in the balance sheet – i.e. net transactions, revaluations due to exchange rate and price changes, loan losses and other changes.

Chart 3 shows annual growth rates in lending by banks and mortgage banks to Danish households and corporations calculated as percentage changes in the outstanding amount (previous method) and as the growth rate calculated on the basis of the index of notional stocks. The chart shows that the annual growth rates in lending measured on the basis of net transactions were only negative in one single month during the financial crisis.

NEW INFORMATION ON MOVEMENTS IN MORTGAGE LENDING AT REGIONAL LEVEL

New information in the MFI statistics enables monitoring developments in new lending by mortgage banks across regions. Just under two thirds of new lending in November for owner-occupied homes and summer cottages situated in the Capital Region of Denmark were variable rate loans, while gross new lending in other regions was almost equally distributed on fixed rate and variable rate loans, cf. Chart 4.

MORE DETAILED SECTORAL CLASSIFICATION

The new statistics meet the requirements in the new European national accounts manual, ESA2010, regarding the sectoral classification

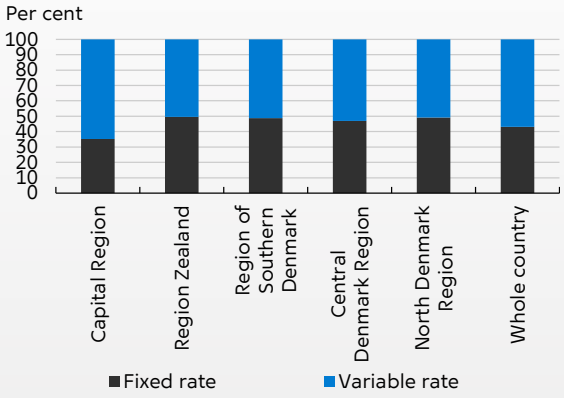
3 The index is calculated using the following formula:

$$I_t = I_{t-1} * \left(1 + \frac{T_t}{B_{t-1}}\right)$$

where I_t is index values in month t, B_{t-1} is the outstanding volume in month t-1 and T_t is net transactions in month t.

New lending by mortgage banks for private individuals' owner-occupied homes and summer cottages, broken down by fixed or variable rates and by regions, November 2013

Chart 4



Note: Loan conversions from e.g. F1 to F3 will be included as gross new lending at variable interest rate.
Source: Danmarks Nationalbank.

of MFI counterparties, which is more detailed than in the previous ESA95. The degree of detail in the published MFI statistics is even higher, however, implying e.g. that the household sector can now consistently be broken down into private individuals and sole proprietors, cf. Box 1. Sole proprietors are e.g. farmers, dentists and small contractors that are not classified as non-financial corporations due to the form of ownership. In the previous statistics non-profit institutions serving households – e.g. unemployment insurance funds and the Red Cross – were included in the household sector. In the new statistics they constitute a separate sector.

In general, the new statistics show that private individuals opt for different loan types than sole proprietors. For example, compared with sole proprietors a smaller share of private individuals' bank loans is in foreign currency, and their loans generally have longer maturities, cf. Chart 5. The latter is also influenced by the fact that a larger share of loans to private individuals consists of housing loans, which typically have longer maturities than e.g. corporate loans.

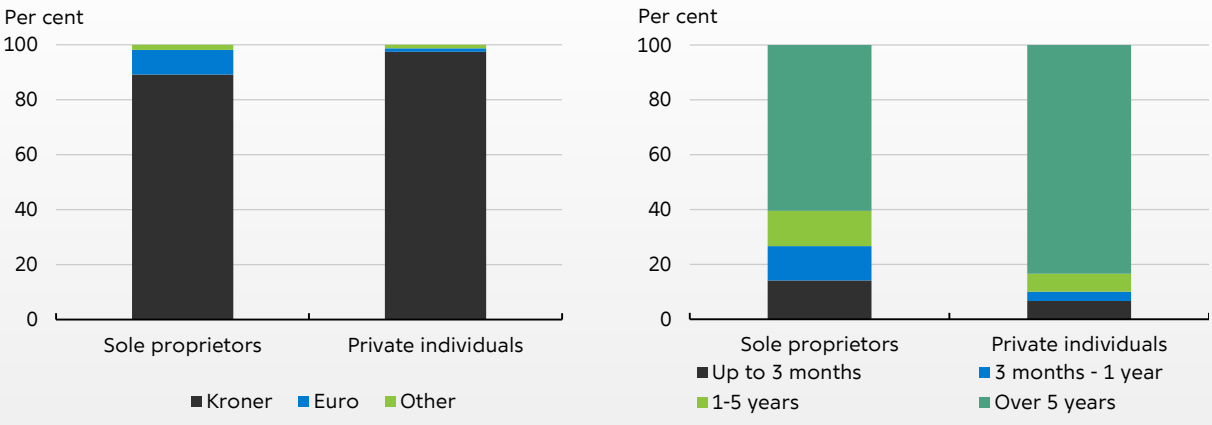
Moreover, the choice of mortgage loans varies between the two groups. Compared with sole proprietors, private individuals tend to have more fixed rate loans, and private individuals with variable rate loans tend to have loans with longer periods of fixed interest rate, cf. Chart 6. In addition, private individuals generally repay a marginally larger share of their total mortgage loans than sole proprietors do.

NEW OPPORTUNITIES FOR ANALYSING THE FINANCING PATTERNS OF INDIVIDUAL INDUSTRIES

The new statistics also enable better monitoring of trends in deposits and loans in individual

Lending by banks to households by subsector and currency (left) and original maturity (right)

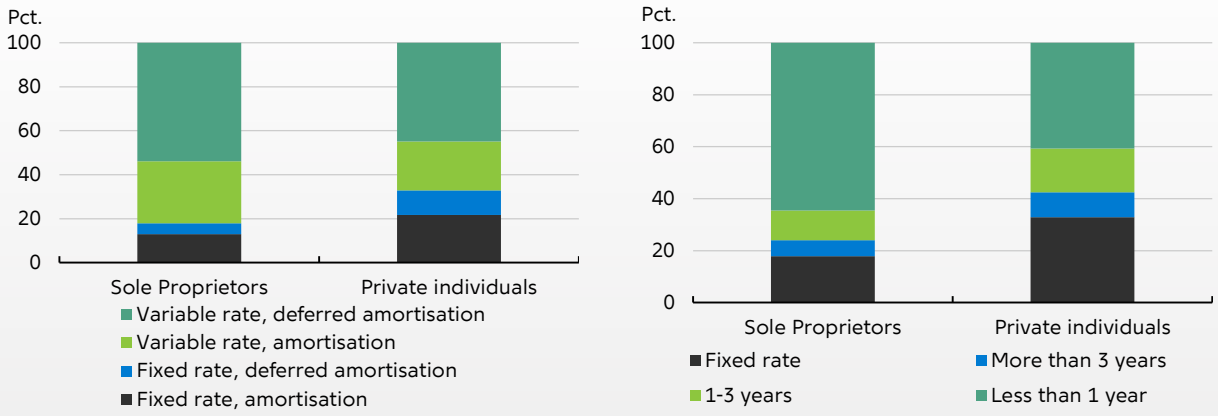
Chart 5



Note: The chart is based on data as at end-December 2013.
Source: Danmarks Nationalbank.

Lending by mortgage banks to households by subsector as well as interest and redemption profile (left) and time to next interest rate fixing (right)

Chart 6

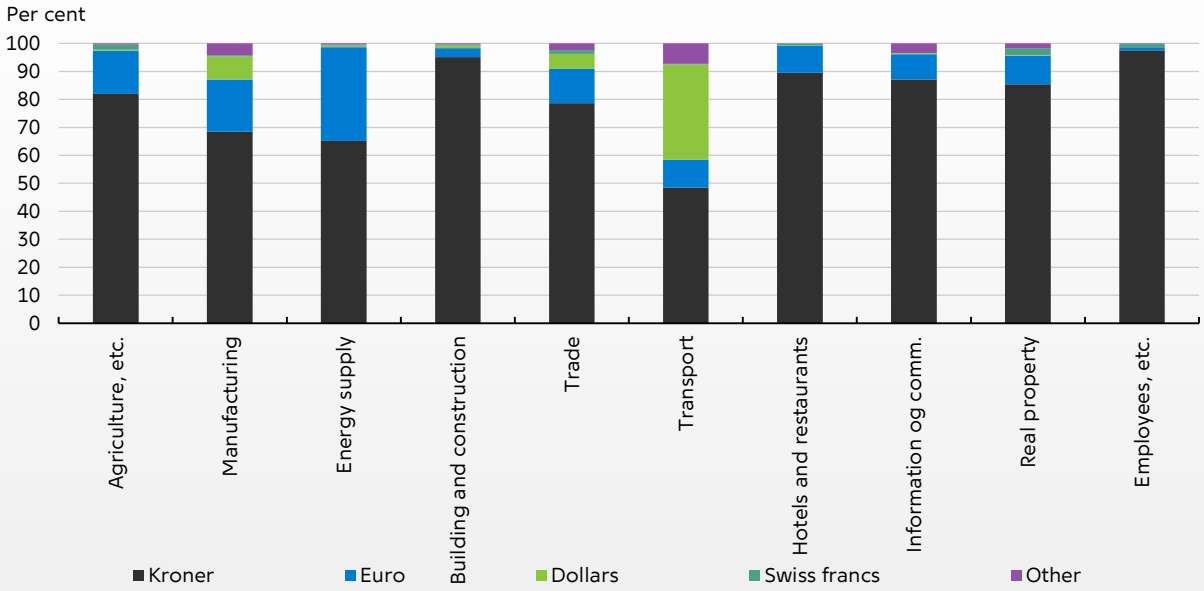


Note: The chart is based on data as at end-December 2013.
Source: Danmarks Nationalbank.

industries – including in industries with various types of firms classified into different sectors. Moreover, the new statistics provide deposits and loans by industry at a monthly frequency, compared with the previous quarterly frequency, and the statistics for loans by industry are now combined with currency information. For example, it is now possible to monitor the development in banks' agricultural loans in Swiss francs – as regards all farm types irrespective of the form of ownership. As another example, the new statistics show that particularly the transport industry is directly exposed to foreign currency, especially dollars, due to its international orientation, while the building and construction industry, which is mainly domestically oriented, has very few currency denominated loans, cf. Chart 7.

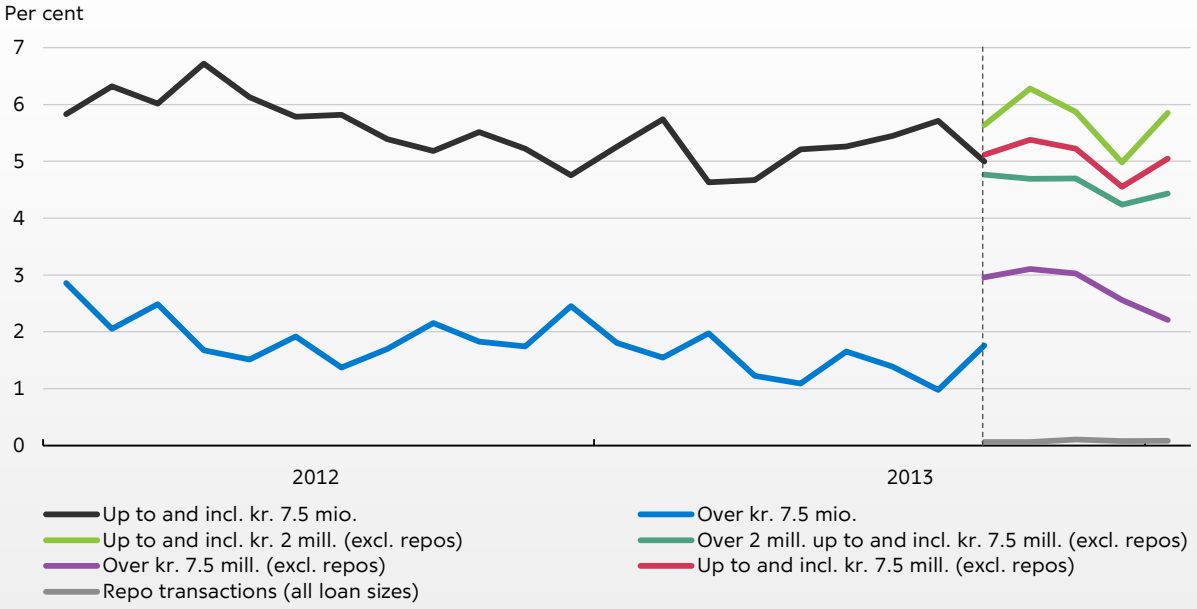
Lending by banks to selected industries by currency

Chart 7



Note: The chart is based on data as at end-December 2013. The picture of industries' exposure to exchange rate risk is not necessarily accurate, since e.g. FX swaps can either increase or reduce this risk.
Source: Danmarks Nationalbank.

Interest rate on new lending by loan size Chart 8



Note: New lending comprises new lending for the month and loans renegotiated during the month.
Source: Danmarks Nationalbank.

LOAN SIZE AND REPO INFORMATION IN THE INTEREST RATE STATISTICS

The new statistics offer better opportunities to monitor trends in interest rates on corporate loans, cf. Chart 8. The two most important improvements are a more detailed breakdown by loan size (up to and including kr. 2 million, kr. 2-7.5 million and over kr. 7.5 million) and better opportunities to separate repo transactions (loans based on securities as collateral), which previously influenced especially interest rates on loans over kr. 7.5 million.[4] Separate identification of repos has three main advantages. Firstly, repos are concluded only with large firms, meaning that the average level of interest rates, including repos, is not representative of the borrowing rates of most Danish firms. Secondly, it improves the opportunities for analysing the competitive situation in the banking sector, given the substantial variation in the repo share of lending across banks. In other words, it is now possible to better compare interest rates on relatively similar products across banks. The third advantage is the improved usability for international comparisons of interest rate levels, since large firms' repo transactions in other countries (e.g. Germany) are not concluded with banks as counterparties, so they are not included in the statistics for these countries.

OTHER KEY CHANGES

Data for total mortgage lending by mortgage banks is now collected both at nominal value – as previously – and at market value. Since mortgage loans are closely linked to the underlying bonds, the market value of loans corresponds to the market value of bonds. As regards uncallable loans (i.e. most variable rate loans), compilation at market value is a better way of calculating the debtor's remaining debt, since this is the amount the debtor must pay to redeem the loan. Moreover, this corresponds to the calculation in mortgage banks' accounts. For this reason, market value is used in future as the main dissemination method, though both figures are available in the Statbank. The market value of mortgage loans is approximately 1-3 per cent higher than the nominal value.

4 See Brian Liltoft Andreasen, Paul Lassenius Kramp and Andreas Kuchler, The banks' interest rates, Danmarks Nationalbank, Monetary Review, 4th Quarter 2012.

In addition, banks' customer funding surpluses are published monthly in the Statbank, including a series excluding repos. Concentration indices, which were previously published at a quarterly frequency, are now also published monthly.

Finally, there are new dimensions, as mentioned in Box 2, which are not yet at a stage of sufficient quality to allow publication. However, these statistics will be published as soon as the quality is found to be satisfactory. Examples of new dimensions include a breakdown of loans by whether the interest rate follows a reference interest rate, and a breakdown by extent of collateralisation.

THE AVAILABILITY OF THE STATISTICS

The new published MFI statistics imply that the tables in the Statbank have been adapted[5]. At the moment, the new tables contain only data from the new statistics while the old tables contain data from the previous statistics which are no longer updated. In the near future, Danmarks Nationalbank will transfer the old data to the new tables. This work will be performed in stages:

- First, data from main series from before September 2013 will be transferred to the new tables. In this connection, adjustment will be made for data breaks to the greatest possible extent.
- Later the remaining historical series available will be transferred.
- Finally, the dimensions not yet at a sufficient stage of quality assurance will be included in the Statbank in step with improvement of the data quality.

5 http://nationalbanken.statistikbank.dk/statbank5a/default.asp?w=1280