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Monetary Review 1st Quarter 2011

Danmarks Nationalbank

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Monetary Review
1st Quarter
Part 1

MONETARY REVIEW 1st QUARTER 2011

The small picture on the front cover shows the "Banker's" clock, which was designed by Arne Jacobsen for the Danmarks Nationalbank building.

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Contents

THE DANISH AND INTERNATIONAL ECONOMY

Niels Arne Dam, Tina Saaby Hvolbøl, Erik Haller Pedersen, Peter Birch Sørensen
and Susanne Hougaard Thamsborg, Economics

Experience from the last decade has, once again, demonstrated that large
fluctuations in house prices can destabilise the economy. Therefore it is
important to understand the factors that drive house prices. This overview article
provides a non-technical summary of the most important analyses presented in
Part 2 of this Monetary Review. The analyses show that the housing market
boom in the mid-2000s was to a large extent driven by the introduction of new
loan types and to some extent by the freeze on the property value tax. These
measures amplified cyclical fluctuations and have entailed lower employment
prospects in the coming years than we would otherwise have seen. Fluctuations
in the housing market, and hence in the economy, can be reduced by restoring
the link between property value tax and current house prices, and by phasing
out deferred-amortisation mortgage loans for owner-occupied housing.

Ann-Louise Winther, Economics

Developments in the government budget balance depend on the fiscal policy
stance as well as the cyclical situation. This article focuses on various methods of
adjusting the actual budget balance for both cyclical and other temporary
fluctuations. This provides a structural balance measure that captures the
underlying trends in public finances. The structural budget balance is calculated
by a number of national and international institutions. Deviations between the
calculations can be attributed to different methods of calculation of the cyclical
part of the balance as well as to the extent of adjustment for other temporary
factors. In the most widely used method, the calculation depends on the output
gap estimate. Moreover, in the compilation of Denmark's structural budget
balance it is essential to adjust for substantial fluctuations in a number of
revenue items.

Jonas Sørensen, Economics

Since private consumption constitutes the largest component in private consumption, prediction of private consumption is an important part of economic forecasting. Several indicators of private consumption are released ahead of the national accounts. This article examines the usefulness of various indicators in estimating current developments (nowcasting) and future developments (forecasting) in private consumption. According to the analysis, the indicators considerably improve the assessment of current developments in private consumption compared with a simple autoregressive model where current consumption is predicted on the basis of the historical development in consumption. The indicators may also play some role in predicting developments in the coming quarter.

Jakob Ekholdt Christensen, Economics

Ireland, Iceland and Latvia have encountered momentous economic problems in recent years. The three countries have requested help from the international community to solve urgent liquidity problems and get their economies back on track. This article compares the economic development ahead of the outbreak of the crisis and highlights similarities and differences in the countries' handling of the crisis. Moreover, the article discusses the experience that the countries have gained from developments before and during the crisis.

FINANCIAL CONDITIONS

Kim Abildgren, Economics, and Jens Thomsen, former Governor

This article compares the Danish economic crises in the years 1987-93 and 2008 and forward. There were significant differences in terms of economic fundamentals, export market growth and the fiscal policy stance up to the crisis. Prior overheating of the Danish economy and surging property prices occurred in both cases. During both crises many of the banks that were unable to continue as independent business enterprises had recorded strong lending growth, a large share of property-related exposures and relatively many large exposures.

Borka Babic, Financial Markets

In December 2010, the Basel Committee on Banking Supervision published the new international regulatory framework for credit institutions (Basel III). At the same time, the results of quantitative studies of the impact of the new rules on the capital and liquidity of credit institutions were published. This article discusses the new liquidity and capital requirements as well as the leverage ratio. The results of the quantitative impact studies are presented.

Birgitte Vølund Buchholst, Financial Markets

This article is a summary of Danmarks Nationalbank's analyses of liquidity in covered and government bond markets. The analysis is based on transaction data that has not been used previously. It suggests that Danish benchmark covered bonds are by and large as liquid as Danish government bonds in periods of market stress. The results also suggest that although trading continued during the financial crisis, both markets experienced substantial declines in liquidity and significantly elevated liquidity risk. Finally, the analysis shows that before the crisis government bonds were slightly more liquid than covered bonds in both the short- and long-term market segments. During the period after the crisis, the two markets appear to have had more or less the same level of liquidity for both short- and long-term bonds.

Anders Møller Christensen, Economics

The Basel Committee has prepared a set of proposals for future regulation of the banking sector. These proposals have economic benefits by lowering the probability of future financial crises and consequently reducing fluctuations in output and unemployment relative to the current regulatory framework, Basel II. However, some economic costs may apply during the phasing-in of the new capital and liquidity requirements. These costs are assessed by most as negligible and hardly measurable in practice. But the banks consider them to be noticeable.

DOCUMENTATION

Elena Kabatchenko, Statistics

In February 2011, Danmarks Nationalbank published new statistics on structured bonds. The article presents the source material and contents of the statistics with a brief outline of the Danish structured bond market.

Tables

Recent Economic and Monetary Trends

This review covers the period from mid-December 2010 to early March 2011

SUMMARY

Growth in the global economy has accelerated over the past year. World trade is increasing, mainly driven by exports to the emerging economies, where the upswing is strongest. In Europe there are considerable differences within the EU. Especially the German and Swedish economies are doing well, while many member states are still saddled with large government debts. The EU and the International Monetary Fund, IMF, have sought to address the sovereign debt crisis.

Commodity prices are almost back at the high level seen immediately before the onset of the financial crisis in 2008. Food prices are also high and rising. This pushes up inflation worldwide, not least in many emerging economies. Nevertheless, core inflation in the euro area remains moderate at around 1 per cent year-on-year. Government bond yields in Germany and the USA have risen over the past six months, but from a low level.

Danish output grew by 2.1 per cent in 2010. Growth turned negative in the 4th quarter, but this slowdown is expected to be temporary. Until now growth has been curbed by a high propensity to save in the private sector, among both households and firms. In 2011 and the following years growth in real disposable incomes is expected to be a good deal lower than in 2010 as wages are set to rise less, while prices and taxes have increased. On the other hand, the consumption ratio is somewhat below its long-term average, which leaves scope for higher private consumption.

The subdued private demand increases the pressure on public finances, but also contributes to a very large current-account surplus. The latter is also boosted by substantial net earnings from the Danish merchant fleet. Both exports and imports of goods have shown an upward trend in recent months.

Last year's economic recovery has not really been reflected in the labour market yet. The weakening of the labour market has reduced wage inflation so that it matches the level in competitor countries, following a long period with higher wage inflation in Denmark than

abroad. Underlying inflation is also moderate, but rising energy and food prices exert upward pressure on headline inflation. If this effect spills over to wage inflation, there is a risk of a price-wage spiral, which could have a further negative impact on competitiveness and employment. The share of income from production that is paid to employees as remuneration rose strongly during the most recent boom, so that real wages increased in spite of weak productivity developments.

In the next couple of years, growth in aggregate demand is expected to outpace the underlying growth in production capacity. In view of the fierce competition, it is essential that the economy leaves room for the increase in private consumption and investment that is possible given the high savings ratio and sound corporate profits. This is one of the reasons why it is important to maintain the tight fiscal policy planned for 2011-13. Fiscal discipline is a precondition for a narrow yield spread to core euro area member states. With a narrow yield spread, monetary policy will still be able to support economic growth, although the international level of interest rates must be expected gradually to normalise.

Volatility in the housing market, and thus in the economy, has increased over the past decade on account of factors such as the freeze on nominal property value tax. It is necessary to dampen fluctuations in the housing market by re-establishing the link between the property value tax and current housing prices. This will prevent further erosion of government revenue from housing taxes and restore an important automatic stabiliser in the economy.

The stability of the Danish economy is also weakened by the more and more widespread use of deferred-amortisation mortgage loans, which has amplified fluctuations in housing prices. A gradual and gentle phasing-out of the access to these loans as the existing 10-year deferred-amortisation loans expire could be introduced without any serious short-term impact on the housing market and would contribute to stabilising the market in the longer term.

Demographic developments point to a shrinking workforce, while the number of people outside the labour market will rise. This undermines the basis for future prosperity and public services. An obvious and undoubtedly effective instrument to address this challenge would be to phase out the early retirement scheme. As the health of the population has improved and life expectancy has increased since the scheme was introduced, there has been a considerable increase in the potential number of years for which people can receive early retirement pension or old-age pension. Even if the scheme is phased out rapidly, the expected net increase in the labour force will be so small that it will be possible to transform it into higher employment without any major adaptation

problems. If a retirement reform is to have any effect before the negative economic implications of the demographic changes hit the economy in earnest, and if the persons affected should have a fair warning, the decision on a reform should be made as soon as possible.

THE INTERNATIONAL ECONOMY

Growth in the global economy has accelerated over the past year. In the advanced economies, the upswing is still fairly tentative and mainly based on improved world trade. Especially exports to the emerging economies are rising.

The recovery is driven by rising output in manufacturing. The global confidence index for this sector has been increasing in recent months, to the highest level in 10 years. The IMF expects growth in the global gross domestic product, GDP, to be slightly lower than in 2010, cf. Table 1, bringing growth in the world economy back to the pre-crisis average.

In Europe there are considerable differences among the EU member states. Those that have posted moderate wage inflation relative to productivity developments and balanced public finances are doing well. In the euro area, particularly the German economy has grown. Ger-

FORECASTS OF GDP GROWTH IN SELECTED AREAS AND COUNTRIES					Table 1
		2011		2012	
Per cent	2010	OECD	IMF	OECD	IMF
USA	2.8	2.2	3.0	3.1	2.7
Euro area	1.7	1.7	1.5	2.0	1.7
Germany	3.5	2.5	2.2	2.2	2.0
France	1.5	1.6	1.6	2.0	1.8
Italy	1.1	1.3	1.0	1.6	1.3
Spain	-0.1	0.9	0.6	1.8	1.5
UK	1.3	1.7	2.0	2.0	2.3
Denmark (own estimate)	2.1	1.9		1.8	
Sweden	5.5	3.3	2.6	3.4	3.0
Japan	3.9	1.7	1.6	1.3	1.8
China	10.3	9.7	9.6	9.7	9.5
India	9.7	8.2	8.4	8.5	8.0
World (PPP)	5.0	4.2	4.4	4.6	4.5
World (MER)	3.9	n.a.	3.5	n.a.	3.6

Note: PPP is GDP based on purchasing power parity, MER is GDP based on market exchange rates. The PPP-based weighting gives "emerging markets" a much greater weight. Subject to considerable data uncertainty, it could be argued that the PPP weights give the best impression of improvements in the global standard of living. As regards the significance for export opportunities, financial flows and capacity for e.g. development aid, the weights based on market exchange rates are the correct measure.

Source: Data for 2010 has been sourced from the national accounts, except for India and the world (latest IMF assessments). Data for 2011 and 2012 is from OECD, *Economic Outlook,* No. 88, November 2010, and from IMF, *World Economic Outlook Update,* January 2011, except for Sweden (IMF, *World Economic Outlook,* October 2010).

many's GDP rose by 3.6 per cent in 2010, driven by private investment and exports, but growth in private consumption also picked up during the year. Rising employment and falling unemployment boost private consumption, while continued growth in world trade stimulates exports and investment. The initial steps towards fiscal consolidation are expected to have only a limited dampening effect on growth in 2011.

The economic upswing in Sweden is especially pronounced. Unemployment fell and employment rose during 2010, and the loss of jobs during the crisis has now been made up for, cf. Chart 1. GDP grew by 5.3 per cent in 2010, driven by private consumption and exports. The housing market has been only mildly affected by the financial crisis and household indebtedness has continued to rise. Fiscal policy, which was expansionary in 2010 against the backdrop of very sound public finances, will also stimulate growth in 2011, but to a lesser extent.

A group of member states with fiscal problems, and in some cases struggling with the repercussions of a housing bubble that burst or low competitiveness, are faring less well. In general, the member states most severely affected by the crisis were characterised by large current-account deficits before the cyclical reversal in 2008. The deficits reflected a level of consumption and investment way in excess of the income base, and with large current-account deficits and foreign debt it is more difficult to ensure stable financing of both government and private-sector debt.

EMPLOYMENT IN DENMARK AND SWEDEN   Chart 1

Index 2001 = 100
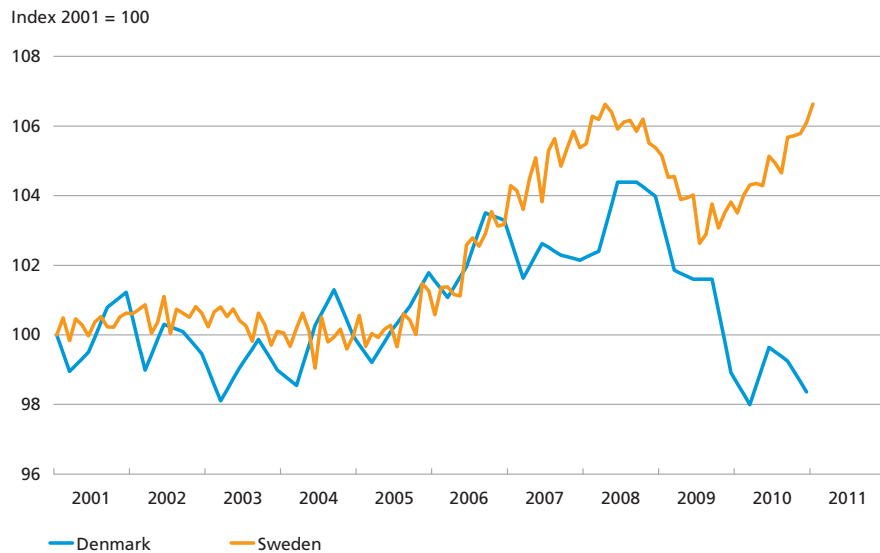
Note: Quarterly data for Denmark.
Source: Reuters EcoWin.

GDP growth in large euro area economies such as France and Italy was 1-1.5 per cent in 2010 and is expected to remain moderate in 2011-12, albeit with a weak upward trend driven by higher exports and resultant investment, cf. Table 1. In the UK, GDP growth was 1.3 per cent last year. Fiscal consolidation will continue in the coming years following the extensive tightening measures implemented last year. This will dampen growth. Export developments have been weak despite the pound's depreciation. Exports are expected to rise in the longer term, but at a relatively modest pace.

Finally, there is a group of member states where waning market confidence in their ability to service their sovereign debts and associated financial sector crises made it necessary to tighten fiscal policy considerably already in 2010. This has prolonged the repercussions of the global financial crisis in these countries. In Spain, the continued crisis in the housing market and the construction sector contributed to slightly negative GDP growth in 2010, but higher growth is expected in 2011-12, cf. Table 1. In Greece and Ireland, GDP is estimated to have fallen by 4.2 and 0.2 per cent, respectively, last year. Greece is not expected to achieve positive growth until 2012, while the tide is expected to turn a little earlier in the Irish economy.[1] Portugal saw positive GDP growth of 1.4 per cent in 2010, but GDP is expected to decline in 2011. Exports from all of these countries are expected to rise as their competitiveness gradually improves.

In the USA, private consumption has picked up nicely, and GDP rose by 2.8 per cent in 2010. The labour market remains squeezed. Long-term unemployment is unusually high with no clear indications that it will fall, cf. Chart 2. The property market bottomed out in 2009, but house prices have not yet shown any real signs of rebounding, and turnover is low. The fiscal agreement adopted by Congress in December will increase the already considerable need for fiscal consolidation in the longer term, but is expected to stimulate demand and output in 2011, resulting in slightly higher GDP growth.

The emerging economies are recording strong output growth. Trade among these countries is increasing, thereby offsetting the weaker demand for imports in industrialised countries. The IMF expects GDP in developing countries to grow by around 6.5 per cent in 2011 and 2012, i.e. slightly less than the 7 per cent seen in 2010. Global imbalances were reduced substantially during the financial crisis, but some of the emerging economies, including China and the oil-exporting countries, still post

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[1] IMF, *Greece: Second review under the stand-by arrangement – Staff report*, December 2010 and IMF, *Ireland: Request for an extended arrangement – Staff report*, December 2010.

UNEMPLOYMENT IN THE USA   Chart 2

Million   Per cent
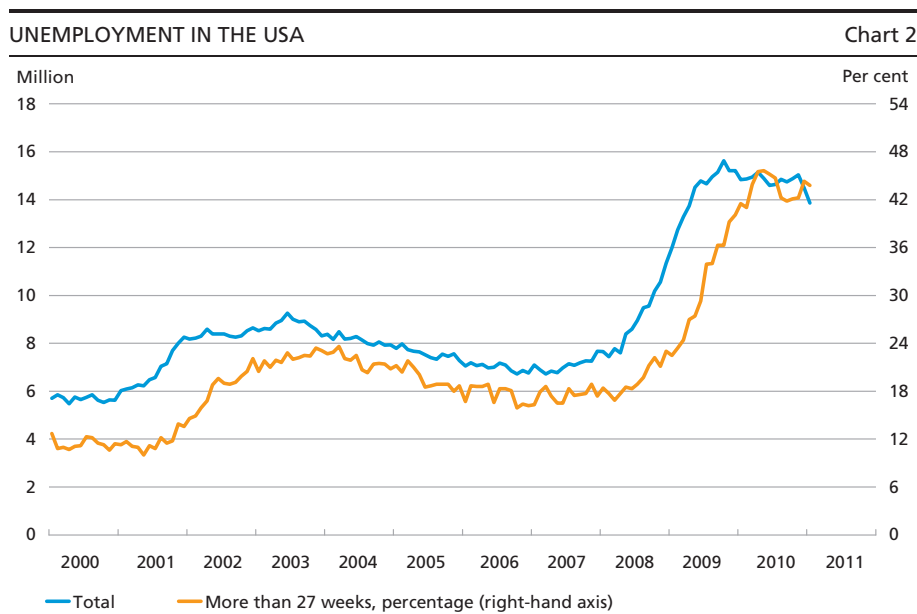
Note   Seasonally adjusted.
Source: Reuters EcoWin.

large current-account surpluses, which are expected to increase further
this year and next year. The Chinese surplus is attributable to structurally
low private consumption and, as a result, sizeable domestic savings. Some
of these savings are invested in housing, resulting in higher housing
prices. Other emerging economies, such as Brazil, India and Turkey, came
out of 2010 with current-account deficits in the range of 2.5 to 5.25 per
cent of GDP. Larger deficits are expected in 2011 and 2012.

The outlook for the world economy holds some promise, especially
since the level of investment has dropped sharply in the wake of the
crisis, setting the stage for future investment growth. On the other
hand, there are also a number of risks that require careful economic
policies:

• In the USA, the private sector is still consolidating, and the labour and
  housing markets remain weak. The major concerns are the very large
  government budget deficit and lack of fiscal sustainability. It could
  have a major impact on the medium-term international growth
  scenario whether sufficient steps are taken to restore fiscal sustain-
  ability before any doubt arises in the markets as to the authorities'
  ability to get public finances under control.

• In a number of European countries, there is a risk that the sovereign
  debt crisis will intensify, and it is necessary to observe the extensive
  fiscal consolidation plans. At the same time, there is still a need to
  strengthen the financial sector in many countries.

- In the emerging economies, there is a risk that sustained capital inflows will contribute to overheating and rising inflation. In some cases tighter fiscal policy and macroprudential measures are called for. In some of the larger economies a stronger currency could dampen the pressure.
- For the world economy overall, rising commodity prices, especially for oil, constitute a major risk. Higher oil prices serve to transfer income from importing to exporting countries. There is currently a risk linked to political unrest in North Africa, but there is also an underlying pressure on the oil market, which should be eased by e.g. phasing out the large subsidies on fossil fuels in many of the emerging economies.

Price developments

Commodity prices in the world market are returning to the high level seen before the global financial crisis. On 9 March the price of a barrel of Brent crude oil was 115 dollars. Price hikes have also been seen for other commodities such as food and metals, cf. Chart 3.

This indicates that the global crisis merely caused a brief interruption of a long-term upward trend in commodity prices. The current increases thus reflect structural changes in a number of relative prices, cf. Box 1. Hence, commodity prices are expected to remain at this high level or to rise further.

OIL PRICES AND OTHER COMMODITY PRICES   Chart 3

Index, 2000 = 100
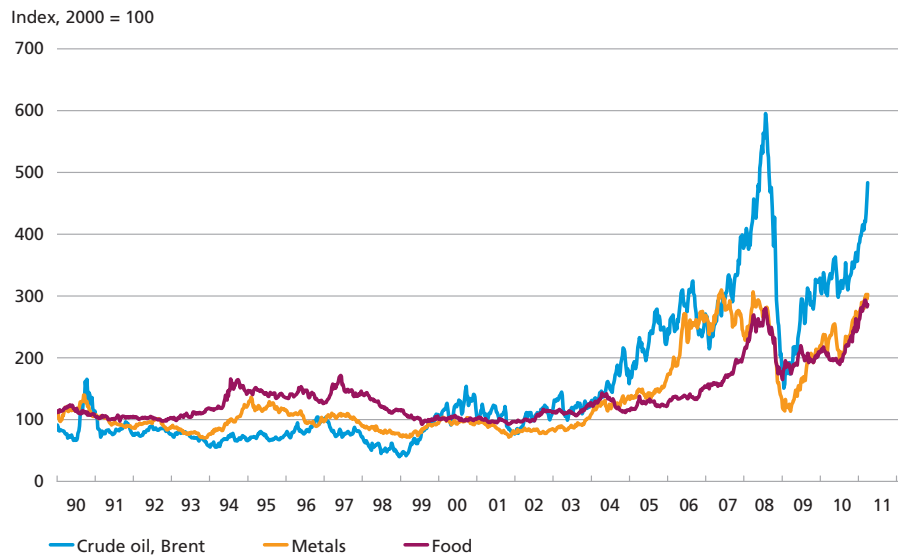
Note: The food and metal indices are from The Economist. Metals are aluminium, copper, nickel, zinc, tin and lead. Food includes coffee, soya beans, sugar, cocoa, meat, wheat and soya oil, among other things.
Source: Reuters EcoWin.

RISING COMMODITY PRICES: A LONG-TERM TREND OR SPECULATION?	Box 1

Commodity prices have generally shown an upward trend since the beginning of this century, but the increases in 2007-08 and in the last year or so have been very strong, cf. Chart 3. Commodity price hikes of the magnitude experienced recently have been seen on only few previous occasions: in the mid-1930s prices rose sharply after having dropped during the Depression, and in the early 1970s it was not only oil prices that went up. Soaring prices can lead to assumptions of speculation, i.e. a situation where commodities are being kept back from the market with a view to driving up prices ("cornering the market"). However, this implies growing inventories of these goods, which has not been observed in the current situation.

The explanation is more likely to be the general upward trend in commodity prices since the turn of the millennium, reflecting rising demand from relatively resource-intensive developing economies such as China. In these high-growth countries, food and energy account for an increasing share of both consumption and output. Many emerging economies in particular subsidise fossil fuels heavily – at the global level, subsidies amount to between 500 and 1,000 billion dollars – e.g. though government-fixed low prices for oil products. The emerging economies' share of global oil consumption has risen to almost half, and when price increases do not filter through to consumers because of subsidies, demand is not dampened, and world market prices are pushed up further. Supply elasticity for many commodities other than food is low, and consequently supply has been struggling to keep up with the rise in demand. Some food crops have increasingly been sold for biofuel. Moreover, difficult production conditions in recent years – bad weather, etc. – may to some extent be of a structural nature as a result of the ongoing climate change.

The question is whether the accommodative financial conditions in industrialised countries at present – and also in the period 2007-08 – have further stoked up the fire and contributed to destabilising commodity prices. Recent years have seen increasing trade in financial instruments derived from commodity trade, including commodity futures, i.e. contracts for purchase and sale of commodities for future delivery. Trade in commodity derivatives ("speculation") can be regarded as trade in information about supply and demand conditions in the commodity markets. This trade makes it possible to hedge price risks. If the "speculators" (investors who are ready to buy commodity derivatives, but do not need the physical commodities for production purposes) are better informed about future supply and demand conditions than other players in the commodity markets, "speculation" may contribute to stabilising commodity prices, but in practice short-term fluctuations in commodity prices in the spot and futures markets seem to have increased as trade in commodity derivatives has grown.

In the current situation nothing indicates that the underlying tendency for commodity prices to rise is out of synch with the above structural changes in the global economy. Nor does empirical evidence point to speculative trading in commodity derivatives having led to systematic increases in spot prices. The role of speculative investors primarily seems to be to contribute liquidity to the commodity markets.[1]

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[1] See e.g. IMF, Has Speculation Contributed to Higher Commodity Prices?, Box 5.1 in *World Economic Outlook,* Chapter 5, September 2006; Scott H. Irwin, Dwight R. Sanders, Robert P. Merrin, *Devil or Angel? The Role of Speculation in the Recent Commodity Price Boom (and Bust)*, in: Journal of Agricultural and Applied Economics, Vol. 41 No. 2, August 2009; Danske Research, *Commodities 2011*, January 2011.

Consumer prices worldwide are affected by the higher commodity prices, and concerns about rising inflation have become an issue when assessing the global economic outlook. However, substantial negative output gaps are dampening inflationary pressures in the advanced economies. In the euro area, the annual rate of inflation reached 2.4 per cent in February, exceeding the target set by the European Central Bank, ECB, of inflation close to, but below 2 per cent in the medium term. Since early 2010 core inflation has been stable at around 1 per cent. The elevated rate of inflation in the euro area is to some extent attributable to higher VAT and other indirect taxes in connection with the ongoing fiscal consolidation. Inflation is lower in the USA. In some of 2010, US consumer price inflation was only just above 1 per cent, and core inflation was declining, but towards the end of the year factors such as the rising commodity prices made their impact. In January inflation rose to 1.6 per cent, and core inflation reached 1.0 per cent, cf. Chart 4.

Particularly in the UK, rising prices constitute a problem. Since early 2010, consumer price inflation has been considerably above the target of 2 per cent. In January, inflation was as high as 4 per cent, partly reflecting a VAT increase at the turn of the year. Core inflation rose to 3 per cent and, like overall inflation, it has been relatively high for quite a while. The pound depreciated strongly in 2008, but has since appreci-

CONSUMER PRICES IN THE USA AND THE EURO AREA   Chart 4
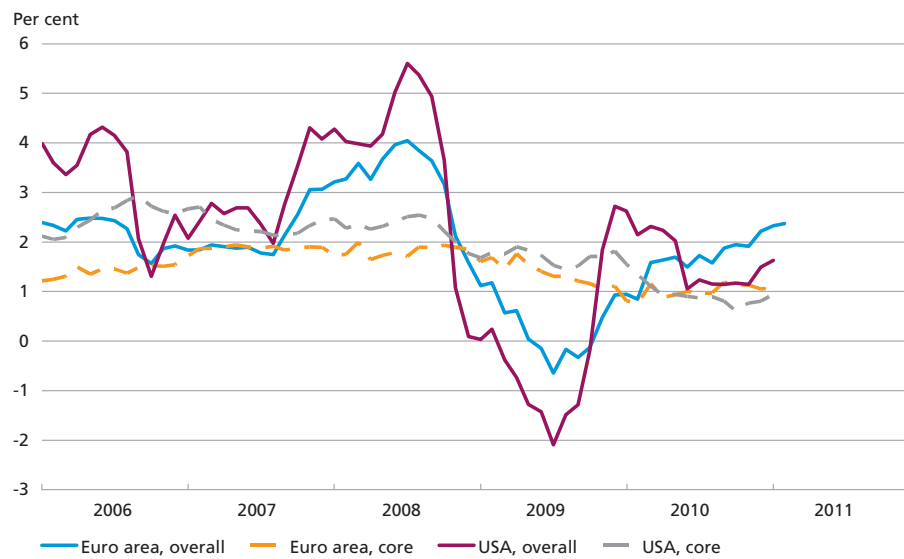
Note: Core inflation is exclusive of energy and food.
Source: Reuters EcoWin.

ated a little, without reaching its former level, however. A lagged response to the weakening of the pound could to some extent explain the high rate of inflation at present.

Japan stands out, in that consumer prices have been falling for some time, i.e. deflation, although the trend abated during 2010.

In the emerging economies inflation is high and rising in most countries. In China, where an underestimated exchange rate contributes to creating inflationary pressure, inflation reached 4.9 per cent in February. For the full year 2010 it was 3.3 per cent, i.e. slightly above the official target of 3 per cent. Some emerging markets have previously seen periods of very high inflation, and the current price hikes may destabilise the anchoring of inflation expectations.

In the USA and Germany, inflation expectations, measured as the difference between the yields on traditional and inflation-indexed government bonds, have risen by around 50 basis points since December, but remain somewhat below the level in 2008, when commodity prices last rose strongly. Hence, developments in consumer prices in the USA and the euro area do not give rise to inflation concerns as such, but do indicate that the period of very accommodative monetary policy is drawing to an end and that focus will once again turn to more traditional monetary policy targets.

Financial markets

Long-term bond yields in the large advanced economies remain low. In the USA and Germany, they have stood at 2-4 per cent since the autumn of 2008, compared with a range of 3-5.5 per cent before the crisis.

In the longer term, an increasing level of activity and improved growth prospects are expected to push up interest rates. After a period of falling interest rates – attributable to e.g. the Federal Reserve's quantitative easing of monetary policy by way of an extensive programme to purchase long-term Treasury bonds – interest rates in the three large advanced economies began to rise in the period from November to early December. This trend has continued in 2011 to date, against the backdrop of positive data releases and confidence indicators, cf. Chart 5.

The current level of nominal interest rates entails low or negative real interest rates. This is normal in connection with the onset of an upswing, when real interest rates are typically below their equilibrium level. But the current situation is affected by the still extraordinary monetary-policy conditions. A survey by the Federal Reserve Bank of San Francisco indicates that without the Federal Reserve's quantitative easing of monetary policy from 2009 onwards, there would presumably be defla-

YIELDS ON 10-YEAR GOVERNMENT BONDS   Chart 5

Per cent
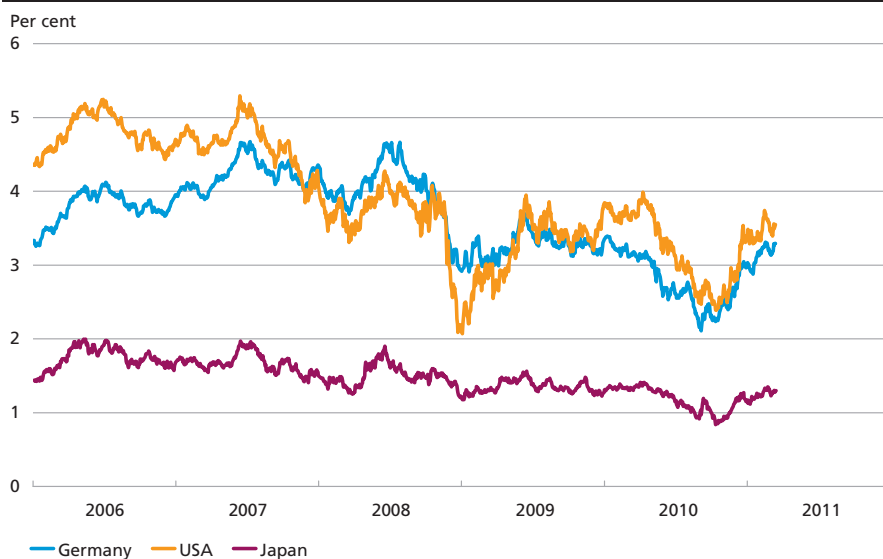
Source: Reuters EcoWin.

tion in the USA now.[1] As nominal interest rates cannot fall below zero, deflation entails a tendency for real interest rates to be high and rising, which increases the burden of servicing debt, including government debt, particularly in a situation with low growth. Hence, the crisis measures taken by the Federal Reserve have contributed to reducing real interest rates, thereby supporting fiscal policy. On the other hand, these measures may have had derived effects on the capital markets and international capital flows that entail new risks.

Negative or low real interest rates on fixed-rate financial assets make other assets such as equities more attractive as investment objects. Indeed, the global stock markets have in recent months continued the upward trend that began in mid-2010. The rising equity prices have been supported by the sustained recovery of the world economy, but the stock market in China, to which foreign investors do not have access, has been unable to keep up and was a little lower in early March than in November. In February, turmoil in the Middle East and concerns about a further rise in oil prices caused equity prices in the advanced economies to rise at a more subdued pace.

Capital flows into the emerging economies have rebounded after the slowdown in 2008-09. Net inflows in 2010 represented around 4 per cent

[1] Hess Chung, Jean-Philippe Laforte, David Reifschneider and John C. Williams, Estimating the Macro-economic Effects of the Fed's Asset Purchases, FRBSF *Economic Letter 2011 No. 3,* January 2011.

of GDP in these countries, compared with 1 per cent during the crisis.[1] The increase is attributable to better return prospects, but also to the quantitative easing of monetary policy in the advanced economies. All the same, capital inflows in 2010 did not reach the pre-crisis level.

The large, sustained Chinese trade surplus is to a considerable extent attributable to savings surpluses in the corporate sector and the households, but also to efforts to keep the exchange rate down. In effect, the currency has not appreciated since early December. The increase vis-à-vis the dollar since June, when China announced that it would introduce a more flexible exchange-rate regime, is only just under 4 per cent. Against other emerging market currencies, such as the Brazilian real, the renminbi has depreciated. China's foreign-exchange reserve continues to grow because the authorities are seeking to keep the exchange rate of the renminbi down. By end-2010, it amounted to 2,847 billion dollars, up from 2,399 billion one year earlier. Japan and several emerging economies also hold large foreign-exchange reserves.

The dollar has fallen by more than 6 per cent vis-à-vis the euro since early December. The spread between US and German long-term government bond yields widened by around 40 basis points in the USA's favour in December, without any strengthening of the dollar against the euro. Subsequently the yield spread narrowed after an interest-rate rise in Germany, while the euro appreciated. Market expectations that the rising inflation in the euro area will prompt the ECB to raise its policy interest rates earlier than expected may also have contributed to the strengthening of the euro.

Fluctuations in the exchange rate of the euro may also reflect shifting expectations of political steps to address the European sovereign debt crisis. In some countries, uncertainty surrounding economic policy, particularly fiscal policy, has led to extraordinarily large risk premiums, which has widened yield spreads to Germany, cf. Chart 8. The sovereign debt crisis in a number of euro area member states intensified in December, and government bond yield spreads to Germany widened considerably. A sovereign debt crisis may affect banks in the member states in question in terms of both assets and liabilities, e.g. through capital losses on bond portfolios and higher financing costs. This impact could make it necessary to introduce new government support measures, which in turn may increase government debt, and so forth. In several cases there has been a close link between sovereign debt and banking sector problems, cf. Box 2.

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[1] IMF, *Global Financial Stability Report Market Update*, January 2011, Figure 7.

FROM GOVERNMENT DEBT TO BANK DEBT AND BACK	Box 2

The sovereign debt crisis in certain euro area member states has revealed a close link between fiscal sustainability and banking sector problems. Aggravated problems in the banking sector can increase investor concerns that the government will have to step in and rescue the banks. Since the government must typically finance bank rescue actions by issuing government bonds, this could cause risk premiums on government debt to rise. But it can also be the other way around, as rising yields on government bonds tend to have a spillover effect on the borrowing costs of the financial sector. Furthermore, large budget and debt problems could trigger fears of a recession as the government must consolidate strongly, which could have a negative impact on the real economy. A recession will lead to rising losses on lending for banks, and their solvency and liquidity problems will increase. Moreover, wider CDS spreads (and higher interest rates) may lead to losses on the banks' holdings of government bonds and thus contribute to reducing the banks' solvency ratios.

When investors see an increased risk that the government will not observe its financial obligations, banks are also cut off from liquidity, and instead they must resort to the ECB's liquidity facilities. So there is a close correlation between the prices of CDS contracts on sovereign debt and the banks' liquidity drawings on the ECB, cf. Charts 6 and 7.

COVARIATION IN NET DRAWINGS ON THE ECB AND CDS SPREADS OF GIPS COUNTRIES   Chart 6

CDS spread for Greek government bonds
Greek banks' net drawings on the ECB (right-hand axis)

CDS spread for Irish government bonds
Irish banks' net drawings on the ECB (right-hand axis)
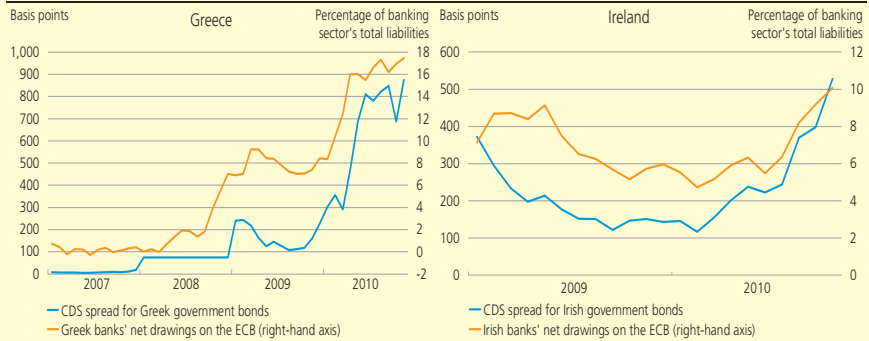
Source: Bank of Greece, Central Bank of Ireland and Bloomberg.

COVARIATION IN NET DRAWINGS ON THE ECB AND CDS SPREADS OF GIPS COUNTRIES   Chart 7

CDS spread for Spanish government bonds
Spanish banks' net drawings on the ECB (right-hand axis)

CDS spread for Portuguese government bonds
Portuguese banks' net drawings on the ECB (right-hand axis)
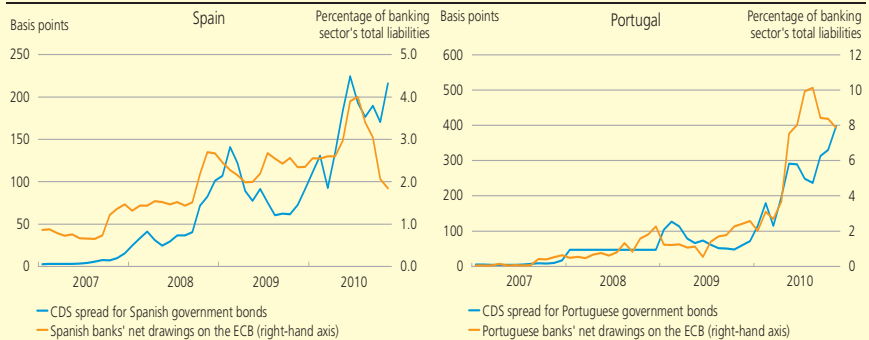
Source: Banco de España, Banco de Portugal and Bloomberg.

YIELD SPREADS TO GERMANY 2010-11, 10-YEAR GOVERNMENT BONDS   Chart 8

Percentage points
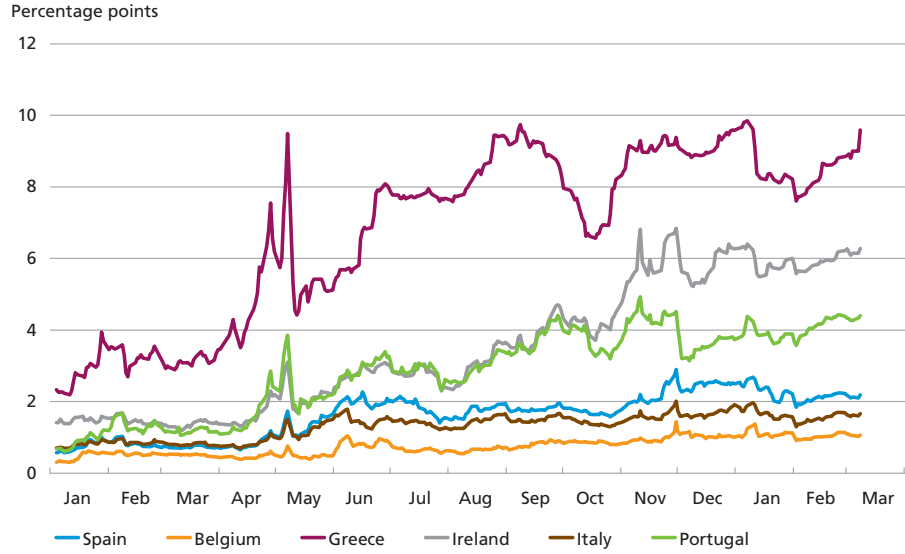
Source: Reuters EcoWin.

Especially the Greek, Portuguese and Spanish banks are exposed to their own sovereign issuer, while, conversely, the Irish government has a relatively large exposure to bonds issued by Irish banks. Banks in other countries are also exposed to the debt-ridden countries. In this situation, a sovereign debt crisis may erode confidence in an already squeezed financial sector and cause liquidity problems for banks, both in the member states in question and elsewhere. Hence, deposits from households and the corporate sector in Greek and Irish banks fell during 2010.

On 1 January, Estonia became the 17th euro area member state. The national currency was phased out over a period of two weeks, after which the euro became the only legal tender. Estonia's transition to the euro was smooth.

International economic policy measures
Working with the IMF, the EU has sought to address the intensified sovereign debt crisis in Europe through a number of economic policy measures that have been coordinated at the EU level. These include:
- financial support for exposed member states,
- fiscal consolidation and structural reforms,
- initiatives to further restructure the financial sector,
- strengthened economic policy coordination in the EU.

At the meeting of the European Council in December, the EU heads of state or government agreed on a limited amendment to the Treaty to enable the establishment of a permanent European Stability Mechanism, ESM, for the euro area member states when the current temporary stability mechanisms, the EFSF and the EFSM, expire in June 2013.[1]

Since then, political debate in Europe has centred on whether the operational scope and financial capacity of the current temporary stability mechanism, the EFSF, should perhaps be expanded and how private-sector creditors might be involved in the restructuring or write-down of government debt. An expansion of the EFSF would serve three purposes: 1) financing loans to member states in difficulties, 2) laying down borrowing terms with a view to ensuring that the loans are paid back, and 3) preventing new crises. The borrowing terms would as such be preventive, and ongoing negotiations therefore focus on how to strengthen these preventive elements as a precondition for expanding the EFSF's credit facilities. All this should be viewed in the light of the current negotiations to strengthen economic surveillance and cooperation in the EU. Consequently, the heads of state or government of the euro area member states at an extraordinary meeting of the European Council on 4 February announced that these elements would be part of a comprehensive package of measures to be adopted at the meeting of the European Council on 24-25 March.

In addition, the heads of state or government of the euro area member states announced on 4 February that they would take further steps to strengthen economic policy coordination. Council President Herman van Rompuy will consult the euro area member states and also involve the non-euro area member states in the further process.

The EFSF issued its first bonds on 25 January. Demand was considerable and the 5-billion-euro issue was oversubscribed several times.

On 16 December a new EU regulation came into force, establishing the European Systemic Risk Board, ESRB, which is an important element of the EU initiatives to strengthen financial stability in the wake of the crisis. It is the task of the ESRB to conduct macroprudential supervision of the financial system in the EU with a view to preventing or mitigating systemic risk, taking into account macroeconomic developments. Denmark participates in this cooperation. The ESRB held its first meeting on

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[1] The EFSF and the EFSM are the European Financial Stability Facility and the European Financial Stability Mechanism, respectively. The purpose of the EFSF is to support euro area member states in difficulties on the basis of mandatory government guarantees and loans from euro area member states and possibly voluntary contributions from other EU member states. The EFSM is a mechanism for all EU member states, for which the European Commission raises capital with guarantees within the EU budget.

20 January and will assess the risk scenario for European financial stability and the derived impacts on an ongoing basis.[1]

On 13 January, the newly established European Banking Authority, EBA, announced that a stress test of the largest EU banks would also be conducted in 2011 to show whether further recapitalisation of European banks is required. The stress test will take place in the 1st half of 2011 so that the results can be published in mid-year. The plan is that individual member states should be ready to launch any required recapitalisation measures when the results are published.

In early December growing sovereign debt problems in Ireland led to the establishment of a borrowing arrangement for Ireland totalling 85 billion euro. The EU committed itself to loans of 45 billion, while the IMF contributed 22.5 billion euro. The Irish authorities contributed the remaining 17.5 billion euro by way of liquid assets. The arrangement is supported by an economic policy programme overseen by the IMF in cooperation with the European Commission and the ECB. Among other things, the programme calls for restructuring and recapitalisation of the financial sector and fiscal consolidation to the tune of 9 per cent of GDP in the period 2011-14. In the assessment of the IMF, the Budget for 2011, which was adopted by the Irish Parliament on 29 January, observes the programme's fiscal targets of consolidation of 3 per cent of GDP in 2011. The budget deficit reached 11.7 per cent of GDP in 2010, exclusive of the Irish government's recapitalisation of Irish banks in the range of 20 per cent of GDP. The programme target for 2011 is a deficit of 10.5 per cent, declining to less than 5 per cent by 2015.

In addition to the necessary economic policy measures, the assumptions are growth in Ireland's GDP of 2.3 per cent on average, accelerating over a five-year period. In this context, net exports are expected to contribute a considerable share of growth, but it has been assumed that domestic demand will also contribute gradually. Lower-than-expected growth is one of the principal concerns in relation to the programme. A large share of Ireland's exports is generated by multinational corporations with very capital-intensive production, matched by substantial imports, but with only limited impact on employment, incomes and hence domestic demand. If the programme is to be a success, structural changes are therefore required so as to improve competitiveness and job creation.

On 17 December, Greece obtained approval for the third disbursement under the IMF/EU loan agreement from May 2010 for a total of 110

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[1] For further information, including the statutory basis for and structure of the ESRB, see www.esrb.europa.eu.

billion euro, of which 30 billion came from the IMF. The decline in GDP in 2010 was larger and tax revenue lower than expected in the pro-gramme supporting the loan arrangement. All the same, compliance with the budget targets was achieved by keeping public spending below budget. In the assessment of the IMF, fiscal adjustment corresponds to 8 per cent of GDP. Hence, the deficit was reduced to 9.6 per cent in 2010 and is expected to fall to 7.4 per cent this year. However, the 2010 deficit was larger than assumed in the programme due to an unexpect-edly large data revision for the public finances.

While fiscal stimulus measures expired in most European countries in 2010 and the first steps have been taken along the path of consolida-tion, the USA in December decided to continue with its accommodative fiscal policy. As the IMF sees it, the tax cuts etc. adopted will increase GDP growth in the USA by 0.5 percentage point in 2011, but with signifi-cant fiscal consequences. In continuation of the large budget deficits, even during the strong boom until 2007, the impact of the subsequent downturn, and fiscal stimulus packages in 2009 and 2010, the latest initiatives will bring the 2011 US budget deficit to 10.75 per cent of GDP, i.e. more than twice the budget deficit of the euro area, cf. Chart 9 – at a time when the economic upswing is well underway. The US admini-stration has not tabled any plans for consolidation in 2011, and as 2012 is an election year it will presumably be politically difficult to introduce

BUDGET BALANCES   Chart 9

Per cent of GDP
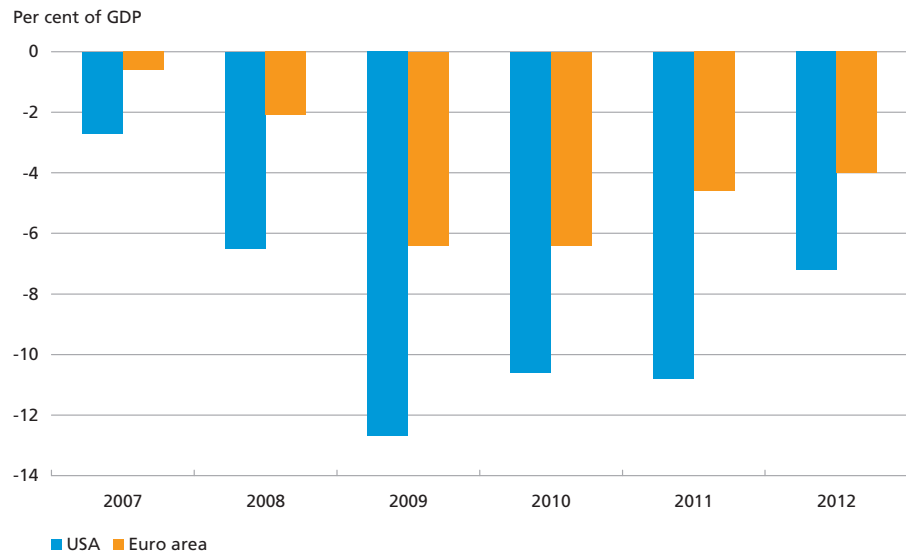
Note: Estimates for 2010, projections for 2011-12. For the euro area, the budget balances of the individual member states have been weighted.
Source: IMF, *Fiscal Monitor Update*, January 2011.

austerity measures. The USA and Japan are the only large OECD coun-
tries not to consolidate their public finances in connection with the
cyclical upswing.[1]

In China, the fiscal stimulus has continued into 2011, but is expected to
be discontinued from the end of the year, and countries such as Brazil,
India and Russia have begun to consolidate. Overall, the fiscal position
of the emerging economies was neutral in 2010 and is expected by the
IMF to be tighter in future. As regards monetary policy, China, like cer-
tain other emerging economies, has implemented a number of measures
to tighten domestic liquidity and dampen demand for housing, while
Brazil, among others, has introduced limits on capital inflows. In add-
ition, all BRIC countries[2] have raised their policy interest rates.

All other things being equal, a steady upward trend in demand and
output in the industrialised countries will accentuate rather than ease
the problem of inflation. This will put monetary policy into focus in
future. Policy interest rates remain unchanged in the benchmark econ-
omies. It is expected that the Federal Reserve will continue its accommo-
dative monetary policy, while the time when the ECB and the Bank of
England begin to tighten theirs has moved closer. The markets now find
it very likely that the ECB will raise its interest rates already in April.
Against the backdrop of strong growth in the Swedish economy,
Sveriges Riksbank has raised the repo rate to 1.5 per cent, and further
increases are expected in the near future.

MONETARY AND EXCHANGE-RATE CONDITIONS

In recent months the krone has been stable vis-à-vis the euro in spite of
the narrowing of the spread between Danish and European money-
market interest rates. There was no noticeable impact on the foreign-
exchange market from sales of TDC shares in December 2010 and a
foreign bid for Danisco in early 2011.

From the beginning of December up to and including February, Dan-
marks Nationalbank purchased foreign exchange for kr. 0.2 billion net in
connection with intervention in the foreign-exchange market. At end-
February the foreign-exchange reserve was kr. 446.4 billion, entailing an
increase of kr. 27.2 billion over this period. Most of the increase is attrib-
utable to revaluations of the foreign-exchange reserve and government
borrowing abroad[3].

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[1] Cf. IMF, *World Economic Outlook Update*, January 2011.
[2] Brazil, Russia, India and China.
[3] The Danish government raises foreign loans in order to maintain an adequate foreign-exchange
reserve. As a rule, the government's issuance of foreign debt is equivalent to the redemptions on
existing foreign loans. Foreign redemptions in 2011 total 4.3 billion euro (kr. 32 billion).

EXCESS LIQUIDITY AND OVERNIGHT INTEREST RATE IN THE EURO AREA   Chart 10
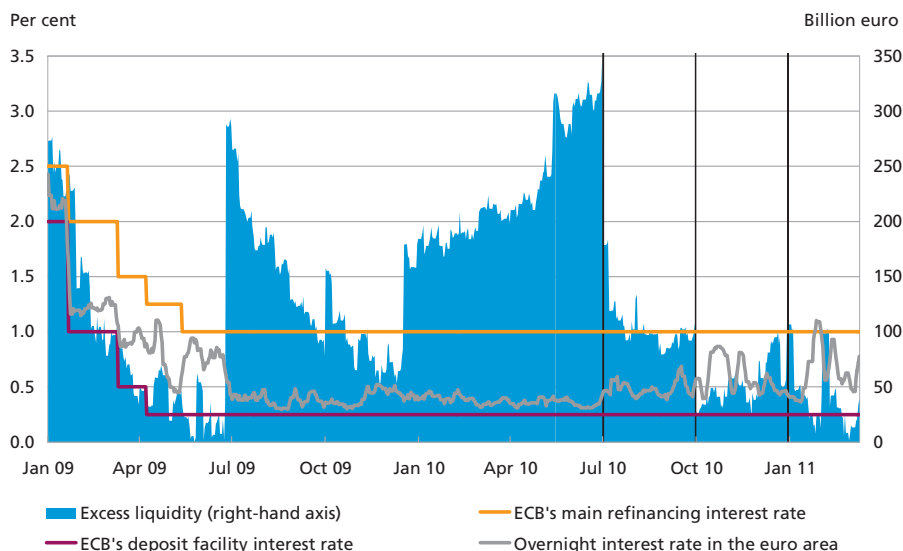
Note: Excess liquidity is the liquidity in the euro area that exceeds the banks' liquidity requirements. The requirements
        are given by the ECB's reserve requirements and the autonomous factors in the euro area. The ECB's rate of
        interest in its main refinancing operations has been a fixed allotment rate since mid-October 2008. 5-day moving
        average for the overnight interest rate in the euro area (Eonia). The most recent observations are from 11 March
        2011. The vertical lines indicate 1 July, 30 September and 23 December 2010, when the 12-month allotments
        expired.
Source: Reuters EcoWin and ECB.

The narrowing of the yield spread to the euro area reflects rising
money-market interest rates in the euro area relative to Denmark. This
should be viewed in the light of several factors. Very short-term money-
market interest rates are primarily governed by liquidity in the banking
system. Since the autumn of 2008 this has been determined by demand
among European banks, whereas previously it was determined by the
ECB's supply[1]. In January 2011, euro area banks chose to demand less
liquidity. The consequent reduction in excess liquidity caused short-term
money-market interest rates in the euro area to rise. Particularly at the
end of January excess liquidity dropped sharply, and the overnight
interest rate in the euro area rose to 1.1 per cent, the highest level since
the spring of 2009. Since then it has decreased somewhat, cf. Chart 10.

[1] In response to the tight liquidity situation that arose during the crisis, the ECB in the autumn of 2008
     and in 2009 conducted extraordinary liquidity allotments with maturities of 6 and 12 months,
     respectively. In addition, from October 2008 the ECB introduced full liquidity allotment at a fixed
     rate of interest in its weekly main refinancing operations and full allotment in the 3-month re-
     financing operations. Subsequently, demand from euro area banks for liquidity rose substantially
     above their immediate requirements. The excess liquidity was placed in the ECB's deposit facility, and
     during this period short-term money-market interest rates were therefore low and close to the ECB's
     deposit rate. In the 2nd half of 2010, the three 12-month operations expired. Since operations at
     shorter maturities were still with full allotment, it was the banks themselves that chose to demand
     less liquidity in the given circumstances.

SELECTED INTEREST-RATE SPREADS BETWEEN DENMARK
AND THE EURO AREA   Chart 11

Percentage points
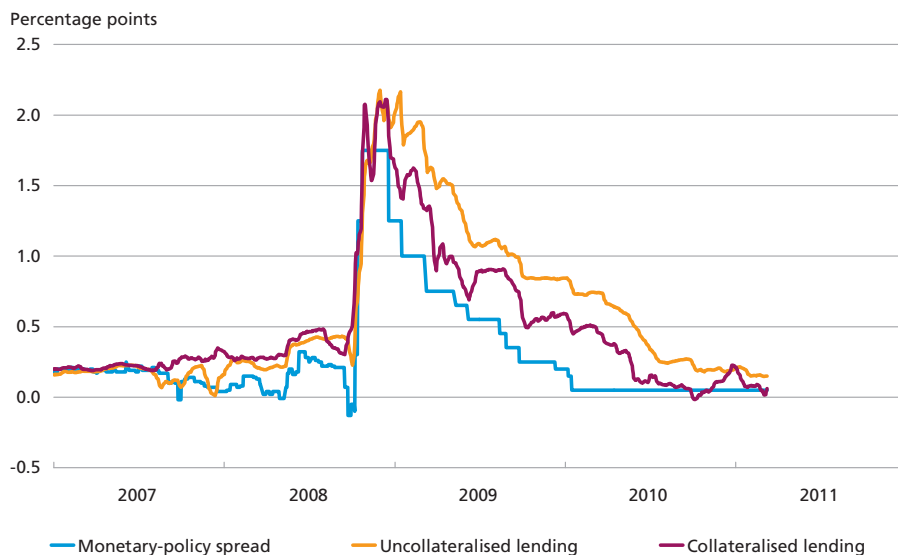
Note: 5-day moving averages, except for the monetary-policy spread. The monetary-policy spread is the difference
        between Danmarks Nationalbank's lending rate and the ECB's marginal interest rate in its main refinancing
        operations. The interest-rate spread for uncollateralised lending is the difference between 3-month Cibor and
        Euribor. The interest-rare spread for collateralised lending is for interest-rate swaps based on a 3-month interest-
        rate swap at the overnight interest rate. The most recent observations are from 10 March 2011.
Source: Reuters EcoWin and Danmarks Nationalbank.

The ECB tightened the rhetoric on inflation at the interest-rate meetings
in the first months of 2011, which has affected market expectations. At
the March meeting, the ECB signalled a forthcoming interest-rate in-
crease, which has been reflected in long-term money-market rates in the
euro area.

   As Danmarks Nationalbank's monetary-policy interest rates have re-
mained unchanged, money-market interest rates in Denmark have not
changed. Consequently, the spread to the euro area has narrowed in the
first months of the year, cf. Chart 11.

   Also at the March 2011 interest-rate meeting, the ECB announced that
the weekly, monthly and 3-month refinancing operations would con-
tinue to be with full liquidity allotment. This policy will apply for as long
as it is deemed necessary, and at least until 12 July 2011. This means that
liquidity in the euro area – and hence to a large extent short-term
money-market interest rates – will continue to be determined by
demand in the European banking system.

   On account of the financial turmoil, in 2008 Danmarks Nationalbank
introduced two temporary credit facilities to support the liquidity of
banks and mortgage banks. The temporary secured lending facility,
under which these institutions could borrow against a new type of

bonds (loan bills) issued by banks in Denmark, was established in May 2008. In September of the same year, Danmarks Nationalbank introduced a credit facility giving banks and mortgage banks the opportunity to borrow against their excess capital adequacy. Both arrangements expired on 26 February 2011. The loan commitments were only to a very limited extent used to raise loans from Danmarks Nationalbank, but the institutions did use them to ensure that the liquidity requirements set by the Danish Financial Supervisory Authority were met.

Developments in the credit and capital markets
The yield on 1-year non-callable fixed-rate bullet bonds ("fixed bullets") used for financing adjustable-rate loans averaged around 1.6 per cent in the auctions in November-December 2010. This is approximately 0.2 percentage point lower than in December 2009. The total volume in the auctions was just over kr. 590 billion, and the process was smooth. Auctions will be held again in March, with an estimated volume of just under kr. 120 billion in krone-denominated bonds and just over 3 billion euro in euro-denominated bonds, making these the largest March auctions so far. Spreading the auctions helps to alleviate the refinancing pressure up to the turn of the year. The yield spread between long-term mortgage bonds and fixed bullets widened in the last three months of 2010. Adjustable-rate loans accounted for 67 per cent of gross new lending in December, up from 46 per cent in September.

Yields on short- and long-term mortgage bonds rose further in the first months of the year, to 1.9 and 4.9 per cent, respectively. This is 0.8 and 0.6 percentage point, respectively, higher than in mid-2010, but still well below the level in previous years, cf. Chart 12. The yield on a 10-year Danish government bond rose to 3.5 per cent, corresponding to the level in the spring of 2010.

The banks' deposit and lending rates to households and the corporate sector have been more or less unchanged in recent months. The banks' seasonally adjusted lending to the corporate sector and to households fell by kr. 7 and 5 billion, respectively, from November 2010 to end-January 2011. The decline in bank lending was offset by an equivalent rise in lending by mortgage banks. Total lending growth year-on-year to the corporate sector increased in early 2010, moving from negative territory to around zero. Growth in lending to households was around 2 per cent in 2010, cf. Chart 13.

Developments in lending by banks and mortgage banks are also reflected in Danmarks Nationalbank's lending survey for the 4th quarter of 2010. While the banks reported unchanged lending policies, the mortgage banks indicated that they had eased credit standards a little

YIELDS ON DANISH GOVERNMENT AND MORTGAGE BONDS   Chart 12

Per cent

- 1-year fixed bullets   - Long-term mortgage bonds   - 10-year government bonds
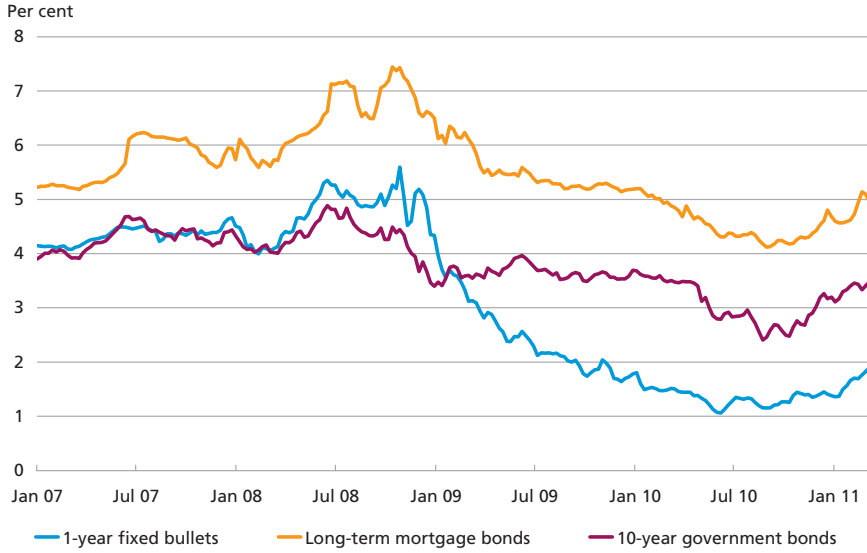
Note: The 1-year yield on fixed bullets is a weekly average, with 10 March 2011 as the most recent observation. The
        long-term mortgage bond yield is an average effective yield on 30-year fixed-rate callable mortgage bonds,
        stated on a weekly basis with week 10 as the most recent observation. The yield on a 10-year government bond is
        the 10-year par yield.
Source: Nordea Analytics, Association of Danish Mortgage Banks and Danmarks Nationalbank.

GROWTH IN LENDING BY BANKS AND MORTGAGE BANKS TO HOUSEHOLDS AND
THE CORPORATE SECTOR   Chart 13

Per cent, year-on-year

- Corporate sector   - Households
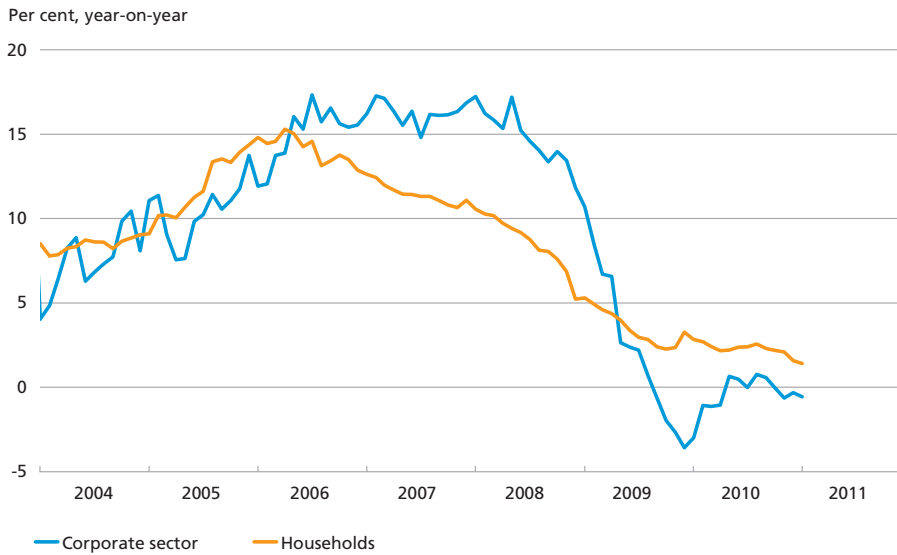
Note   Seasonally adjusted data. Outstanding lending by banks and mortgage banks in Denmark. "Households" also
        includes sole proprietorships, including farms. The corporate sector consists of non-financial corporations. The
        most recent observations are from January 2011.
Source: Danmarks Nationalbank.

vis-à-vis the corporate sector compared with the previous quarter and expected to ease them further in the 1st quarter of 2011. The mortgage banks cited fiercer competition, an increase in their own risk appetite and the general economic outlook as the main factors behind their easing of credit standards. Both banks and mortgage banks experienced rising demand for loans from new and existing corporate and retail customers in the 4th quarter of 2010 and expect this trend to continue in the 1st quarter of 2011.

Since the 4th quarter of 2008, the banks have reduced their customer funding gap by almost kr. 280 billion, so that the gap has practically halved. The customer funding gap has increasingly been financed by long-term debt instruments and to a lesser extent by short-term money market loans. This tendency is particularly pronounced for the medium-sized banks, cf. Chart 14. Part of the shift towards bond financing should be viewed in the light of the banks' option to issue debt with individual government guarantees under Bank Rescue Package II.

The reduction of the banks' customer funding gap, as well as more long-term funding and lower dependency on funding by other credit institutions, all indicate that the sector's funding is becoming more stable.

The banks' available financial statements for 2010 point to decreasing write-downs. For the large banks in the Danish Financial Supervisory Authority's group 1, write-downs on loans and guarantees totalled kr. 21 billion in 2010, compared with kr. 37 billion in 2009.

LARGE AND MEDIUM-SIZED BANKS' FUNDING BROKEN DOWN BY
MATURITIES   Chart 14
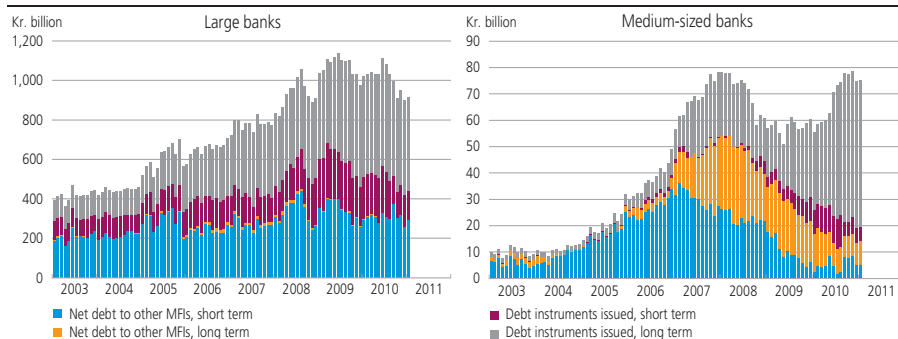
Note: Short term is defined as an original term to maturity of up to and including 1 year, while long term is more than
        1 year. The large banks are defined as the Danish Financial Supervisory Authority's group 1 in 2010, the medium-
        sized banks as group 2. The data is not consolidated, i.e. the funding of foreign branches is not included. Net
        debt to other MFIs is exclusive of central banks and of intra-group MFIs. The most recent observations are from
        January 2011.
Source: Danmarks Nationalbank.

The Bank Rescue Packages

At the close of 2010, the banks' and mortgage banks' option to issue debt with individual government guarantees under Bank Rescue Package II expired. By year-end the Financial Stability Company had issued guarantee commitments totalling kr. 366 billion to 64 institutions, but only 50 of these had actually issued debt, for a total of kr. 193 billion. Issuance predominantly took place in the 1st half of 2010, the reason being that earlier in the year it had been uncertain whether the Commission would approve an extension of the arrangement beyond 30 June 2010. Furthermore, the Commission's approval of the extension until 31 December 2010 was conditional upon an increase of the guarantee commission and submission of profitability plans by the institutions. These requirements made it less attractive to apply for individual government guarantees in the latter half of 2010.

Bank Rescue Package I expired on 30 September 2010, marking the end of the unlimited government guarantee to all depositors and other unsecured creditors against losses on claims on banks that are members of the Private Contingency Association. The general government guarantee was a necessary measure during the crisis, but also an extensive measure of a magnitude that made it necessary to limit the guarantee period. After the expiry of the unlimited guarantee it was important for the Danish banking sector to be able to stand on its own feet once again. Consequently, Bank Rescue Package I made way for Bank Rescue Package III, adopted by the Folketing (Danish parliament) on 1 June 2010. Bank Rescue Package III contains no further guarantee beyond the statutory deposit guarantee agreed by the EU member states, under which an amount corresponding to a maximum of 100,000 euro per depositor is covered. Bank Rescue Package III establishes a permanent set of rules for winding up of distressed banks after 30 September 2010, so that the Financial Stability Company can still take over banks with a view to resolution. This ensures a better and more flexible transition for the customers and creditors of the ailing bank, and the values and assets of the bank are preserved and continued to a larger extent than if the bank is compulsorily wound up.

On 6 February 2011, Amagerbanken A/S announced that it no longer met the statutory solvency requirements, and the management of the bank decided to let it be wound up by the Financial Stability under Bank Rescue Package III. As a result, most ordinary customers did not notice any change in the practical handling of their bank transactions; they were still able to use their credit cards, Internet banking, etc. The share capital and subordinated liabilities in Amagerbanken are lost, and customers with deposits exceeding the guaranteed limit of 100,000 euro

and other creditors could initially dispose of only 59 per cent of the excess amount.

On 16 February, the international credit rating agency Moody's announced the downgrading of five Danish banks, while the rest of the Danish banking sector was put on the observation list with a view to potential future downgrading. The reasons given were that the general government guarantee to depositors and unsecured creditors of Danish banks has expired and that activation of Bank Rescue Package III in connection with the resolution of Amagerbanken has emphasised that large depositors and creditors may suffer losses when an insolvent Danish bank is wound up. Hence, the downgrading of the Danish banks is part of Moody's general reassessment of European banks as a consequence of the expiry or near expiry of a number of government guarantee schemes launched during the financial crisis.

The expiry of the unlimited government guarantee and the resolution of Amagerbanken highlight the challenge faced by Danish banks in future, especially when the individual government guarantees under Bank Rescue Package II expire in 2013. Looking ahead, it is therefore important that the banks strengthen their capital bases and secure their funding.

THE DANISH ECONOMY

Economic activity

After five quarters of sound growth, GDP in volume terms declined by 0.4 per cent in the 4th quarter of 2010, cf. Chart 15. Falling exports and rising imports entailed a negative contribution to growth from foreign trade. Inventory investments also made a negative contribution, while there was a small increase in final domestic demand. Growth in 2010 overall was 2.1 per cent, mainly fuelled by domestic demand, while exports of goods have been struggling to keep up with the international upswing. Hence, the Danish economy is only slowly recovering from the crisis, and there is some way to go before GDP is back at the level seen just before the downturn.

Private consumption is picking up and grew by 0.8 per cent in the 4th quarter relative to the preceding quarter, to a level approximately 3 per cent higher than when it bottomed out in the spring of 2009. As a result of sound growth in residential investments, total investments in the private sector have also ceased to fall. Investments in machinery continued to fall in the 4th quarter, however.

In 2009 and early 2010, growth in the Danish economy was mainly driven by public demand, but in the last two quarters growth in public

GROSS DOMESTIC PRODUCT, GDP, IN VOLUMES	Chart 15

Billion 2000-kr.
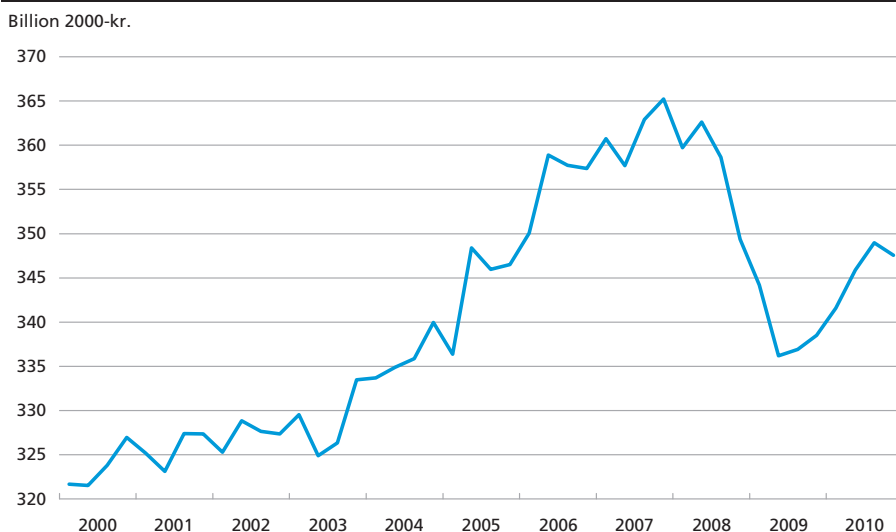
Note: Quarterly data, seasonally adjusted. Chained values. The most recent observation is from the 4th quarter of 2010.
Source: Statistics Denmark.

demand has been marginally negative. For the full year 2010, public consumption grew by 1.7 per cent, which was considerably more than planned. In the preceding years, growth was even stronger. All in all, domestic demand increased by almost 2 per cent in 2010.

Exports, including manufactured exports, grew in the first part of 2010, but the 4th quarter saw a decline of 0.5 per cent. As imports rose by 0.3 per cent at the same time, net exports fell in the last quarter of the year.

Growth is curbed by strong consolidation in the private sector, cf. Box 3. Many firms, especially the large ones, are posting sound profits, but only investing little at the moment. The relatively high savings ratio of the households should be seen in the light of factors such as extensive borrowing in the boom years followed by loss of wealth when housing prices fell.

The households' real disposable incomes are estimated to have risen by just over 7 per cent in 2010, partly as a result of income tax cuts. This was much more than the increase in private consumption, and consumption as a ratio of disposable income is now well below its long-term average. In the coming years real disposable incomes can be expected to rise at a substantially slower pace than in 2010, as wage inflation has declined and taxes are no longer being reduced. On the contrary, income tax brackets will be frozen, while a number of indirect taxes will be raised.

SAVINGS SURPLUSES BY SECTOR	Box 3

The savings surplus, and thus net lending, in the private sector has become very large. The savings surplus is mainly attributable to the corporate sector, both financial and non-financial corporations, while the households' balance is close zero, cf. Chart 16. This is a significant change compared with previously, as households have traditionally had a considerable savings deficit. However, in earlier periods when the economy was weak the households have also had savings surpluses close to zero, e.g. in 2001-03.

The large corporate savings surplus reflects that the economic tide is turning, and corporate profits are rising, but without entailing a need to expand the capital stock by way of investment. In the financial sector, another factor, besides high earnings, is that banks which received individual government guarantees under Bank Rescue Package II are not allowed to distribute dividends.

The financial sector's savings surplus remained high during the crisis in spite of the banks' poor financial performance. The reason was that write-downs on loans reduce the financial result in the period when the loans are written down, while net lending/net borrowing in the sector is only affected to the extent that the write-downs are subsequently realised as losses.

NET LENDING/BORROWING BY SECTOR	Chart 16

Per cent of GDP

Legend: Non-financial corporations, Financial corporations, General government, Households, Current-account surplus
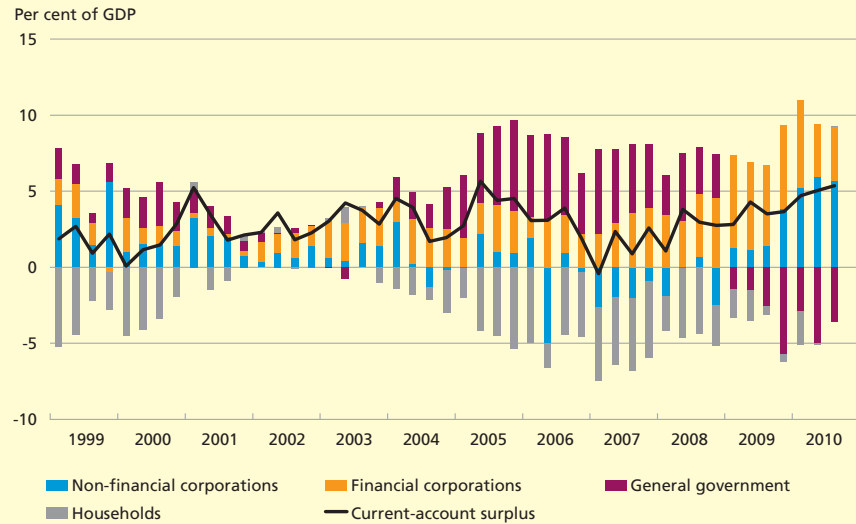
Note: The sum of net lending/borrowing by sector does not add up to the balance of the current account as the "capital transfers" item is not included. This is usually a minor item.
Source: Statistics Denmark and own calculations.

Besides tax cuts, a pronounced fall in interest expenses has eased the finances of the households over the last couple of years, cf. Chart 17. This is predominantly attributable to a lower level of interest rates, especially at the short end of the curve. Concurrently with the rise in household indebtedness during the boom, a shift was seen towards loans with shorter maturities. This has further reduced interest payments beyond

HOUSEHOLDS' GROSS DEBT AND INTEREST COSTS   Chart 17

Per cent of disposable income   Per cent of disposable income
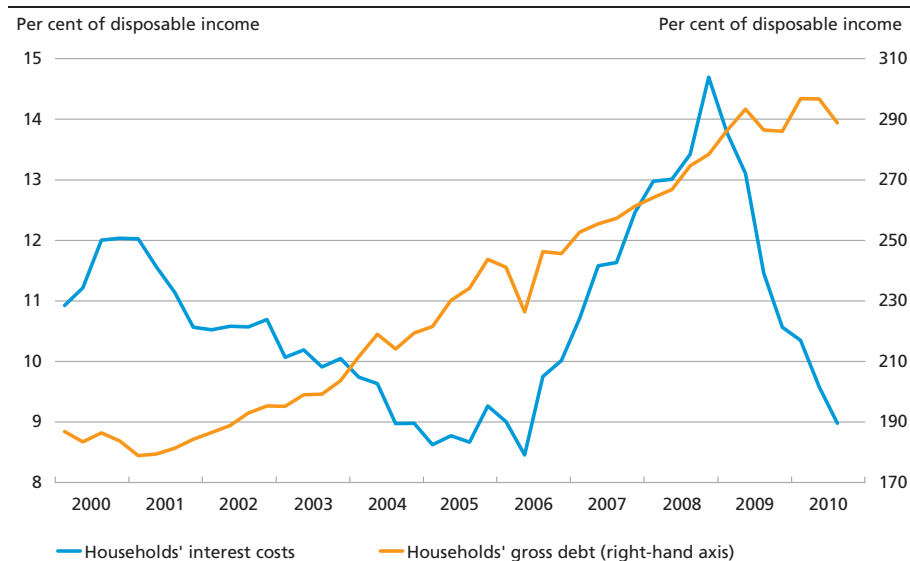
Note: Pension contributions have been deducted from the statement of disposable income as they are not immediately
        disposable for payment of interest costs. Data for the household sector includes farms. The pattern does not
        change much if farms are left out of the calculation.
Source: Danmarks Nationalbank.

what the falling rates would warrant, as short-term interest rates are lower than long-term interest rates. On the other hand, the households have become much more vulnerable to rising interest rates. The same tendency is seen in the corporate sector.

The declining interest burden has facilitated consolidation by the households while also supporting economic developments, e.g. via the housing market. However, this situation cannot be expected to last. At some point the level of interest rates will normalise, which will undo the temporary improvement of household finances. The high savings ratio at present could indicate that, in the current situation with low interest rates, the households are gearing their finances to higher future interest rates.

Confidence indicators
Consumer confidence has fluctuated around a modest positive level over the last year, cf. Chart 18. The current confidence level is slightly above the average since the mid-1980s, which is in line with the increase in private consumption in the last year.

Sales of passenger cars to households increased in 2010 and is now almost back at the level seen before the downturn in the economy. Cars are increasingly leased, and during the last year leasing accounted for 65

CONFIDENCE INDICATORS   Chart 18

Percentage balances   Percentage balances
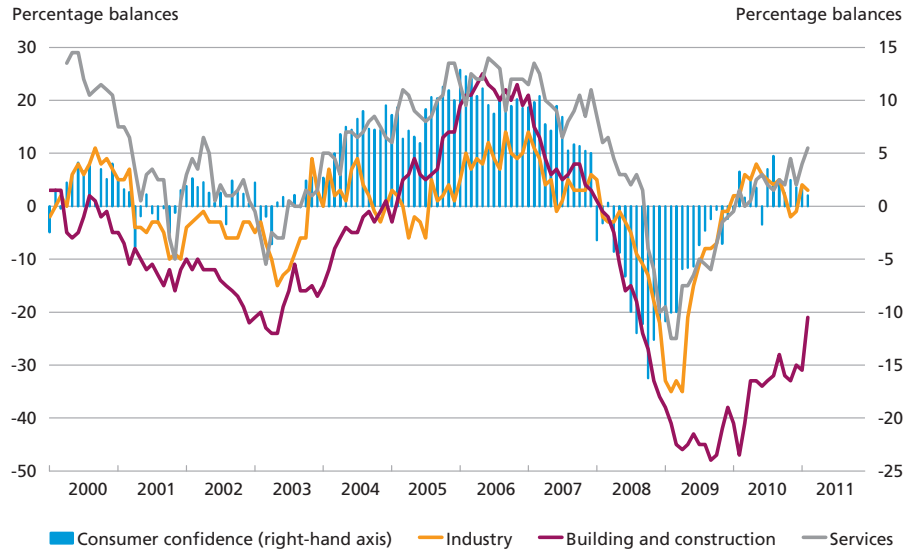
Note: Indicators of expectations for industry, services and building and construction. The most recent observations are
        from February 2011. All indicators have been adjusted for seasonal fluctuations.
Source: Statistics Denmark.

per cent of corporate car purchases. Around one fifth of these cars are subsequently leased to private users.

Business indicators support the picture of a tentative upswing. Over the last year, the composite, seasonally adjusted industrial confidence indicator has been almost flat at a level slightly above its long-term average. In January output expectations rose a little, however. Actual industrial production, seasonally adjusted and exclusive of ships, etc., fell in the months up to the turn of the year, but rose in January. Output in January was still 15 per cent below the peak in the spring of 2008.

The indicator for the service sector rose marginally in 2010, while the indicator for building and construction has shown a pronounced increase since the trough in early 2010. This tendency was particularly strong in February 2011, but all the same the indicator remains well below its long-term average.

The improved finances of many firms were reflected in a lower number of compulsory windings-up in the autumn. Those that do fail are mainly small domestic-market oriented firms, so employment is affected only to a lesser extent.

The number of enforced sales has been unchanged over the last year, but household arrears ratios vis-à-vis mortgage banks has declined over the last three quarters. This reflects an improved ability to meet payments in the household sector.

Foreign trade and balance of payments

The recovery of world trade in the wake of the sharp decline during the crisis was not fully reflected in Danish exports in 2010. Exports of goods, including manufactured exports, rose in the first part of the year, but then flattened out. Recent months have seen a renewed upward trend. Exports of agricultural produce and fuel have also risen. Exports of goods are not yet quite back at the pre-crisis level.

Danish manufactured exports have not been able to keep up with the growing economies of Denmark's trading partners, entailing loss of market shares, cf. Chart 19, especially in volume terms. The more favourable development in current prices shows that the terms of trade have improved.

It is not unusual for Denmark to lose market shares when the economy picks up. The reason is that Danish exports contain a relatively high share of goods and services that are not so cyclically sensitive, e.g. pharmaceuticals. But seen over a longer period, there has been a downward trend in Danish industrial market shares. This is to some extent attributable to the rapid advance of less developed countries, which generally reduces the market shares of the old industrialised countries. However, it is not the only explanation. Loss of competitiveness has been a key factor. On the other hand, the opportunities to export to the less developed countries increase as their economies are growing strongly.

INDUSTRIAL MARKET SHARES   Chart 19
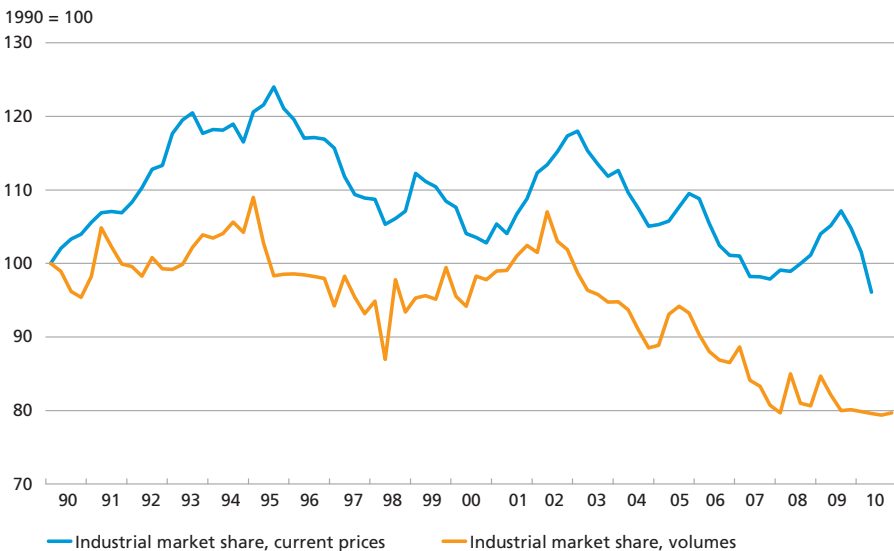
Note: "Industrial market share" calculated as Danish manufactured exports to OECD countries as a share of the OECD
        countries' imports.
Source: OECD and Statistics Denmark.

Imports have shown the same development pattern as exports, i.e. increasing in recent months. This applies to imports for both consumption and business. The seasonally adjusted trade surplus remains unchanged at around kr. 6 billion per month, as it has been for the last year.

The current-account surplus has improved strongly over the last year and has reached a very high level. The surplus for the 12 months up to and including January 2011 was kr. 104 billion, corresponding to 6.0 per cent of GDP, compared with 3.7 per cent in the preceding 12-month period. The increase is attributable to higher trade surpluses in both goods and services, but most of the improvement from 2009 to 2010 reflects higher income from sea freight.

Income from sea freight has contributed kr. 58 billion to the balance of services in the last year. To calculate the net contribution from sea freight to the current account of the balance of payments, costs for e.g. bunkering for the merchant fleet must be deducted. Bunkering costs, primarily purchase of fuel for the vessels, are registered under trade in goods, and constituted kr. 30 billion. Hence, the net contribution from sea freight to the current-account surplus was approximately kr. 28 billion over the last year, up from only kr. 6 billion in 2009[1]. In Chart 20, bunkering costs have been moved from the balance of goods to the balance of services. Seen over a slightly longer period, the shift in net interest payments on foreign debt, etc. has strengthened the balance of payments substantially.

Labour market

The improved economy in 2010 has not really been reflected in the labour market yet. Employment has declined, and unemployment has been almost flat over the past year. This shows that there is still plenty of spare capacity.

Net unemployment adjusted for seasonal fluctuations was 114,000 in January, equivalent to 4.2 per cent of the labour force, while gross unemployment was 6.1 per cent. Gross unemployment is the sum of net unemployment, previously referred to as registered unemployment, and people on activation schemes.

The number of announced lay-offs has been lower in the last year than in previous years and only slightly above the level in the period 2004-05. However, this series is highly volatile and caution should be exercised when using the figure as anything other than a very uncertain indicator of unemployment trends.

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[1] For an in-depth analysis, see Anders Ejstrup and Caroline Bindslev, Foreign-Exchange Earnings in the Shipping Sector, Danmarks Nationalbank, *Monetary Review*, 2nd Quarter 2010.

CURRENT ACCOUNT OF THE BALANCE OF PAYMENTS WITH
SUBCOMPONENTS   Chart 20

Kr. billion
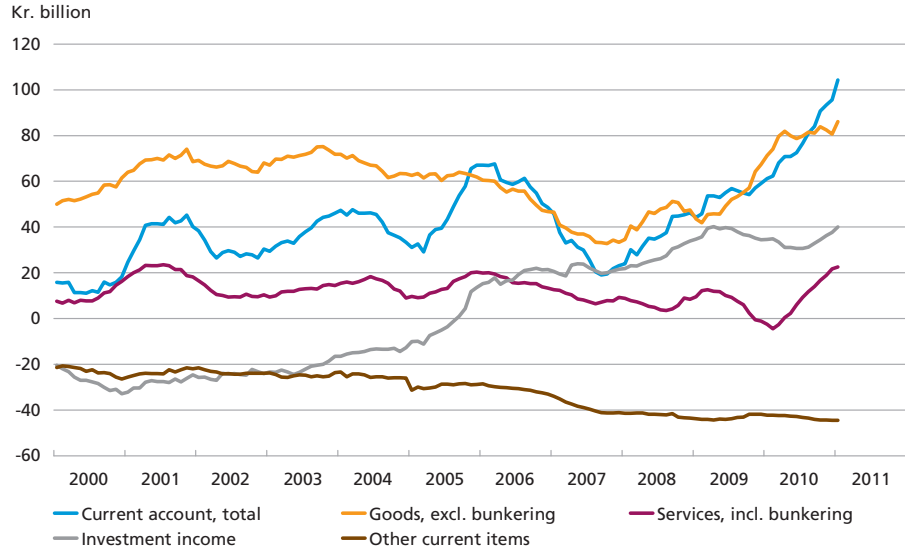
Note: 12-month sums. Bunkering has been deducted from the balance of goods and added to the balance of services.
        "Other current items" comprises unilateral payments, EU payments and wage income. The most recent observa-
        tions are from January 2011.
Source: Statistics Denmark and own calculations.

According to the national accounts, employment fell by 3,000 in the 4th
quarter. Public-sector employment was reduced by 7,000, which means
that private-sector employment has increased. For the full year 2010,
employment fell by 59,000, corresponding to 2 per cent.

Not only employment, but also the labour force has been declining in
the last couple of years. The reduction has mainly been cyclical. How-
ever, for many years to come there will also be an underlying demo-
graphic reduction in the labour force, partly because more people will
be opting for early retirement. Phasing out the early retirement scheme
as envisaged by the government will reverse the falling trend in the
labour force so that it will increase moderately, cf. Table 2.

The increase in the labour force achievable by phasing out the early
retirement scheme is so small that it can be absorbed by the labour
market. A retirement reform will reduce the need for higher taxation
or lower public spending in other areas, thereby increasing the de-
mand for labour. Any adaptation problems in connection with the
phasing-out of the early retirement scheme would be far smaller than
the adaptation problems otherwise faced by the economy on a regular
basis. The phasing-out of the transitional allowance, which in many
ways resembled the early retirement scheme, led to a higher employ-

IMPACT ON THE LABOUR FORCE IF THE EARLY RETIREMENT SCHEME IS
PHASED OUT   Table 2

1,000 persons	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Demographic reduction in labour force	-5	-5	-5	-4	-2	-3	-3	-3	-4	-3
Impact on supply of labour if early retirement is phased out	0	0	0	4	5	9	11	15	13	13
Net impact on labour force	-5	-5	-5	0	3	7	8	12	9	10

Note: The demographic reduction in the labour force reflects the fact that the number of people in the age groups
         from which the labour force is mainly recruited is set to fall. The calculations assume unchanged participation
         rates in terms of age, gender, background and origin. The effect on the supply of labour of the Danish
         government's proposed retirement reform is given as the number of people who defer their transition to early
         retirement as a consequence of the reform, assuming that they have the same age-related propensity to opt for
         early retirement as those who did so in 2009-10. The number of people who are expected to receive senior social
         pensions or other social pensions or who transfer to old-age pension after early retirement pension have been
         deducted from this figure.
Source: Statistics Denmark and own calculations.

ment rate in the relevant age group in the second half of the 1990s, cf.
Chart 21.

   After the reform, the employment rate for this age group was almost
the same as for younger age groups.

EFFECT ON EMPLOYMENT RATE OF PHASING-OUT OF TRANSITIONAL
ALLOWANCE   Chart 21
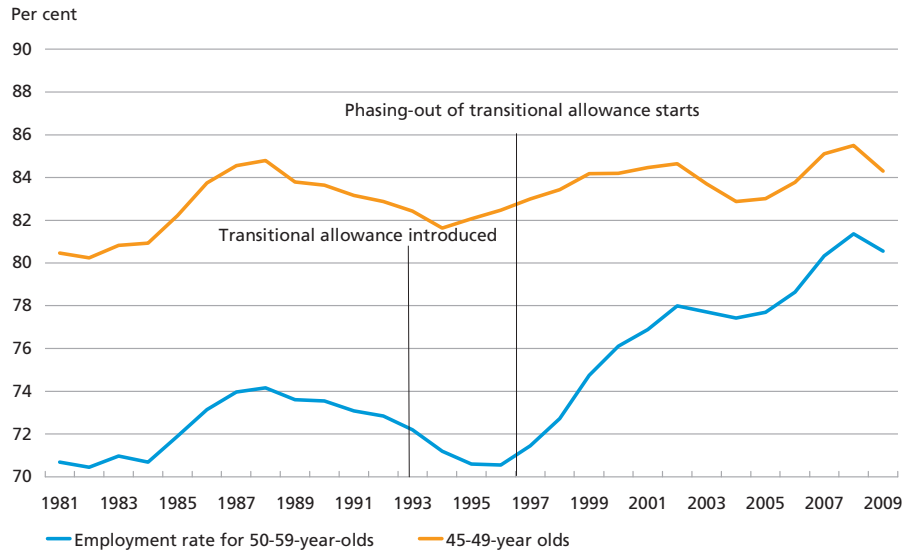
Note: From 1 March 1992, people aged 55-59 who had been unemployed for more than 12 months could opt for a
         transitional allowance corresponding to approximately 80 per cent of the individual unemployment benefit rate.
         People on the transitional allowance no longer had to be available for work, and the right to early retirement
         was retained. From 1994, the transitional allowance scheme was extended to also include the long-term
         unemployed aged 50-54, i.e. people who had been unemployed for more than 12 months. From 1996 it was no
         longer possible to join the scheme, and by 2006 it had been fully phased out. When the influx stopped, 46,000
         people were receiving the transitional allowance.
Source: Statistics Denmark and own calculations.

Housing market

The tentative upswing in housing prices came to a halt in the summer. In the 3rd quarter, housing prices were at the same level as in the spring and 2.7 per cent above the level in the same quarter of 2009, according to Statistics Denmark. The rise over the last year has been strongest in the Copenhagen area, but even here prices have flattened out. At the national level, prices of homes sold were reduced by just under 10 per cent in the 3rd quarter. The reduction is calculated as the difference between the traded price and the price at which the home was put up for sale.

The housing market is squeezed by an increasing number of homes on the market. According to the statistics of the Association of Danish Mortgage Banks, almost 60,000 owner-occupied homes were for sale at end-2010, of which 10,000 were leisure homes. At the beginning of 2010 there were signs that the trading volume was picking up, but the trend halted over the summer. The number of trades is significantly below the average for the last 15 years.

The Danish housing market is analysed in more detail in the article "Developments in the Market for Owner-Occupied Housing in Recent Years – Can House Prices be Explained?" in Part 2 of this Monetary Review. For a more compact overview, see the article "The Housing Bubble that Burst: Can House Prices be Explained? And Can Their Fluctuations be Dampened?" on p. 47.

Wages and prices

Wage inflation in the private sector has responded to the weakening of the labour market and has declined to a level of around 2.5 per cent year-on-year. Public-sector wage inflation is also declining after having been substantially above the private-sector level for some time. Wage inflation in the Danish industrial sector is now virtually in line with the level abroad. However, Danish wages grew faster than those of Denmark's competitors for a long time, without a corresponding increase in product-ivity. In 2008 wages in the Danish industrial sector were almost 10 per cent higher than in Germany and 15 per cent higher than in Sweden.

Rising real wages can reflect higher productivity, a higher wage share, i.e. the share of the production result for the year, and hence of income, paid to the labour force, or the relationship between producer and con-sumer prices. In Chart 22, growth in real wages has been broken down by these three components.

The strong wage inflation in Denmark means that real wages for people employed in the private non-agricultural sector have risen more than productivity since the mid-1980s. This has put residual incomes under pressure and increased the wage share. The latter typically rises in periods

BREAKDOWN OF DEVELOPMENT IN REAL WAGES   Chart 22

Per cent, year-on-year

| | Wage share | Ratio between producer and consumer prices | Hourly productivity | Real wages |
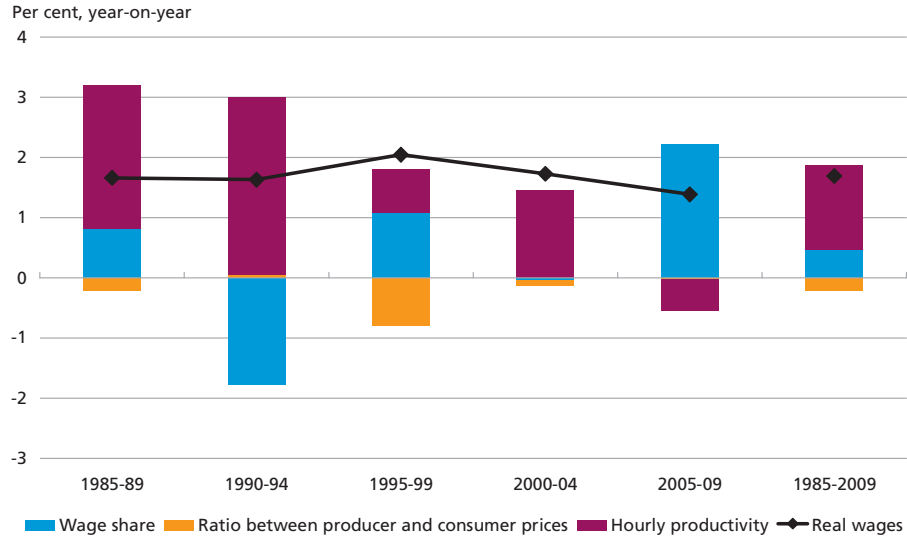
Note: The "wage share" is defined as the relationship between payroll costs in the private non-agricultural sector and
        gross value added at current prices. An increase in real wages may be attributable to higher hourly productivity,
        a higher wage share or the relationship between producer price and consumer prices. The Chart shows a
        breakdown of the increase in real wages by these three factors for selected periods. In the calculation, hourly
        wages in the private non-agricultural sector have been approximated by hourly wages in industry. Consequently,
        the three factors do not add up to the change in real wages for all sub-periods.
Source: Statistics Denmark and own calculations.

when the labour market is under pressure, as was the case during the
most recent boom. Conversely, if unemployment is high, as it was in the
early 1990s, the wage share may fall. The development in the relationship
between producer and consumer prices has made a weak negative
contribution to the development in real wages. This could be attributable
to an increase in the indirect taxes included in consumer prices.

Inflation, measured by the Harmonised Index of Consumer Prices, HICP,
has been rising for eighteen months, but the rate of increase fell a little
at the beginning of this year, cf. Chart 23. Annual growth in HICP was 2.6
per cent in both January and February 2011. Higher taxes on goods such
as tobacco and confectionary at the beginning of 2010 pushed up price
inflation, but from the turn of the year this base effect has dropped out
of the calculations. On the other hand, food and especially energy prices
have risen strongly, and indirect taxes were raised further on 1 July. In
February, energy prices were 9 per cent above the level one year earlier,
while food prices were up by almost 4 per cent.

If the volatile components – energy, food and alcohol and tobacco –
are excluded, prices have risen by just over 1 per cent in the last year.
Hence, there are no strong underlying inflationary pressures in the
economy at present. If this situation is to be maintained, the current

CONSUMER PRICES AND CORE INFLATION   Chart 23

Per cent, year-on-year

HICP   Core inflation
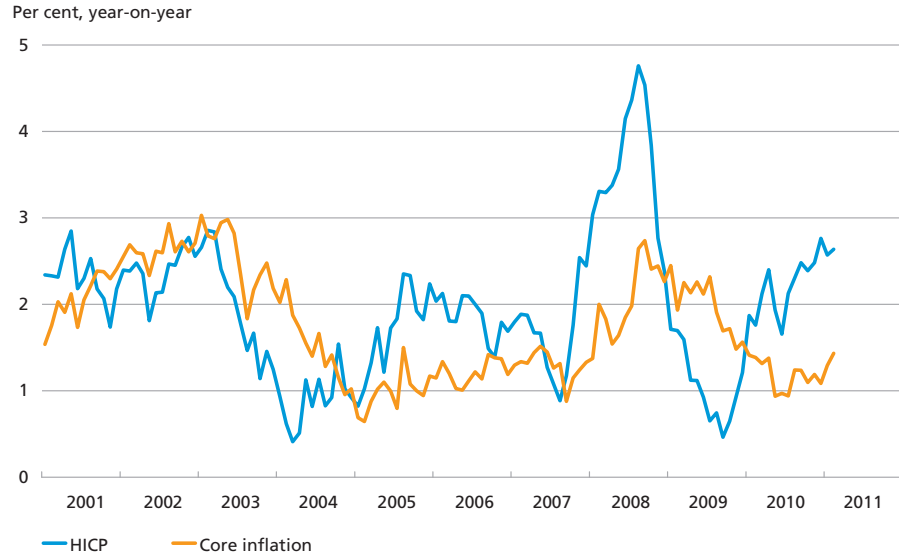
Note: HICP is the EU's Harmonised Index of Consumer Prices. Core inflation is consumer prices excluding the energy, food, alcohol and tobacco components. The most recent observations are from February 2011.
Source: Statistics Denmark.

slightly higher rate of inflation must not be allowed to spill over to wages, thereby triggering a price-wage spiral.

Consumer surveys show that most consumers expect higher inflation one year ahead than today. Wholesale prices also point to mounting price pressures in future. They grew by 7.7. per cent in January relative to the same month of 2010, mainly driven by strong increases in the prices of a number of commodities, including energy and food. On the commodity exchanges, many staple food prices were almost back at the high levels from 2008 in the first few months of this year. Looking ahead, developments in wholesale prices will affect prices in later links of the production and sales chain so that rising wholesale prices put consumer prices under pressure. But typically higher prices for imported goods such as energy are not immediately passed on to sales prices; instead, profit margins are squeezed for a while.

Euro area consumer prices rose by 2.4 per cent in February according to the flash estimate. For a couple of years, inflation in Denmark has been above the euro area level, but the gap has narrowed in recent months. Adjusted for indirect taxes, the two have been very close.

Forecast for the Danish economy 2011-13
On the basis of the cyclical trends described above, Danmarks National-bank's most recent forecast for the Danish economy is described below.

The forecast has been prepared using the macroeconometric model MONA[1] and is based on the available economic statistics, including Statistics Denmark's quarterly national accounts for the 4th quarter of 2010[2]. The underlying assumptions concerning the international economy, financial conditions and fiscal policy are described in Appendix 1. Changes compared with the December 2010 forecast are outlined in Appendix 2.

GDP is estimated to grow by just under 2 per cent in both 2011 and 2012, which is in line with growth in 2010 and higher than the underlying growth in potential output. The loss of output after the financial crisis is expected to have been caught up by 2013, when the Danish economy approaches normal capacity utilisation and GDP growth declines to around 1.5 per cent. The growth profile is similar to those of both the USA and the euro area, cf. Chart 24. However, the growth outlook is weaker than for the USA, where underlying growth is higher, mainly on account of demographics, but a little stronger than that of the euro area, which is weighed down by the crisis-stricken member states. Growth is set to be slightly lower in Denmark than in Germany in the forecast period.

In the coming years, private final demand and exports will assume a more prominent role in growth in demand, whereas corporate inventories have more or less been adjusted to turnover, and public-sector demand will slow down, cf. Table 3. Against this background, growth will be more balanced, but will also be curbed by the consolidation taking place both in the households and in the corporate sector, cf. above. The projection envisages a continued slight upward trend in private consumption, based on a moderate increase in disposable incomes and a small increase in the consumption ratio from a low level. The weak labour market, combined with rising interest rates and high energy and food prices will dampen consumption growth. Private investment will also contribute to growth in demand, but investment ratios will not rise much from the current low levels.

Expectations of sound growth in some of Denmark's most important export markets, especially in 2011, are reflected in export growth in the projection. As wages are set to grow at a slightly higher pace than abroad, some market shares will still be lost. Rising demand pressures lead to a higher import ratio in the projection. Import growth is in line with export growth in 2011, but gradually outpaces export growth in 2012 and 2013. As a result, the current-account surplus declines a little

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[1] This model is described in Danmarks Nationalbank, *MONA – a quarterly model of the Danish economy*, 2003.
[2] The calculations are based on statistical information up to and including 10 March 2011.

GDP GROWTH IN DENMARK, THE EURO AREA AND THE USA   Chart 24
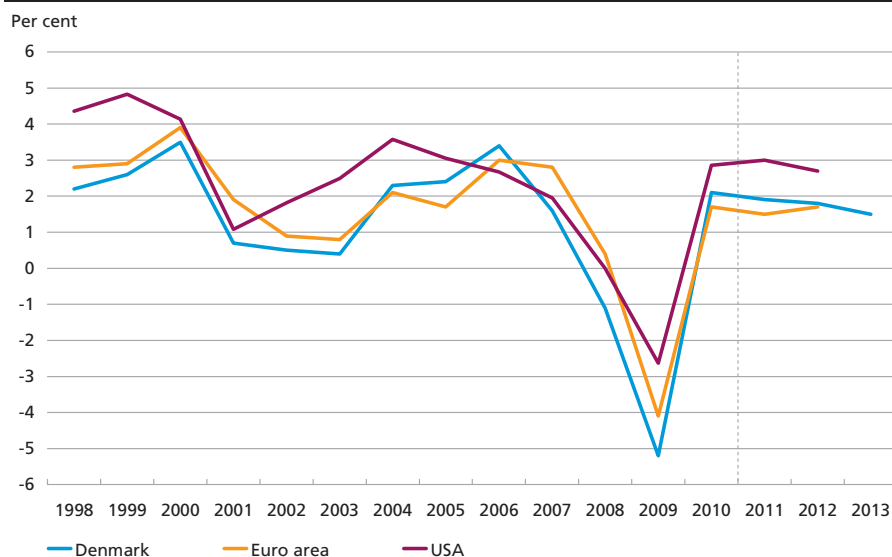
Note: Estimates after the broken line.
Source: Statistics Denmark, Reuters EcoWin, IMF, *World Economic Outlook Update*, January 2011, and own forecast.

from its record high level of 5.5 per cent of GDP in 2010 to 4.5 per cent of GDP by 2013.

Despite rising output since mid-2009, employment continued to show a slight downward trend in the 2nd half of 2010, which means that

KEY ECONOMIC VARIABLES   Table 3

Real growth on previous year, per cent	2010	2011	2012	2013
GDP	2.1	1.9	1.8	1.5
Private consumption	2.1	1.9	2.3	1.5
Public consumption	1.7	-0.1	0.5	0.2
Residential investment	-10.4	0.1	2.0	3.2
Public investment	14.2	-1.2	-8.0	-2.9
Business investment	-4.8	3.5	6.3	7.7
Inventory investment[1]	0.9	0.3	0.2	0.1
Exports	2.4	4.8	3.5	3.2
Manufactured exports	6.7	6.3	5.1	4.2
Imports	1.9	4.5	4.3	4.2
Total employment, 1,000 persons	2,765	2,761	2,769	2,775
Unemployment, gross, 1,000 persons	164	166	155	146
Unemployment, net, 1,000 persons	114	113	106	101
Balance of payments, per cent of GDP	5.4	5.1	4.8	4.5
Government balance, per cent of GDP	-3.7	-4.6	-3.4	-2.7
Cash prices, per cent year-on-year	2.3	0.0	1.2	1.5
Consumer prices, per cent year-on-year	2.2	2.4	1.8	1.7
Hourly wages, per cent year-on-year	2.5	2.5	3.0	3.2

[1]   Contribution to GDP growth.

much of the decline in productivity prior to and during the crisis has been caught up. In the projection, productivity growth declines, so that output growth will be reflected in a moderate increase in employment. In the coming years, the demographic tendency for the labour force to shrink is assumed to be matched by a cyclical influx to the labour force, which is therefore estimated to remain at around its current level. Consequently, unemployment will decline in step with the rise in employment, i.e. to around 100,000 in 2013 for net unemployment. Gross unemployment, which includes recipients of unemployment and cash benefits who are on activation schemes, will fall slightly more, from 167,000 at the end of 2010 to 146,000 by 2013, reflecting an expected decline in the number of people in activation.

Consumer price inflation, measured in terms of HICP, has increased notably in the last year, from around 1 per cent year-on-year at the end of 2009 to 2.6 per cent year-on-year in February 2011. The increase is to a large extent attributable to price hikes for energy and food, reflecting developments in the international commodity markets. Core inflation, which excludes these two components, was considerably more subdued, at 1.4 per cent year-on-year in February 2011. The last time commodity prices rose strongly, in 2007-08, there was a certain lagged, albeit modest, knock-on effect on other prices. As yet, there are no indications of a similar impact this time around, cf. the low core inflation, and the risk of such spill-over effects is deemed to be lower in the current situation with weak capacity pressures. In the projection, the rate of inflation remains at around its current level throughout 2011, but then abates to just under 2 per cent year-on-year in 2012 and 2013, cf. Table 4.

Wage inflation in industry was around 2.5 per cent year-on-year throughout 2010. This is the lowest rate of increase for some years and

CONSUMER PRICES								Table 4
Per cent, year-on-year	Weight[1]	2010	2011	2012	2013	Q4 2010	Q1 2011	Q2 2011
HICP		2.2	2.4	1.8	1.7	2.6	2.5	2.5
Index of net retail prices	100	2.0	2.4	2.0	1.8	2.2	2.2	2.5
Exogenous:								
Energy	7.1	12.3	11.6	0.8	0.1	11.9	12.6	12.3
Food	13.1	-0.2	2.7	2.0	1.8	2.1	2.8	3.2
Adm. prices	4.2	3.9	1.9	2.8	3.0	4.1	3.7	1.8
Rent	23.6	2.6	2.9	2.9	2.7	2.6	2.8	3.0
Excl. exogenous	52.0	0.6	0.7	1.6	1.5	0.5	0.1	0.8
Imports	15.6	0.8	3.8	1.3	1.7	3.1	4.1	4.3
IMI	36.4	0.6	-0.5	1.7	1.5	-0.5	-1.5	-0.6

Note: In the index of net retail prices, indirect taxes and duties have been deducted from consumer prices, while any subsidies have been added.
[1] Weight in the index of net retail prices, per cent.

reflects the weakening of the labour market. It is almost in line with wage increases abroad, which are also affected by the crisis. Wage inflation is expected to remain at around this level in the coming year or so, followed by an increase to just over 3 per cent year-on-year towards the end of the forecast period in response to higher price inflation and a gradual strengthening of the labour market.

Economic policy

The Danish economy was overheated in 2006-07. Besides the impact of the international upswing, this was attributable to the imported low level of interest rates, accommodative fiscal policy and easy credit standards in large parts of the financial sector. Analyses in this Monetary Review show that the overheating and the subsequent financial crisis were amplified by several economic policy initiatives that increased the underlying instability of the economy, including the freeze on nominal property value tax and the introduction of deferred-amortisation mortgage loans.

Like all periods of overheating, this one was succeeded by a cyclical downturn, government debt problems and deteriorating competitiveness. This time around, the downturn was exacerbated by the international and Danish financial crisis.

At this point, with current-account surpluses and moderate government debt, the Danish economy is stronger than after the overheating in the mid-1980s and Denmark is in a better position than countries where the preceding overheating was stronger. All the same, several of Denmark's neighbours, including Sweden and Germany, managed to avoid serious overheating of their economies. Denmark has a clear competitive problem, and particularly the domestic-market oriented sectors – construction and services – have a serious productivity problem. At the same time hours worked per employee is below the OECD average, and the labour force is set to decrease.

The automatic stabilisers in the Danish economy remain high in an international context, but have fallen over a number of years on account of lower marginal taxes and a certain reduction in the replacement ratio of unemployment benefits. Both of these elements have strengthened production capacity and should be retained. In contrast, the freeze on nominal property value tax means that housing taxes *de facto* decrease when house prices rise – and vice versa. This destabilises the economy overall as well as household finances and weakens financial stability by amplifying fluctuations in housing prices.

The link between housing taxes and housing prices should therefore be re-established by revoking the freeze on property value tax. If the

rate is reduced at the same time, this can be effected without any notable impact on current housing prices, and in a longer-term perspective housing prices will be surrounded by more certainty as fluctuations will be reduced. If the freeze is revoked, the real value of property value taxes will no longer gradually decline. This will prevent considerable loss of revenue in the long term.

The introduction of deferred-amortisation mortgage loans for home financing has also amplified fluctuations in housing prices. If prices go up, loans with amortisation entail a larger increase in overall payments to service the loan compared with deferred-amortisation loans. The higher costs dampen the demand for housing and thus curb the price rise. Conversely, if housing prices fall, loans with amortisation entail a larger decline in the payments compared with deferred-amortisation loans. This stimulates demand for housing and helps to buoy up the market. In other words, loans with amortisation help to stabilise housing prices. This favourable effect is lost as deferred-amortisation loans gain ground.

The growing popularity of deferred-amortisation loans also increases the vulnerability of homeowners and hence of the whole economy to unexpected falls in housing prices, as less home equity is built up. Widespread use of deferred-amortisation loans will increase the number of homeowners who are technically insolvent in the event that housing prices drop sharply. This is not only a problem to the households in question, but also to the economy overall. Technical insolvency can prompt homeowners to increase their savings in periods of recession and falling housing prices, when low consumption will amplify the downturn. Furthermore, technical insolvency could mean that the homeowners in question cannot afford to move, which impedes mobility in the labour market and thus makes it difficult to reduce unemployment during a recession.

All this points to phasing out access to new deferred-amortisation mortgage loans for home financing. A gradual and gentle phasing-out could be implemented without serious negative implications for the housing market in the short term and would contribute to stabilising the market in the longer term. In this way, it would serve as a bulwark against large future rises and falls in housing prices if these loans are phased out and the link between property value tax and housing prices is re-established.

In the wake of the crisis, employment has fallen, and the fall has continued even though output has been growing for some time. The reason is that firms have been catching up on part of the serious decline in labour productivity seen during the economic downturn. This year

and the next couple of years, growth in aggregate demand is set to outpace the underlying growth in production capacity. As a result, employment can also be expected to rise in the coming years, unless the international economy suffers an unexpected setback. It is essential that there is room for the expected increase in private consumption and investment without labour market pressures leading to further erosion of competitiveness. Consequently, the tight fiscal policy planned for 2011-13 should be maintained. It made good sense to ease fiscal policy during the strong economic downturn in 2009 and 2010. But now the economy is recovering, while public finances have deteriorated sharply. So it is time for consolidation. Even with the planned tightening, the most recent easing will not be fully undone by 2013.

The current problems resulting from large and growing government debts in a number of countries have caused international investors to focus strongly on whether the individual countries are making a targeted effort to get their public finances under control. Weakening of fiscal discipline in Denmark could therefore undermine the confidence in the Danish economy that is a precondition for maintaining a narrow yield spread to Germany. With a narrow yield spread, monetary policy will still be able to support economic growth, although the international level of interest rates must be expected gradually to normalise.

For the next many years to come, demographic developments will point to a shrinking workforce and a rising number of people outside the labour market. This is a challenge for future prosperity and public services. An obvious and undoubtedly effective instrument for offsetting the decline in the labour force and strengthening public finances would be to phase out the early retirement scheme. Even with gradual phasing-out from the middle of this decade, the net increase in the labour force in the years ahead is expected to fall short of the increase in the labour force in the past decade. The growth in the labour force brought about by a phasing-out of the early retirement scheme could therefore be transformed into higher employment. Since the introduction of the early retirement scheme in 1979, improved health has raised the average remaining life expectancy of 60-year-olds by almost 4 years. In practice, retirement opportunities have therefore been expanded strongly since 1979. If a retirement reform is to have any effect before the negative economic implications of the demographic changes filter through in earnest, and if the persons affected should have a fair warning, the decision on a reform should be made as soon as possible.

APPENDIX 1: ASSUMPTIONS IN THE FORECAST FOR THE DANISH ECONOMY

The projection is based on a number of assumptions concerning the international economy, financial conditions and fiscal policy.

The international economy

The global economy is still improving, and world trade is increasing. But the upswing remains fairly modest and growth is generally highest in export-oriented economies. Two of Denmark's major trading partners, Sweden and Germany, saw high growth and rising employment in 2010. Against this background, Danish export market growth in 2011 has been set at 7.5 per cent, which is higher than in the December forecast. Growth is expected to be lower in 2012 and 2013, cf. Table 5.

   The higher commodity prices are pushing up global prices. This year, price increases in Denmark's export and import markets are assumed to be just below the level of increase in 2008, when commodity price hikes were also seen. Import prices in the countries to which Denmark exports and export prices in the countries from which Denmark imports will rise by a good 2 per cent this year, followed by a slightly lower rate of increase in the following years. Foreign wage increases are expected to be modest in the projection period as a result of weak labour markets in most countries.

OVERVIEW OF FORECAST ASSUMPTIONS				Table 5
	2010	2011	2012	2013
International economy:				
Export market growth, per cent year-on-year	10.9	7.5	6.5	5.0
Export market price[1], per cent year-on-year	-0.9	2.2	1.7	1.2
Foreign price[2], per cent year-on-year	-0.7	2.3	1.8	1.2
Foreign hourly wages, per cent year-on-year	2.4	1.3	2.0	2.6
Financial conditions, etc.:				
3-month money-market interest rate, per cent p.a.	0.6	1.2	2.2	2.5
Average bond yield, per cent p.a.	2.7	3.2	3.8	4.3
Effective krone rate, 1980 = 100	104.0	103.4	103.6	103.6
Dollar exchange rate, DKK per USD	5.6	5.3	5.3	5.3
Oil price, Brent, USD per barrel	80.3	112.7	112.1	109.2
Fiscal policy:				
Public consumption, per cent year-on-year	1.7	-0.1	0.5	0.2
Public investment, per cent year-on-year	14.2	-1.2	-8.0	-2.9
Public-sector employment, 1,000 persons	839	834	835	836

[1]   Weighted import price for all countries to which Denmark exports.
[2]   Weighted export price for all countries from which Denmark imports.

Interest rates, exchange rates and oil prices

Developments in short- and long-term interest rates in the forecast are based on the expectations of future developments that can be derived from the yield curves in the financial markets. Short-term interest rates have risen a little in recent months. The 3-month money-market interest rate was around 0.8 per cent in early March and is expected to rise to a level of around 2.5 per cent by 2013. Long-term interest rates have also risen in recent months, but remain low. The average bond yield was 3 per cent at the beginning of March and is forecast to rise to 4.3 per cent by 2013.

Since the December forecast, the nominal effective exchange rate of the krone has increased a little. This development reflects weakening of the pound sterling and the dollar vis-à-vis the euro, and thus also the Danish krone, while the Swedish krona and the Norwegian krone have strengthened. In the projection, the dollar rate and the effective krone rate are assumed to remain constant at the level from early March.

Since the last forecast, the price of oil has risen substantially, to around 115 dollar per barrel at the time of the forecast. In the projection the oil price is expected to match futures prices, so that it will fall back to just under 110 dollars by 2013.

Fiscal assumptions

The fiscal assumptions in the forecast are based on the announced fiscal-policy stance, including regional and local government budgets for 2011 and the Finance Act for 2011. Real public consumption is assumed to fall marginally in 2011, and then to grow by 0.5 per cent in 2012 and 0.2 per cent in 2013. Public investment will fall a little this year and then be reduced in 2012 and 2013 in step with the planned consolidation.

APPENDIX 2: REVISIONS IN RELATION TO THE PREVIOUS FORECAST

The estimated growth in GDP in 2011 remains unchanged from the December forecast, cf. Table 6, in which the revisions of GDP and consumer prices are broken down by key background factors. An upward adjustment of export market growth points to higher growth, but a slightly stronger effective exchange rate of the krone and higher oil prices point in the opposite direction. Against this background, the estimated GDP growth in 2012 has been adjusted marginally downwards.

Consumer price inflation has been revised upwards to 2.4 per cent in 2011 and 1.8 per cent in 2012, mainly because the oil price in dollar terms has risen by a good 20 per cent since December. This is to some extent balanced by the strengthening of the krone. Other factors, including data revisions, contribute only modestly to the revisions of the estimated increase in GDP and consumer prices.

REVISIONS IN RELATION TO THE PREVIOUS FORECAST						Table 6
	GDP			Consumer prices, HICP		
Per cent, year-on-year	2010	2011	2012	2010	2011	2012
Forecast, December 2010	2.0	1.9	1.9	2.2	1.9	1.5
Contribution to revised estimate from:						
Export market growth	0.0	0.2	0.2	0.0	0.0	0.0
Interest rates	0.0	0.0	0.0	0.0	0.0	0.0
Exchange rates	0.0	-0.1	-0.1	0.0	-0.1	-0.1
Oil prices	0.0	-0.1	-0.1	0.0	0.6	0.2
Other factors	0.1	0.1	-0.1	0.0	0.0	0.2
This forecast	2.1	1.9	1.8	2.2	2.4	1.8

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

The Housing Bubble that Burst: Can House Prices be Explained? And Can Their Fluctuations be Dampened?

Niels Arne Dam, Tina Saaby Hvolbøl, Erik Haller Pedersen, Peter Birch Sørensen and Susanne Hougaard Thamsborg, Economics

INTRODUCTION AND SUMMARY

The Danish housing market went through a dramatic cycle in the 2000s. Over a few years in the middle of the decade, real house prices rose at a pace not seen since the hectic years from 1983 to 1986. Then the curve took a steep dive, and homeowners experienced large real capital losses in 2008 and the first half of 2009.

The skyrocketing house prices contributed strongly to the overheating of the Danish economy seen in 2006 and 2007, and the downturn in the housing market began before the international and Danish financial crisis hit the real economy in earnest. The timing of the housing market plunge was very unfortunate as it amplified the contractionary effects of the financial crisis.

Experience from the last decade has, once again, demonstrated that large fluctuations in house prices can destabilise the economy. Therefore it is important to understand the factors that drive house prices. Broader understanding of pricing mechanisms for owner-occupied housing is a prerequisite if future economic policy is to prevent large fluctuations in the housing market.

In Part 2 of this Monetary Review, we perform an in-depth analysis of recent years' developments in the owner-occupied housing market and discuss how fluctuations can be curbed. This article provides a non-technical summary of our most important results and conclusions. One of the main conclusions is that the housing market boom in the last decade was to a large extent driven by the introduction of new forms of housing finance and to some extent by the nominal freeze on the property value tax. These measures amplified cyclical fluctuations and have entailed lower employment prospects in the coming years than we would otherwise have seen. Fluctuations in the housing market, and hence in the economy, can be reduced by restoring the link between

HOUSE PRICES, SINGLE-FAMILY HOUSES (LEFT) AND REGIONAL
DEVELOPMENT IN HOUSE PRICES (RIGHT)   Chart 1
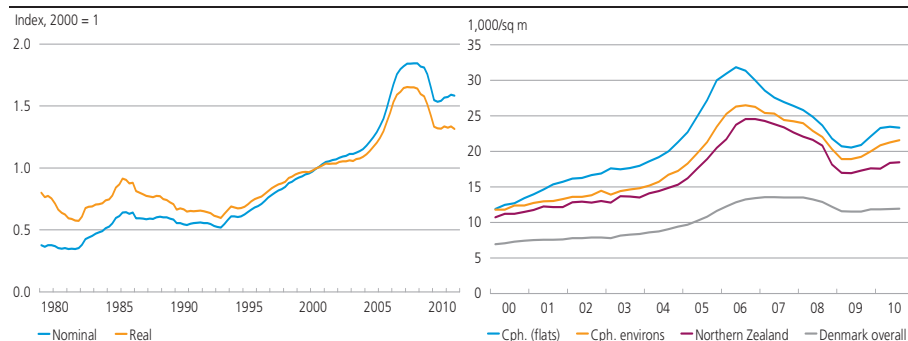
Note: Seasonally adjusted price indices (left). The real house price was obtained by deflating by the national accounts
         deflator for private consumption. Price per square metre for single-family houses, unless otherwise indicated
         (right).
Source: Statistics Denmark, Association of Danish Mortgage Banks (own seasonal adjustment) and MONA databank.

property value tax and current house prices, and by phasing out
deferred-amortisation mortgage loans for owner-occupied housing.

CAN HOUSE PRICES BE EXPLAINED?[1]

Chart 1 (left) shows developments in nominal and real house prices in
Denmark since 1980. The hike from 2004 to 2007 and the subsequent
dive in 2008-09 are clearly seen. The average price increase over the last
decade masks considerable differences across Denmark. The rise in the
housing market began in Copenhagen, not least in the market for
owner-occupied flats, and soon spread to the environs and Northern
Zealand, cf. Chart 1 (right). The high-income municipalities on the
northern fringe of Copenhagen thus saw unusually strong price in-
creases for houses. Outside Greater Copenhagen and Northern Zealand
prices developed at a much more moderate pace.

Another remarkable feature in the last decade was the increasing use
of new types of financing, supported by liberalisation of legislation on
home financing. Adjustable-rate loans were introduced as far back as in
1996, but only really gained ground after the millennium change. In
October 2003, deferred-amortisation loans were introduced and quickly
became very popular. In just a few years, these new loan types have
eclipsed traditional fixed-rate loans with amortisation as the dominant
type of home financing, cf. Chart 2.

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[1] This section recapitulates the article by Niels Arne Dam, Tina Saaby Hvolbøl, Erik Haller Pedersen,
     Peter Birch Sørensen and Susanne Hougaard Thamsborg, Developments in the Market for Owner-
     Occupied Housing in Recent Years – Can House Prices be Explained? Danmarks Nationalbank, Part 2
     of this *Monetary Review.*

COMPOSITION OF HOME-BUYER FINANCING   Chart 2

Kr. billion

1,750

1,500

1,250

1,000

750

500

250

0

Dec Jun Dec Jun Dec Jun Dec Jun Dec Jun Dec Jun Dec Jun Dec
03 04 04 05 05 06 06 07 07 08 08 09 09 10 10

■ Fixed-rate loans with amortisation   ■ Adjustable-rate loans with amortisation
■ Fixed-rate loans without amortisation   ■ Adjustable-rate loans without amortisation
■ Bank loans for housing purposes
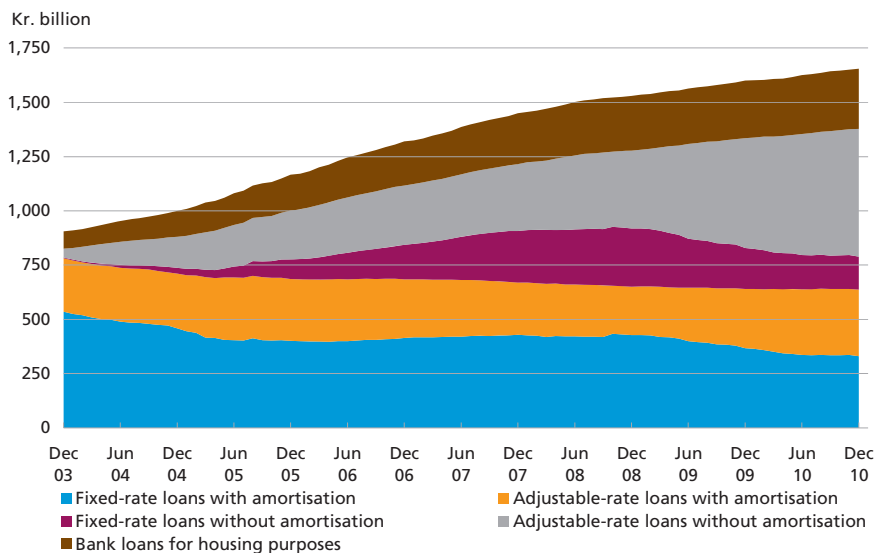
Source: Danmarks Nationalbank.

The rise in house prices triggered a strong construction boom. Historically there has been a close correlation between residential investment and the price of existing housing relative to new construction – if building a house is less expensive than buying an existing one, this option becomes more favourable. During the upswing, residential construction responded strongly to the fact that the price of existing housing had risen relative to that of new construction, cf. Chart 3. By 2006, residential investment was 61 per cent above the level in 2002.

Denmark was not the only country to experience soaring house prices in the years after the millennium change. In countries such as the UK, France, Spain, the USA, Norway and Sweden real prices also increased markedly until 2007, after which they generally declined substantially until 2009. Since then, they have been more or less unchanged, cf. Chart 4. A characteristic of the development in Denmark was that house prices began to rise relatively late, but then rose more steeply than in other countries when the Danish "housing bubble" eventually began to unfold in 2005 and 2006. As a result, developments in the Danish housing market in those years were unusually hectic, both in a historical and an international perspective.

A new house-price relation for Denmark
In an attempt to explain the above developments, we have performed an econometric analysis to identify the factors determining Danish house

HOUSE PRICES, CONSTRUCTION COSTS AND RESIDENTIAL INVESTMENT   Chart 3

Billion 2000-kr.   Index, 2000 = 1

Residential investment   House price/construction costs (right-hand axis)
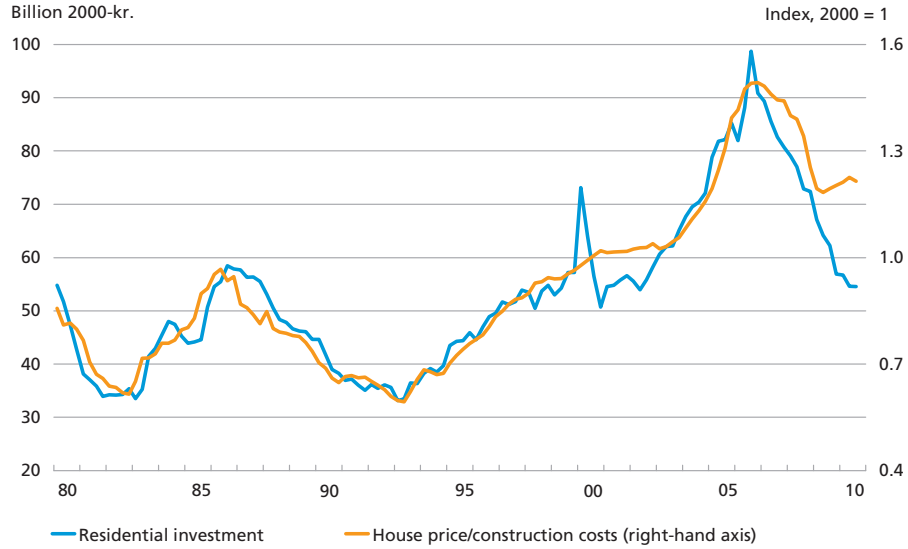
Note: Annualised seasonally adjusted quarterly figures for construction investment. The national accounts deflator for
        construction investment is used as construction costs.
Source: Statistics Denmark and Danmarks Nationalbank.

prices. The point of departure is that prices are determined by demand in the short term since the supply can be changed only slowly as new housing is constructed and the existing stock is worn down. Traditionally it has been assumed that housing demand varies positively with real household disposable income and negatively with the user cost of owner-occupied housing. The user cost is a measure of the expected costs of owning a home. It includes real interest after tax and housing

REAL HOUSE PRICES IN SELECTED OECD COUNTRIES   Chart 4

UK   France   Spain   USA   Denmark   Germany   Netherlands   Sweden   Norway   Denmark
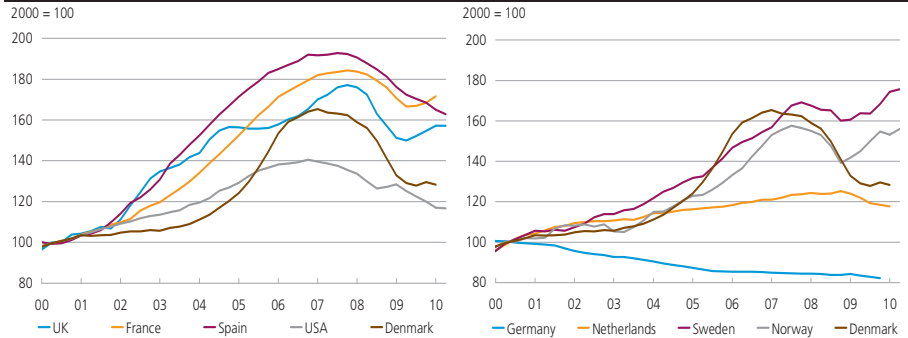
Note: Real house prices: nominal house prices deflated by the national accounts deflator for private consumption.
Source: OECD House Price Database.

taxes (land tax and property value tax).[1] Any expected real price fall on the house is also included in the user cost as it entails loss of wealth for the homeowner. Conversely, the user cost is reduced in case of expected real house-price increases as the homeowner will achieve a capital gain. By setting up a relation (equation) for determining housing demand, it is possible to derive the real house price that buyers are willing to pay per square metre of housing at a given level of disposable income and a given user cost.

The traditional house-price relations in the existing macroeconometric models for the Danish economy have all been found wanting when it comes to explaining recent years' developments in house prices. Consequently, we have examined whether it is possible to achieve a better explanation by assuming that home buyers respond to housing costs that comprise a weighted average of the traditional user cost and the lowest first-year payments that can be achieved using the mortgage loan types available at the time of purchase. First-year payments equal the sum of the first year's repayments, housing taxes and nominal interest payments after tax for a fully leveraged home purchase. By including the lowest possible first-year payments as an explanatory variable, we allow the emergence of new loan types such as deferred-amortisation loans to influence housing demand and house prices.

In principle, home buyers "ought not" to see mortgage repayments as part of the user cost, but rather as savings that will reduce future interest payments. However, in practice homeowners do to some extent see repayment as a cost. The reason could be that some potential home buyers want to increase their consumption but have limited borrowing options. In that case they are willing to pay a higher price for the house if they can defer amortisation. Other home buyers may simply be short-sighted, so that they seek to achieve the lowest possible costs right now rather than ensuring low future payments by gradually reducing their loans.

A short-term approach can also make adjustable-rate loans based on short-term interest rates seem more attractive than they actually are. Arbitrage behaviour in the financial markets means that long-term bond yields have a tendency to be equal to the average of the current and the expected future short-term interest rates plus a risk premium for the uncertainty related to the future level of interest rates. So when short-term interest rates are well below long-term interest rates it is not necessarily more advantageous to finance a home purchase by taking

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[1] Strictly speaking, the user cost also includes housing repair costs (depreciation), but according to Statistics Denmark these costs are very stable over time and hence do not contribute to explaining house-price fluctuations, so depreciation is not included in our expression of the user cost.

out an adjustable-rate loan rather than a fixed-rate long-term loan. A steep yield curve usually reflects that short-term interest rates are set to rise substantially, or that there is considerable uncertainty regarding the future level of interest rates. If home buyers are not fully aware of this, access to adjustable-rate loans based on short-term interest rates could make a home purchase look more favourable. Financing at a currently low rate of interest could also be attractive for liquidity-constrained buyers who would like to increase consumption now at the expense of future consumption.

So there are several reasons to assume that the emergence of new loan types in the early 2000s contributed to raising housing demand and house prices. As previously mentioned, we are assuming that home buyers re-spond to housing costs that are a weighted average of the traditional user cost (the relevant costs for a rational home buyer not constrained by liquidity) and the lowest possible first-year payments, given the loan types available at the time of the purchase. In our econometric analysis, we let data determine the weight of the first-year payments in the housing costs, selecting the weight so as to achieve the best possible statistical explan-ation of house prices. Using this approach, we find that home buyers respond to housing costs in which the first-year payments have a weight of 60 per cent, while the traditional user cost has a weight of 40 per cent. One possible interpretation is that 60 per cent of home buyers are con-strained by liquidity or are short-sighted, while the remaining 40 per cent take a longer-term approach and are not short of liquidity for financing their desired consumption level. Another, equally plausible, interpretation is that individual home buyers attach considerable importance (60 per cent) to the opportunity to consume now, but that they also attach some importance (40 per cent) to consumption opportunities in the longer term, which are improved by e.g. repayment of loans (and by inflation that erodes the real value of their debt).

Our econometric relation for explaining the average level of house prices takes into account that prices only gradually adjust to changes in the underlying housing demand, which is, as already mentioned, deter-mined by real disposable income and by our weighted average of the user cost and the lowest possible first-year payments. The long-term yield on 30-year fixed-rate mortgage bonds affects housing demand and house prices by way of the user cost, while short-term yields and re-quired mortgage repayments have an impact via their effect on the first-year payments. Housing taxes work through both channels. Over time, changes in house prices affect the housing supply by impacting on the volume of new construction. In that way, changes in housing demand are slowly reflected in changes in supply, which dampens long-term

price fluctuations. Our analysis of house prices takes account of the development in the housing supply.[1]

Using the above explanatory variables, we have estimated a house-price relation on Danish data for the period from the 1st quarter of 1972 to the 2nd quarter of 2010. As house prices respond sluggishly to changes in the underlying housing demand, there is a statistical correlation between current house prices and prices in previous periods. We have performed a "dynamic simulation" of the estimated house-price relation in which the predicted house price in a given period is based not only on the currently observed levels of interest rates, incomes and taxes, etc., but also on predicted house prices in previous periods. In this way we can examine whether the relation is good at capturing fluctuations in house prices or whether the house-price predictions tend to diverge from actual developments.

The result of this exercise is illustrated in Chart 5. It is seen that the relation generally captures the most significant fluctuations in house prices until 2004 fairly well, while it has difficulty explaining the steep price increases in 2005-06 and the subsequent fall in 2008-09. This supports the popular assumption that there was a "bubble" in the housing market in the years just before the financial crisis, when house prices were decoupled from the underlying economic fundamentals that normally govern price formation. When the bubble burst, the subsequent price fall was particularly dramatic because prices had risen so far above their fundamental level.

As previously mentioned, expectations of future capital gains on houses will stimulate housing demand by reducing the user cost. Various surveys indicate that household expectations of the future course of house prices are strongly influenced by price developments in the immediate past. This assumption has been incorporated into our econometric analysis. In the "bubble years" 2005-07, our estimate of the expected rise in house prices reached the highest level seen at any time during the period from 1972 to the present. The high expectations of future capital gains contribute to explaining why housing demand and house prices soared in the "bubble years". Yet our estimated house-price relation is unable to capture all of the actual price increase. The reason could be that the relation does not take account of the possibility that house-price expectations may have carried greater weight in buyer considerations in the years when observed price increases were particularly dramatic. The economic literature on speculative bubbles in asset markets

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[1] In the house-price relation, we take the development in the housing supply as a given. However, we have also estimated a separate relation for explaining residential investment, which is presented in more detail in Dam et al. (2011a).

REAL HOUSE PRICES, ACTUAL AND SIMULATED   Chart 5

Index, 2000 = 1
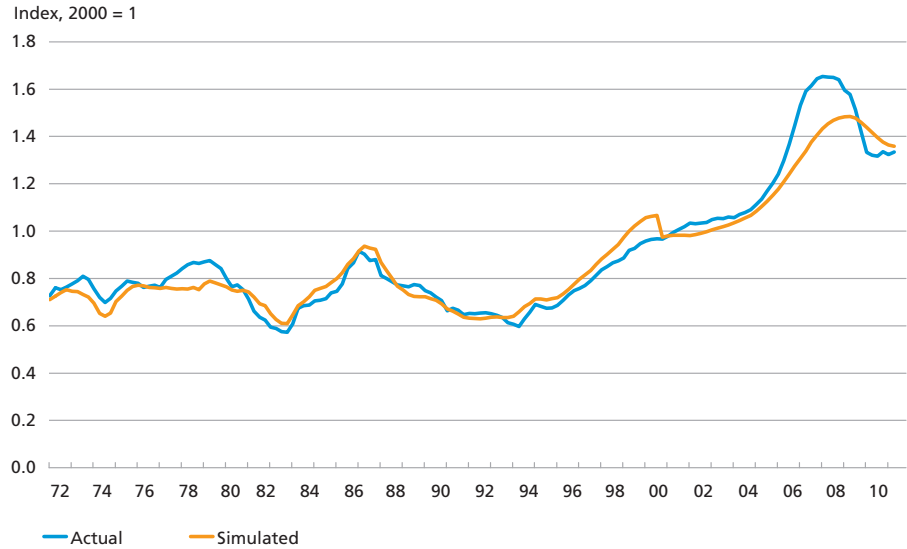
Note: Simulated house prices are based on a dynamic simulation of the estimated house-price relation as from the 1st
         quarter of 1972.
Source: MONA databank and own calculations.

actually emphasises that expectations of capital gains play a special role in "bubble periods" when asset prices seem to be out of synch with the economic fundamentals.[1]

As we see it, it is fair to say that the development in house prices in the past decade included an actual house-price bubble in the years 2005-07 when behaviour in the housing market was "abnormal" and characterised by unrealistic expectations of future house prices. It is also worth noting that while our house-price relation does not capture all of the observed price rise in the bubble years, it is actually quite good at explaining the overall change in house prices from the beginning to the end of the last decade. This is demonstrated by the two curves in Chart 5, which are fairly close to each other at both these points.

How much did the new loan types and the freeze on property value tax influence house prices?

Using our house-price relation, we can illustrate how house prices would have developed if the new loan types had not been introduced. In this context we assume that all other explanatory variables such as interest rates, incomes and taxes would still have followed their observed historical course. This gives us an estimate of the isolated effect of the new

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[1]   See e.g. Case and Shiller (2003) and Arce and López-Salido (2011).

loan types. Initially we assume that the large unexplained "bubble element" in house prices in the middle of the last decade would have been unchanged. In this way we find that the increase in real house prices from the 4th quarter of 1999 until the peak in the 1st quarter of 2007 would "only" have been approximately 40 per cent if the new loan types had not been introduced, compared with an actual increase of 71 per cent. According to the house-price relation, adjustable-rate loans and deferred-amortisation loans have had more or less the same impact on house prices.

We have also calculated the isolated effect of the freeze on property value tax in nominal terms from the beginning of 2002. If this freeze had not been introduced, property value tax would have developed more or less in line with house prices. In addition, we assume that all other factors (including the new loan types) would have developed as they actually did. We have performed two alternative calculations. In the first one, we assume that home buyers solely respond to current property value tax, i.e. that no-one takes into account the gradual erosion of taxes by inflation as a result of the freeze. Under this assumption, our house-price relation shows that real house prices would have risen by approximately 5 percentage points less up to the peak in the 1st quarter of 2007.

However, as already mentioned, our house-price relation could also be interpreted to the effect that a proportion (an estimated 40 per cent) of home buyers are actually forward-looking and attach importance not only to current, but also to future housing costs. At the other extreme we have therefore assumed that these home buyers fully factor in the future tax savings achieved through the freeze on nominal property value tax. Applying a conservative assumption of expected house-price rises, we find that the real increase in house prices from the end of 1999 to the beginning of 2007 would have been a good 9 percentage points lower if the property value tax had not been frozen.

These estimates assume that the unexplained "bubble element" in house prices in 2005-07 would have been unaffected by intervention to dampen house prices. In reality it seems more likely that such intervention would have dampened the extraordinarily high expectations of price increases in the "bubble period" that our estimated house-price relation has difficulty capturing. In Chart 6 we have therefore assumed that if non-introduction of the new loan types or non-freezing of property value tax had dampened house prices by a certain factor, as indicated by the house-price relation, the bubble element in house prices would have been reduced by the same factor. In other words, we assume that the unexplained bubble component in house prices is reduced

proportionally to the explained price component. Obviously it is very difficult to say how such intervention would actually have affected the speculative bubble element in house prices, but it is worth noting that our calculation method still leaves scope for a certain bubble component in prices in the scenarios with intervention to dampen prices.

Under these assumptions, the grey curve in Chart 6 shows that the wave of soaring house prices up to 2007 would have been more or less eliminated if the new loan types had not been introduced and property value tax had not been frozen. Hence our calculations entail that real house prices would have risen by only 15 per cent or so from the end of 1999 to the beginning of 2007, compared with the actual increase of 71 per cent.

This striking result seems to contrast with the widespread belief that last decade's housing boom was primarily attributable to the low interest rates and rising real incomes. In this context it should, however, be noted that it was the new loans types that allowed home buyers to benefit from the low and falling short-term interest rates. Given the existence of the new loan types, interest-rate developments have had a significant impact on house prices. Our estimated house-price relation thus entails that a good 13 percentage points of the total real increase

REAL HOUSE PRICES WITH AND WITHOUT NEW LOAN TYPES AND TAX
FREEZE, WITH PROPORTIONAL ADJUSTMENT OF UNEXPLAINED PART   Chart 6

Index, 2000 = 1

Legend:
- Actual
- Without new loan types
- Without freeze on property value tax
- Without new loan types and freeze
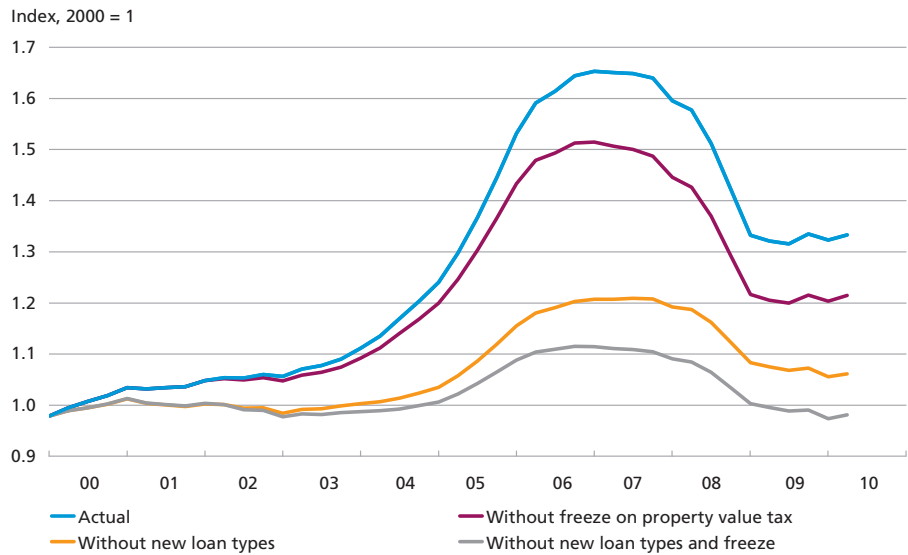
Note: Counterfactual scenarios based on the estimated demand relation. Adjustable-rate loans are not assumed to be
          reflected until the 1st quarter of 2000. In the absence of the freeze, the property value tax is assumed to be kept
          constant as a ratio of the housing stock calculated at market value. The modelling of the freeze assumes that 40
          per cent of home buyers fully factor in expected future tax savings resulting from the freeze, cf. the text.
Source: MONA databank and own calculations.

in house prices from the millennium change until the peak in the 1st quarter of 2007 are attributable to the low level of the 30-year bond yield, while an equivalent share of the price increase can be related to the interest savings from the low (short-term) yield on adjustable-rate loans. The house-price relation also entails that just under 7 percentage points of the increase in real prices are attributable to income developments, when adjustment is made for growth in the housing stock.

In summary, the estimated relation means that approximately 20 percentage points of the total increase in real prices of 71 per cent from the 4th quarter of 1999 to the 1st quarter of 2007 can be explained by developments in incomes (adjusted for the increased housing stock) and the low level of the 30-year yield. The remaining part is attributable to the combined effect of the low yield on adjustable-rate loans, the option to defer amortisation and home buyers' elevated expectations of future increases in house prices in the middle of last decade. Viewed in isolation, the freeze on property value tax from 2002 also had a notable effect as a driver of prices, but on the other hand prices were dampened by the increase in housing taxes seen from 1999 to 2002 as a result of the "Whitsun Package" of austerity measures.

Regional consequences of the freeze on property value tax
For Denmark overall, our calculations show that the nominal freeze on property value tax has had a somewhat smaller impact on house prices than the new loan types. Nevertheless, there is no doubt that the freeze has had a significantly larger impact in Greater Copenhagen and Northern Zealand, where houses are most expensive, and where prices rose the most during the upswing.

This is implied in Chart 7, which shows that the freeze in the boom year 2007 led to average tax savings per household of almost kr. 25,000 in the environs of Copenhagen (including the areas to the south, west and north of the city), but only just under kr. 5,000 in Northern Jutland. In the City of Copenhagen and Northern Zealand, average tax savings were almost as large as in the environs, while they were considerably smaller in the provinces. The tax savings have been calculated by comparing with a situation in which the rules for property value tax applicable until 2002 had still been in force, including the rules on indexation of the progressivity threshold.

Are house prices currently overvalued?
It is of major significance to economic developments in the coming years whether house prices are currently overvalued, as a further fall in house prices would dampen growth in aggregate demand.

REDUCTION IN PROPERTY VALUE TAX PER HOUSEHOLD DUE TO THE
FREEZE ON PROPERTY VALUE TAX   Chart 7
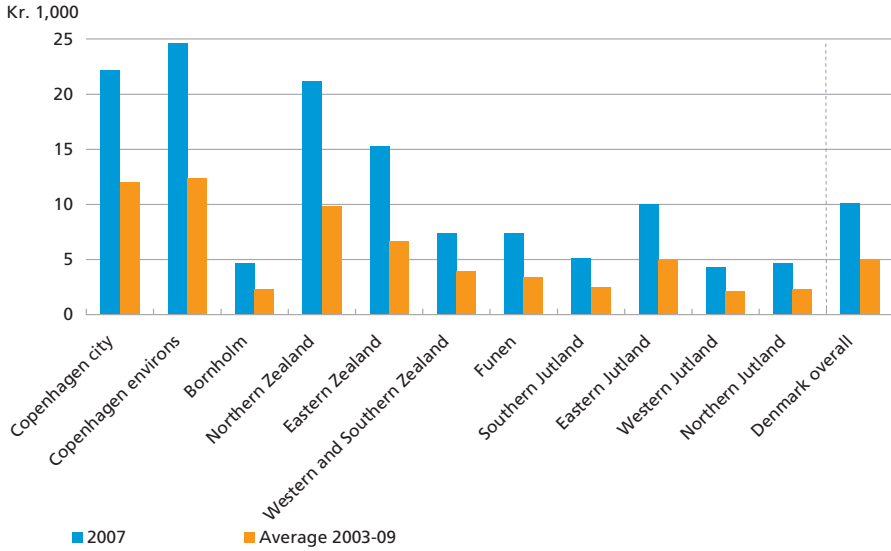
Kr. 1,000

Note: All amounts at 2010 level. Property value tax has been calculated based on extracts of data from Statistics
        Denmark where all single-family houses are divided into ranges of kr. 100,000 on the basis of their public
        property valuation. Reductions in property value tax for pensioners and houses traded before 1 July 1998 are
        disregarded. The counterfactual property value tax has been calculated with a progression limit projected based
        on the rules applicable until 2002.
Source: Statistics Denmark and own calculations.

The term "overvaluation" of prices can be interpreted in two ways.
Firstly, it could mean that the current house prices are "abnormally"
high in relation to the normal link between interest rates, incomes,
housing taxes and house prices. Chart 5 does not indicate that this is the
case. In 2010 house prices were actually a little below the level to be
expected according to our estimated house-price relation.

   Chart 8 confirms the impression that the current house prices are not
particularly high seen in relation to the level of incomes and interest
rates, etc. The Chart illustrates developments since 1971 in the average
"housing burden" for Denmark overall. The housing burden is calcu-
lated as the financing costs (including amortisation) of a fully leveraged
purchase of a house with a garden, plus land tax and property value tax.
These housing costs are compared with the average disposable income
per household. In a long-term perspective, fixed-rate loans with amort-
isation have been the predominant type of home financing, and con-
sequently this loan type is the basis for the calculations underlying Chart
8. It is seen that the current housing burden is very close to the average
for the last 40 years, which is 31 per cent. The housing burden has de-
clined by a good 8 percentage points since the most recent peak in 2007,
when prices for owner-occupied housing were at their highest.

HOUSING BURDEN SINCE 1971   Chart 8

Per cent
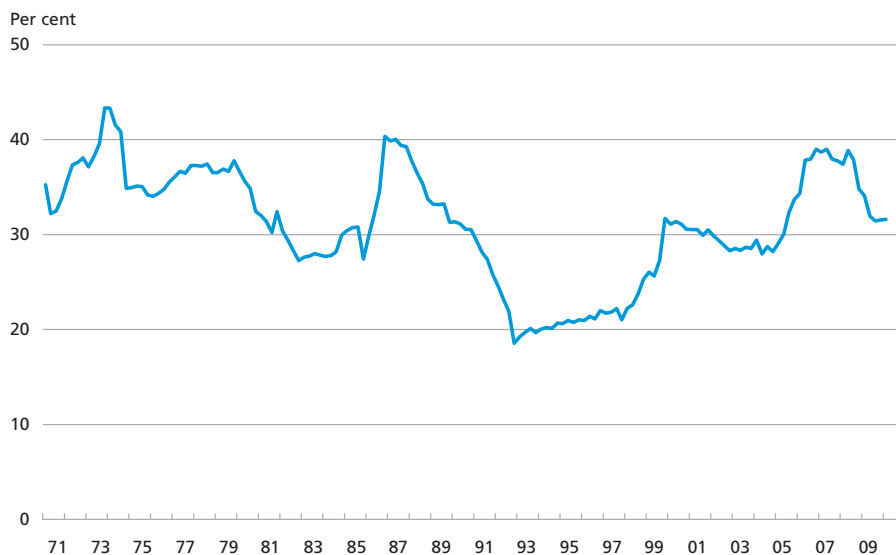
Note: The housing burden in the form of stylised financing costs, including property taxes, on the purchase of a single-
         family house as a ratio of the average household disposable income. Financing costs are based on a fixed-rate
         mortgage loan with amortisation plus a bank-financed loan for the portion that cannot be financed by a
         mortgage loan. The basis for the housing burden calculated is described in more detail in Dam et al. (2011a,
         Appendix D).
Source: Statistics Denmark, Association of Danish Mortgage Banks, the Danish Customs and Tax Administration (Skat) and
         Danmarks Nationalbank.

We have also calculated developments in housing burdens in various parts of Denmark, assuming different types of financing. Again, our calculations do not point to general overvaluation of house prices at present.

Although house prices are not overvalued in the above sense, they may still be higher than the level which is compatible with long-term equilibrium in the housing market. To assess whether that is the case, we have performed three types of calculations. The first method is based on the assumption that the market for owner-occupied housing can only be in long-term equilibrium if the costs of living in one's own house more or less correspond to the normal costs of renting an equivalent house. Calculations based on this method indicate that real house prices must come down in the longer term. But there are considerable data problems related to using this method as the market for rented single-family houses is very small. Furthermore, the market for rental housing is extensively regulated and there are often waiting lists. As a result, it is very difficult to determine the ratio of owner-occupied housing prices to rents that is sustainable in the long term.

Our other two calculation methods are variations of the "Tobin's Q" method, which assumes that in a situation of long-term equilibrium the

price of existing housing must correspond to the cost of acquiring new housing of equivalent size and quality. One of the two variants of the Tobin's Q method indicates that house prices are currently somewhat above the long-term sustainable level, while the other variant gives a more ambiguous outcome. A fundamental problem when using this approach is that new housing and existing housing are often not comparable as they are situated on plots of land with very different location values. The location value in central, "expensive", fully de-veloped areas is determined by demand for housing with this specific location, so there is no fixed, cost-based long-term equilibrium price for such housing.

In other words, the Tobin's Q method and the method based on calcu-lation of the house-price-to-rent ratio provide only a weak basis for assessing the long-term sustainability of the current house prices. Con-sequently, we attach more importance to the results of our calculation of the housing burden, which does not indicate that the housing market is currently overvalued, cf. above. This conclusion is supported by the proximity of the current house prices to the level that could be expected on the basis of the house-price relation.

All the same, it is important to be aware of the fundamental differ-ences between the calculation methods described. While calculations of the house-price-to-rent ratio and Tobin's Q assess current house prices relative to an expected long-term equilibrium level, the house-price rela-tion and the calculation of the housing burden seek to assess whether current house prices are "reasonable" in view of the current levels of in-terest rates, incomes and housing taxes. Hence, the question is how house prices can be expected to develop in the coming years – when interest rates are expected to rise.

Where is the housing market heading?
We have tried to answer this question by projecting developments in the supply of and demand for housing. We have done so by incorporating our estimated house-price relation and a newly estimated relation for residential investment into Danmarks Nationalbank's macroeconometric model, MONA. Using this extended model, we have performed a me-dium-term projection of developments in the Danish economy up to and including 2015, given the expected average growth in Denmark's export markets and the expected international interest-rate developments, etc.

The implications for real house prices of the medium-term projection are illustrated in Chart 9. The left-hand side of the Chart shows the base-line scenario; here we assume that long-term mortgage yields reach 6 per cent from 2013 onwards, while short-term mortgage yields gradually

MEDIUM-TERM PROJECTION OF REAL HOUSE PRICES   Chart 9
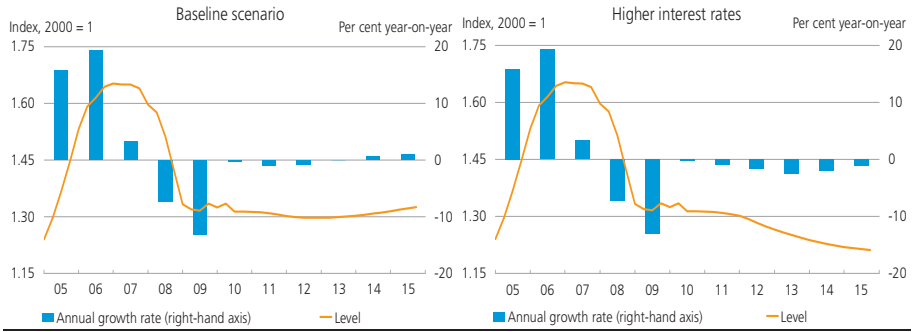
Note: Projection of real house prices based on MONA extended by new relations for house price and residential
        investment. The baseline scenario is based on the forecast published in this Monetary Review supplemented by a
        technical projection for 2014-15.
Source: Danmarks Nationalbank.

rise to 4 per cent in the period up to 2015. In this scenario, real house
prices are expected to be almost flat in the coming years, i.e. average
nominal house prices are expected to develop more or less in line with
the consumer price index. Real house prices do not fall despite the
expected rise in interest rates; this is attributable to factors such as the
expected gradual normalisation of the cyclical situation by 2015, which
provides a basis for a certain increase in real disposable income, thereby
stimulating housing demand.

Chart 9 (right) shows the expected development in house prices in an
alternative scenario, in which international and Danish interest rates
from 2012 rise more rapidly and to a higher level than in the above
baseline scenario. In this scenario, both short-term and long-term bond
yields are 1 percentage point higher by 2015 than in the baseline scen-
ario. The steep rise in interest rates will dampen growth in the Danish
economy, which in turn will reduce housing demand and hence house
prices. In addition, there is a direct negative impact on house prices in
that the additional rise in interest rates increases the households'
housing costs. As a result, real house prices fall by 6-7 per cent in the
period up to 2015, cf. Chart 9 (right).

We see the baseline scenario in Chart 9 (left) as the most likely one,
since interest rates in the alternative scenario (right) exceed the level
deemed to be normal in the longer term. All the same, it should be
emphasised that model simulations such as those shown here are not
good at capturing the fluctuations in house prices that may occur as a
result of sudden shifts in households' expectations of the future. The
projection is also based on the assumption that the international econ-
omy does not suffer a new, unexpected downturn, e.g. because the
European sovereign debt crisis intensifies.

CAN HOUSE-PRICE FLUCTUATIONS BE DAMPENED?[1]

Costs of fluctuating house prices

The housing boom and subsequent downturn in the housing market seen after the introduction of the new loan types and the freeze on property value tax have amplified cyclical fluctuations in the Danish economy since the middle of the last decade. This is illustrated by Chart 10, where the yellow bars show the actual growth rates in the real gross domestic product, GDP, while the blue bars show the growth rates that would, according to Danmarks Nationalbank's MONA model, have been realised if house prices had followed the lower grey curve in Chart 6 (without new loan types and tax freeze) instead of their actual course. It is seen that growth would have been lower in the middle of the last decade, when the economy was overheated. On the other hand, the cyclical downturn in the wake of the financial crisis would have been a little milder, and growth in 2010 would have been slightly higher.[2] Our calculations show that approximately two thirds of the additional cyclical fluctuations that accompanied the housing bubble can be attributed to the deferred-amortisation loans and the nominal tax freeze.

The model simulations behind Chart 10 and the medium-term projection behind Chart 9 also show that without the housing boom unemployment would have been higher in the middle of the last decade, but competitiveness would have developed more favourably. This means that there would have been prospects of stronger export performance and higher employment in the export sector in the coming years. The model simulations also show that the housing boom contributed strongly to a general boom in business fixed investment. This will dampen the demand for labour in the coming years as expansion of the capital stock can to some extent replace the need for labour in production. Combined with the weakening of Denmark's competitiveness, this means that the housing boom will entail a higher level of unemployment in the coming years than could otherwise have been expected. In addition, the freeze on property value tax has weakened public finances. According to the model simulations, the freeze reduces the balance of the public finances by approximately kr. 10 billion in 2015.

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[1] This section provides a brief outline of the article by Niels Arne Dam, Tina Saaby Hvolbøl and Peter Birch Sørensen, Can House-Price Fluctuations be Dampened? Danmarks Nationalbank, Part 2 of this *Monetary Review*.

[2] This analysis confirms the hypothesis of the impact of financial innovation in the mortgage-credit market presented in Danmarks Nationalbank *Monetary Review*, 1st Quarter 2006, cf. p. 33: "The introduction of new financial products can also strengthen the link between housing wealth and consumption and may lead to larger fluctuations in housing prices and thus to greater cyclical fluctuations than previously seen."

SIGNIFICANCE OF THE HOUSING MARKET TO GDP GROWTH   Chart 10
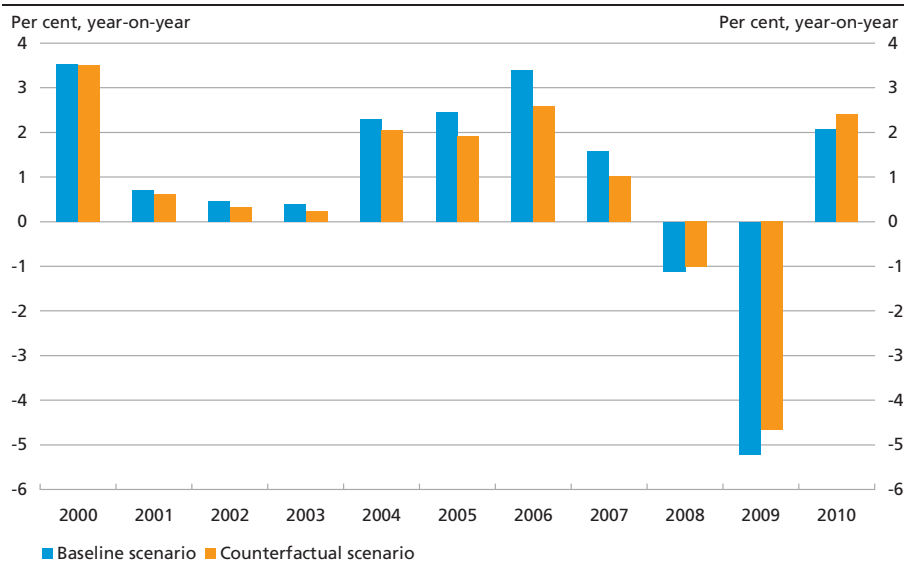
Per cent, year-on-year   Per cent, year-on-year

■ Baseline scenario ■ Counterfactual scenario

Note: Own estimates based on MONA with new relations for house price and residential investment, cf. Dam et al.
        (2011a). The baseline scenario is based on the forecast published in this Monetary Review, supplemented with a
        technical projection for 2014-15, cf. Dam et al. (2011a, section 5). The counterfactual scenario is based on the
        assumptions that deferred-amortisation loans and adjustable-rate loans were never introduced, and that
        property value tax was not frozen in 2002. These assumptions are followed up by a proportional correction of the
        unexplained residuals in house price developments as from 2004, cf. the discussion above.
Source: Danmarks Nationalbank.

These results show that large house-price fluctuations entail consider-
able macroeconomic costs. Furthermore, there are microeconomic wel-
fare costs, as homeowners – due to the combination of strong un-
expected price movements and heavy costs of moving – may find them-
selves "locked" in a different housing consumption situation than what
they would have preferred in view of the fluctuating current house
prices. Following a more detailed analysis, we estimate the annual
welfare costs at up to kr. 2.5 billion, but the estimate is subject to some
uncertainty. In addition, the large fluctuations in house prices may lead
to considerable and often arbitrary redistribution of income and
wealth.

Taxation and house-price fluctuations
Analyses based on our estimated house-price relation show that general
fiscal policy is not a very efficient instrument for countering large house-
price fluctuations. Nor can monetary policy be used to address undesir-
able bubble trends in the housing market as Denmark's interest-rate
policy is aimed at keeping the krone stable vis-à-vis the euro. Con-
sequently, other instruments must be applied to dampen fluctuations in
the housing market.

HOUSE-PRICE FLUCTUATIONS AND TAX SUBSIDIES IN SELECTED OECD
COUNTRIES   Chart 11

House-price volatility
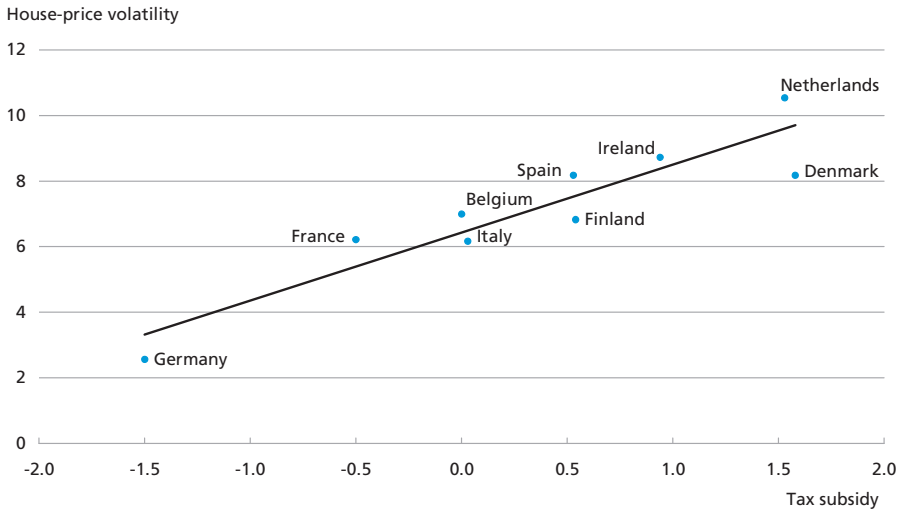
Note: The tax subsidy for owner-occupied housing consumption is calculated in accordance with the tax rules and levels
         of interest rates in 1999. The regression line inserted is estimated using ordinary least squares ($R^2 = 0.847$).
Source: Data supplied by Paul van den Noord and own estimates for Denmark.

In this context, taxation is particularly relevant. International experience
shows that, all other things being equal, average house-price fluc-
tuations increase in step with tax subsidies for owner-occupied housing
consumption. This is illustrated in Chart 11. The vertical axis measures
volatility in house prices, stated as their average percentage deviation
(in a randomly selected year) from the underlying long-term price trend.
The horizontal axis measures the size of the tax subsidy for owner-occu-
pied housing consumption, defined as the tax value of interest deduct-
ibility less any housing-related taxes (in Denmark land tax and property
value tax) calculated relative to the current property value. There is a
clear tendency for house prices to fluctuate more in countries with lar-
ger tax subsidies for owner-occupied housing consumption. This can be
explained as follows:

   Taxation of interest income and the related interest deductibility
lower homeowners' financing costs when buying a house so that an
increase in the price of the house has a smaller impact on current
housing costs. In other words, interest deductibility means that housing
demand becomes less sensitive to fluctuations in house prices. If, say, an
increase in aggregate income entails that more people want to buy a
house, interest deductibility means that house prices must rise more for
equilibrium in the housing market to be restored.

Whereas interest deductibility increases the volatility of house prices, all other things being equal, property taxes on houses have the opposite effect, to the extent that they are levied on the basis of current property values and hence indexed to match developments in house prices. If higher house prices lead to higher housing taxes, the price rise will have a more pronounced impact on housing costs and thus make the housing demand more sensitive to changes in prices. Housing taxes that track property values therefore reduce fluctuations in house prices resulting from demand shocks.

It follows from this analysis that the freeze on the nominal property value tax and the resultant decoupling of taxes from current property prices have removed an important automatic stabiliser in the Danish housing market. When property value tax is no longer permitted to mirror the ups and downs of house prices, it cannot contribute to reducing fluctuations. Based on the empirical relationship illustrated in Chart 11, we estimate that after the freeze on property value tax house prices will, on average, deviate by a good 7.5 percentage points from their long-term equilibrium level. In the absence of a freeze, prices would have deviated from their equilibrium level by only 6 percentage points on average. So the volatility of house prices increases by around one fourth relative to a situation where the freeze had not been introduced. The analysis behind Chart 6 also supports the conclusion that the nominal freeze applied to property value tax has increased the volatility of house prices.

Chart 12 provides another illustration of the destabilising impact of the freeze on property value tax. The Chart shows the development in the effective rate of property value tax over the last decade. This rate measures the property value tax actually paid relative to the current property value according to the public property valuations. In addition, we show the development in the output gap, which is the percentage deviation between actual GDP and the estimated GDP level in a normal cyclical situation.

According to Chart 12, the freeze on nominal property value tax meant that the effective property value tax *fell* as house prices (and public valuations) rose, and the economy became increasingly overheated in the period until 2006-07. On the other hand, the effective property value tax *rose* in 2008 and particularly in 2009 when the boom made way for a recession and house prices plummeted. The changes in the effective tax rate amplified cyclical fluctuations, not only by increasing fluctuations in house prices, but also because the decline in the effective property value tax entailed an increase in disposable income as the overheating accelerated, while the rising effective property value

EFFECTIVE PROPERTY VALUE TAX RATE AND OUTPUT GAP   Chart 12

Per cent   Per cent of GDP
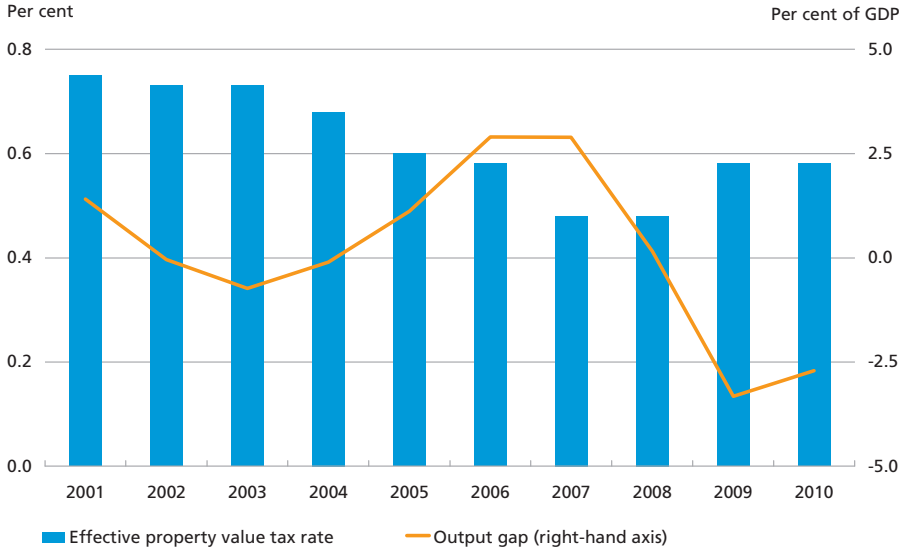
Note: The effective property value tax rate is calculated as revenue from property value tax as a ratio of the public
        valuation of the housing supply taxed in accordance with the "Law Model" of the Ministry of Finance. The
        output gap is estimated by the Ministry of Finance.
Source: Ministry of Economic and Business Affairs and Ministry of Finance.

tax eroded disposable income when the economy went into reverse. Hence, our calculations show that the freeze on property value tax prevented an automatic tax increase, the shortfall growing during the upswing to a level of kr. 9 billion by 2007, while the households were deprived of automatic tax relief of kr. 4 billion from 2007 to 2009-10, compared with a situation in which the freeze had not been introduced. Like the less pronounced fluctuations in house prices, these automatic adjustments of disposable income would have contributed to stabilising the economy.

Overall, our analyses provide strong arguments for lifting the freeze and restoring the link between property value tax and current property valuations. This can be done without increasing the aggregate level of taxation in the short term if the property value tax rate is lowered at the same time. Recoupling property value tax and house prices will con-tribute to stabilising the housing market and the economy, while also preventing further weakening of public finances.

Deferred-amortisation loans and instability in the housing market
As previously stated, our empirical analysis indicates that mortgage repayments are to some extent seen as a cost by home buyers, in line with interest and taxes. This means that the introduction of deferred-amortisation mortgage loans has amplified fluctuations in house prices.

If prices go up, loans with amortisation entail a larger increase in overall payments to service the loan compared with deferred-amortisation loans. The higher costs dampen the demand for housing and curb the price rise. Conversely, if house prices fall, loans with amortisation entail a larger decline in the payments compared with deferred-amortisation loans. This stimulates the demand for housing and helps to buoy up the market. In other words, loans with amortisation help to stabilise house prices. This desirable effect is lost as deferred-amortisation loans gain ground. Our quantitative analysis shows that deferred-amortisation loans have contributed even more to volatility in house prices than the freeze on property value tax.

This calls for all future mortgage loans for owner-occupied housing being with amortisation. Like a repeal of the nominal tax freeze, such a reform would contribute to dampening fluctuations in the housing market. By ensuring accumulation of home equity, a phase-out of deferred-amortisation mortgage loans would also reduce the vulnerability of homeowners, and thus of the economy in general, to unexpected negative shocks to the housing market. To avoid a negative impact on the housing market in the short term, access to deferred-amortisation loans should be phased out gently, e.g. by reducing the upper limit for new deferred-amortisation loans for owner-occupied housing by 10 percentage points of the property value a year.

How will the housing market be affected by the measures proposed?
In Chart 13 we use the MONA model extended by the new relations for the housing market to estimate how the measures discussed above can be expected to affect the housing market in the short and medium term. We assess the effects by comparing with the same baseline scenario as shown in Chart 9 (left).

Chart 13 (left) shows the simulated effect on real house prices of restoring the link between property value tax and current property valuations. It is assumed that the property value tax rate is reduced at the same time so that total tax revenue remains unchanged in the short term, but will no longer be eroded by inflation. It is seen that this reform would have only a very limited negative impact on house prices over the next few years.

Chart 13 (right) shows the model simulation of the effect of gradually phasing out deferred-amortisation loans for new home purchases by 10 percentage points of the property value a year. Again, the impact on house prices is seen to be relatively small.

In other words, the measures proposed can be introduced without serious negative consequences for the housing market in the short term

SHORT-TERM EFFECT OF LIFTING THE NOMINAL FREEZE ON PROPERTY
VALUE TAX (LEFT) AND OF A GRADUAL PHASE-OUT OF DEFERRED-
AMORTISATION LOANS (RIGHT)   Chart 13
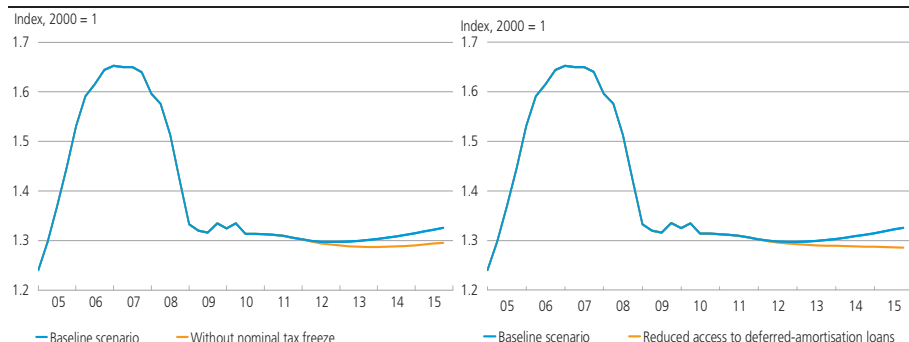
Note: Own estimates based on MONA with new relations for house price and residential investment, cf. Dam et al.
        (2011a). The baseline scenario is based on the forecast published in this Monetary Review, Part 1, supplemented
        with a technical projection for 2014-15, cf. Dam et al. (2011a). The modelling of the freeze assumes that 40 per
        cent of home buyers fully factor in expected future tax savings resulting from the freeze, cf. the text.
Source: Danmarks Nationalbank.

and will contribute significantly to stabilising the market in the longer
term. If, say, interest rates suddenly rose unexpectedly or the economy
reversed, the reforms proposed would curb the resultant fall in house
prices. So phasing out the deferred-amortisation loans and restoring the
link between property value tax and house prices would provide a
safeguard against large future increases and falls in house prices.

The stabilising effect of the reforms proposed is illustrated in Chart 14.
As we saw in section 1, the introduction of deferred-amortisation loans
and the freeze on property value tax were indeed the factors behind a
large part of the price boom in the housing market in the mid-2000s.
The Chart shows the overall impact of these two measures on develop-
ments in real house prices over the past decade, calculated using the
estimated house-price relation. In the scenario illustrated by the yellow
curve, we have assumed that the unexplained bubble element in the
prices hikes in 2005-06 would have been equally large, had deferred-
amortisation loans and the tax freeze not been introduced. In that case,
the total real price increase from the millennium change to the peak in
the 1st quarter of 2007 would have been 44 per cent, rather than the
actual 71 per cent.

In the scenario shown by the red curve in Chart 14, we have, more
plausibly, assumed that the lower rate of price increase that would be a
direct result of lifting the freeze and phasing out deferred-amortisation
loans would also have reduced the unexplained bubble element in the
prices. In that case, the total real price increase until the peak in early
2007 would have been only 28 per cent compared with the realised 71
per cent.

REAL HOUSE PRICES WITH AND WITHOUT DEFERRED AMORTISATION AND
FREEZE ON PROPERTY VALUE TAX   Chart 14

Index, 2000 = 1

- Actual
- Without deferred amortisation and freeze on property value tax
- Without deferred amortisation and freeze on property value tax, reduced bubble component
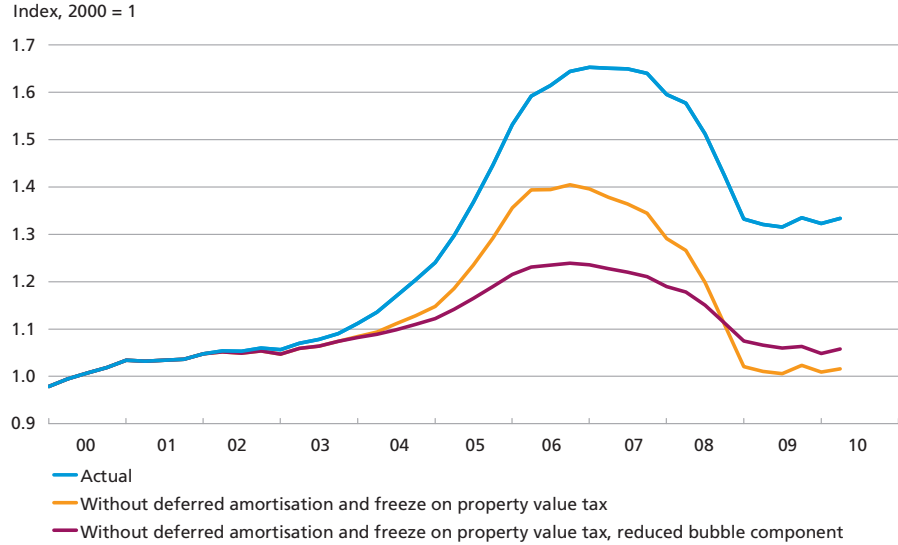
Note: Counterfactual scenarios based on the estimated house-price relation. In the absence of the nominal freeze on
        property value tax, the imputed rate of property value tax of the MONA databank is assumed to be kept
        constant as a ratio of the housing stock calculated at market value. The modelling of the freeze assumes that 40
        per cent of home buyers fully factor in expected future tax savings resulting from the freeze, cf. Box 3.3 in Dam
        et al. (2011a). In the scenario with a reduced bubble component (red curve), the unexplained residuals in 2004-09
        are reduced by 66 per cent, corresponding to the dampening of the explained part of the cumulative price
        growth in the period from the 1st quarter of 2004 to the 1st quarter of 2007 in the absence of deferred
        amortisation and the freeze on property value tax.
Source: MONA databank and own calculations.

Conclusion

Changes in house prices must necessarily play a large role in equilib-
rating supply and demand in the owner-occupied housing market when
demand fluctuates as a result of e.g. changes in interest rates and in-
comes. The reason is that the housing supply can be changed only slowly
as new housing is constructed and the existing stock is worn down. All
the same, our analyses show that the house-price fluctuations required
to ensure equilibrium in the housing market can be reduced significantly
by introducing more appropriate rules for taxation and home financing.

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Business Cycles and Public Finances

Ann-Louise Winther, Economics

INTRODUCTION AND SUMMARY

Developments in public finances depend on the fiscal policy stance as well as the cyclical situation. During an economic downturn like the recent one, public finances automatically deteriorate because falling incomes, consumption, output and employment result in lower revenue from direct and indirect taxes and higher expenditure for e.g. unemployment benefits. Conversely, public revenue automatically increases and public expenditure automatically decreases during a boom like the one prior to the economic crisis. The development in the actual government budget balance thus depends both on active fiscal-policy decisions to adjust taxes and public spending and on automatic cyclical effects. Against this background, the actual balance is not a fair measure of the active fiscal policy or the underlying position of public finances.

Although there is a clear correlation between economic activity and public finances, it is by no means evident how to measure and adjust for the cyclical effects on the government balance. This article focuses on various methods of adjusting the actual balance for both cyclical and other temporary fluctuations. By adjusting the actual balance for these factors it is possible to calculate a structural balance measure that captures the underlying trends in public finances as well as the effects of the active fiscal policy on the government budget balance. Given that fiscal policy should have a stabilising effect on the economy, it is important to take these correlations into account when assessing and planning fiscal policy.

The structural budget balance is calculated by the Ministry of Finance, the Danish Economic Councils and a number of international organisations, including the European Commission, the OECD, the International Monetary Fund, IMF, and the European Central Bank, ECB. The calculation is a part of these institutions' assessment of public finances and the fiscal policy pursued. In an EU context, the structural balance plays a key role in the assessment of the member states' compliance with the requirements set out in the Stability and Growth Pact, including the excessive deficit procedure, as these requirements have been defined in relation to the structural balance among other factors.

This article initially describes the overall calculation of the structural budget balance, followed by outlines of the various methods applied in the calculation and a description of how the calculation of the structural budget balance in Denmark depends on the method chosen. The focus is on the three methods applied by the Ministry of Finance, the Commission and the ECB, respectively.

These methods differ in several respects, which also implies diverging calculations. In the most widely used method, the uncertainty in the calculation is mainly related to the output gap estimate. The level of, but not necessarily the changes in, the structural balance is particularly sensitive to this uncertainty. Moreover, in the calculation of Denmark's structural budget balance it essential to adjust for a number of temporary factors in the form of extraordinary tax revenue, which have a substantial impact on the actual balance in some years. After adjustment for temporary factors, the year-on-year changes in the structural balance are relatively robust and can be compared with calculations of direct revenue effects of the fiscal measures implemented.

MEASURING THE STRUCTURAL BALANCE

The structural budget balance has been adjusted for of cyclical fluctuations and other temporary factors, making it an expression of the underlying trends in public finances. There is a clear correlation between economic activity and public finances, cf. Chart 1. The high and progressive income tax and the high level of various indirect taxes and of unemployment benefits make public finances very sensitive to fluctuations in economic activity. However, despite the clear correlation, the method of measuring and adjusting for the cyclical component of public finances has by no means been established.

The structural budget balance is calculated residually by subtracting a cyclical component and other temporary factors from the actual budget balance:

$$\boxed{\text{Structural balance}} = \boxed{\text{Actual balance}} - \boxed{\text{Cyclical component}} - \boxed{\text{Temporary factors}}$$

The cyclical component is the part of the government budget that depends on cyclical developments. In addition, adjustment can be made for items that are not systematically cyclical, but which fluctuate substantially over time due to temporary or extraordinary factors. Examples include revenue from pension-yield tax and from North Sea oil production.

A number of national and international institutions calculate the structural balance for Denmark, cf. Chart 2. Viewed over a period of just under

ECONOMIC CYCLES AND GOVERNMENT BUDGET BALANCE　　Chart 1

Per cent　　　　　　　　　　　　　　　　　　　　　Per cent of GDP

- Government budget balance (right-hand axis)
- Real GDP, deviation from trend
- Private-sector employment, deviation from average
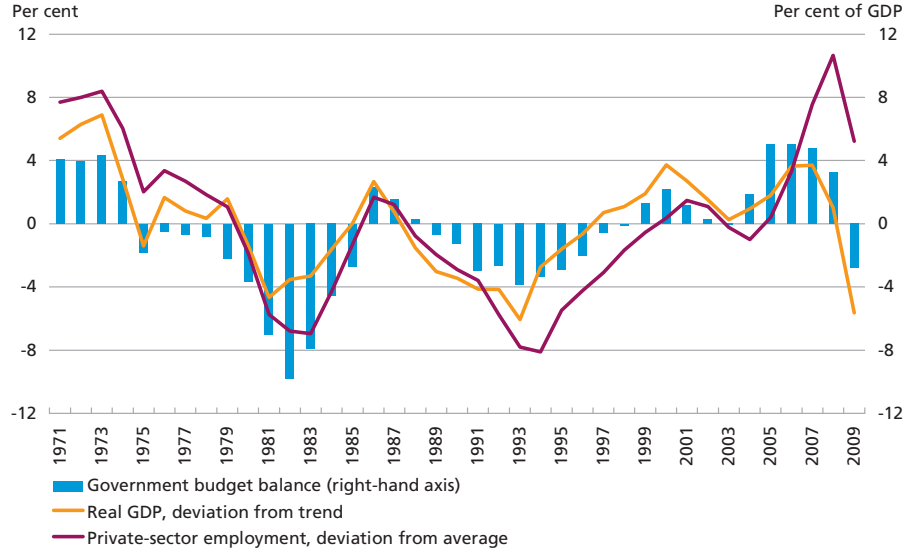
Note:　The yellow curve indicates the deviation of real GDP from its trend in the period 1971-2009. The red curve shows
　　　　the deviation of private-sector employment from its average in the period 1971-2009.
Source:　Statistics Denmark and own calculations.

STRUCTURAL BUDGET BALANCES　　Chart 2

Per cent of GDP

- Ministry of Finance
- European Commission
- Danish Economic Councils
- IMF
- ECB
- OECD
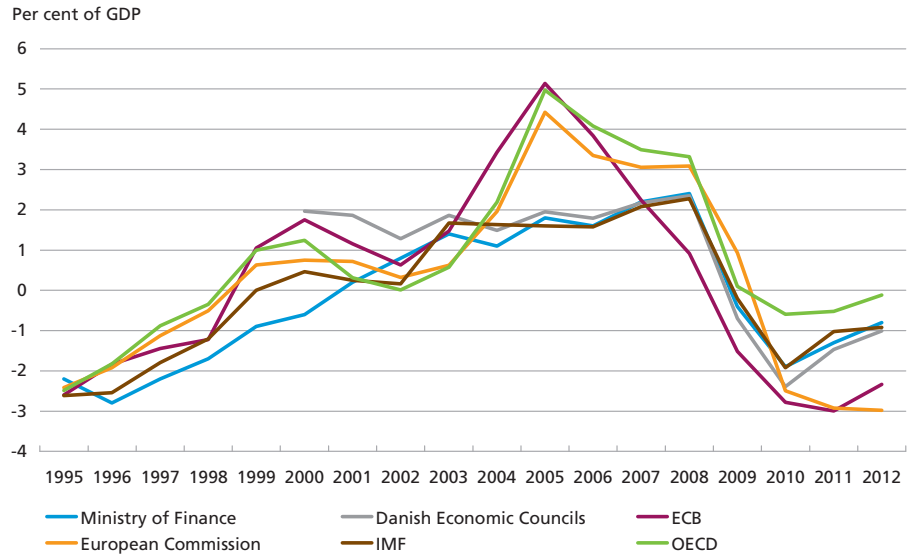
Note:　As regards the European Commission, the structural balance in 2003-12 is shown. Before 2003, the measure is the
　　　　cyclically adjusted budget balance, as a calculation of the structural balance is only available from 2003. The ECB's
　　　　structural balance has been calculated by applying the ECB's method to data from Statistics Denmark and
　　　　Danmarks Nationalbank's forecast from the Monetary Review, 3rd Quarter 2010.
Source:　Statistics Denmark, Ministry of Finance (2010), The Danish Economic Councils (2010), Danmarks Nationalbank
　　　　(2010), European Commission (2010a), International Monetary Fund (2010) and OECD (2010).

20 years, the various calculations show the same general trend in the structural balance. The underlying positive movement from the mid-1990s until 2008 is notably influenced by falling interest costs and declining structural unemployment. During the most recent crisis, all calculations show strong deterioration of the structural balance, reflecting the discretionary easing of fiscal policy implemented to cushion the decline in economic growth. The calculations diverge considerably at times, however. A case in point is the structural balance in the period 2004-06, for which the Commission, OECD and ECB calculations show a pronounced improvement, while the Ministry of Finance, Danish Economic Councils and IMF calculations are practically unchanged. The difference can primarily be attributed to the latter institutions' adjustment of the balance for extraordinary revenue items, e.g. pension-yield tax, corporate tax and North Sea oil production. Since the other institutions do not adjust for these extraordinary revenue items, they are included in the calculations of the structural balance. This results in a misleading picture of tight fiscal policy during a period of fiscal expansion. The following sections provide overviews of various methods of calculating the cyclical component and the conventions applied to adjustment for other temporary factors across institutions.

METHODS FOR CALCULATING THE CYCLICAL COMPONENT

There are two principal methods of calculating the cyclical component of the budget balance, an aggregate method and a disaggregate method, cf. Chart 3. The aggregate method can be broken down into two steps. First, the size of the cyclical fluctuations is estimated by calculating an output gap, which is a measure of the deviation of the actual gross domestic product, GDP, from the estimated potential GDP. Then the elasticity of the budget is calculated with respect to the output gap, i.e. the total cyclicality of the budget. The cyclical component is calculated by multiplying the output gap by the budget elasticity, cf. the Chart. This approach is used by the Commission and the OECD[1].

The Ministry of Finance applies a similar approach, but uses a cyclical gap instead of the output gap. The cyclical gap is a weighted average of the output gap and the employment gap, the latter calculated as the difference between actual employment and estimated structural (cyclically adjusted) employment[2]. The IMF has recently adopted an approach which is close to that of the Ministry.

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[1] Larch and Turrini (2009) and André and Girouard (2005).
[2] Ministry of Finance (2009).

METHODS OF CALCULATING CYCLICAL COMPONENT   Chart 3

Aggregate method: (Ministry of Finance, European Commission, IMF and OECD)

| Output gap or cyclical gap |

| Total budget elasticity |

→ Cyclical component

Disaggregate method: (ECB and the Danish Economic Councils)

| Elasticity of budget item 1 |

| Base gap for budget item 1 |

Cyclical component 1

| Elasticity of budget item n |

| Base gab for budget item n |

Cyclical component n
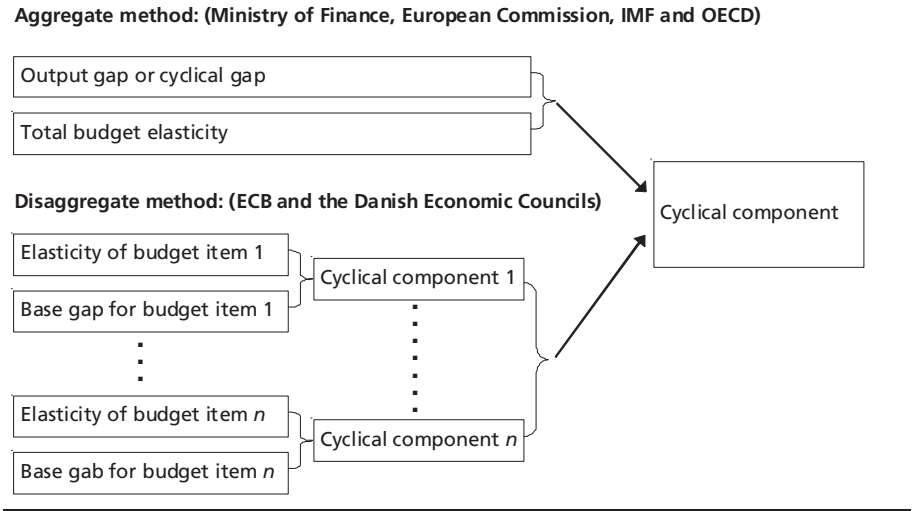
The following sections review calculation methods for the output gap and the cyclical gap as well as approaches to determination of budget elasticity. The focus will be on the approach applied by the Commission and the Ministry of Finance.

The approach applied by the ECB and the Danish Economic Councils is often referred to as the disaggregate method[1]. In this method, the calculation of the cyclical component is not based on the aggregate output gap, but instead the cyclical budget items are treated individually. The fundamental principle is that each item depends on its own base. For example, revenue from indirect taxes depends on private consumption. Consequently, the aim is to determine the gap, i.e. the deviation between the actual and normal levels for each base, e.g. for private consumption, and to determine the sensitivity of the budget items to the chosen base. The overall cyclical component of the budget is the sum of the cyclical components of the individual budget items. This method is reviewed with focus on the ECB's approach.

Calculation of output gap and cyclical gap

The output gap expresses the difference between actual and potential GDP, which cannot be directly observed and hence has to be estimated. A widely used approach to estimating potential output is based on a specific production function describing the potential output level. Output is typically modelled as a function of capital, labour and total factor productivity, cf. Chart 4. The advantage of this approach is that potential

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[1] Bouthevillain et al. (2001) and the Danish Economic Councils (2010).

METHOD OF CALCULATING POTENTIAL OUTPUT   Chart 4

```
                        ┌─────────────────────────────────┐
                        │      Production function        │
                        └─────────────────────────────────┘
            ┌───────────────┐    │    ┌───────────────────────┐
            │               ▼    ▼    ▼                       │
    ┌───────────────────┐        │        ┌─────────────────────────┐
    │   Capital stock   │        │        │ Total factor productivity│
    │                   │        │        │         (trend)          │
    └───────────────────┘        │        └─────────────────────────┘
            │                    ▼                             │
            │   ┌─────────────────────────────────────────┐   │
            │   │ Structural employment =                 │   │
            │   │  ┌─────────────────┐   ┌──────────────┐ │   │
            │   │  │Structural labour│ − │  Structural  │ │   │
            │   │  │     force       │   │ unemployment │ │   │
            │   │  └─────────────────┘   └──────────────┘ │   │
            │   │  ┌──────────┐ ┌──────────┐ ┌──────────┐ │   │
            │   │  │Population│ │Participa-│ │Determined│ │   │
            │   │  │of working│ │tion rate │ │by model- │ │   │
            │   │  │   age    │ │ (trend)  │ │  ling    │ │   │
            │   │  │          │ │          │ │  (e.g.   │ │   │
            │   │  │          │ │          │ │ Phillips │ │   │
            │   │  │          │ │          │ │  curve)  │ │   │
            │   │  └──────────┘ └──────────┘ └──────────┘ │   │
            │   └─────────────────────────────────────────┘   │
            ▼                    ▼                             ▼
    ┌─────────────────────────────────────────────────────────────┐
    │                     Potential output                        │
    └─────────────────────────────────────────────────────────────┘
```
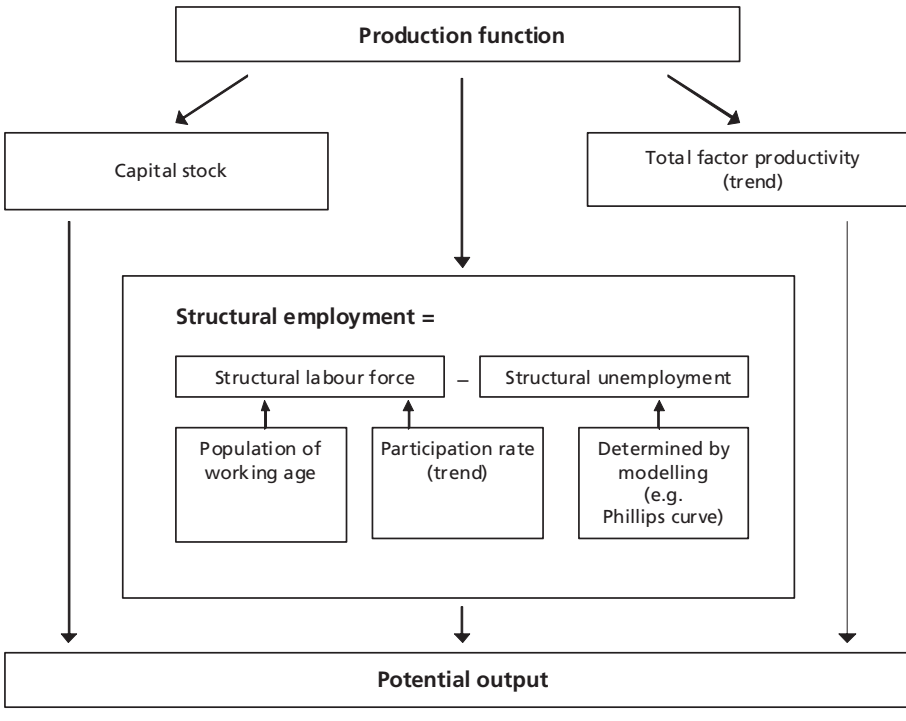
output is rooted in a concrete, albeit simple, model of the underlying technology. The exercise is thus to eliminate cyclical fluctuations from each input factor in the production function in order to determine the potential output level. The challenge is to determine the underlying structural levels of total factor productivity and employment. Structural employment is typically determined residually on the basis of estimates of the structural levels of labour force and unemployment. It is normally assumed that the actual capital stock is always at its potential level. The underlying trends of the variables have to be estimated as they cannot be observed directly. In connection with a production function, the measure of potential output thus ultimately depends on the assumptions and methods used as the basis for estimating the underlying trends in a number of variables.

Both the Commission and the Ministry of Finance apply the production function method when calculating the output gap[1]. The estimates of the two institutions show covariation over a relatively long period, cf. Chart 5. However, their output gaps tended to diverge more during the latest cyclical reversal. Compared to the Ministry of Finance's estimate, the

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[1] European Commission (2010b) and Ministry of Finance (2004).

OUTPUT GAP AND CYCLICAL GAP   Chart 5

Per cent of GDP
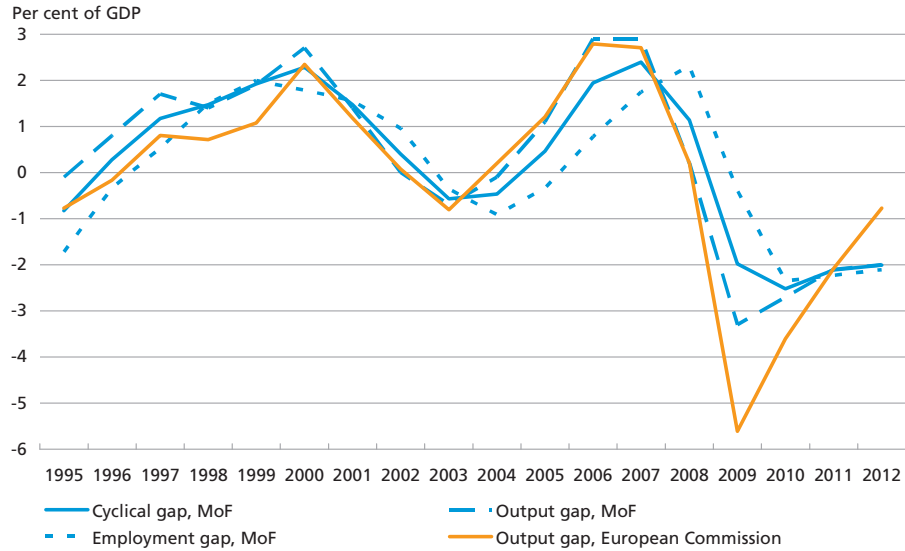
Source: European Commission (2010a) and Ministry of Finance (2010).

Commission finds that the output gap was somewhat more negative during the crisis, but also that the gap closed much sooner. In 2009, when the economic cycle bottomed out, the difference between the two negative output gaps is attributable to the fact that the Ministry of Finance's estimate shows a drop in potential output, while the Commission's estimate shows almost unchanged potential output. It is particularly complicated to estimate potential output at cyclical reversals.

In the projection up to 2012, the reason for the divergence is that the Commission expects very low potential growth and that the gap is thus set to close sooner. The differences between the output gaps emphasise the uncertainty associated with estimating future trends in both the actual and the structural levels of the inputs to output.

Besides the differences in output gap estimation, another important factor is that the Commission applies the output gap in its calculation of the cyclical component of the balance, while the Ministry of Finance applies the output and employment gaps weighted together. The unemployment gap is an indication of the gap between actual and structural employment, and it thus requires estimation of structural employment. According to the Ministry of Finance (2009), the motivation for applying the two gaps weighted together is that some revenue items are related to the output gap, while others are related to the employment gap. For example, revenue from personal income tax is closely linked to the development in employment, while e.g. revenue from

indirect taxes depends more directly on demand and output. This could play a role in the calculation of the cyclical component of the budget balance, particularly at cyclical reversals, since employment often responds more slowly than output. One reason is that firms typically adapt their staff to output with a certain lag. Consequently, it may take some time for a decline in output, as seen recently, to filter through to employment. By calculating the dependence of the individual revenue items on variations in the employment or output gap, respectively, it is possible to determine the weights of the two gaps in an aggregate cyclical gap. According to the Ministry of Finance, the weight of the output gap is 0.56 per cent, while the employment gap accounts for the remaining 0.44 per cent. Given the lesser weight of the employment gap and its lag relative to the output gap, the output gap of the Commission and the cyclical gap of the Ministry of Finance tend to diverge even more.

Calculation of budget elasticities

Once a measure of cyclical fluctuations has been determined, either as an output gap or a cyclical gap, the next step is to calculate the sensitivity of the budget to cyclical fluctuations in order to achieve an overall measure of the cyclical component of the budget. In general, there are two alternative approaches to calculation of budget elasticity. The first one is based on direct econometric estimation. It is applied by the Commission, which uses the OECD's estimates in its calculation of the cyclical component. The second method is to calculate budget elasticities on the basis of simulations in a macroeconomic model, measuring the effect on the cyclical budget items of a simulated cyclical fluctuation. This method is applied by the Ministry of Finance, among others. The methods are outlined below.

Econometric estimation of budget elasticities

Total budget elasticity can be measured by estimating the effect on the cyclical government budget items of cyclical fluctuations, measured as changes in the output gap. The OECD's approach, as described in André and Girouard (2005), is to estimate a number of elasticities for the cyclical budget items, and the elasticities are then added up as the total budget elasticity. The cyclical budget items are given as four revenue items, i.e. personal income taxes, social contributions, corporate taxes and indirect taxes, and one expenditure item, i.e. unemployment benefits. The method has three principal steps, as illustrated in Chart 6.

The *first* step is to perform the actual estimation of the individual budget elasticities. For each of the five budget elasticities, it is necessary

ESTIMATION OF TOTAL BUDGET ELASTICITY   Chart 6

Step 1	Step 2	Step 3

E(Revenue item, base)

x

E(Base, output gap)

E(Revenue item, output gap)   x   Revenue item / GDP

E(Indtægtspost, outputgab)

E(Revenue item, base)

x

E(Base, output gap)

E(Revenue item, output gab)   x   Revenue item / GDP

+

E(Expenditure item, unemployment)

x

E(Unemployment, output gap)

E(Expenditure item, output gap)   x   Expenditure item / GDP   →   E(Expenditure item, output gap)

=

Totel
Budget elasticity:
E(Budget, output gap)

Note: E(x,y) indicates the elasticity of x with respect to y.

to know 1) the sensitivity of each budget item to its revenue or expenditure base, and 2) the sensitivity of the base to the output gap.

As regards the revenue items, the sensitivity to the tax base depends on the structure of the taxation system. For example, the sensitivity of progressive taxes, e.g. income taxes, to changes in the tax base is higher than 1. In the OECD calculation, the elasticities of the various revenue items are determined on the basis of information on the taxation system and detailed revenue data in 2003. The elasticity of unemployment benefit expenditure to unemployment is assumed to be 1. The sensitivity of the budget items to their bases may change in the event of changes in the taxation system or income transfer rules.

The sensitivity of the bases to changes in the output gap is determined by econometric estimation over the period 1980-2003. Multiplication of the two sensitivities yields the elasticity of each budget item with respect to the output gap. The uncertainty in the measurement of the output gap is thus transferred to the estimate of budget elasticity. Another weakness of this method is that it does not take into account the variation over time of the factors driving the economic cycle. The composition of the underlying shock determines the cyclical sensitivity of the budget; the effect on the government budget balance of shocks to e.g. private consumption is much more pronounced than that of export-driven shocks. The reason is that indirect taxes apply to private consump-

tion, but not to exports. Consequently, an economic upswing driven primarily by higher external demand, will impact on public finances almost exclusively through higher disposable incomes and lower income transfers as a result of increased output and employment, cf. Olesen and Winther (2009). The method implies that the estimated budget elasticities become expressions of the average sensitivity of the budget to cyclical fluctuations over the estimation period.

The *second* step is to multiply the estimated budget elasticities by their weights in the total budget elasticity. The weights are given by the individual budget elasticities as a ratio of GDP. Multiplication of weights by elasticities yields one elasticity for the revenue side and one for the expenditure side.

The *third* and final step is to find the total budget elasticity by adding up the numerical values of the revenue and expenditure elasticities. The OECD finds that Denmark's budget elasticity is 0.59. This implies a change in the government budget balance of 0.59 per cent of GDP if the output gap changes by 1 per cent of GDP.

Budget elasticities based on model simulations
Alternatively, budget elasticities can be based on model simulations. The following is based on the Ministry of Finance's calculations of fiscal cyclicality, cf. Skaarup (2005). They are based on simulations on the macroeconomic model, ADAM, i.e. using a model of economic relations and institutional factors in the Danish economy.

The aim of this calculation is to measure the effect on the cyclical budget items of increasing gross value added, GVA, by 1 per cent in the model. The increase in GVA is driven purely by cyclical factors, and a key issue in the model-based calculation is that it requires modelling of the underlying shock to the economy. Consequently, it is necessary to determine which subcomponents of economic growth are drivers of cyclical developments. The Ministry of Finance calculation is based on a shock composed almost equally of increases in the demand components for the private sector, i.e. private consumption, investment, exports and imports. The model simulation shows that the government budget balance improves by 0.79 per cent of GDP on an increase of 1 percentage point in real GVA. Chart 7 compares the results of the OECD and the Ministry of Finance, with the estimated and model-based budget elasticities broken down by subcomponents. The higher model-based elasticity is mainly attributable to the more pronounced cyclicality of direct and indirect taxes in the model simulation compared with the econometric estimation. This applies even though the Ministry of Finance does not include the cyclical items concerning revenue from corporate taxes in its

BUDGET ELASTICITIES   Chart 7
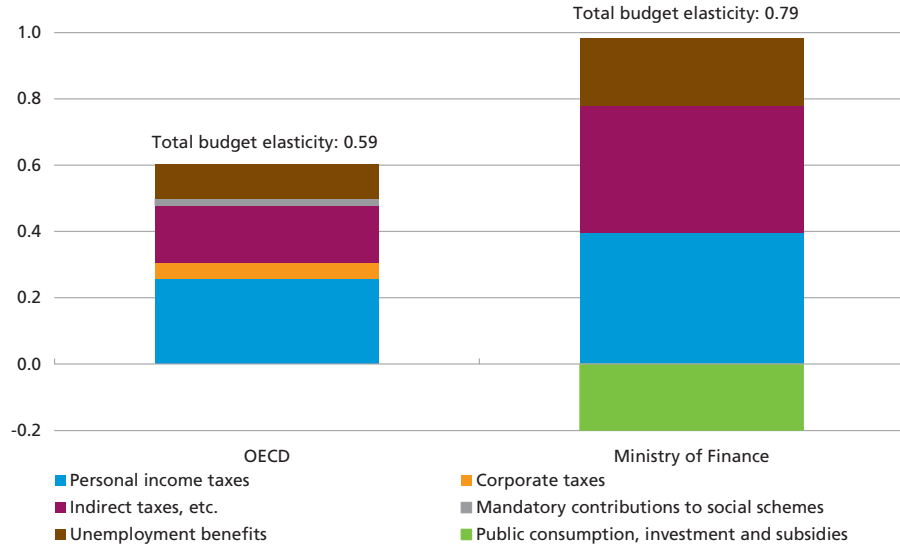
Note: The budget elasticity indicates the change in the government budget balance as a percentage of GDP with respect to a change in the output gap of 1 per cent of potential GDP. The elasticities calculated by the Ministry of Finance are averages of the effect in years 1-3 on a 1-per-cent increase in gross value added. The Ministry's calculation does not include the elasticity of corporate taxes as this revenue item is taken into account separately in the adjustment for other temporary factors.
Source: Skaarup (2005), André and Girouard (2005) and European Commission (2005).

calculation of the cyclical component, as separate adjustment is made for temporary fluctuations in revenue from corporate taxes, cf. the section "Temporary factors" on p.86.

The results for the expenditure side show the opposite trend. According to the OECD calculation, public expenditure is significantly sensitive to fluctuations in the output gap, while the Ministry of Finance's model calculation, overall, shows no such sensitivity to cyclical fluctuations. The reason is that the model calculation takes into account cyclical effects for all budget items, while the estimated results only takes into account effects on five selected budget items. For example, expenditure for unemployment benefits tend to drop during a boom. At the same time, however, the increased economic activity entails higher prices and public-sector wages, which will increase expenditure for public spending, investment and subsidies. According to the model calculation of the Ministry of Finance, this increase in expenditure is almost equivalent to the decline in expenditure for unemployment benefits.

The results of both methods are, as mentioned, sensitive to changes in the taxation system and income transfer rules. There is reason to believe that some of the budget elasticities for Denmark have been declining over a large number of years. A case in point is the decrease over a prolonged period in both marginal tax rates and the replacement ratio of

BUDGET ELASTICITY AND THE AUTOMATIC STABILISERS	Box 1

When overall output and income decline, revenue from direct and indirect taxes is automatically reduced as the tax base weakens. At the same time, disbursements of unemployment benefits automatically rise as lower output entails an increase in un-employment. These automatic budgetary reactions contribute to cushioning the de-cline in the households' disposable incomes, with a stabilising effect on the economy. Conversely, an increase in output triggers an automatic rise in revenue from direct and indirect taxes and an automatic decrease in disbursements of unemployment benefits, which contributes to reducing the risk of overheating of the economy.

The size of the automatic stabilisers depends on e.g. the average rate of marginal income tax and the average replacement ratio in the unemployment benefit system (the ratio between the benefit rate and the average wage). Tax reforms implemented over the last decades have included reductions of marginal taxes. Moreover, the average replacement ratio has declined as a result of e.g. a series of labour-market reforms. Chart 8 shows the decrease over the last 12 years in the average marginal tax and replacement ratio. Both measures had also been declining before this period. The reforms have strengthened the supply of labour and reduced structural unemploy-ment, thereby paving the way for higher prosperity and improved fiscal sustainability.

MARGINAL TAX AND REPLACEMENT RATIO	Chart 8
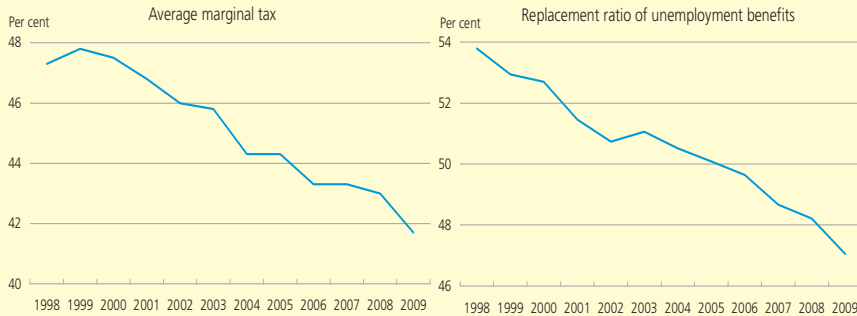
Note: The average marginal tax is stated as an increase in income tax and labour-market contributions in the event of additional wage income of kr. 100. The calculation is based on samples of 3.3 per cent of the population. The replacement ratio for unemployment benefits has been calculated for an industrial worker, cf. ADAM.
Source: Danish "Law Model" and ADAM.

However, one side effect of the reforms has been a reduction in the size of some of the automatic stabilisers compared with previously. Consequently, the cyclicality of the government budgets has also diminished. A simple method of calculating this effect on the automatic reaction of the government budget is described below. The method should be regarded as an attempt to provide a rough estimate of the magnitude of the effect.

The method is based on the budget elasticity (E), defined as

$$E \equiv \frac{\Delta b}{\Delta Y / Y}, \qquad b \equiv \frac{B}{Y}, \tag{1}$$

where B is the government budget balance, Y is GDP, and Δ indicates the change in

CONTINUED	Box 1

the following variable. GDP is assumed initially to be at its potential level, whereby the denominator in the definition of budget elasticity equals the change in the output gap. As a result of the automatic stabilisers, the budget balance B depends on GDP. By applying the definition of b in (1), it can easily be proved that

$$\Delta b = \frac{db}{dY} \cdot \Delta Y = \frac{\Delta Y}{Y} \cdot \left(\frac{dB}{dY} - b \right) \quad \Rightarrow$$

$$E = \frac{dB}{dY} - b. \tag{2}$$

In (2), b equals the initial budget balance (relative to GDP), which equals the structural balance, given the assumption that GDP is initially at its structural level. The first term on the right-hand side of (2) indicates the improvement of the government budget balance when GDP increases by kr. 1. The contribution of income tax to budget elasticity (the contribution to the fraction dB/dY) can be written as $m \cdot a$, where m is the average marginal tax rate in the income tax system, and a is the income tax base calculated as a ratio of GDP. If income tax revenue is stated as P, we can read from the right-hand column in Chart 7 of the main text that

$$\frac{\Delta P}{Y} \times 100 = \frac{m \cdot a \cdot \Delta Y}{Y} \times 100 = m \cdot a = 0.4. \tag{3}$$

The result in (3) reflects that the experiment with the ADAM model, which is the basis for Chart 7, involves an increase in GDP (specifically gross value added) of 1 per cent, i.e. $(\Delta Y / Y) \times 100 = 1$. Chart 8 shows the development in the average marginal tax rate in the period 1998-2009. It was 0.45 on average over the period. If, for simplification purposes, we assume that the estimation period for the ADAM model corresponds to the period in Chart 8, application of the result in (3) enables us to estimate the size of the parameter a to $a = 0.4/0.45 = 0.89$. From 1998 to 2009, the average marginal tax rate has, according to the Chart, declined by around $\Delta m = -0.06$. Viewed in isolation, the marginal tax cut has thus entailed a change in the budget elasticity of approximately

$$\Delta E = \Delta m \cdot a = -0.06 \cdot 0.89 = -0.05.$$

The drop in the replacement ratio of the unemployment benefit system shown in Chart 8 has also reduced budget elasticity. If k is the average replacement ratio, W is the average wage in the labour market, and A is the number of unemployed, the expenditure for unemployment benefits (U) can be written as $U = kWA$, where WA can be interpreted as the total loss of wage income as a result of unemployment. It can reasonably be assumed that the size of this income loss is a declining function $f(\cdot)$ of the level of GDP, i.e. $WA = f(Y)$, where $f'(Y) < 0$. Consequently, the contribution from the unemployment benefit system to budget elasticity in (2) can be written as $-dU / dY = -k \cdot f'(Y)$. By applying the same reasoning as we did when deriving the result in (3), we find, by reading the right-hand side of Chart 7, that $-k \cdot f'(Y) = 0.2$. The average replacement ratio was 0.51 over the period from 1998 to 2009. This results in the estimate $f'(Y) = -0.2 / k = -0.2 / 0.51 = -0.40$. From

CONTINUED	Box 1

the beginning to the end of the period under review, the replacement ratio changed by $\Delta k = -0.07$. It then follows that, all other things being equal, the lower replacement ratio has impacted on budget elasticity in the order of

$$\Delta E = -\Delta k \cdot f'(Y) = 0.07 \cdot (-0.40) = -0.03.$$

According to this simple calculation, the drop in marginal taxes and the replacement ratio from 1998 to 2009 entails an overall decline in budget elasticity of almost 0.1. These are not the only examples of reduction of the automatic stabilisers in recent years. The freeze on nominal property value tax since early 2002 thus removed an important automatic stabiliser in the housing market and in the economy. As described in more detail in Dam et al. (2011a and 2011b), this has led to larger fluctuations in housing prices and economic activity.

unemployment benefits as a result of labour-market and tax reforms. The calculations in Box 1 indicate that the fall in these automatic stabilisers from 1998 to 2009 has caused the total budget elasticity to decline by around 0.1. This should be seen in relation to total budget elasticity of approximately 0.6-0.8, cf. Chart 7.

Disaggregate method

The disaggregate method, applied by the ECB, among others, allows different GDP components to influence the budget balance to varying degrees. One of the weaknesses of calculating the cyclical component as a function of the output gap or cyclical gap is, as mentioned, that this method ignores the underlying cyclical factors in the calculation of the budgetary sensitivity to cyclical fluctuations. This is taken into account in the ECB's method, which calculates of the cyclicality of a number of budget items separately rather than calculating the aggregate budgetary sensitivity, cf. Bouthevillain et al. (2001). It is assumed that four revenue items and one expenditure item are sensitive to cyclical fluctuations. The selected items are the same as those applied by the OECD in its calculation of budget elasticities, as shown in Table 1 together with their determinant bases.

The calculation of the five cyclical subcomponents requires an estimate of the elasticity of each budget item relative to its base and an estimate of the "base gaps", defined as the deviation of bases from their structural levels. Consequently, the sum of the subcomponents equals the total cyclical component of the budget.

This method is simple, transparent and easy to reproduce, which facilitates cross-country comparison of the structural balance. However,

BUDGET ITEMS AND BASES	Table 1
Budget item	Macroeconomic base
Direct taxes from households .... Social contributions from private-sector employees	Private-sector employment and average payroll costs per private-sector employee
Indirect taxes	Private consumption
Corporate taxes	Indicator of gross corporate profits
Expenditure for unemployment benefits	Number of unemployed

Source: Bouthevillain et al. (2001).

the HP filter does have a number of weaknesses, so it is not without problems in practice. HP filtering is a purely statistical exercise decomposing a variable into a cyclical component and a trend. The trend is simply determined as a symmetrical moving average, making the determination very imprecise at the ends of the time series due to the relatively low number of observations. This is inappropriate since the most recent observations of the trend are often those of greatest interest when it comes to economic policy planning. The ECB's method solves the problems with end values by mechanically projecting the variables for a number of years beyond the estimation period. Consequently, the trend is dependent on this mechanical projection, which may very well turn out to be different from the actual development. Ideally, the structural levels of the bases should be derived from theoretical models in the same way as potential output can be derived using the production function method.

Calculations of the cyclical component

As expected, the three methods for calculation of the cyclical component of the budget balance produce different results, cf. Chart 9. The results produced by the Commission and the Ministry of Finance generally show the closest covariation, reflecting the same basic approach. The Ministry's use of the employment gap in its measure of cyclical fluctuations implies a certain lag in the cyclical component relative to the Commission's calculation. The largest deviation between the two calculations can be seen from 2009 onwards, reflecting the previously described differences in projections of potential output. The diverging projections of the output gap emphasise the great uncertainty associated with estimating future developments in both actual and structural output levels. The ECB's disaggregate method has been applied to data from Statistics Denmark and Danmarks Nationalbank's forecast in the Monetary Review, 3rd Quarter 2010. Compared to the methods of both the Commission and the Ministry of Finance, the ECB's method produces larger cyclical components for most of the period under review.

THE CYCLICAL COMPONENT OF THE GOVERNMENT BUDGET BALANCE   Chart 9

Per cent of GDP
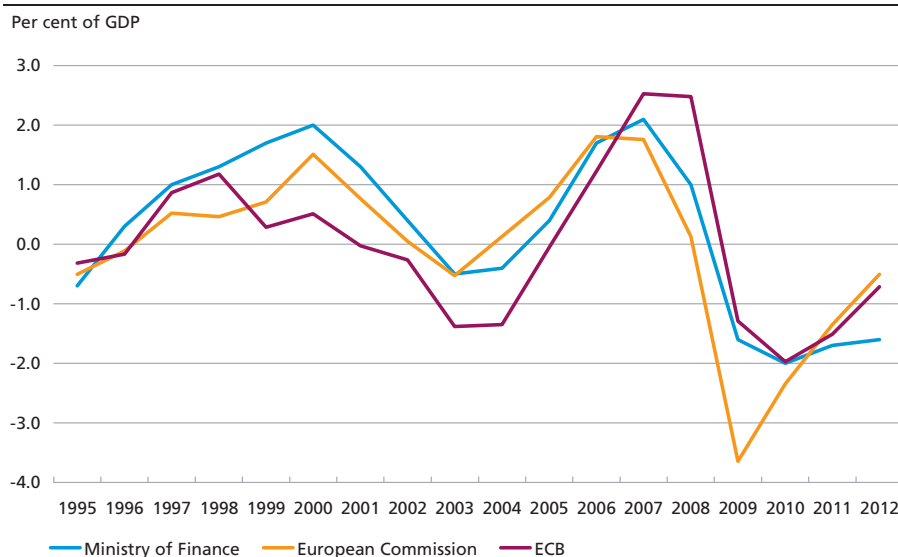
Note: The ECB's cyclical component has been calculated by applying the ECB's method to data from Statistics Denmark
         and Danmarks Nationalbank's forecast from the Monetary Review, 3rd Quarter 2010. The budget elasticity used
         in the Commission's calculation of the cyclical component is 0.65, i.e. slightly higher than that of the OECD of
         0.59. This is attributable to the greater weight of the elasticity of public expenditure as regards the output gap in
         the Commission's calculation. The Commission's weighting is based on a broader category of unemployment-
         related expenses, while the OECD applies only expenditure for unemployment benefits.
Source: Statistics Denmark, Ministry of Finance (2010), Danmarks Nationalbank (2010) and European Commission (2010a).

TEMPORARY FACTORS

As previously mentioned, the government budget balance is dependent
on both cyclical factors and a number of other temporary factors that
are not directly linked to cyclical developments. The structural budget
balance should therefore be adjusted for these factors as well. While it
was possible to determine the cyclical component by estimation or
model simulation, the temporary factors are determined on an ad hoc
basis. Consequently, the various institutions' adjustment for these fac-
tors varies considerably. The Ministry of Finance adjusts several budget
items for temporary factors primarily related to the financial markets,
including stock prices, interest rates and oil prices. Adjustment is made
for e.g. extraordinary revenue from pension-yield tax, corporate taxes
and North Sea oil production and on the expenditure side for fluctua-
tions in the public sector's net interest costs due to interest-rate vari-
ations. The challenge lies in identifying the normal level of the revenue
and expenditure items in question.

   The Commission generally makes very few adjustments for temporary
factors. The main principles are that adjustment is only made for tem-
porary factors of a certain magnitude and that basically no adjustment is

made for factors that increase the government deficit, cf. European Commission (2006). In practice, adjustment is based on an individual assessment of each member state.

Since the structural balance is an element of the assessment of the individual EU member states' compliance with the requirements of the Stability and Growth Pact, the Commission's approach minimises the risk that some member states may include temporary factors to manipulate their structural government deficits. The rules regarding adjustment for other temporary factors than cyclical factors were tightened after the first years of cooperation in Economic and Monetary Union, when it was observed that especially member states with particularly large deficits tended to make considerable adjustments for temporary factors[1].

The ECB also makes very few adjustments for temporary factors, given the principle of uniform rules for all member states. Basically, adjustment is made only for temporary factors that increase the government budget balance, as in the Commission's approach.

The temporary factors that are included in the calculations of the structural balance by the Ministry of Finance, the Commission and the ECB, respectively, are shown in Chart 10. In addition, the Chart decomposes the total actual budget balance into the structural component, the cyclical component and other temporary factors. It is seen that in practice, the ECB and the Commission make virtually no adjustment of Denmark's actual budget balance other than adjustment for cyclical factors. As mentioned previously, the substantial adjustments made by the Ministry of Finance in 2004-08 were attributable to extraordinary revenue items. As a result of these adjustments, the Ministry's calculation shows an almost unchanged structural balance for those years, while those of the Commission and the ECB show an improvement in the structural balance. Consequently, the two international institutions' limited adjustment for temporary factors has the weakness that their measures of the structural balance at times show a very misleading picture of the fiscal policy stance. This applies especially to countries like Denmark with tax revenue items that are particularly sensitive to factors such as oil, stock and bond prices.

The Ministry's projections for 2011 and 2012, on the other hand, comprise adjustment for expected extraordinarily low revenue from pension-yield tax in particular as the projections operate with higher government bond yields. This adjustment contributes to increasing the divergence between the Ministry of Finance's and the Commission's measures of the structural government budget balance for Denmark for the

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[1] Larch and Turrini (2009).

TOTAL DECOMPOSITION OF ACTUAL BUDGET BALANCE   Chart 10

Per cent of GDP
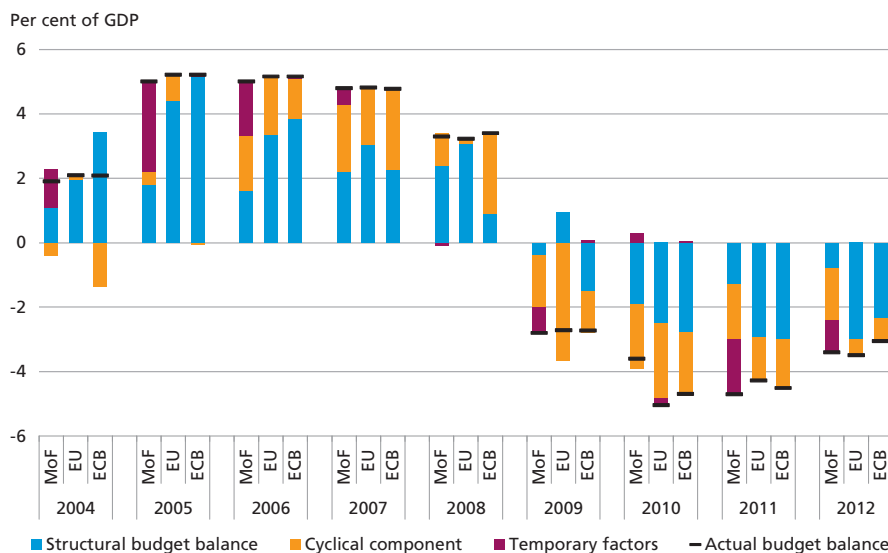
Note: The ECB's decomposed budget balance has been calculated by applying the ECB's method to data from Statistics
        Denmark and Danmarks Nationalbank's forecast from the Monetary Review, 3rd Quarter 2010. The difference
        between the calculations of the actual balance is that back in time, the Ministry of Finance calculates the balance
        according to ENS95, while the European Commission and the ECB calculate the EMU balance, i.e. the balance
        adjusted for swap arrangements and UMTS licences.
Source: Statistics Denmark, Ministry of Finance (2010), Danmarks Nationalbank (2010) and European Commission (2010a).

coming years. While the structural balance calculated by the Ministry
improves steadily from 2010 to 2012, the Commission's calculation is
almost unchanged despite the many consolidation measures in the
economic recovery plan to be implemented in 2011-13. The Commission
finds that its most recent assessment of the structural balance is subject
to great uncertainty, so it has chosen also to apply calculations of the
direct revenue effects of the measures in the economic recovery plan in
its evaluation of fiscal measures in Denmark. Against this background,
the Commission concludes that Denmark is complying with the EU's
recommendation of annual improvement of the structural balance by
0.5 per cent of GDP in 2011-13[1].

CONCLUDING REMARKS

The discussions in this article show that the calculation of the structural
balance depends on the methods and assumptions applied. In the most
frequently used method, the calculation of the cyclical budget com-
ponent depends on the estimated output gap, which is subject to uncer-
tainty, particularly as regards the level of the structural balance. More-

[1] European Commission (2011).

over, in some years a key factor is the type of adjustment made in addition to the adjustment for cyclical factors. When calculating the Danish structural budget balance, it is particularly important to make adjustment for a number of extraordinary tax revenue items that have a strong impact on the actual balance in some years. The absence of such adjustment can result in a very misleading picture of the fiscal policy stance. After adjustment for temporary factors, the calculation of year-on-year changes in the structural balance is relatively robust, because the year-on-year change can be compared with measures of the direct revenue effects of the individual fiscal policy measures.

Besides, the change in the structural balance is often used in an assessment of whether the discretionary part of fiscal policy is contractive or expansionary. However, in this connection it is necessary to bear in mind that changes in the structural balance are a measure of the effects of discretionary fiscal policy on the government budget and not a measure of the effects of fiscal policy on the economy overall. The latter depends on the fiscal-policy tools applied. For instance, changes in public consumption and investment have a direct impact on output and thus on GDP, while changes in taxes only impact in step with households' adjustment of consumption as a result of changes in disposable incomes. The Ministry of Finance and the Danish Economic Councils, among others, therefore calculate a fiscal effect, i.e. a measure of the direct effect of fiscal policy on economic activity. This fiscal effect, together with the measures of structural balance and direct revenue effects, is included in the overall assessment of fiscal policy.

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Indicator Models for Private Consumption

Jonas Sørensen, Economics

INTRODUCTION AND SUMMARY

Private consumption accounts for around half of Denmark's gross domestic product, GDP, and is therefore an important factor when assessing the current state and direction of the economy. As part of the preliminary national accounts, Statistics Denmark publishes data for private consumption in Denmark on a quarterly basis around two months after the expiry of the quarter under review. Hence, various private consumption indicators may be useful when attempting to estimate current developments (nowcasting) and future developments (forecasting).

This article describes simple estimations of private consumption based on indicators. While not theoretically based, these estimations aim solely to predict as accurately as possible developments in private consumption in the very short term. Estimation of indicator models may quantify the usefulness of various economic indicators to predict developments in private consumption and it may contribute to a consistent interpretation of the figures.

According to the analysis, the indicators considerably improve the assessment of current developments in private consumption compared with a simple autoregressive model where current consumption is predicted on the basis of the historical development in consumption. The indicators may to some extent continue to play a role in predicting developments in the coming quarter, but their contribution is considerably smaller than in a nowcasting context. Furthermore, they are not particularly useful for assessing developments in private consumption beyond the next quarter.

The estimations show that the development in the number of new passenger car registrations may give an indication of developments in private consumption. Dankort turnover is also relevant, and consumer confidence, which includes forward-looking elements, also seems to have some explanatory power in terms of nowcasting and forecasting private consumption. In addition, the analysis shows that little is gained by splitting consumer confidence into subcomponents rather than estimating on the basis of the composite indicator.

Finally, it is illustrated how the estimated consumption growth in two different quarters changes as economic indicators are released.

DATA DESCRIPTION

Data for seasonally adjusted private consumption is compiled on a quarterly basis in the national accounts. The quarterly growth rates are highly volatile and there seems to be a negative autocorrelation. In other words, when consumption rises in one quarter, it tends to fall in the subsequent quarter, cf. Chart 1. The focus of this article is on the quarterly development. There seems to be less noise when it is compiled as annual growth rates, and this may call for estimation on the basis of annual changes. However, the quarterly development is often of interest for cyclical forecasting purposes.

Large fluctuations in private consumption growth are of significance when interpreting indicator models. Negative quarterly growth rates may easily occur during periods when the Danish economy is otherwise in an upswing – as was the case in the mid-2000s. So if the indicators point to sudden private consumption falls, say, this does not necessarily indicate a cyclical reversal. For this reason, the model estimates must be interpreted in the context of the economic development in general, and the models are just one of several forecasting tools used by Danmarks Nationalbank.

REAL PRIVATE CONSUMPTION	Chart 1

Per cent, quarter-on-quarter
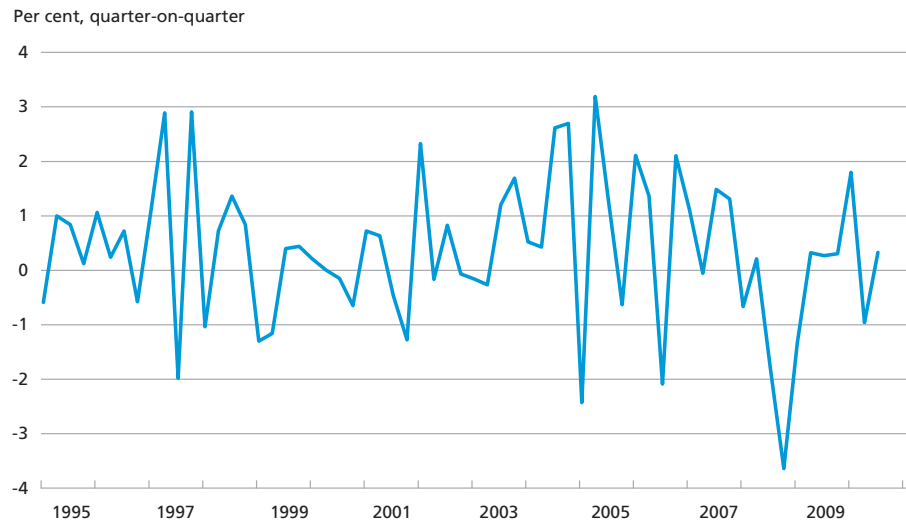
Note: Seasonally adjusted data.
Source: Statistics Denmark.

There are many potential indicators of private consumption and it is not clear which ones should be selected. Rather than being theoretically based, the success criterion for a consumption indicator is its ability to provide an early indication of the development in private consumption. The national accounts include several private consumption subgroups, including a breakdown according to consumer groups such as food, clothing, etc., electricity and fuel, acquisition of vehicles, housing occupancy, leisure equipment, entertainment and travel, etc. This breakdown is an obvious source of inspiration when looking for indicators. However, other indicators are also used which do not target the subcomponents of private consumption but may capture more general consumption development trends. Box 1 provides an overview of the indicators under review in this article.

POTENTIAL PRIVATE CONSUMPTION INDICATORS	Box 1

It is essential for the usefulness of indicators in connection with nowcasts and forecasts that they are available prior to the release of the time series they are used to predict. This article examines both economic indicators which may be regarded as indicators of the subcomponents of private consumption, e.g. retail sales and new passenger car registrations for households, and other types of indicators, e.g. consumer confidence and Dankort turnover, cf. Table 1. What is important is that the indicators contribute to explaining the development in private consumption. Under this approach the final models only contain the indicators suggested by various tests.

INDICATORS			Table 1
Description	Name of variable	Compilation lag	Source
Retail sales	DETA	30 days	Statistics Denmark
New passenger car registrations for households	BIL	20 days	Statistics Denmark
Electricity sales	FCEL	40 days	The Danish Energy Agency and own calculations
Sales of certain oil products	FSOP	40 days	The Danish Energy Agency and own calculations
Domestic sales in the hotel and restaurant sector	FRESHO	35 days	VAT statistics, Statistics Denmark
Dankort turnover	Fdankort	5 days	Nets
Consumer confidence (composite and split)	CONF	Middle of same month	Statistics Denmark

Note: Several of the series from Statistics Denmark are spliced with completed series in order to create time series of sufficient length. VAT statistics used to be released on a quarterly basis but they are now released on a monthly basis. *Compilation lag* is the approximate number of days after the expiry of the reference month.
Source: Statistics Denmark, the Danish Energy Agency, Nets and own estimates.

To ensure the validity of the estimates it is essential that the time series are stationary. The above series are therefore transformed into quarterly changes (percentage growth rates or changes in levels where relevant).

Table 2 shows the correlation between quarterly changes in different indicators and quarterly growth in private consumption. It is seen that while the covariation of Dankort turnover and car purchases with private consumption is high, there is also a considerable amount of correlation between private consumption and retail sales, electricity sales and sales of certain oil products. The change in composite consumer confidence has a very low correlation with contemporaneous changes in private consumption, while the correlation with lagged consumer confidence is higher.

The consumer confidence indicator is arrived at by taking a simple average of five subquestions about the family's financial situation today compared with the situation a year ago, expectations of the family's financial situation one year ahead compared with the situation today, the Danish economy today compared with a year ago, expectations of the Danish economy one year ahead compared with the situation today and the assessment of the advantage of acquiring major consumer durables such as television sets, washing machines, etc. at the moment. The time horizons for the above subquestions differ, but this is not clearly evident from the correlation with private consumption.

CORRELATION WITH GROWTH IN PRIVATE CONSUMPTION				Table 2
Correlation coefficients	t	t-1	t-2	t-3
ΔDETA	0.33	-0.04	0.13	0.10
ΔBIL	0.56	-0.18	0.19	0.04
ΔDankort	0.59	-0.35	0.08	0.23
ΔFCEL	0.31	-0.13	-0.02	-0.17
ΔFSOP	0.38	0.00	-0.29	-0.01
ΔFRESHO	-0.06	0.16	-0.12	0.00
ΔCONF	-0.04	0.17	0.18	0.07
ΔFamily's financial situation today	-0.20	0.22	0.26	-0.06
ΔFamily's financial situation one year ahead .	-0.19	0.23	-0.0•	-0.23
ΔThe Danish economy today	0.01	0.16	0.28	0.02
ΔThe Danish economy one y ear ahead	-0.11	0.21	0.1•	0.08
ΔAcquisition of major consumer durables	0.13	-0.08	-0.04	0.13

Note: The first column indicates the correlation between private consumption in period t and contemporaneous indicators. The next columns indicate the correlation between private consumption in period t and the indicators in preceding periods. The period of observation is 1st quarter 1995 – 2nd quarter 2008. Dankort turnover is deflated by the composite consumer price index. Hotel and restaurant sales are deflated by the hotel and restaurant price index, which is a subindex of the consumer price index.

Source: Own estimates.

In principle, estimation of indicator models should be based on real-time data where a data set is available for each time frame with data as it was at the time in question. Rather than real-time data, this article uses data available in early 2011. The more extensive revisions the indicators are subjected to, the more important the distinction between real-time

data and final data will be. This is especially relevant for private consumption because the national accounts are revised on an ongoing basis and are only considered final after 3-4 years.

Some of the indicators may also be subject to revisions after their first release, e.g. retail sales and new passenger car registrations, but such revisions are normally small. Other indicators are considered final on first release. This applies to e.g. consumer expectations.

NOWCASTING PROPERTIES

To illustrate the value of the above economic indicators as indicators of private consumption, FCP, simple regressions of the following type are made:

$$\Delta FCP_t = \alpha_1 \cdot \Delta FCP_{t-1} + ... + \alpha_p \cdot \Delta FCP_{t-p} + \sum_{i=1}^{n} \beta_0^i \cdot Ind_t^i + ... + \sum_{i=1}^{n} \beta_q^i \cdot Ind_{t-q}^i + c + \varepsilon_t \quad (1)$$

where c is a constant, and ε is the error term. In addition to the indicators mentioned in Box 1, *Ind* also includes a dummy variable for the growth in Dankort turnover to prevent its coefficient from being affected by the extraordinary fall in turnover due to the impact of the Dankort fee in January and February 2005. So initially it is sought to explain growth in private consumption by lagged consumption values, *n* indicators with *q* lags and a constant. The frequency is quarterly, and the indicators are converted into quarterly figures by taking simple averages or totals of the monthly figures according to the nature of the variable concerned. Initial estimations including one indicator at a time indicate that two lags sufficiently capture the autocorrelation in private consumption.

Insignificant variables are gradually removed from the general model of type (1), and the model is reestimated. Selection of the final model also focuses on various information criteria[1], model reduction tests and misspecification tests. Table 3 shows the result of the estimations based on (1) using the composite consumer confidence indicator and splitting it into subcomponents, respectively.

The model using the composite consumer confidence indicator explains about 70 per cent of the variation in private consumption growth. It appears from the partial R^2, which is a measure of the contribution of individual variables to the overall explanation, that the number of new

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[1] Specifically, Akaike's information criterion, AIC, Hannan-Quinn's information criterion, HQ, and the Schwarz Bayesian information criterion, SC or BIC, are examined. The principle of these criteria is that they weigh the explanatory power of the model against its complexity, measured by the number of variables. The information criteria include a term that rewards high explanatory power, and a penalty term which increases with the number of regressors in the model. According to Verbeek (2004, p. 285), the AIC criterion has a tendency to result asymptotically in overparameterised models. Consequently, the AIC is less in focus if the criteria produce unclear signals.

REGRESSION RESULTS – NOWCASTING						Table 3
	Model 1 Composite consumer confidence			Model 2 Split consumer confidence		
Right-hand-side variables	Coefficient	Standard deviation	Partial R^2	Coefficient	Standard deviation	Partial R^2
Constant	0.45	0.24	0.08	0.43	0.23	0.08
ΔBIL_t	0.06	0.01	0.40	0.06	0.01	0.42
$\Delta Fdankort_t$	0.20	0.07	0.14	0.20	0.07	0.15
$\Delta Fdankort_{t-1}$	-0.21	0.07	0.15	-0.20	0.07	0.15
$\Delta FSOP_t$	0.12	0.04	0.16	0.14	0.04	0.22
$\Delta FRESHO_{t-1}$	0.15	0.05	0.16	0.16	0.05	0.19
$\Delta CONF_{t-2}$	0.13	0.05	0.14			
$\Delta Anskidag_t$				0.05	0.03	0.07
$\Delta DKøkidag_{t-2}$				0.06	0.02	0.14
$Dummy_t$	0.13	0.16	0.01	0.05	0.16	0.00
$Dummy_{t-1}$	0.32	0.15	0.10	0.25	0.14	0.06
R^2	0.73			0.76		
Mean error	-0.51			-0.36		
RMSE	0.70			0.71		
Estimation period	Q1 1995 – Q2 2008			Q1 1995 – Q2 2008		
Out-of-sample	Q3 2008 – Q3 2010			Q3 2008 – Q3 2010		

Note: Mean error and root mean square error, RMSE, are measures of prediction errors. The dummy variable prevents the Dankort fees in January and February from affecting the coefficient of Dankort turnover. Partial R^2 is a measure of the contribution of individual variables to the overall explanation. As a main rule, insignificant variables (5 per cent level of significance) have gradually been removed from the estimations, but the constants and the dummy variables have been retained irrespective of significance. *Anskidag* and *DKøkidag* refer to the assessments *The advantage of acquiring major consumer durables at the moment* and *The Danish economy today compared with a year ago*, respectively.

Source: Statistics Denmark and own estimates.

passenger car registrations for households is an important indicator of private consumption. Dankort turnover, consumer confidence with a lag of two quarters, consumption of certain oil products and domestic sales in the hotel and restaurant sector also influence the nowcast.

In general, the coefficients have the expected signs. For example, a 1 per cent increase in new passenger car registrations for households is associated with a boost in private consumption of 0.06 per cent according to the model. The coefficient is smaller than the car purchases share of private consumption in the national accounts, which was almost 12 per cent during the period. It is not an estimation of an identity, however, as consumer confidence and Dankort turnover are also included. As a result, the coefficient for e.g. new passenger car registrations cannot be expected to equal the car purchases share of consumption in a national accounts sense.[1] Presumably, the positive sign for consumption of certain oil products reflects e.g. that the variable captures large increases in heat consumption during cold winters.

[1] Besides, new passenger car registrations are not fully consistent with the consumption component of car purchases (acquisition of vehicles) in the national accounts, one reason being that the former does not take the composition of car purchases into account.

ACTUAL AND PREDICTED VALUES – NOWCASTING   Chart 2
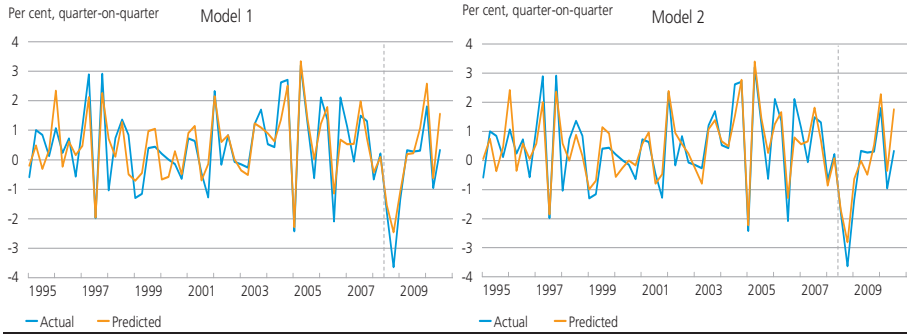
Per cent, quarter-on-quarter   Model 1   Per cent, quarter-on-quarter   Model 2

Note: The left-hand chart shows predictions from the model based on the composite consumer confidence indicator,
         while the right-hand chart shows predictions based on the split model.
Source: Statistics Denmark, the Danish Energy Agency, Nets and own calculations.

The lagged value of private consumption is not significant in the final model. This is worth noting when taking the negative autocorrelation in consumption growth into account, but it probably reflects the relatively high correlation of both Dankort turnover and new passenger car registrations with private consumption. The coefficients for Dankort turnover and the one-quarter lag thereof are almost of equal size, but with the opposite sign. This may indicate that the negative autocorrelation in consumption in the indicator model is to some extent captured by the development in Dankort turnover.

The absence of lagged values of private consumption is convenient in the ongoing work because it increases the resilience of the model to revisions of the national accounts. This means that the results are affected by the issue of real-time data only to a minor degree, cf. above. Consequently, lagged values of private consumption are omitted in the subsequent estimations. Another notable result is that retail sales are not significant in the estimation despite the fact that they constitute around one third of private consumption.

There are no indications of misspecification in the model, and recursive estimations show no signs of coefficient instability over time. During the evaluation period, 3rd quarter 2008-3rd quarter 2010, the ability of the estimated model to nowcast developments quarter-on-quarter is evaluated. While a few quarters show relatively big nowcast errors, the ability of the model to capture the development in consumption is fairly good, cf. Chart 2. However, the model tends to overestimate consumption growth during the evaluation period. The mean prediction error is around 0.5 percentage points per quarter.[1] This means that during the

[1] The assessment of the models during the evaluation period is based on national accounts data on private consumption which is not yet final. Later revisions may therefore change the impression of the model properties during the period.

evaluation period the model points to a rate of quarterly growth that is around 0.5 percentage points higher than the average quarterly consumption growth, which was -0.5 per cent for the period.

The composite consumer confidence indicator is arrived at by taking a simple average of five subquestions. Two of these are forward-looking, and a split into subcomponents makes it possible to attach different weights to the subquestions and lagged values thereof. This is not possible with the composite confidence indicator. Table 3 shows the result of an estimation of (1) based on the subcomponents of consumer confidence rather than the composite indicator. The estimation is made without lagged values in private consumption, cf. above.

According to the model, an increase in the respondents' assessment of the Danish economy today compared to a year ago is associated with significantly higher consumption growth two quarters later. Similarly, an increase in the assessment of the advantage of acquiring major consumer durables at the moment indicates higher consumption growth in the same quarter. However, it is seen that splitting consumer confidence into subcomponents leads to only modest model gains. The explanatory power is marginally higher and the prediction errors during the evaluation period are slightly less systematic, while the errors are almost identical (measured in terms of RMSE). Parameter estimates for new passenger car registrations and Dankort turnover are virtually unchanged compared to model 1.

As an indication of the models' contribution to explaining private consumption growth, a comparison can be made with an autoregressive model (AR model) as presented in Table 4. Such a comparison clearly shows that the indicators have good predictive properties. The explanatory power of the AR model is significantly lower than that of models 1

REGRESSION RESULTS			Table 4
	Model 3 AR(2)		
Right-hand-side variables	Coefficient	Standard deviation	Partial R^2
Constant	0.85	0.20	0.26
ΔFCP_{t-1}	-0.42	0.14	0.16
ΔFCP_{t-2}	-0.26	0.14	0.07
R2	0.17		
Mean error	-1.73		
RMSE	2.57		
Estimation period	Q1 1995 – Q2 2008		
Out-of-sample	Q3 2008 – Q3 2010		

Source: Statistics Denmark and own calculations.

and 2, and the prediction errors are considerably larger during the evaluation period.

FORECASTING PROPERTIES

In order to assess the forecasting properties of the indicators, the following model is estimated:

$$\Delta FCP_{t+1} = \sum_{i=1}^{n} \beta_0^i \cdot Ind_t^i + ... + \sum_{i=1}^{n} \beta_q^i \cdot Ind_{t-q}^i + c + \varepsilon_t \tag{2}$$

In terms of analysing the forecasting properties of the indicators, the information set available at the time plays an important role. For example, to forecast the development in period *t*, based on simple regressions as presented here, the indicator for period *t+1* may not be contained in the information set, cf. (2). Likewise, (2) does not contain lagged values of private consumption, cf. above.

   As expected, in the estimations based on (1) it is the contemporaneous indicators in particular which contribute to nowcasting private consumption. In view of this, expectations of the indicators in terms of their forecasting properties are not high. Table 5 shows the results of estimation of (2). Estimations are based on both the composite consumer confidence indicator and its subcomponents.

   As in the corresponding nowcast model, lagged values of Dankort turnover capture a good deal of the dynamics of private consumption,

REGRESSION RESULTS – FORECASTING   Table 5

Right-hand-side variables	Model 4 Composite consumer confidence			Model 5 Split consumer confidence		
	Coefficient	Standard deviation	Partial R^2	Coefficient	Standard deviation	Partial R^2
Constant	0.74	0.36	0.08	0.77	0.33	0.10
$\Delta Fdankort_{t-1}$	-0.31	0.11	0.14	-0.32	0.10	0.17
$\Delta Fdankort_{t-2}$	0.19	0.11	0.06	0.19	0.10	0.07
$\Delta CONF_{t-2}$	0.19	0.08	0.10			
$\Delta DK\o kidag_{t-2}$				0.09	0.03	0.13
$\Delta Fam\o kidag_{t-1}$				0.22	0.10	0.09
$Dummy_{t-1}$	0.14	0.25	0.01	0.20	0.23	0.02
$Dummy_{t-2}$	-0.49	0.22	0.09	-0.61	0.21	0.15
R^2	0.28			0.38		
Mean error	-1.32			-1.02		
RMSE	1.90			1.95		
Estimation period	Q1 1995 – Q2 2008			Q1 1995 – Q2 2008		
Out-of-sample	Q3 2008 – Q3 2010			Q3 2008 – Q3 2010		

Note: See Table 3. *Famøkidag* indicates the assessment of *Family's financial situation today compared with a year ago*.
Source: Statistics Denmark and own calculations.

while an increase in the consumer confidence indicator suggests a rise in private consumption two quarters ahead. The coefficients are slightly higher than in the corresponding nowcast model. This should be viewed in relation to the reduced information set. As expected, the forecasting properties are poorer than the nowcasting properties. This applies to the ability of the indicators to describe private consumption variations as well as their ability to predict developments in the evaluation period, cf. Chart 3. In the composite consumer confidence model the mean prediction error is approximately 1.3 percentage points. This means that during the evaluation period the model points to a rate of quarterly growth which is, on average, 1.3 percentage points higher than the actual growth.

In a forecasting context, there is little to be gained by estimating on the basis of the split consumer confidence indicator rather than the composite indicator. The coefficient of Dankort turnover and the constant are not changed by a split, but the explanatory power increases slightly. During the evaluation period, the mean prediction error is slightly lower, while the magnitude of the errors (measured by RMSE) is unchanged. Models 4 and 5 show no signs of misspecification, and recursive estimations show that the parameter estimates are relatively stable throughout the estimation period.

The AR model presented in Table 4 may also be used for predictions one quarter ahead. Often, data on growth in private consumption in the preceding quarter will not be available at the time of forecasting, however. For forecasting purposes it will therefore typically be necessary to use the model's prediction of lagged growth in private consumption as an approximation of actual growth, meaning in this case that the prediction errors is actually reduced during the evaluation period.

ACTUAL AND PREDICTED VALUES – FORECASTING   Chart 3
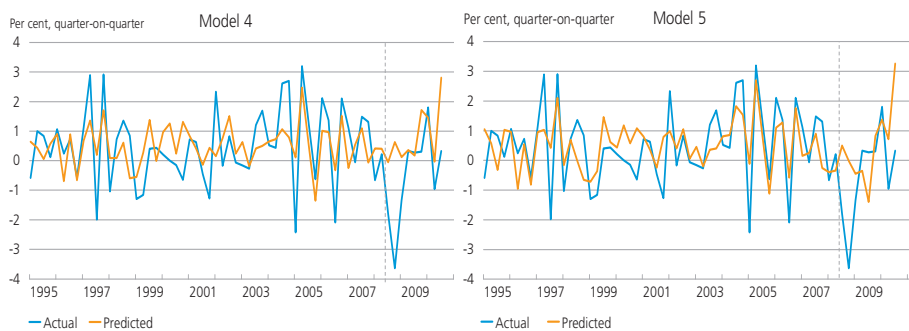
Note: The left-hand chart shows predictions from the model based on the composite consumer confidence indicator, while the right-hand chart shows predictions based on the split model.
Source: Statistics Denmark, the Danish Energy Agency, Nets and own calculations.

Omitting contemporaneous indicators as well as indicators from the preceding quarter provides a model for predicting the development in private consumption more than one quarter ahead. In general, such estimations do not produce interesting results, and the explanatory power is generally very low. It may therefore be concluded that one should not expect to be able to predict the development in private consumption more than one quarter ahead using the indicators.

Overall, the estimations show that the indicators may contribute significantly to estimating the development in consumption in the quarter concerned, but their prediction powers are otherwise limited. A common characteristic of both nowcast and forecast models is that they underestimate the large decline in private consumption at the end of 2008. However, the decline was exceptionally large.

ONGOING SIGNALS OF THE INDICATOR MODELS

Above, the monthly indicators have been compiled into a quarterly frequency. This means that, in principle, the development in a given quarter estimated by the indicator models will not be available until the data for the last month of the quarter in respect of the least timely indicator is released.

This section illustrates how, using a simple approach, monthly indicators may be used to update model predictions continuously. Lacking data for any remaining months in a given quarter are provided by flat projections of the underlying seasonally adjusted monthly series before being aggregated to quarters.[1]

Chart 4 illustrates how the indicator model forecasts of consumption growth in the 4th quarter of 2008 and the 4th quarter of 2009, respectively, change as data is released. The illustration is based on models 2 and 5, in which consumer confidence is split into subcomponents. The forecast model's estimate for the 4th quarter of 2008 is highly inaccurate, and it does not improve even when more information becomes available. On the other hand, the accuracy of the nowcast model gradually improves, in this case, as new data is released. According to the nowcast model, the ongoing extension of data clearly indicates that the decline in private consumption was unusually large. The indicators for the quarter as a whole are not available until February, and in this case the nowcast model's final prediction for the quarter is very close to the

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[1] Seasonal adjustment may play a role here, in as much as the adjustment factor changes when months are added to the data set. Accordingly, a seasonally adjusted figure for a given month may be changed on an ongoing basis when the data period is extended, even though the actual series is not revised. This technical aspect is disregarded here.

ILLUSTRATION OF ONGOING ESTIMATES OF CONSUMPTION GROWTH   Chart 4
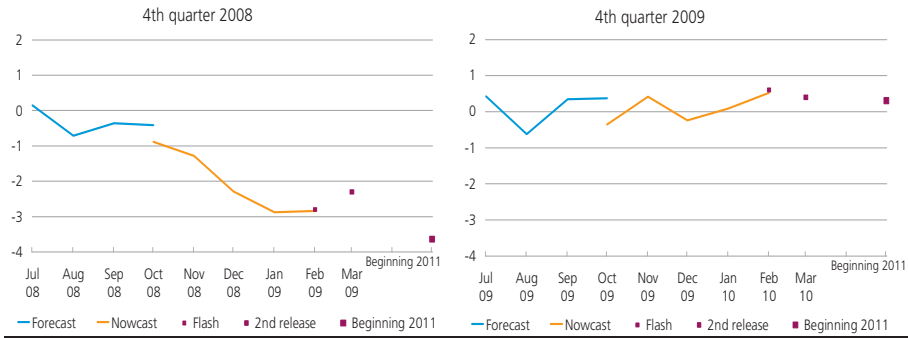
Note: A data set for each month has been created containing the information available on the 20th of the month. The
        series have then been subjected to a flat projection for the remaining months of the quarter. The blue curve
        shows the development in the forecast model estimate of consumption growth in the 4th quarter as the 3rd
        quarter progresses. Similarly, the yellow curve shows how the nowcast model estimate for the 4th quarter
        changes as the 4th quarter progresses. The dots show growth in the 4th quarter in accordance with the ongoing
        revisions of the national accounts. The first national accounts data for the 4th quarter are normally available at
        the end of February.
Source: Own calculations.

flash estimate (Statistics Denmark's first release of the national ac-
counts). According to the revised figures, the actual decline in private
consumption was even larger, however.

In other quarters the ongoing release of new data does not change
the nowcast nearly as much. At the same time, more information does
not always bring the nowcast closer to the actual development in con-
sumption. Chart 4 illustrates for the 4th quarter of 2009 that in one
month the nowcast model calls for a decline in consumption of almost
0.5 per cent, while new data in the subsequent month indicates an in-
crease of almost 0.5 per cent.

As illustrated by the examples, the models' first indication of the de-
velopment in consumption and their final estimates may diverge con-
siderably. At the same time they also show that more information does
not necessarily make the models more accurate.

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The Economic Crisis in Ireland, Iceland and Latvia

Jakob Ekholdt Christensen, Economics

INTRODUCTION AND SUMMARY

Ireland, Iceland and Latvia have encountered momentous economic problems in recent years. There has been a striking resemblance be-tween the factors that triggered the crisis in the three countries. Ahead of the crisis, all three countries saw strong economic growth, driven by the banks' aggressive credit policies and booming property markets. This led to worsening economic imbalances. The banking sectors grew to a size many times larger than the annual gross domestic product, GDP, making these countries very vulnerable when investors lost confidence in them.

The three countries have requested help from the international com-munity to solve urgent liquidity problems and get their economies back on track. Thus, loan programmes have been launched with contributions from the International Monetary Fund, IMF, the EU and the Nordic coun-tries, including Denmark. All three countries are implementing massive fiscal consolidation plans – with direct austerity measures by close to or more than 10 per cent of GDP. Moreover, a significant improvement of competitiveness is needed in the three countries. In Ireland and Latvia, this is obtained via lower prices and wages and a prolonged period of very modest wage increases. Latvia, among others, has also seen very substantial growth in productivity, which is helpful to the recovery pro-cess. The Icelandic krona fell sharply by about 50 per cent in the autumn of 2008. To prevent further depreciation and capital flight, this was met by very extensive capital controls, which have prevented international investors from withdrawing their capital and prevented Icelanders from investing abroad. The decline in the exchange rate eroded purchasing power, resulting in a decline by 20-25 per cent in private consumption in Iceland, while the decline in real GDP was curbed by the impact on competitiveness. Due to the inflationary effect of the currency depreci-ation, wages and prices have not declined in Iceland.

In spite of the severe economic adjustment, there are tentative signs of recovery in the three countries. The macroeconomic situation has sta-

bilised, and the economies experience export-driven growth. However, it is too soon to declare the crisis over, and it will be a great challenge, particularly for Ireland, to complete the extensive adjustment pro-gramme and restore investor confidence.

A DEBT-FINANCED ECONOMIC UPSWING

Ireland, Iceland and Latvia posted strong economic growth from early 2000 until the economic slowdown at end-2007, cf. Chart 1. The upswing was largely driven by a huge boom in the housing market, cf. Chart 2. In the period 2001-06, annual increases in nominal house prices averaged 11, 14 and 32 per cent. Investment in construction rose by 5-8 per cent of GDP from 2000 to 2007 and thus accounted for 20 per cent of GDP in 2007, cf. Chart 2. In comparison, investment in construction in Denmark totalled 11.5 per cent of GDP in 2007.

The strong growth was stimulated by aggressive expansion of bank lending. The banks benefited from the ample international liquidity, and credit demand was underpinned by low (or negative) real interest rates. In Iceland and Latvia, many of the loans were issued or index-linked in foreign currency. Irish and Latvian banks primarily granted loans to the housing and construction sectors. The proportion of home loans in the Irish banks' portfolios rose from 40 to 60 per cent during the period 2002-06. In Latvia, home loans also constituted an important

DEVELOPMENT IN REAL GDP	Chart 1

Index 2000 = 100
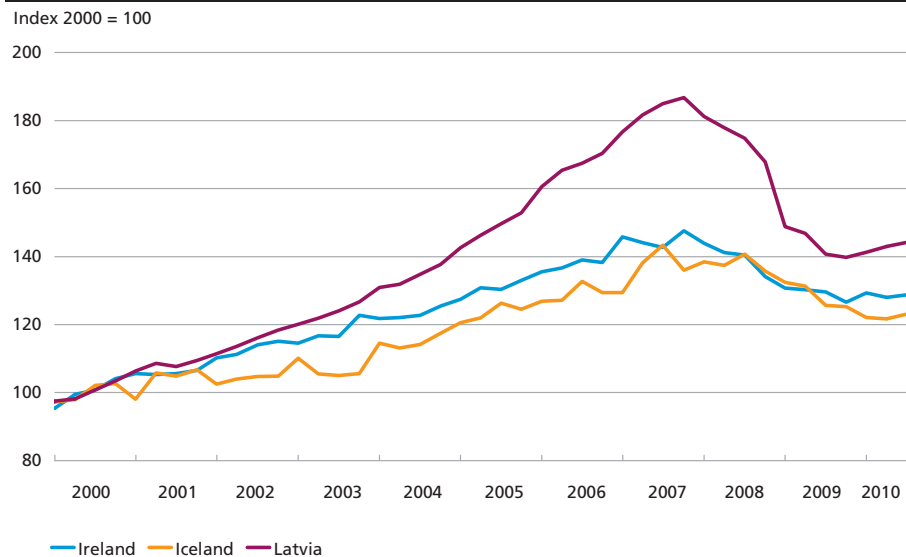
Source: The European Commission's Ameco database.

HOUSE PRICES AND INVESTMENT IN CONSTRUCTION, 1996-2010   Chart 2
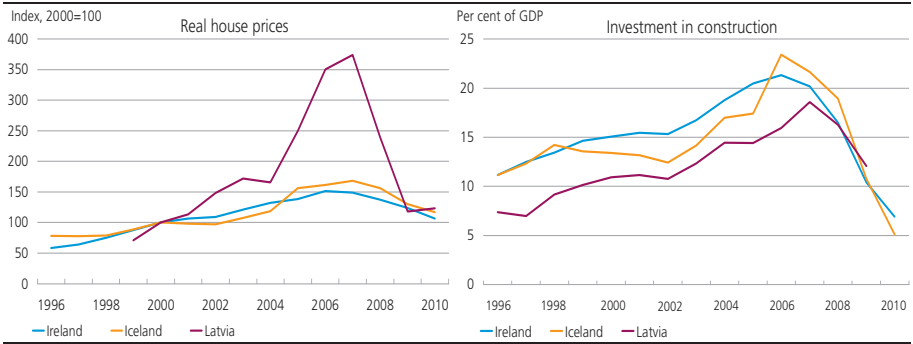
Note: House prices have been deflated by the GDP deflator. House prices for Latvia are based on prices of a standard
       flat in Riga. As prices were stated in dollar terms until 2005, the price fluctuations were to some extent affected
       by exchange rate movements between dollar and euro, to which the Latvian currency was pegged. The sharp
       price increases in 2004 were, according to the Latvian central bank, due to price hikes by estate agents in
       connection with the transition to quotation in Latvian lats.
Source: National statistical agencies and the European Commission's Ameco database.

element in the banks' loan portfolios, while the Icelandic banks primarily granted loans to holding companies. This loan type represented half of the Icelandic bank lending in March 2008.

The rapid increase in lending meant that the banks grew very large relative to the size of the economies. This was particularly the case in Ireland and Iceland where the banking sector's assets accounted for 791 and 681 per cent of GDP, respectively, in 2008. Growth in the Latvian banking sector was more subdued, as the sector's assets reached 144 per cent of GDP.

The banks funded much of their lending growth through loans from international capital markets. In this process, they built up large customer funding gaps, which rose to 280, 250 and 220 per cent of deposits in Icelandic, Latvian and Irish banks, respectively, in 2008.

Not until late in the period did the authorities step in with macroprudential instruments to dampen the rapid lending growth. In both Latvia and Iceland, the reserve requirements for banks were reduced during the upswing. In Iceland, the reserve requirements applying to deposits in the banks' international branches were removed, cf. Iceland's Special Investigation Commission (2010). When the authorities finally tightened the reins on banks, it was too late, and the measures were too inadequate for effective reversal, cf. Honohan et al. (2010).

Nor was fiscal policy sufficiently tight to offset the overheating of the three economies. Even though public finances improved, and government debt was reduced, the underlying fiscal balance was weak. Ireland's structural budget deficit rose from 2.8 to 7.3 per cent of potential GDP from 2004 to 2007 according to the most recent assess-

ment by the IMF (2010). This assessment reflects a sharp downward revision of the estimate of the structural balance relative to the IMF's 2007 forecast of a surplus on the structural balance of 0.7 per cent of GDP in 2007. The erroneous assessment of the underlying fiscal position has presumably contributed to the overly accommodative fiscal policy before the crisis. In Iceland, taxes were cut, cf. Iceland's Special Investigation Commission (2010). In both Ireland and Latvia, the authorities raised public-sector wages and transfer payments, cf. Purfield and Rosenberg (2010) as well as Regling and Watson (2010). In Ireland, government revenue became increasingly dependent on taxation related to property transactions. This made public finances vulnerable to the slowdown in the housing market, cf. Kanda (2010).

The strong economic growth led to overheating. Ireland and Iceland were close to full employment, and unemployment fell sharply in Latvia. The low unemployment triggered higher wages, with annual wage inflation reaching 8 per cent in Ireland, 11 per cent in Iceland and 27 per cent in Latvia in 2004-2008. The strong growth in both domestic demand and wages caused inflation to rise, exceeding 10 per cent in both Iceland and Latvia. Business competitiveness was eroded in tandem with the appreciation of the real exchange rate, particularly in Ireland and Latvia. The Icelandic krona weakened from early 2006. The weaker currency to some extent prevented appreciation of the real exchange rate. However, the weakening of the nominal exchange rate contributed to heightening any inflation pressures in the economy.

The overheating caused increasing external imbalances. In both Iceland and Latvia, the current-account deficit rose to more than 20 per cent of GDP before the outbreak of the crisis. The widening of the Irish deficit to 6 per cent of GDP was more moderate. As the deficits were increasingly funded via short-term foreign loans, the countries became more vulnerable to sudden drops in capital inflows.

STRONG MEDICINE AND LEAN YEARS

The three countries were already hit by an economic slowdown in late 2007, before the global crisis broke out in the wake of the collapse of Lehman Brothers. International funding conditions for the countries' banks tightened. At the same time, the banks tightened their credit standards, particularly regarding loans to the housing sector. Moreover, underlying fiscal problems surfaced during the economic downturn.

The banks' liquidity problems worsened after the collapse of Lehman Brothers, and Iceland and Latvia soon had to turn to the international community for help in October and December 2008. Ireland for long

tried to avoid an external rescue package, but had to apply for assistance from the IMF and the EU in December 2010, as the pressure had become too strong after new write-downs in the banking sector. The loans under the rescue packages were substantial, totalling 54 per cent of GDP for Ireland, 40 per cent for Iceland and 33 per cent for Latvia. Denmark contributes bilateral government loans to all three rescue packages.

A basic focal point in the countries' economic stabilisation programmes has been to address the considerable internal and external economic imbalances and at the same time address the serious problems in the financial sectors. Three focus areas were defined: 1. Fiscal consolidation to get government debt under control. 2. Improvement of competitiveness and strengthening of the basis for export-driven growth. 3. Cleanup of the financial sectors.

In spite of the common goals, the actual implementation in economic policy has varied across the countries. Ireland and Latvia, which have fixed exchange rates, follow an internal devaluation programme based on tight fiscal and wage policies combined with structural reforms and support for ailing banks. Iceland, however, pursues a strategy based on depreciation of the exchange rate, capital controls and a serious slimming down of the banking sector. The two types of programmes are outlined below, with special focus on differences and similarities.

Fiscal consolidation and reduction of debt burdens
The three countries recorded burgeoning budget deficits and government debt after the outbreak of the crisis.[1] The main reasons included transfer of social payments to the ever-increasing unemployment queue and expenditure for bank rescue packages. Furthermore, their budgets were burdened by the strong growth in public expenditure before the crisis, cf. Chart 3. Also, tax revenue fell almost as rapidly as it had risen up to the crisis.

The governments therefore had to prescribe a drastic fiscal cure. Since end-2008, Ireland, Iceland and Latvia have tightened their fiscal policies by 6, 7 and 13 per cent of GDP, respectively. Most of the adjustment has been on the expenditure side, partly by reducing public-sector wages, the number of public-sector employees and state pensions. In Latvia, public-sector wages have been reduced by 25 per cent on average. However, all programmes have included room for targeted stimuli, particularly to mitigate the effect of the cutbacks on the most vulnerable groups.

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[1] The IMF estimated that the budget deficit would have increased to 13.5 per cent of GDP in Iceland and 20 per cent in Latvia in 2009 if the governments had not implemented fiscal tightening measures.

GOVERNMENT EXPENDITURE AND REVENUE DURING THE UPSWING AND
RECESSION   Chart 3

Accumulated annual changes in per cent
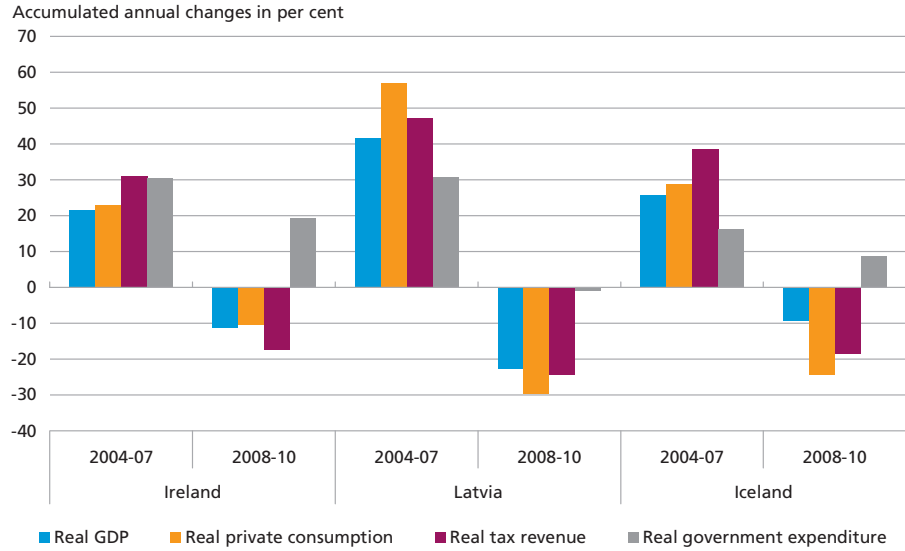
Source: The European Commission's Ameco database.

However, public finances remain adversely affected by sizeable struc-
tural deficits, support for ailing banks and high unemployment. Ireland
is hardest hit, with debt expected to rise above 120 per cent of GDP in
2012 despite substantial fiscal tightening, cf. Chart 4. Therefore, the
country is also forced to introduce further considerable fiscal tightening
of 9 per cent of GDP over the next four years. This is intended to reduce
the deficit to 3 per cent of GDP in 2013. However, the other two coun-
tries still have to implement substantial consolidation to reduce debt.

PRIMARY GOVERNMENT BUDGET BALANCE AND GROSS DEBT, 2008-15   Chart 4
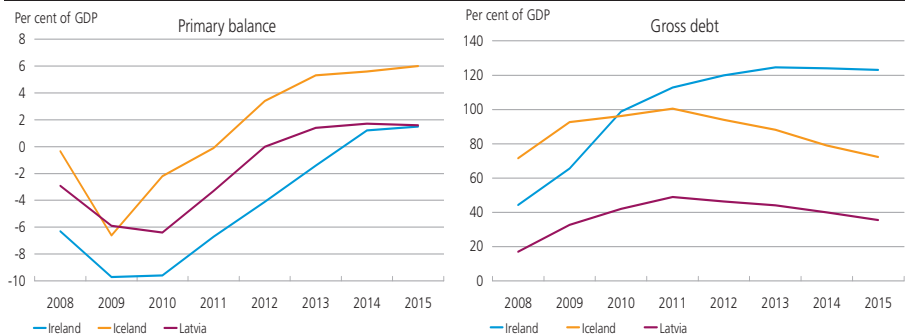
Note: The primary balance of Ireland excludes support for the banking sector of 2.6 per cent of GDP in 2009 and 19.4
       per cent in 2010.
Source: IMF (2010b), IMF (2010c) and IMF, *World Economic Outlook*, autumn 2010.

Improvement of competitiveness and export-driven growth

Ireland and Latvia have sought to strengthen competitiveness via a reduction of nominal labour costs. Their labour markets are dominated by a very high degree of flexibility in wage formation. The economic downturn has contributed to putting pressure on private-sector wages, meaning that unit labour costs in Ireland and Latvia have been reduced by 6 and 15 per cent, respectively, in 2009-10. The wage adjustment has caused the real effective exchange rate to depreciate by 15 and 10 per cent in the two countries since the peak in April 2008 and February 2009, respectively, cf. Chart 5.

As a euro area member state, Ireland was, by definition, not exposed to exchange-rate pressure during the crisis, and the wide yield spread after the crisis is not due to exchange-rate risk, but rather to market-related fears of credit risk. It could be argued that the markets practically ignored credit risk during the first 8-10 years after the introduction of the euro and almost exclusively noted that there was no longer any exchange-rate risk related to investment in government securities from euro area member states. Thus, yield spreads to Germany were extraordinarily low for all euro area member states in this period.

Latvia wishes to join the euro area as soon as possible, but has not yet had the opportunity. Instead, Latvia pursues a fixed-exchange-rate policy, in line with Denmark. This situation led to a stronger pressure from the markets as well as much international discussion and disagreement

DEVELOPMENT IN REAL EXCHANGE RATES 2000-10   Chart 5
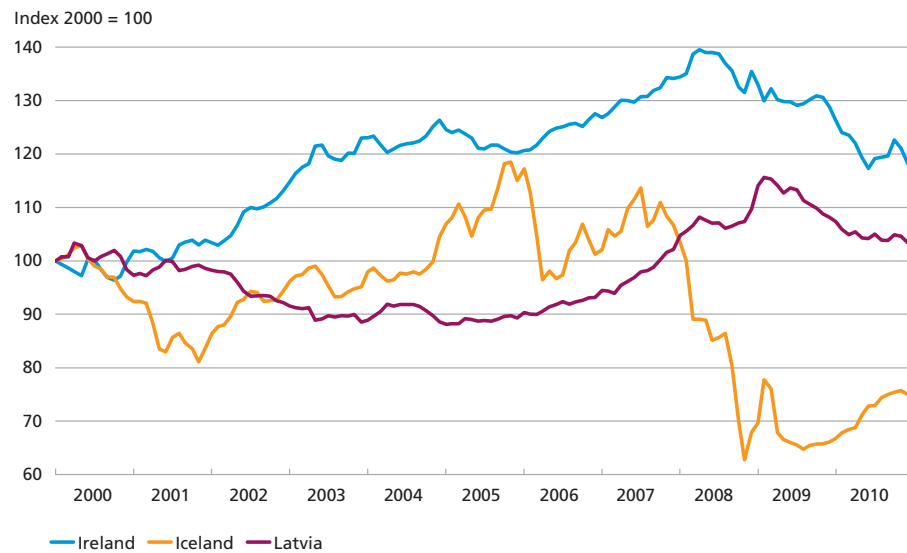
Source: Reuters EcoWin.

on whether this was the right crisis strategy for Latvia, and some observers recommended devaluation. However, it was of crucial importance to Latvia to maintain the fixed exchange rate vis-à-vis the euro. For more than 15 years, the fixed-exchange-rate regime has provided the basis for stabilising the economy. The authorities feared a string of negative consequences if the exchange rate was allowed to weaken. Firstly, confidence in the country's exchange-rate policy would be eroded. One case of devaluation justifiably causes markets to expect further devaluation in future, resulting in wider yield spreads. Secondly, devaluation would lead to considerable imported inflation, which would make efforts towards wage restraint unrealistic and thus not complement, but replace the other elements of the strategy. Moreover, given the private net debt in foreign exchange of 70 per cent of GDP, devaluation would lead to massive and immediate declines in the net worth of the private sector, which would have a strong contractive effect. Thirdly, Latvia, as a small country, would have problems managing its exchange rate and become strongly exposed to international capital movements with unpredictable effects on the exchange rate and interest rates. Maintenance of the fixed-exchange-rate regime was the most important precondition for euro area membership and hence for obtaining protection against destabilising capital movements.

Latvia's strategy was supported and appreciated, not least by the EU and the Nordic countries. In addition to the assessment of what was best for Latvia, the risk of spreading the exchange-rate pressure to the other Baltic states should also be avoided.

The Icelandic krona weakened already from late 2007 when the economic setback began. The financial crisis in autumn 2008 resulted in further erosion of the exchange rate, and the nominal exchange rate bottomed out in November 2008, having declined by more than 50 per cent compared with the level at the outbreak of the crisis. To offset the weakening of the currency, monetary policy was tightened, and extensive capital controls of cross-border capital movements were introduced.[1] Unit labour costs in domestic currency rose slightly in 2008-10, so overall competitiveness, measured on the basis of the real exchange rate, has improved by 34 per cent from July 2007, cf. Chart 5.

Improvement of competitiveness has limited the decline in Iceland's real GDP to some 10 per cent as from 2008. In spite of the much bigger challenge in the financial sector, this loss of output does not exceed the output losses in hard-hit countries in the rest of Europe. However, the

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[1] Restrictions on outgoing investments meant, *inter alia*, that international investors had been forced to maintain their exposure to Iceland. Moreover, the Icelanders have had to invest their savings in Icelandic assets, including government bonds.

standard of living has been clearly reduced by a contraction in private consumption of more than 20 per cent, cf. Chart 3. The reason is that a sharp decline in the exchange rate through deterioration in the terms of trade erodes domestic purchasing power, but through the effect on competitiveness, it affects export and import volumes and strengthens net exports.

Cleanup of the financial sectors
In light of the very large banking sectors in Ireland and Iceland, it is not surprising that the extent of the banking crisis and the price of cleaning up after the collapse have been higher there than in Latvia. Box 1 outlines the main features of the three countries' handling of the banking crisis. In Iceland, the three largest banks – with a combined market share

THE BANKING CRISIS APPROACHES OF IRELAND, ICELAND AND LATVIA	Box 1

The three countries have handled the banking crises differently. The differences are to some extent due to the extent of the banking crisis, the banks' exposure and the degree of foreign ownership. In Latvia, most banks were on foreign hands, so they received liquidity injections from their parent banks and maintained their exposure, partly by agreement with the government according to the European Bank Coordination Initiative.

In Iceland, it was not possible to continue operation of the banks due to their size and substantial foreign exposure. To slim down the banking sector, the government split up the banks into "new" and "old" banks. The new state-owned banks took over domestic deposits and assets, and the government subsequently injected capital into these banks. Thus, the domestic banking activities could continue without any significant problems. The "old" banks maintained their foreign exposure. The banks' resolution committees are now responsible for the administration of the bankruptcy estates. Kaupthing and Glitnir were privatised under new names in 2009 and 2010. Landsbanki is still owned by the state. The discontinuation of foreign exposure has reduced the size of the banking sector (in terms of total assets) from 700 to 200 per cent of GDP, cf. Chart 6. The discontinuation of foreign exposure has reduced the Icelandic foreign debt accordingly.

However, the discontinuation of foreign exposure has not been a smooth process. Firstly, the Icelandic authorities passed emergency legislation, changing the priority of depositors, so that depositors took priority over foreign investors in the administration of the bankruptcy estates. Secondly, depositors in international branches of Icelandic branches, most importantly in the UK and the Netherlands, are covered by the 20,000 euro deposit guarantee according to the EU Directive on deposit guarantee that Iceland has joined via the agreement within the EEA (European Economic Association, which, in addition to the EU, comprises Iceland, Liechtenstein, Norway and Switzerland). After a lengthy negotiation process – the Icesave dispute – Iceland, the UK and the Netherlands have agreed on the conditions for refunding the UK and Dutch outlays for the guarantee in autumn 2008. A referendum is scheduled on the issue in Iceland.

CONTINUED	Box 1

The problems of the Irish banks were primarily ascribable to their strong exposure to the housing market and a wide customer funding gap, which made them vulnerable if they could not refinance their loans in the international capital markets. The government has kept the banks afloat via capital injections of 45 billion euro in 2009-10. Moreover, the government has set up an agency for managing the banks' bad assets (National Assets Management Agency, NAMA). At end-2010, the agency had taken over bad assets from the banks equivalent of 71.2 billion euro with average write-downs of 58 per cent, cf. National Assets Management Agency (2010). The liquidity problems have been mitigated by government guarantees for the banks' liabilities, access to the ECB's liquidity facilities and emergency liquidity assistance from the Central Bank of Ireland. So far, the strategy has failed to reduce the Irish banking sector notably. The consolidation of the banking sector is expected to take off as part of the IMF/EU programme of support, including via divestment of the banks' international assets.

DEVELOPMENT IN THE BANKS' ASSETS, 2000-10	Chart 6

Per cent of GDP
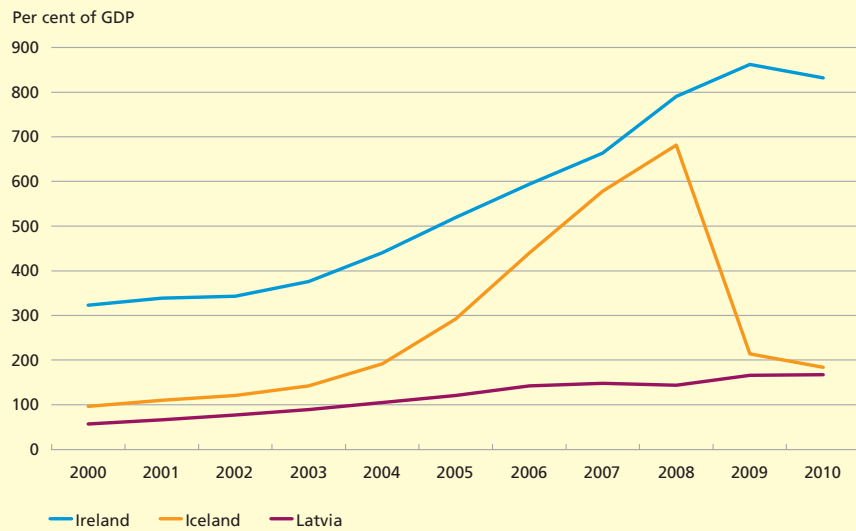
Note: GDP for 2010 is based on IMF estimates, *World Economic Outlook*, autumn 2010.
Source: Reuters EcoWin, IMF, *World Economic Outlook*, autumn 2010, and national supervisory authorities.

of 85 per cent – collapsed. In Ireland, ailing banks that have received a bailout from the government account for just over three quarters of the banking sector, cf. Laeven and Valencia (2010). In Latvia, only two domestically owned banks collapsed. One of them was the second largest bank in the country. Overall, these banks had a market share of less than 20 per cent. The large foreign-owned banks were supported by their parent banks.

The banking crisis has had a strong negative impact on government budgets in Ireland and Iceland. In Ireland, government capital injections

into the banking sector amounted to 45 billion euro in 2009-10, corresponding to just over 22 per cent of GDP, cf. IMF (2010b). For Iceland, the crisis has so far cost an amount corresponding to 22 per cent of GDP in government capital injections and payment of state guarantees under the deposit guarantee scheme, cf. IMF (2010c).[1] In Latvia, the bill was significantly lower at 10 per cent of GDP in 2008-11, cf. IMF (2010a).

The countries' banking sectors are still struggling with non-performing loans. In Ireland, they accounted for 13 per cent of the banks' total loan portfolio in August 2010 and in Latvia for 19 per cent in December 2010. In Iceland, 40 per cent of corporate loans were non-performing in August 2010.

Thus, the private sector is still faced with serious debt problems in all three countries. Therefore, restructuring private debt is a key issue. In Iceland, the government, banks and pension funds entered into an agreement last autumn, aimed at easing homeowners' debt burden. Accordingly, the most heavily indebted homeowners can reduce their loans to 110 per cent of the property value. Other selected borrowers may voluntarily have their loans reduced to 100 per cent of the property value. Moreover, the banks have agreed to reduce the interest rate for selected homeowners for the text two years. IMF (2010c) estimates that the banks' earnings will decline by 10 per cent as a consequence of lower interest income, but it will not affect their solvency notably. In Ireland and Latvia, the restructuring of debt is effected on a more voluntary basis.

Economic outlook 2011-15
There are signs that two years of harsh reforms are beginning to bear fruit in Iceland and Latvia. Confidence in the economies is returning, as reflected in declining risk premiums and yield spreads. For Iceland, however, it remains uncertain how private investors will react when the restrictions on capital movements are lifted. Confidence in the Irish economy is weakened by worries about further losses in the financial sector and mounting debt problems. The rescue package from the IMF and the EU member states has not yet convinced investors that Ireland can break the vicious spiral between the financial sector and public finances.

Though the countries experience an incipient upswing, the crisis is expected to cast long shadows over their economies for many years. The international organisations expect growth to remain moderate until

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[1] Though this is a large amount, it is significantly lower than the initial estimates, according to which gross costs of rescuing the banks would have been 83 per cent of GDP, cf. IMF (2008).

118

2015. The growth outlook is brightest for Latvia, following by Iceland and then Ireland. Domestic demand will be negatively affected by heavy debt burdens and the need for fiscal consolidation.[1] There is a basis for export-driven growth, though. The economies have already succeeded in regaining some of the lost competitiveness, but continued wage restraint and structural reforms are needed to improve the export potential, cf. IMF (2010).

THE LESSON FROM THE ECONOMIC CRISIS

The financial and economic crisis has had a very high price for the three countries under review. They have lost five years of economic growth. In other words, GDP is back at the 2005 level. A record-high number of people have lost their jobs. The bank rescue packages have cost taxpayers dearly. At the same time, the countries have had to accept harsh adjustment programmes, often dictated by foreign institutions.

Obviously, the crisis has led to self-scrutiny in the countries to find out why it went so wrong, and how a similar situation can be avoided in future. The countries have set up commissions to examine these issues (the Regling Watson report on Ireland and the Special Investigation Commission in Iceland). The lesson is largely the same for the three countries. Firstly, significant overheating of the economy results in severe economic crises and a tough adjustment process. There is no easy way out of such a crisis, which – regardless of the crisis management approach – has negative implications for the standard of living and entails a need for prolonged fiscal consolidation programmes. The international community can contribute to preventing the economies from collapsing completely, but the fundamental restoration can only be handled nationally. Against this backdrop, authorities should display stronger vigilance towards macroeconomic warning signals, including awareness as to whether growth is based on unsustainable indebtedness. There is no doubt that fiscal and macroprudential tools should have been used more actively to curtail overheating and the strong credit growth.

Secondly, there are considerable risks associated with allowing the financial sector to grow significantly out of proportion to the size of economy. Experience from Ireland and Iceland shows that the price can become very high in terms of public finances, but also for the economy overall, if the banks face problems.

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[1] Herzberg (2010) has estimated that Latvian households' debt overhang has so far reduced private consumption and GDP by 3 per cent. The high corporate indebtedness has reduced investments and caused a decline in GDP of 4 per cent.

Thirdly, it is important to create appropriate incentive structures in the banking sector and at the same time strengthen banking supervision. This will require adequate resources and competencies as well as better and closer cooperation between the various institutions responsible for supervising the banks.

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A Tale of Two Danish Banking Crises

Kim Abildgren, Economics, and Jens Thomsen, former Governor

INTRODUCTION AND SUMMARY

This article compares the Danish economic crises in the years 1987-93 and 2008-10.

A significant difference between the two crises concerns external conditions. The economic crisis in recent years has been virtually global, while the Danish export markets showed sound progress during most of the period 1987-93.

Another major difference is that the economic fundamentals, in terms of the balance of payments, foreign debt, government debt and the labour market, were much stronger in the past decade than in the 1980s.

Prior overheating of the Danish economy and surging property prices occurred in both cases, whereas the fiscal-policy stance diverged. In the years immediately prior to the most recent financial crisis an accommodative fiscal policy contributed to amplifying the overheating of the economy. In the mid-1980s, on the other hand, a tight fiscal policy contributed to reducing overutilisation of production resources.

During both crises the number of failing companies in the corporate sector reached high levels, while households were more severely affected in the early 1990s than during the most recent crisis. This should be viewed in the light of the lower interest rates and unemployment in recent years compared with the early 1990s.

Both crises had a significant impact on the banking sector, while the mortgage sector got off more easily. But the two crises diverged considerably in terms of the volume of government support measures to ensure financial stability. Despite the stronger economic fundamentals, there was a greater and broader need for government support during the most recent crisis. In addition to the much faster setback, by all appearances this can be attributed to more lenient capital requirements and fewer provisions.

During both crises many of the banks that were unable to continue as independent business enterprises had recorded strong lending growth, a large share of property-related exposures and relatively many large exposures.

The crisis in 1987-93 prompted only minor adjustments to the statutory regulation of the financial system, reflecting that a minor share of the problems erupted directly from the financial sector. On the other hand, there are many indications that the amendments to financial regulation in the wake of the recent financial crisis will be much more extensive. The underlying factors are the global and systemic nature of this financial crisis as well as the massive government support measures.

ECONOMIC BACKGROUND

In Denmark the years 1987-93 constituted an unusually long period of low growth and rising unemployment after five years of strong economic upswing and overheating of the economy, cf. Chart 1.

Assessed on the basis of the quarterly seasonally adjusted national accounts, the economic reversal set in already at the beginning of 1986, i.e. before the implementation of the package of economic austerity measures in October 1986, including tax on consumer loan interest (which was soon abolished, however) and tightening of the home-financing rules to counteract a rapidly growing current-account deficit.

The transition to a consistent fixed-exchange-rate policy in 1982 and abolition of the automatic cost-of-living adjustment reduced devaluation and inflation expectations during the 1980s and the early 1990s. But the resultant drop in interest rates also led to a strong boom. As the starting point was a highly indebted economy, large current-account

REAL GROWTH IN GDP	Chart 1

Per cent, year-on-year
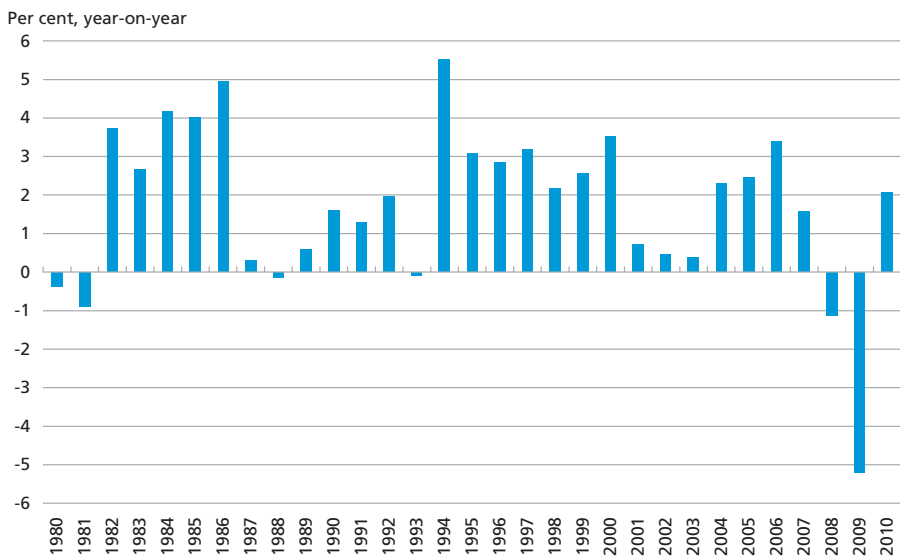
Source: Statistics Denmark.

deficits and a structurally weak labour market, there was a need for strong fiscal improvements and incentives for private savings. Though long, the required period of adjustment also provided a foundation for the subsequent strengthening of the Danish economy and confidence in the fixed-exchange-rate policy. A comprehensive tax reform reduced the taxable value of the tax relief on interest with effect from 1987, cf. Callesen et al. (2008) and Gaard and Kieler (2005). Real interest rates after tax, which had been negative from the beginning of the 1970s to the mid-1980s, now became positive. While leading to a much needed improvement of the financial incentive structure that was conducive to savings, this dampened consumption and residential investment in the short term.

Finally, as a result of overheating of the economy in the mid-1980s, high wage increases (close to 10 per cent) were agreed in connection with the collective bargaining in 1987. This led to deterioration of competitiveness in the exporting sectors of a magnitude that prompted the government to intervene at the end of the year, restructuring the taxes paid by employers.

The low growth in the Danish economy during the 2nd half of the 1980s cannot be attributed to cyclical developments in other countries, however. The Danish export markets showed sound progress during that period, further buoyed up by high growth in Germany in the early 1990s immediately after the reunification of East and West Germany. The cyclical reversal in the European economy did not dampen Danish export growth until 1992/93, cf. Chart 2.[1]

Unlike the situation in the period 1987-93, the recession in recent years has to a high degree been founded in the global economy. During 2008 the world economy was hit by the most severe downturn in times of peace since the Great Depression in the 1930s due to a combination of macroeconomic overheating and financial markets running out of control. The crisis was triggered by the turmoil in the US financial markets as a result of the downturn in the US housing market which spread to the financial markets in Europe in the 2nd half of 2007, cf. Bech and Berg (2009). US subprime mortgages had been "repackaged" as underlying assets in different types of structured bonds and then sold to banks and investors worldwide. As the losses on such loans began to surface there was considerable uncertainty as to which banks had that type of bonds in their portfolios and were therefore at risk of incurring losses. As a consequence, banks in both the USA and Europe became reluctant

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[1] The German reunification boom in the early 1990s also led to relatively high inflation by German standards, however, and thus a relatively high level of interest rates, which influenced the interest-rate level in Denmark via the fixed-exchange-rate policy.

REAL GROWTH IN EXPORTS OF GOODS AND SERVICES   Chart 2

Per cent, year-on-year
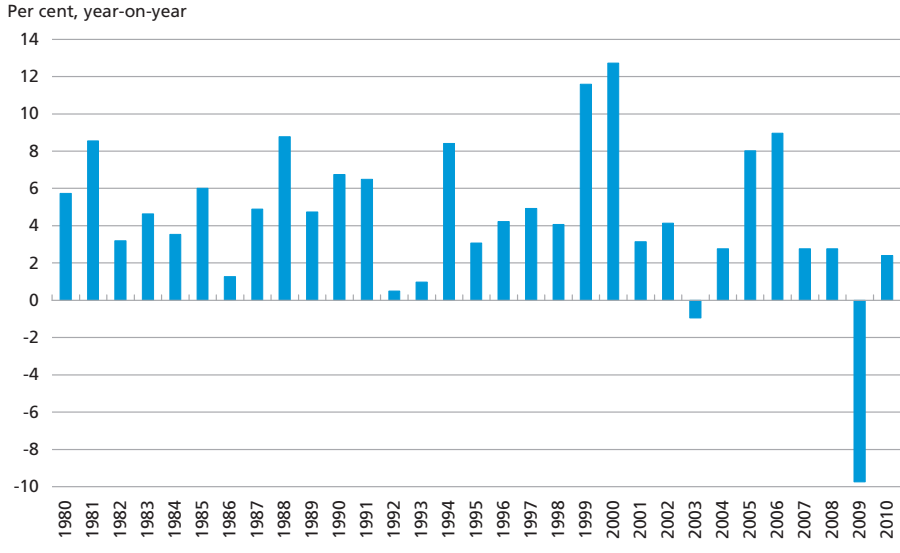
Source: Statistics Denmark.

to lend each other liquidity offered on an uncollateralised basis, result-
ing in a large share of trading in the money markets practically coming
to a standstill. Moreover, it became clear to the financial enterprises that
their total leverage and exposure had become much too high.

Initially, it was a liquidity crisis in the banking system, but in the course
of 2008 it became clear that the losses of several of the world's major
financial enterprises were so severe that both their solvency and the
overall financial stability were at risk. In September 2008 the US authori-
ties had to take control of the two mortgage giants, Fannie Mae and
Freddie Mac, and the insurance company AIG, while the Lehman
Brothers investment bank failed; global confidence in the financial sys-
tem plummeting as a result. Central banks and governments worldwide
had to implement a large number of support measures to prevent a
meltdown of the financial system.

In Denmark the fall in the real gross domestic product, GDP, was ap-
proximately 5 per cent in 2009, the most rapid recession seen since the
end of World War II. Growth in 2009 was about 6 percentage points
lower than estimated in Danmarks Nationalbank's spring forecast from
the 1st quarter of 2008. About two thirds of the unexpected large fall in
real GDP in 2009 can be attributed to lower growth in the export mar-
kets, cf. Spange (2010).

The Danish economy was in a slowdown phase even before the global
financial crisis really took off in 2008, however. House prices as well as

quarterly seasonally adjusted real GDP fell in the 4th quarter of 2007. The reversal in the Danish economy prior to the financial crisis came after several years of economic boom and overutilisation of production resources.

The capacity pressure on the Danish economy prior to the financial crisis in 2008 can be illustrated by the "output gap" which quantifies actual real GDP in relation to potential real GDP, i.e. an estimate of the maximum output volume that will not lead to pressure on the labour market, cf. Chart 3. Measured in this way, the economy exceeded its capacity limit in the years 2005-07. An accommodative fiscal policy further amplified the overheating of the economy and the pressure on the labour market during that period. In comparison, the tight fiscal policy in the mid-1980s contributed to limiting the overheating of the economy.

The wage competitiveness of Danish industry has gradually weakened since the mid-1990s as a result of higher growth in unit labour costs in Denmark than abroad. Nevertheless, there has been a sound current-account surplus over the last decade, cf. Chart 4. This is particularly due to strong improvement of net income from interest, partially in step with the reversal of the external debt to net external assets. It may also be attributed to high growth in Denmark's export markets, a strong increase in the value of North Sea oil and gas production and a considerable ex-

OUTPUT GAP WITH AND WITHOUT ACTIVE FISCAL POLICY   Chart 3

Per cent of GDP

■ Actual output gap   ■ Output gap without active fiscal policy
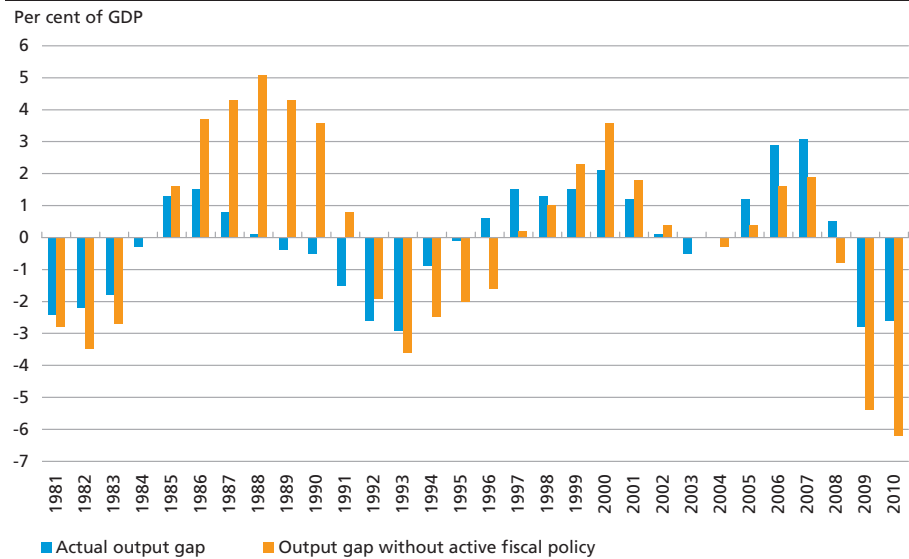
Note: Output gap without active fiscal policy is calculated by stripping the real output gap of multi-annual fiscal effects on real GDP.
Source: Ministry of Finance and Danmarks Nationalbank.

BALANCE OF THE CURRENT ACCOUNT OF THE BALANCE OF PAYMENTS   Chart 4

Per cent of GDP
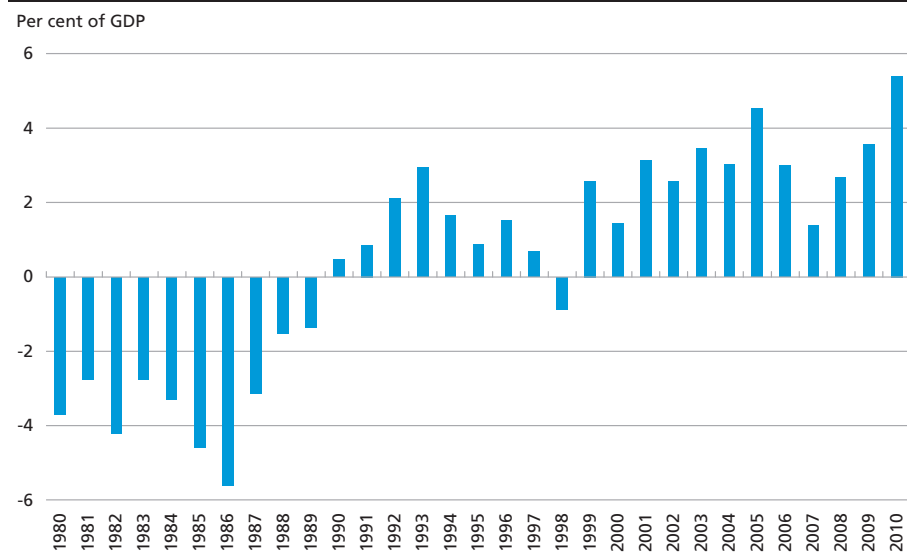
Note: Calculated as external net lending in the national accounts.
Source: Statistics Denmark.

pansion of the merchant fleet. The course of the balance of payments during the most recent overheating of the economy is therefore different from the situation in the mid-1980s when contractive policy measures were implemented in response to current-account problems.

Experience in Denmark as well as other countries shows that during periods of strong economic growth, imbalances typically build up in the economy and subsequently have to be addressed, cf. Pedersen and Sørensen (2009). In the 1st half of the 1980s property prices increased substantially over a few years in relation to the development in construction costs, cf. chart 5. The years leading up to the most recent financial crisis were also characterised by soaring property prices. Part of the banks' lending is collateralised against real property, and both crises have been characterised by substantial write-downs in banks with large property-related exposures as property prices reversed. The development in house prices is analysed in more detail in Dam et al. (2011).

BANK FAILURES AND CREDIT EXPANSION

Following the many bank failures during the inter-war period, the period from the end of World War II until the early 1980s was characterised by pronounced stability in the Danish banking sector. It was also a period in which credit rationing and foreign-exchange control were central economic policy tools, cf. Abildgren (2009) and Østrup (2008).

INDEX OF PROPERTY PRICES IN RELATION TO CONSTRUCTION COSTS   Chart 5

1980 = 100

— Single-family houses, Denmark overall   — Single-family houses, Capital Region
— Commercial properties
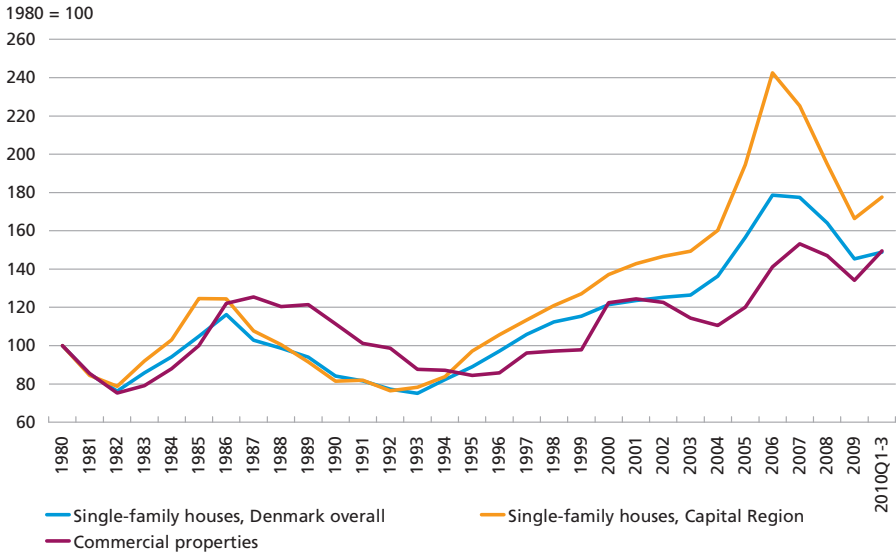
Note: The price deflator for residential investments is used as an indicator of construction costs. The price development
        for single-family houses in all local authority districts in the County of Copenhagen is used for the period prior to
        2006 as an indicator of the price development in the Capital Region of Denmark. Experience shows that the price
        development for commercial properties covering strictly commercial properties should be interpreted with
        caution due to the relatively low number of transactions.
Source: Statistics Denmark and the Central Tax Administration (SKAT).

At the end of 1984, Denmark's seventh largest bank, Kronebanken, faced a crisis, and the period until the mid-1990s was characterised by many ailing banks. 102 banks discontinued their operations in the period 1985-95, 52 of them as a result of difficulties, cf. Mølgaard (2003). They were primarily small and medium-sized financial institutions, however, and part of the solution was often that the crisis-stricken institutions were taken over by other banks. Danmarks Nationalbank and the central government were directly involved in finding solutions for a few ailing banks, the bailout of Varde Bank – Denmark's ninth largest bank – being the largest in 1992/93.

In the late 1980s and especially the early 1990s Norway, Sweden and Finland saw actual systemic crises during which significant parts of the banking sector, including several nationwide banks, were in difficulties. Compared to the other Nordic countries, the Danish financial system was much less severely affected by the crisis in 1987-93 despite the banks' substantial write-downs, cf. Chart 6. This is attributable to various factors, cf. the Ministry of Economic Affairs (1994), Vastrup (2009) and Abildgren et al. (2010).

Throughout the 1970s and 1980s, the Danish financial sector had been subject to a gradual deregulation process which gave the financial institutions the necessary time to improve their risk management systems

BANKS' AND MORTGAGE BANKS' WRITE-DOWNS   Chart 6

Per cent
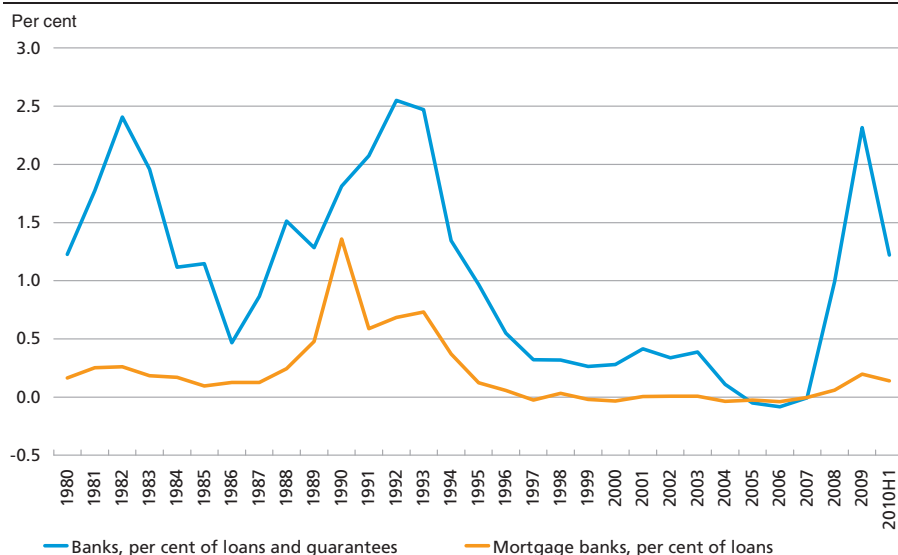
Note: As from 2005, banks' write-downs (losses and provisions) on loans are no longer calculated on the basis of a
         demonstrated risk of losses under the prudent accounting principle. Instead, a neutrality principle is applied to
         write down loans when there is prior objective evidence of impairment. In 1990 the principles for mortgage
         banks' write-downs were amended to the effect that, in future, provisions also had to be made for probable
         losses and not just for certain losses. In principle, part of the provisions in 1990 therefore concern previous years.
         Negative figures for write-downs indicate that previous write-downs are reversed as income. Figures for the 1st
         half of 2010 are adjusted to a full-year basis.
Source: Danish Financial Supervisory Authority.

and prepare for new, more deregulated market conditions. In the other Nordic countries the deregulation was implemented later and thus over a shorter period of time.

In Denmark write-downs and losses were also spread over a somewhat longer period and the worst crises were limited to small and medium-sized banks.

Furthermore, the pre-crisis capital requirements for banks were stricter in Denmark. In most countries the introduction of the Basel Committee's new capital requirements led to a tightening compared to the existing capital requirements when they came into force in the early 1990s. The transition to the Basel I rules on capital adequacy in Denmark, on the other hand, constituted a substantial easing of the statutory capital requirement for banks. This made it possible for Danish banks to absorb losses for a number of years of poor financial results.

Finally, the merger of six of the largest Danish banks with varying solvency ratios into two big banks in 1990 increased the resilience of the banking sector.

Even though Denmark was less hard hit by the crisis than the other Nordic countries, the write-downs in the Danish banking sector in the

BANKS' WRITE-DOWN RATIOS BY SECTOR   Chart 7

Per cent of loans and guarantees
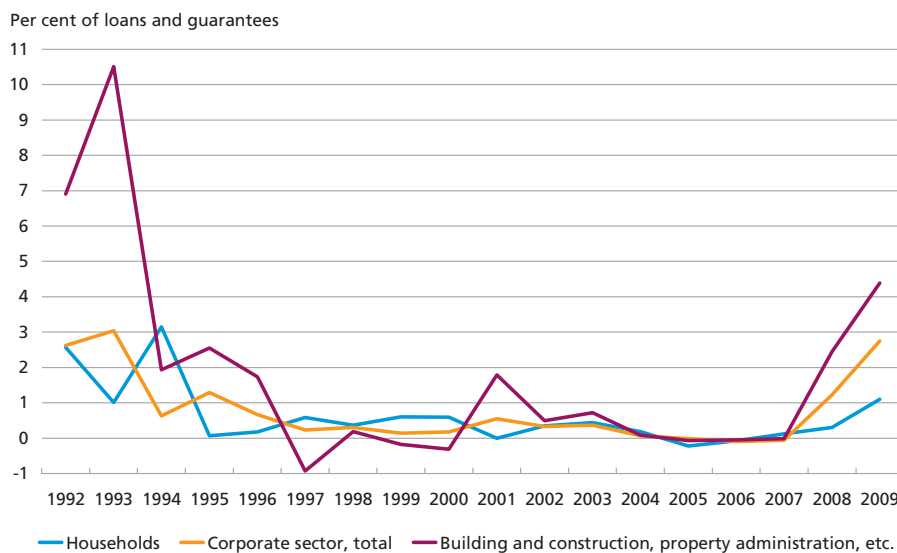
Note: Approximative calculation. Negative figures indicate that previous write-downs are reversed as income.
Source: Ministry of Economic Affairs (1994), Danish Financial Supervisory Authority and Danmarks Nationalbank.

early 1990s were relatively large. In particular, this was the case for banks that were strongly exposed to the construction and property sector, cf. Chart 7. In general, the write-down ratios were relatively high for lending to both the corporate and household sectors. This was a consequence of the general economic conditions, the fall in property prices and excess capacity of commercial properties. The number of enforced sales and unemployment was also high, cf. Chart 8.

Nor can there be any doubt about the severity of the crisis in the Danish financial sector in the 2nd half of the 1980s and especially in the early 1990s. In June 1992 Danmarks Nationalbank had to provide stand-by liquidity facilities for Denmark's second largest bank, Unibank, following rumours that the Danish Financial Supervisory Authority had taken special measures against the bank. Stability was quickly restored in relation to Unibank, but if the situation had developed unfavourably this might have had serious consequences for the stability of the Danish financial sector and the economy as a whole.

Danish mortgage banks also experienced some years of substantial write-downs from the end of the 1980s. Depreciation in the mortgage banks was particularly strong in 1990 when the principles of provisions were amended to the effect that, in future, provisions also had to be made for probable losses and not just for certain losses. In addition, certain mortgage banks tried to expand internationally in the 1980s, resulting in major losses.

ENFORCED SALES RATE AND UNEMPLOYMENT   Chart 8

Per cent of housing stock   Per cent of labour force
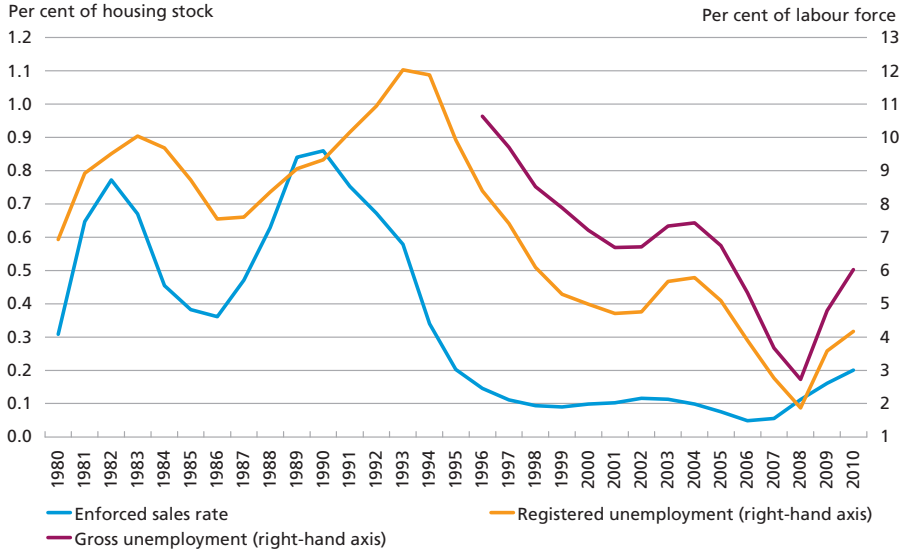
Note: The rate of enforced sales indicates the number of enforced sales (excluding farms) as a ratio of the number of
         homes. Gross unemployment comprises persons registered as unemployed and persons in activation schemes.
Source: Statistics Denmark and Ministry of Finance.

Finally, to illustrate the severity of the Danish crisis it should also be noted that some of the largest Danish insurance groups suffered major losses in the early 1990s and ceased to exist as independent business enterprises. The losses were not a result of the core activities (insurance) but rather they were related to loan-financed property investments, etc.

The financial crisis in recent years differs from the crisis in the early 1990s in several respects. The most striking difference has been the global nature of the crisis and the ensuing steep decline in Danish export market growth. The Danish corporate sector has been particularly affected by the crisis, experiencing the highest failure rates since the end of the 1970s, cf. Chart 9. So far, households have been less severely affected, which is reflected in a considerably lower level of enforced sales and fewer write-downs in the mortgage sector compared to the early 1990s. This should be viewed against the fact that despite an increase, unemployment is still at a relatively low level. Household finances have also benefited from a low level of interest rates on both short-term and long-term mortgage loans calculated after tax, cf. Chart 10.

The banks' write-downs increased significantly in 2008 and compared to the situation in 1987-93, several medium-sized banks faced difficulties. Roskilde Bank, Forstædernes Bank, Fionia Bank and Amagerbanken, which were all among the 15 biggest Danish banks before the crisis, have ceased to exist as independent business enterprises in recent years.

RATE OF FAILED COMPANIES AND JOB LOSSES ON LIQUIDATION   Chart 9

Per cent

[Line chart showing two series from 1979 to 2010, with Per cent axis from 0.0 to 1.6]

Number of failed companies, per cent of total number of companies
Job losses on liquidation, per cent of total employment
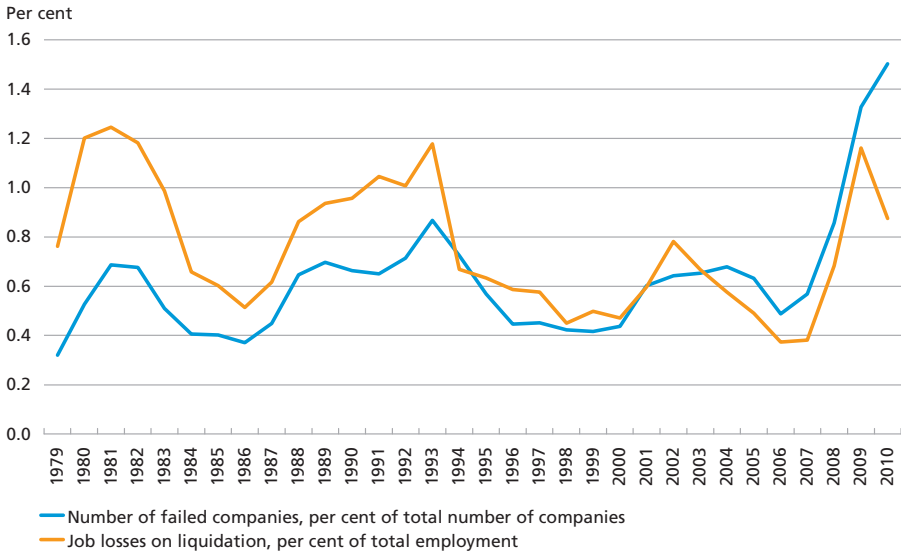
Note: Job losses on liquidation are measured by the number of employee claims submitted to the Employees' Guaran-
         tee Fund (Lønmodtagernes Garantifond – LG).
Source: Statistics Denmark and LG.

INTEREST AFTER TAX ON NEW MORTGAGE BONDS   Chart 10

Per cent

[Chart showing bars (1 year) and line (30 years) from 1982 to 2011, with Per cent axis from 0 to 9]

1 year   30 years
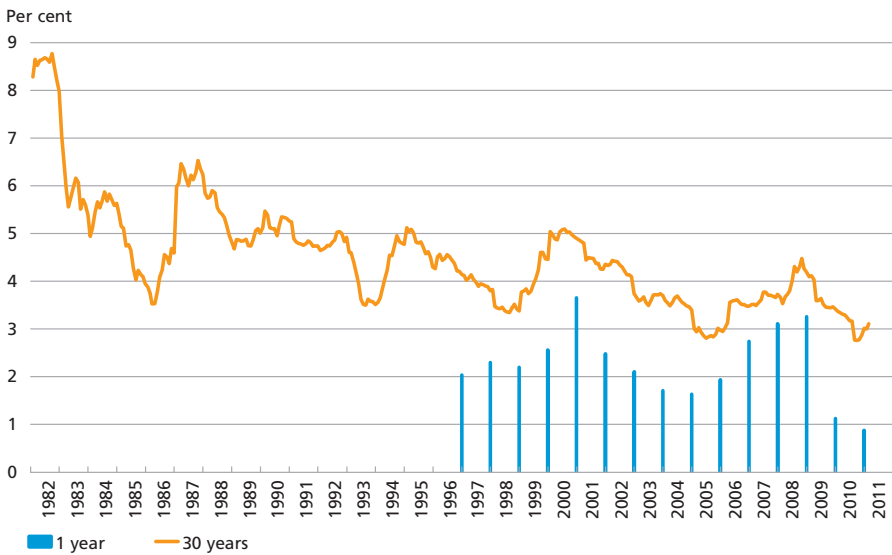
Note: Calculated on the basis of the tax rate for negative capital income. The bars for short-term interest rates indicate
         the average level of interest rates for 1-year adjustable-rate loans in December of the years concerned.
Source: Danmarks Nationalbank.

BANKS' DEPOSIT SURPLUS   Chart 11

Kr. billion
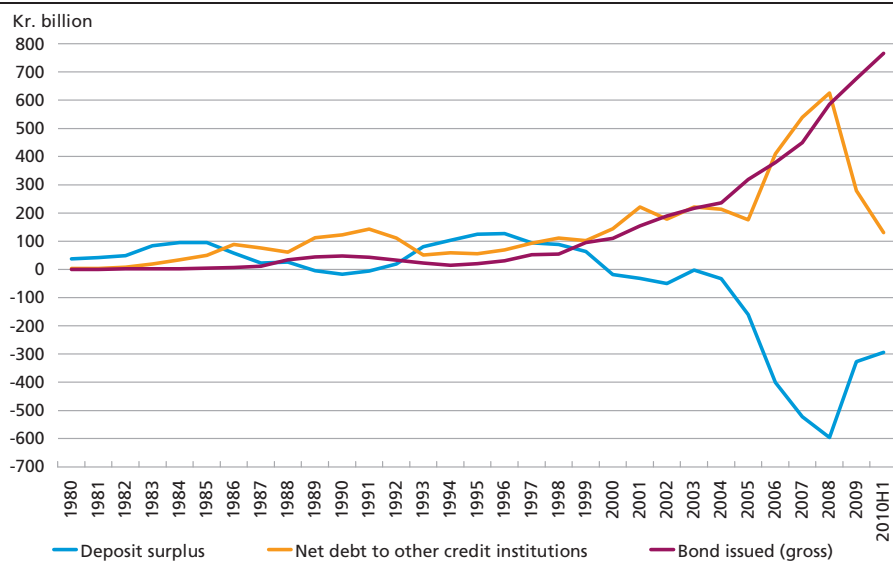
Source: The Danish Financial Supervisory Authority.

One of the significant differences between the crises in 1987-93 and 2008-09 is related to the shift in the bank funding structure around the millennium rollover, cf. Chart 11. Up until the end of the 1990s, the banks' deposits and lending were of more or less the same magnitude. In the years following the millennium rollover the banks accumulated large customer funding gaps during a period of strong lending growth. They financed the gaps, *inter alia,* by issuing short-term bonds and borrowing from foreign credit institutions. Short-term funding via the international money and capital markets is normally less stable and more sensitive to changes in the banks' own credit rating than deposits and long-term bond financing. Unlike the situation in the early 1990s, the crisis in 2008-09 was of a global nature, thus substantially compromising the functionality of the international money and capital markets, and this shift in the funding structure gave cause for concern and contributed considerably to the extensive government measures to support the banking sector. The concern related to the risk that in a situation of such general turmoil in the financial markets, the suspension of payments or failure of one bank and the ensuing losses of foreign unsecured creditors might have an adverse knock-on effect on other banks' borrowing abroad.

Another significant difference concerns the banks' buffers against losses. As mentioned above, the banks' large buffers in the 2nd half of the 1980s enabled them to absorb losses. That was not the case at the

beginning of the most recent crisis. One of the reasons was the transition to new international accounting principles in 2005 according to which banks no longer had to make provisions for lending on the basis of a demonstrated risk of losses under the prudent accounting principle. Instead, loans were to be written down according to a neutrality principle when there was prior objective evidence of impairment. Accordingly, the new accounting rules of 2005 did not allow the build-up of "hidden" reserves, thereby reducing the buffers and providing room for increased credit expansion. Another reason was the easing of capital requirements in connection with the implementation of the Basel II capital adequacy rules in 2007 under which some banks chose to utilise the easing for additional lending.

A common feature prior to the crises in 1987-93 and 2008-10 was several years of high real growth in the banks' outstanding amounts of loans, cf. Chart 12. Historically, periods of high lending growth have often been followed by higher write-downs on loans and losses, indicating that credit quality tends to deteriorate during periods of high lending growth.

Another common feature of the two crises is the significant slowdown in the banks' lending growth in the wake of large write-downs during the crisis years while that has not been the case for mortgage banks. In effect, the tendency has been towards substitution by way of mortgage

REAL GROWTH IN BANKS' AND MORTGAGE INSTITUTES' OUTSTANDING
LOANS AT YEAR-END   Chart 12
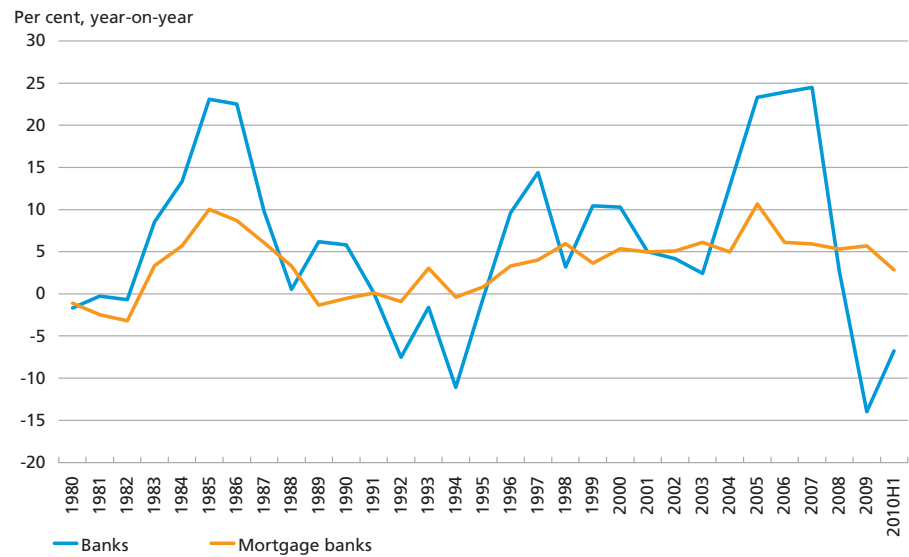
Note: Real growth is based on deflation by the consumer-price index.
Source: Statistics Denmark and the Ministry of Finance.

loans after the two crises. In the early 1990s this tendency was amplified by changes in mortgage legislation which facilitated mortgaging home equity without borrowers having to state the purpose.

Several discontinued banks in recent years differed from the sector as a whole in terms of a number of key accounting parameters. They were characterised by having shown particularly strong lending growth, many large exposures, a large customer funding gap and considerable exposure to the property sector compared to the banking sector as a whole, cf. Danmarks Nationalbank (2008). It is worth noting that many of the banks which went out of business in the 2nd half of the 1980s were also characterised by very strong lending growth and that many of the banks which ceased to exist in the early 1990s had relatively large property-related exposures, cf. Ministry of Economic Affairs (1995). In 2010, based on this experience from the two crises, the Danish Financial Supervisory Authority introduced as part of its bank supervision the "Supervisory Diamond" for banks, with a number of benchmarks for what must be defined as banking activity subject to enhanced risk, cf. Danish Financial Supervisory Authority (2010). The benchmarks of the Supervisory Diamond concern lending growth, property exposure, large exposures, excess liquidity cover and funding ratio (lending/deposits).

Finally, it was a common feature of the two crises that the problems in the financial sector coincided with pressure against the krone, cf. Danmarks Nationalbank (2009).

GOVERNMENT SUPPORT MEASURES AND FUTURE REGULATION OF THE FINANCIAL SECTOR

The periods 1987-93 and 2008-10 differ significantly in terms of the scope of government measures in support of financial stability and regulatory initiatives in response to the crises.

The original costs of the government and Danmarks Nationalbank by way of loans and outstanding guarantees, etc. related to the rescue of Danish banks (excluding Faroese banks) in the 2nd half of the 1980s and the early 1990s can be estimated at around kr. 5-6 billion. A large part of the original expenses were recouped, however, via repayment of loans provided and dividend from estates being wound up. Accordingly, the net expenses were less than kr. 1 billion estimated at the price level of the time. Apart from liquidity guarantees for a few crisis-stricken banks, the crisis did not entail a need for Danmarks Nationalbank to establish additional credit facilities.

Some of the bank crises in the 1980s led to a couple of specific measures. Firstly, 6' Juli Banken's suspension of payments in 1987, together

with a wish to accommodate a recommendation in this area from the European Commission, gave rise to the introduction of a general deposit guarantee scheme in 1988. Secondly, Danmarks Nationalbank's losses in connection with the crisis in C&G Banken in 1987 led to the introduction, towards the end of the 1980s, of requirements for collateral in connection with the banks' day-to-day overdrafts on their current accounts at Danmarks Nationalbank.

Following the bailout of Varde Bank in the early 1990s, the government also decided that an account of the situation in the banking sector and expectations for developments in the coming years should be prepared. The account was prepared by the Interministerial Liaison Committee concerning the Financial Market. The report concluded that "... the difficult period for Danish banks must be viewed in light of the extraordinarily long period of low economic growth from 1987 – a period which followed a number of years of very high growth" (English translation of a quotation in Danish from p. 8). With respect to whether amendments to the current legislation were needed, the general conclusion of the report was that "... the existing rules in most areas is adequate and has been kept up to date on an ongoing basis" (English translation of a quotation in Danish from p. 10).

In some respects, however, adjustments to the legislation in the financial area were proposed, cf. the Appendix to Chapter 10 in the Ministry of Economic Affairs (1994). The proposals included a raising of the Depositor Guarantee Fund's coverage of ordinary deposits on suspension of payments or liquidation, which was implemented in 1995. Proposals were also presented to empower the Danish Financial Supervisory Authority to require extraordinary provisions on parts of the loan portfolios in banks with a particularly high risk profile. Such a regulation was implemented by an amendment to the Commercial Banks and Savings Banks Act in 1996.[1] According to the explanatory notes to this Act, the banks should be able to account for the provisions in the usual way, and to appeal them to the Company Appeals Board. In practice, however, the regulation did not come to play any major role, and it was abolished in 2003 when the Commercial Banks and Savings Banks Act was replaced by the Financial Business Act. The adoption of the Basel II rules on capital adequacy in 2007 introduced the possibility of applying differentiated capital requirements which were higher than the minimum capital requirement of 8 per cent so as to better reflect the risks incurred by the

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[1] Pursuant to Act No. 376 of 22 May 1996 and the Report on proposals for amendment of the Act to Amend the Commercial Banks and Savings Banks, etc. Act, the Act on Investment Associations and the Act on Insurance Business and various other Acts submitted by the Trade and Industry Committee on 30 April 1996.

individual banks. If the Danish Financial Supervisory Authority deems the board and management's assessment of the capital need to be inadequate, it may impose higher individual solvency requirements. However, these rules came too late to have any real impact prior to the recent banking crisis.

The support measures in favour of the financial sector have been on a much larger scale during the most recent financial crisis than in the period 1987-93. Like the central banks in other countries, Danmarks Nationalbank launched a series of temporary measures in connection with the financial crisis to improve the stability of the financial system. Additional credit facilities were established and the collateral base was expanded in a number of ways, cf. Dam and Risbjerg (2009).[1]

The government also launched a series of comprehensive initiatives, including a guarantee scheme which for a 2-year period ensured that all claims of depositors and other unsecured creditors in banks were fully covered. This was a very extensive government guarantee (kr. 4,200 billion or around 250 per cent of GDP). Moreover, the Financial Stability Company was established to manage ailing banks, and for a period of time, credit institutions were given the opportunity to receive government capital injections and purchase individual government guarantees, cf. Appendix A.

It is a common feature of the bank rescues involving the government during the crises in 1987-93 and 2008-10 that the solutions resulted in losses for the shareholders in the distressed banks. During both crises, the shareholders in certain banks lost their entire shareholdings, and the subordinated capital also sustained losses.

One difference between the two bank crises concerns the role of the European Commission in connection with government support measures to ensure financial stability. During the most recent financial crisis, the Commission has focused to a far greater degree than previously on ensuring that government measures in Denmark and other countries do not conflict with EU regulations on state aid.

It is not yet possible to compile the total central government net costs of the rescue packages for the financial sector during the most recent financial crisis.

In terms of the winding up of ailing banks under Bank Rescue Package I and the winding up of Roskilde Bank alone, the central government net profit at the end of the 3rd quarter of 2010, according to the Finan-

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[1] According to Moessner and Allen (2010), the most recent financial crisis was characterised by central banks worldwide providing liquidity to the market to a much greater extent than was the case in connection with the banking crisis during the Great Depression in the early 1930s.

cial Stability Company,[1] was estimated at kr. 2.5 billion. This amount is arrived at by taking the difference between the guarantee commission and recourse guarantee of kr. 25 billion paid to the government by the Danish Contingency Association and subtracting government losses of kr. 22.5 billion.

As a result of Bank Rescue Package II, the central government has currently injected capital into a number of credit institutions. Furthermore the government has also provided individual government guarantees that may run until the end of 2013. These injections and guarantees provide income from interest and guarantee commission, but they may also result in losses. In the first part of February 2011, the Ministry of Economic and Business Affairs[2] presented the preliminary result of Bank Rescue Package II and the individual guarantees as a net profit for the central government of kr. 1.98 billion for the period 2009-11 after recognition of the preliminary bank losses in Amagerbanken and Eik Banki. This amount is arrived at by taking central-government interest revenue from capital injections and guarantee commission from individual government guarantees of kr. 9.25 billion in total and subtracting central-government losses of kr. 7.27 billion.

In the wake of the most recent financial crisis, a number of initiatives have been launched at the international level with a view to preventing similar serious crises from arising and developing in the future. Furthermore, the EU has established the European Systemic Risk Board, ESRB, which is to be responsible for financial stability surveillance in the EU. Even though work on regulatory measures is ongoing, there is no doubt that future financial legislation will tighten the liquidity and capital requirements for banks.

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[1] Cf. the notification "Finansiel Stabilitet A/S – regnskab for bankpakken" (The Financial Stability Company – accounts for the bank rescue package – in Danish only) of 4 February 2011.
[2] Cf. the memorandum "Foreløbig status for bankpakkerne" (Preliminary status for the bank rescue packages – in Danish only) from the Ministry of Economic and Business Affairs of 8 February 2011.

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APPENDIX A: OVERVIEW OF CENTRAL-GOVERNMENT MEASURES DURING THE FINANCIAL CRISIS SINCE 2008

Bank Rescue Package I ("the Bank Package"), October 2008

In early October 2008 the central government entered into an agreement with a broad majority of the parties in the Folketing (Danish Parliament). Under this agreement, the central government with the financial sector guaranteed that all claims of depositors and other unsecured creditors in banks that were members of the Danish Contingency Association would be fully covered for a 2-year period until 30 September 2010. The government guarantee was very extensive (kr. 4,200 billion or around 250 per cent of GDP), and the financial sector was required to contribute up to kr. 35 billion to the scheme. At the same time, the central government established a winding-up company, the Financial Stability Company, to manage the activities of ailing banks.

Overall, banks which had joined the Danish Contingency Association ended up paying kr. 25 billion (guarantee commission of kr. 15 billion and recourse guarantee of kr. 10 billion) in connection with Bank Rescue Package I.

Financial stability agreement for the pension sector, October 2008

The Danish mortgage market was also affected by the escalation of the financial crisis in the autumn of 2008. Yields on both short-term and long-term mortgage bonds increased considerably in September and October, and the yield spread to government bonds widened considerably. This widening affected pension companies, because the value of their mortgage bonds (assets) fell while the value of their life insurance provisions (liabilities) did not change, as mortgage bonds were not included in the discount rate used to calculate the life insurance provisions. Against this background, the Ministry of Economic and Business Affairs, the Danish Financial Supervisory Authority and the Danish Insurance Association agreed to launch a number of initiatives. As one of the initiatives, mortgage yield was temporarily included in the yield curve used in the calculation of the pension companies' liabilities. All other things being equal, this led to a reduction of the present value of the liabilities by about 0.5 per cent.

Amendment of the International Financial Reporting Standards, October 2008

In October 2008 the International Accounting Standards Board, IASB, adopted a revision of the International Financial Reporting Standards which offered listed enterprises certain possibilities of reclassifying their

assets and liabilities on the balance sheet with retrospective effect from 1 July 2008. The possibilities concerned assets and liabilities included in trading portfolios, which normally had to be priced at fair value with recognition of value adjustments in the result. However, as a result of the international financial crisis, it had become difficult to accurately determine the price of certain financial claims due to illiquid markets. Reclassification according to the new rules made it possible to prevent major unrealised capital losses from affecting the profit and/or equity capital of the enterprise. The European Commission approved the new accounting standards in October 2008, and some major Danish banks chose to make use of the new possibilities immediately.

Bank Rescue Package II ("the Credit Package"), February 2009
In February 2009 a bill on government capital injections into credit institutions was passed by the Folketing in a situation where pressures on the solvency of credit institutions were expected to mount. The purpose was to recapitalise Danish banks and mortgage banks through government capital injections of up to kr. 100 billion in 2009 to pre-vent the financial crisis from developing into an outright credit crunch where creditworthy households and enterprises were unable to obtain credit.

In connection with the adoption of Bank Rescue Package II it was also made possible for credit institutions to purchase individual government guarantees for non-subordinated unsecured debt and for loans issued for financing top-up collateral.

Overall, 43 credit institutions received capital injections during 2009, totalling kr. 46 billion at an average yield to maturity of 10.08 per cent, and at the end of 2010, 50 institutions had issued for a total of kr. 193 billion with individual guarantees.

Increased deposit guarantee, October 2010
Concurrently with the expiry of the general government guarantee un-der Bank Rescue Package I, the deposit guarantee was increased to cover net deposits of up to approximately kr. 750,000 (100,000 euro), for ordi-nary deposits, while special deposits, including pension savings, remain fully covered.

Bank Rescue Package III, October 2010
Concurrently with the expiry of the general government guarantee un-der Bank Rescue Package I, a new model to manage ailing banks was also implemented. With the new model, the Financial Stability Company retains its option of acquiring and winding up ailing banks. If an ailing

bank decides to be wound up via the model, Financial Stability establishes a subsidiary which acquires the activities of the ailing bank and winds it up. In this way the customers of an ailing bank are not forced to find a new bank at short notice.

Status on Basel III – Liquidity and Capital

Borka Babic, Financial Markets

INTRODUCTION AND SUMMARY

In December 2010, the Basel Committee on Banking Supervision, BCBS, published the new international regulatory framework for credit institutions (Basel III). The new framework entails stronger liquidity and capital requirements. The intention is to strengthen the resilience of the financial sector to economic and financial turmoil and thus to reduce the risk of a negative real-economic impact. Basel III comprises requirements for the individual credit institutions and it is addressing system-wide risks that may build up in the sector.

Basel III is not binding on Danish financial corporations, but will be implemented – after more or less adjustment – via EU legislation. In 2011, the European Commission is expected to present proposals for amendments to the EU capital adequacy framework in the areas covered by Basel III. The Commission's proposal will then be considered by the Ecofin Council and the European Parliament.

Before the publication of Basel III, the BCBS and the EU performed quantitative impact studies, QISs, of the impact of the new rules on the capital and liquidity of the credit institutions. The results were published in December 2010.

This article discusses the four principal areas of Basel III: introduction of quantitative liquidity requirements, strengthening of the quality and quantity of capital, introduction of capital buffers and a leverage ratio.[1] The QIS results are also discussed.[2]

Basel III contains two quantitative liquidity requirements: a requirement to ensure sufficient liquidity buffers in the financial sector and a stable funding requirement. The BCBS has restricted the use of mortgage bonds in the liquidity buffer. This is not an appropriate approach, given the high liquidity of Danish mortgage bonds. The liquidity buffer should be based on actual liquidity rather than criteria that discriminate issuers without considering the liquidity. It should be possible to include mortgage bonds alongside government bonds in the liquidity buffer.

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[1] Basel III also includes amendments to the rules on counterparty credit risk which will not be discussed in this article.
[2] The BCBS' original proposals from December 2009 are described in Babic og Rasmussen (2010).

The stable funding requirement should give the institutions an incentive to choose longer-term funding. Consequently, it is expected to address, to a certain extent, the refinancing risk of the very widely used adjustable-rate loans, which is an important risk in the Danish financial system.

The QIS results show that the liquidity requirements will have a substantial impact on Danish credit institutions. However, many aspects of Basel III remain to be clarified, so it is difficult to assess the ultimate impact on the institutions' liquidity management.

Implementation of the new capital requirements, including the buffer and leverage ratio requirements, is expected to entail higher capital requirements for Danish credit institutions, but the length of the transitional period will, in general, leave room for orderly adjustment.

QUANTITATIVE LIQUIDITY REQUIREMENTS

In the liquidity area, Basel III introduces two quantitative requirements, Liquidity Coverage Ratio, LCR, and Net Stable Funding ratio, NSFR.[1]

Liquidity Coverage Ratio
The purpose of the LCR is to ensure adequate liquidity buffers in the financial sector. The LCR is a measure of the stock of high-quality liquid assets that an institution is required to hold in order to handle the net cash outflows in a scenario with intensive, short-term liquidity stress. The volume of liquid assets to be held by each institution will thus depend on the liquidity risks faced by the institution.

The liquidity buffer will primarily consist of cash, central-bank reserves and government bonds (Level 1 assets). Other assets, including covered bonds (Level 2 assets) may account for up to 40 per cent of the LCR. These assets are subject to a haircut of at least 15 per cent, i.e. only 85 per cent of their value counts in the compilation of the LCR.

Moreover, Basel III contains an exception for countries with insufficient amounts of Level 1 assets. They have the three following options:
- Establishment of contractual committed liquidity facilities from the relevant central bank. Such facilities will be available to credit institutions for a fee.
- Supervisors may allow credit institutions to hold foreign currency liquid assets.

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[1] Basel Committee on Banking Supervision (2010a). Basel III is based on a proposal from December 2009 and the press releases published by the BCBS in July and September 2010.

- Countries with sufficient amounts of Level 2 assets may raise the cap on inclusion of these assets to more than 40 per cent. The haircut on these assets must be higher than the haircut on the Level 2 assets that may be included in the stock of liquid assets at up to 40 per cent.

The BCBS has not yet established criteria for the use of these exceptions. This will happen during the observation period from 1 January 2011 to mid-2013. In this period, the BCBS will be able to adjust the design of the LCR if the current design proves to be inexpedient. Whether the rules will be adjusted also depends on the results of the quantitative impact studies that will be performed on the basis of data from end-2010 and mid-2011.

As from 1 January 2012, credit institutions are to report to the national supervisory authorities on their compliance with the requirements. The LCR will be introduced on 1 January 2015.

The BCBS puts a cap on inclusion in the LCR of mortgage bonds in general without taking into account the liquidity of the bonds. The Danish market for mortgage bonds is large and liquid, and mortgage bonds are virtually as liquid as government bonds.[1] The rules do not provide a true and fair picture of the liquidity of the various assets that may be used to meet the requirement. It should be possible to include mortgage bonds, which play a key role in the liquidity management of Danish credit institutions, in the LCR alongside government bonds.

Net Stable Funding Ratio
The objective of the Net Stable Funding Ratio, NSFR, is to promote more medium-term and long-term funding of the assets and activities of credit institutions. The NSFR establishes a minimum acceptable amount of stable funding based on the liquidity characteristics of an institution's assets as well as the potential drawings on liquidity as a result of credit commitments and other off-balance-sheet items.

Stable funding is defined as funding that can be expected to be stable over a 1-year horizon. The BCBS is considering a certain degree of inclusion of funding with a term to maturity of less than one year in stable funding. The expediency of this will be tested during the observation period from 1 January 2011 to mid-2016. The treatment of short-term financing with matching assets and liabilities will be evaluated and an incentive for longer-term funding within a maturity of one year will be created – e.g. to recognise that 9 month funding is preferential to 3 month funding.

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[1] See the article "Liquidity in Danish covered and government bonds" in this *Monetary Review*.

In this area as well, QISs will be performed on the basis of data from end-2010 and mid-2011. As from 1 January 2012, credit institutions are to report to the national supervisory authorities on their compliance with the requirements. By the end of the observation period, in 2016, the definition of the NSFR will be in place, and it will be introduced on 1 January 2018.

Introduction of the NSFR is a relevant way of addressing the refinancing risk of the very widely used adjustable-rate loans, i.e. long-term loans financed by issuing short-term bonds. Even though the deadline for implementation is a long way into the future, the Danish credit institutions should prepare well in advance for issuance of new products without refinancing risk, also with a view to reducing any transitional problems with the large outstanding volumes of adjustable-rate loans.

QUALITY AND QUANTITY OF CAPITAL

Basel III also comprises higher minimum requirements and requirements of higher quality of the credit institutions' capital.[1] Chart 1 illustrates the new and the existing minimum capital requirements concerning Common Equity Tier 1 capital, Tier 1 capital and total capital. The categories are described in Box 1.

The total capital requirement is 8 per cent, i.e. unchanged from the existing rules, while the minimum requirements for Tier 1 and Common Equity Tier 1 have been raised to 6 and 4.5 per cent, respectively. The existing rules to the effect that Tier 2 may not exceed half of the total capital and that hybrid capital may not exceed half of Tier 1 will be revoked.

The new Tier 1 requirements will be phased in gradually from 1 January 2013 until completion by 2015.

In addition, the BCBS has set out a number of criteria for each capital category. The strictest requirements apply to Common Equity Tier 1. In principle, the Common Equity Tier 1 of joint stock companies will comprise solely common shares and reserves. Non-joint stock companies may use other types of capital which meet the same criteria. It will be possible for supervisory authorities to take into account the specific constitution and legal structure of the enterprise when applying the criteria.

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[1] Basel Committee on Banking Supervision (2010b). Basel III is based on the BCBS consultation document of December 2009 and the BCBS press releases issued in July and September 2010.

MINIMUM CAPITAL REQUIREMENTS UNDER BASEL II AND BASEL III	Chart 1

Per cent of risk-weighted assets

Basel II — Basel III   Basel II — Basel III   Basel II — Basel III

■ Common Equity Tier 1   ■ Tier 1   ■ Total capital
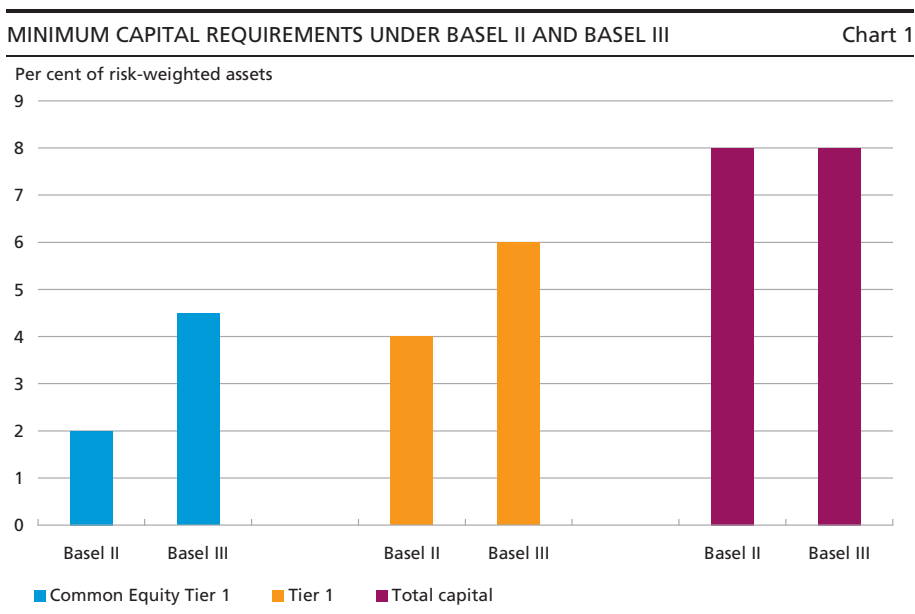
Additional Tier 1 must meet 14 criteria, and the requirements have been strengthened relative to the existing rules.[1] For example, it should be possible to write down Additional Tier 1 capital or convert it into common shares when a predefined event occurs. Moreover, Additional Tier 1 must be perpetual, i.e. with no maturity date, and with no step-ups or other incentives to redeem.

Nor must there be any incentives to redeem Tier 2, which must have a minimum original maturity of at least 5 years. Inclusion in the capital base of the credit institution during the last five years before maturity will be reduced gradually. It must also be possible to write down and/or convert Tier 2 into common shares if the credit institution reaches the point of non-viability.

The capital base of the credit institutions must be of high quality, so it is adjusted for a number of deductions, e.g. deferred tax assets and goodwill. The value of deferred tax assets and goodwill is small or non-existing when the institution is performing poorly, so they cannot be expected to absorb losses. Basel III harmonises the deduction rules. The deductions applicable under Basel III are generally already being applied in Denmark. The new aspect relative to the current Danish rules is that

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[1] The current criteria for hybrid capital have been defined in connection with the amendments to the EU's capital adequacy rules adopted in 2009. Under these rules, capital that does not meet the criteria may be included, in full or in part, in the institution's capital until 1 January 2040. The Basel III rules on phasing-in are much stricter. See European Parliament and the Council (2009) and Committee of European Banking Supervisors (2009).

CAPITAL CATEGORIES	Box 1

The total capital[1] of the credit institutions consists of three elements:

- Common Equity Tier 1
- Additional Tier 1 and
- Tier 2

The first two taken together form the Tier 1 capital of the credit institutions. The total capital is thus made up of Tier 1 and Tier 2 capital.

The three types of capital may take different forms, but the focus of Basel III is not on the form, but primarily the characteristics of the capital. The BCBS has set out a number of criteria for each type of capital: 14 for both Common Equity Tier 1 and Additional Tier 1 and 9 for Tier 2[2]. These criteria determine whether a debt instruments can be included as capital and in which category. The criteria are strictest for Common Equity Tier 1, followed by Additional Tier 1, while they are mildest for Tier 2.

Common Equity Tier 1 typically consists of common shares and reserves, including retained earnings. Non-joint stock companies cannot issue common shares, and their Common Equity Tier 1 may include other forms of capital that meet the criteria. Examples of non-joint stock companies are savings banks, which issue guarantee capital, and cooperative banks, which issue cooperative capital. Common Equity Tier 1 is regarded as capital of the highest quality. If an institution is to be wound up, this is the capital type first used to cover losses, i.e. the most subordinated form of capital.

Additional Tier 1 consists of loans (bond loans or other types) raised on special terms. Under Basel III, the loan must be perpetual, it must be possible to cancel distributions/payments, and it must be possible to convert capital into common shares or write it down. The aim of the strict requirements are to ensure that the capital can absorb losses to enable the institution to continue as a going concern. In the event of liquidation, this capital ranks immediately after Common Equity Tier 1 and before all other loans.

Tier 2 also consists of loans raised by the credit institution. It is subject to a number of criteria, which are, however, less strict that those for Common Equity Tier 1. For example, this type of capital may have a maturity date, and there are no requirements as to cancellation of payments to service the loan. This is due to the nature of this type of capital as gone concern capital, which is to cover losses when the bank is unable to survive on market terms. In the event of liquidation, Tier 2 ranks after Common Equity Tier 1 and Additional Tier 1.

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[1] The Box mentions the capital that can be included in the institution's calculation of its regulatory solvency requirement. The institution may have capital which is not eligible for inclusion in a regulatory context.

[2] In January 2011, the BCBS announced that it should be possible to write down and/or convert to common shares all capital when the institution reaches point of non-viability. The capital should also meet this criterion.

deductions will generally be applicable to Common Equity Tier 1, while they are applicable to more categories of capital today.

The instruments that fail to meet the criteria will be phased out gradually from 2013 when 90 per cent of their original value can be included in the capital base. The new rules will be fully phased in by 2022. If there are incentives to redeem capital, and that capital does not meet one or more of the other criteria, it will not at all be eligible for inclu-

sion after the effective maturity date (interest-rate step-up date). Government capital injections that do not meet the criteria, e.g. the Danish injections under Bank Rescue Package II, will be eligible for inclusion until January 2018.

The ability of the total capital to absorb losses is enhanced by strengthening the quality of the credit institutions' capital and raising the minimum requirements of the size of the Tier 1 capital (including and excluding hybrid capital). Consequently, it is important to apply the same criteria to non-joint stock companies to the largest possible extent, but the future rules should take into account the special characteristics of these companies.

BUFFERS

The Basel III rules contain requirements to introduce two types of buffer:
- a capital conservation buffer and
- a countercyclical capital buffer.[1]

The buffers should be added to the minimum capital adequacy requirement of 8 per cent, cf. Chart 2. These requirements are designed to ensure that credit institutions hold capital to withstand periods of substantial losses.

The capital conservation buffer should be equivalent to 2.5 per cent of risk-weighted assets. In addition, a countercyclical buffer of 0-2.5 per cent must be held in periods when systemic risk is building up, e.g. when lending growth is high.

The national authorities should impose requirements of countercyclical buffers on the credit institutions under their supervision. For internationally active institutions, the buffer should be calculated as a weighted average of the institution's geographical exposures. The authorities may choose to impose a buffer exceeding the maximum of 2.5 per cent. Foreign supervisors are only obliged to apply a buffer of 2.5 per cent to the credit institutions under their supervision.

Restrictions on distribution of dividend, share buy-backs or bonus payments will be imposed on credit institutions when they do not comply with the requirements. The less the compliance with the buffer requirement, the larger the restriction on allocation of earnings, cf. Table 1.

The capital conservation buffer and the countercyclical buffer must be met with Common Equity Tier 1.[2]

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[1] See also Mads Peter Pilkjær Harmsen (2010).
[2] The BCBS is considering whether to permit other fully loss-absorbing capital for the countercyclical buffer and is planning to publish guidelines to this effect later.

CAPITAL REQUIREMENTS INCLUDING BUFFER REQUIREMENTS UNDER
BASEL II AND BASEL III   Chart 2

Per cent of risk-weighted assets

	Common Equity Tier 1		Tier 1		Total capital
	Capital conservation buffer		Capital conservation buffer		Capital conservation buffer
	Countercyclical buffer		Countercyclical buffer		Countercyclical buffer
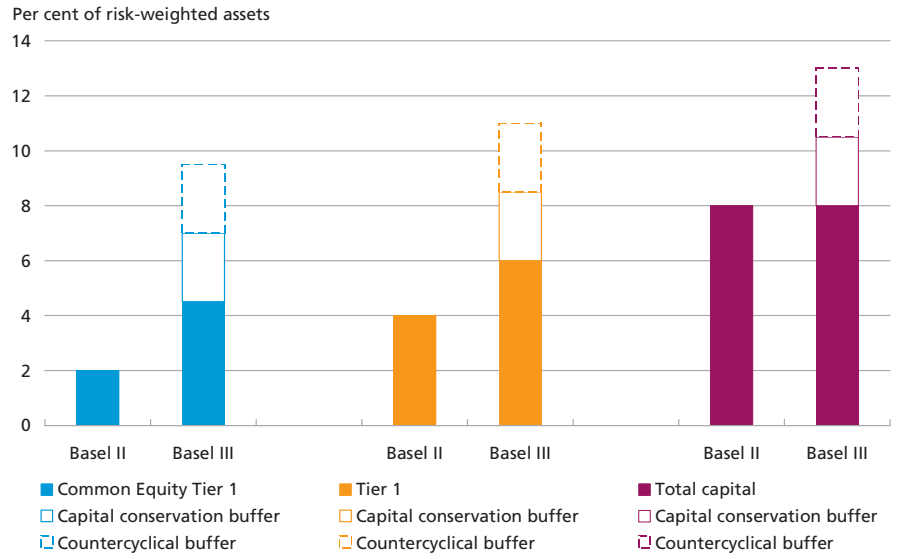
The countercyclical buffer is to cover system-wide risks. These risks are among those that, under the existing rules, can be covered under Pillar II, which stipulates the individual capital need. To avoid duplication of requirements for the sector, this risk type should not be covered by Pillar II in future, according to the BCBS. Other bank-specific risks, e.g. concentration risk, will still be covered by Pillar II.

The BCBS has provided room for the discretion of national authorities in the calculation and the release of countercyclical buffers, including as regards the variables and information to be used for the buffer decision. The changes over time in economic and financial structures are thus taken into account. Ideally, implementation of the countercyclical buffers will be as harmonised across national borders as possible in order to ensure optimum transparency.

INDIVIDUAL BANK MINIMUM CAPITAL CONSERVATION STANDARDS   Table 1

Common Equity Tier 1 (incl. other fully loss-absorbing capital)	Minimum capital conservation requirements (percentage of earnings)
Within the 1st quartile of buffer	100
Within the 2nd quartile of buffer	80
Within the 3rd quartile of buffer	60
Within the 4th quartile of buffer	40
Above top of the buffer	0

Source: Basel Committee on Banking Supervision (2010b).

The countercyclical capital buffer should be imposed correctly to act as an efficient macroprudential instrument. Moreover, it is important that the buffer is determined by a politically independent authority in order to avoid political pressure for not building up the buffer in good times.

In order for the buffer requirements to be effective, the market must be aware that they are not minimum requirements that must be met at all times. Perception of the buffer as a minimum capital requirement may trigger a market reaction already with an institution's capital is approaching the buffer zone. In that case, the buffer would give a false sense of security. There is also the risk of crowding out the voluntary buffer previously held by the institutions, and the risk that the total buffer of the sector is not improved to any significant extent.[1]

LEVERAGE

A leverage ratio will be introduced as a supplement to the risk-based capital requirements and in order to contain excessive leverage in the financial sector.

The leverage ratio will be a measure of the ratio between the Tier 1 capital and the institution's assets and off-balance-sheet items. The focus is on Tier 1, but the effect of applying the total capital and Common Equity Tier 1 in the calculation of the leverage ratio will also be examined during the transitional period. All on-balance-sheet items, including derivatives, repurchase agreements and off-balance-sheet items such as loan commitments, credit cards and unutilised liquidity facilities, will be included in the calculation. Generally, the items are not risk-weighted.

The BCBS has fixed a leverage ratio of 3 per cent, which will be tested during a transitional period from 1 January 2013 to 1 January 2017. As from 1 January 2015, the credit institutions must disclose the leverage ratio and its composition. On the basis of experience from the transitional period, the BCBS will, in the 1st half of 2017, make adjustments, if required, with a view to introducing the leverage ratio as a minimum capital requirement (Pillar I requirement) in January 2018.

Basel III does not distinguish between various loan types, nor does it take collateral into account. The role of collateral varies with the business model applied. For example, Danish mortgage banks have large amounts of collateral for their lending, which is thus less risky than ordinary uncollateralised lending. Uniform application of the leverage

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[1] See also Danmarks Nationalbank's responses in connection with the consultations initiated by the BCBS and the European Commission, respectively, as regards the countercyclical buffer at http://www.nationalbanken.dk/dndk/presse.nsf/PrevHearingReplyPerYear.HTML!OpenView&Start=1&Count=1000&Expand=2#2

ratio to all credit institutions would, all things being equal, require the mortgage banks to hold the same amount of capital as institutions with a large proportion of uncollateralised loans. Consequently, it is important to test, during the transitional period, the impact of the new rules on the various business models.

RESULTS OF QUANTITATIVE IMPACT STUDIES OF BASEL III

During 2010, both the BCBS and the Committee of European Banking Supervisors, CEBS[1], conducted quantitative impact studies, QISs, of Basel III.[2] 23 countries (263 institutions) participated in the BCBS QIS[3], while 21 EU member states (246 institutions) participated in the CEBS QIS. Several Danish institutions participated in the CEBS QIS.

The calculations show the impact of the rules if fully implemented in 2009, which does not take account of transitional arrangements. Moreover, the QIS results do not reflect the full impact of Basel III as the some elements were not known when the calculations were made.

Liquidity

On average, the LCR and the NSFR are lower for credit institutions in the EU than in the BCBS member jurisdictions. In addition, the large institutions are further from compliance with the requirements than the smaller institutions, cf. Table 2.

According to the QIS results, the BCBS members are 1,730 billion euro of liquid assets from meeting the LCR requirement and 2,890 billion euro of stable funding from meeting the NSFR requirement.

For the Danish institutions that participated in the QIS, the average LCR is 55 per cent, while the NSFR averaged 74 per cent. Their LCR and NSFR are thus lower than the EU averages and particularly lower than the average for the BCBS members. The low LCR reflects the less favourable treatment of mortgage bonds relative to government bonds. The low NSFR reflects, *inter alia*, a large share of adjustable-rate loans. The ultimate effect on the banks' liquidity management is, by nature, not known before the final design of the rules is in place and they have been adopted by the EU. New quantitative impact studies of Basel III will be conducted on the basis of data from end-2010 and mid-2011.

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[1] On 1 January 2011, the CEBS became the European Banking Authority, EBA.
[2] Basel Committee on Banking Supervision (2010c) and Committee of European Banking Supervisors (2010).
[3] The BCBS has 27 members.

COMPLIANCE RATIOS REGARDING THE TWO LIQUIDITY REQUIREMENTS		Table 2
Per cent	LCR	NSFR
BCBS		
Large credit institutions	83	93
Small credit institutions	98	103
CEBS		
Large credit institutions	67	91
Small credit institutions	87	94

Note: Large credit institutions have a Tier 1 capital of more than 3 billion euro and are well diversified and inter-nationally active. The calculations are based on consolidated figures for 2009.
Source: Basel Committee on Banking Supervision (2010c) and Committee of European Banking Supervisors (2010).

Capital

The impact of Basel III on the credit institutions' capital is shown in Table 3. The impact is strongest on large institutions, and slightly larger on credit institutions in the EU relative to the BCBS members.

According to the BCBS estimate, the large credit institutions are 165 billion euro from compliance with the 4.5-per-cent requirement for Common Equity Tier 1. The institutions are a further 577 billion euro from compliance with the additional requirements of a capital conser-vation buffer (i.e. the 7-per-cent requirement). The large EU credit insti-tutions are 53 and 263 billion euro, respectively, from compliance with the two requirements. The need to raise capital is markedly lower for the small credit institutions as their degree of compliance is already higher, among other reasons.

The capital ratios of the Danish credit institutions, calculated according to the new rules, are higher than the averages of the BCBS members and the EU credit institutions. A key factor affecting the Danish institutions is

BASEL III EFFECTS ON CREDIT INSTITUTIONS' CAPITAL			Table 3
Per cent	Common Equity Tier 1, new rules (Common Equity Tier 1, existing rules*)	Tier 1, new rules (Tier 1, existing rules)	Total capital, new rules (total capital, existing rules)
BCBS			
Large credit institutions	5.7 (11.1)	6.3 (10.5)	8.4 (14.0)
Small credit institutions	7.8 (10.7)	8.1 (9.8)	10.3 (12.8)
CEBS			
Large credit institutions	4.9 (10.7)	5.6 (10.3)	8.1 (14.0)
Small credit institutions	7.1 (11.1)	7.6 (10.3)	10.3 (13.1)

Note: Large credit institutions have a Tier 1 capital of more than 3 billion euro and are well diversified and inter-nationally active. The calculations are based on 2009-figures. The figures show the total impact of Basel III on the capital of the credit institutions, i.e. not only the effect of strengthening the quality and quantity of capital, but also the effect of adjusting risk-weighted items in accordance with amendments of the rules for management of trading-book risk, counterparty risk, etc. *Common Equity Tier 1, existing rules* is not adjusted for deductions.
Source: Basel Committee on Banking Supervision (2010c) and Committee of European Banking Supervisors (2010),

the strengthening of the criteria for Additional Tier 1 and Tier 2, but the relatively solid starting point and the length of the transitional period leave room for the necessary adjustment.

Leverage

According to the calculations of the BCBS, the leverage ratio of the large credit institutions is 2.8 per cent, while that of the small institutions is 1 percentage point higher, implying that the small institutions are less leveraged. The leverage ratios of the large and small institutions in the EU are 2.5 and 3.5 per cent, respectively.

The results of the EU QIS exercise show that the leverage of the Danish credit institutions largely corresponds to the BCBS average. Among other factors, the results reflect the effect on the institutions' capital of the strengthening of the criteria for Additional Tier 1. In this area as well, the length of the transitional period leaves room for adjustment.

THE FURTHER PROCESS

As appears from the above, the Basel III rules are in some respects not yet finalised (including in the liquidity area), so further specification is expected.

Moreover, the BCBS is processing the proposal concerning a special type of debt (contingent capital) that is automatically converted into common shares or written down when a predefined event – e.g. the solvency of the credit institution drops below a certain percentage – occurs. This will make it possible promptly to recapitalise a credit institution in difficulties. The BCBS is considering this type of capital, *inter alia*, in relation to extra capital requirements that are expected to be imposed on systemically important financial institutions, SIFIs.

Measures for SIFIs go beyond the extra capital requirements that are expected to be proposed jointly by the BCBS and the Financial Stability Board, FSB, in 2011. They comprise, *inter alia*, more extensive supervision and orderly resolution of ailing SIFIs. The FSB report, published in October 2010, outlines the overall framework and time frame for the work of reducing SIFI-related risks.[1]

The BCBS will develop a method for identifying systemically important institutions. In consultation with the BCBS and other bodies, the FSB and the national authorities will in mid-2011 identify the institutions that will initially be subject to the FSB recommendations. These will be large, global, systemically important institutions, G-SIFIs. Cross-border coordin-

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[1] Financial Stability Board (2010).

ation will be established as regards e.g. assessment of risks related to G-SIFIs and resolution of insolvent G-SIFIs.

   Initially, the focus on G-SIFIs means that no Danish institutions are expected to be included. However, extra requirements are also expected to be imposed on national systemically important institutions.

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Liquidity in Danish Covered and Government Bonds

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INTRODUCTION AND SUMMARY

This article is a summary of Danmarks Nationalbank's analyses of liquidity in the covered and government bond markets in Denmark before, during and after the financial crisis in 2008. The results are presented in detail in Danmarks Nationalbank's Working Paper Series, No. 70, September 2010, cf. Gyntelberg et al. (2010).

The analysis suggests that Danish benchmark covered bonds by and large are as liquid as Danish government bonds during periods of market stress. The results also suggest that although trading continued during the crisis, both markets experienced substantial declines in liquidity and significantly elevated liquidity risk. Finally, the analysis shows that before the crisis, government bonds were slightly more liquid than covered bonds in both the short- and long-term market segments. During the period after the crisis, the two markets appear to have had more or less the same level of liquidity for both short- and long-term bonds.

The data material is at transaction level and has not been used previously. It covers all transactions in government and covered bonds in the period from January 2005 up to and including May 2010.

THE FINANCIAL CRISIS AND THE DANISH BOND MARKETS

Trading in the Danish bond markets primarily relates to government and covered bonds, of which outstanding volumes total 35 per cent and 140 per cent, respectively, of the gross domestic product, GDP. Both types of bonds are eligible securities in the collateral base of Danmarks Nationalbank.

In autumn 2008, the markets were affected by the escalation of the financial crisis, and yields on both short- and long-term covered bonds rose markedly in September and October 2008, cf. Danmarks Nationalbank (2008). At the same time, the spread to government yields widened. These price developments clearly suggest that liquidity in the

MEASURES DURING THE CRISIS	Box 1

The first measure was adopted on 31 October 2008 as an agreement between the Danish Insurance Association and the Ministry of Economic and Business Affairs. The purpose was to ensure that the widening of the spread between covered bonds and government bonds would not force pension funds to divest covered bond from their portfolios. The agreement implied a new method for calculating the term structure of interest rates applied by the pension funds for discounting their provisions. The new method includes the covered bond yield, and this contributed to offsetting the significant increase in provisions resulting from the unusual interest-rate developments. The agreement focused on long-term covered bonds, as the pension funds primarily invest in long-term bonds.

The other measure was announced in early November 2008. According to the announcement, the Social Pension Fund would invest kr. 22 billion in short-term covered bonds at the December 2008 auctions with the aim of hedging the central government's interest-rate risk in connection with the financing of subsidised housing. The market generally interpreted this as a signal that the government was willing to support the market in the event of further turmoil arising from the crisis.

covered bond market was significantly reduced in this period. However, unlike in most other covered bond markets, trading in Danish covered bonds continued during the crisis.

Two policy measures were introduced in this period, cf. Box 1. They contributed to restoring market participants' confidence, which was reflected in sharp declines in yields for both short-term covered bonds as well as the yield spread to government bonds.

DELINEATION AND DATA

The analysis is based on previously unused transaction data from Nasdaq OMX Copenhagen A/S and the Danish Financial Supervisory Authority (FSA). The data set comprises all transactions in government and covered bonds, and data from both sources has been combined with contractual information on each bond from VP Securities A/S.

The period before the crisis is defined to be from January 2005 till end-July 2008. The crisis period is defined as being the period from August till end-November 2008, corresponding to the period when the pricing of Danish bonds was most clearly affected by the financial crisis. This period covers the federal takeover of Fannie Mae and Freddie Mac, the AIG bailout and the failure of Lehmann Brothers. Finally, the period after the crisis is from early December 2008 till end-May 2010.

A distinction is made between short- and long-term government and covered bonds. Short-term covered bonds are confined to fixed-rate bullet bonds which are issued with a maturity of up ten years. However, the

majority of the bonds are issued with a maturity of only one year as they provide funding for adjustable-rate mortgages which have their interest rate reset once a year. The term to maturity in this segment is therefore primarily shorter than 1 year. Short-term government bonds are defined as bonds with a remaining term to maturity of maximum 5 years.

Long-term covered bonds are defined as fixed-rate, callable covered bonds, while long-term government bonds are defined as government bonds with a remaining term to maturity of more than or equal to 5 years.

Focus is on trades of at least kr. 10 million in bonds with a nominal value of at least 1 billion euro. To the extent possible, the data has been adjusted for repo transactions, and price changes of more than 2 per cent have been examined to identify any errors in the data.

RESULTS

Overall, the results show that Danish benchmark covered bonds are by and large as liquid as Danish government bonds during periods of market stress. Before the crisis, government bonds were slightly more liquid than covered bonds in both the short- and the long-term market segments. In the period after the crisis, the results suggest that the two markets appear to have had the same level of liquidity for both short- and long-term bonds. The conclusions are based on four standard liquidity measures or proxies: median trade size, turnover rate, bid-ask spread and the price impact of trades, cf. Box 2 and the results in Tables 1 and 2.

Liquidity in short-term bonds

The median trade size for short-term covered bonds was stable ahead of the crisis and almost half the size of a trade in short-term government bonds. From 2009, it rose sharply, and for several months of 2009 it had nearly doubled, and the difference to government bonds had shrunk to almost nothing.

In the pre-crisis period, the turnover rate was largely the same for the two markets. From September 2008 till end-2009, it was markedly higher for short-term covered bonds than for government bonds. From early 2010, the difference between the turnover rates in the two markets had more or less been eliminated, and they stood at a considerably higher level than before the crisis.

The bid-ask spread in both markets was lower before the crisis, but during the crisis it more than doubled for government bonds. In comparison, covered bond spreads remained stable during the crisis. They have subsequently stabilised at a somewhat higher level than before the crisis.

LIQUIDITY MEASURES	Box 2

The analysis is based on four standard liquidity measures or proxies calculated for each of the four bond types:

- Monthly median trade size: the median of the market value of each trade in a given month.
- Turnover rate: the sum of the market value of all trades in a given month divided by the average of the nominal outstanding volume at the beginning and the end of each month.
- Bid-ask spread: as shown in Roll (1984), the bid-ask spread under certain conditions equals twice the square root of minus the covariance between two subsequent prices: $Roll_t = 2\sqrt{-\operatorname{cov}(\Delta P_i, \Delta P_{i-1})}$ where t is the period, for which the measure is calculated.
- Price impact of trade (Amihud): To take into account that large trades may have a higher price impact, the illiquidity measure is calculated as suggested in Amihud (2002) as the percentage price change divided by the trade size:

$$Amihud_t = \frac{\dfrac{P_j - P_{j-1}}{P_{j-1}}}{Q_j} ,$$

where t is the period, and Q is the trade size in million euro in trade j, and P is the price of trade j. The procedure in Dick-Nielsen et al. (2009) is followed, whereby the monthly Amihud measure is calculated as the median of daily measures within the month.

Before the crisis, the price impact of trade for government and covered bonds was relatively stable, cf. Chart 1. It was generally slightly higher for covered bonds than for government bonds – except in December when liquidity in covered bonds rises temporarily. In 2008 there is a clear indication that the price impact of trade is higher for covered bonds than in the previous three years. During the crisis, the price impact of trade for government bonds increased rapidly, reaching a significantly higher level than for covered bonds. After the crisis, the effect con-

SHORT-TERM BONDS, MEDIAN OF LIQUIDITY MEASURES						Table 1
	Before the crisis		During the crisis		After the crisis	
	Covered bonds	Government bonds	Covered bonds	Government bonds	Covered bonds	Government bonds
Trade size, million euro	3.93	7.99	4.01	5.07	6.79	7.02
Turnover rate, per cent	13.39	11.96	18.32	7.15	19.07	7.41
Bid-ask spread, ticks	6.16	3.05	7.12	15.7	10.54	9.5
Price impact of trade, per cent .	0.0059	0.0028	0.0076	0.0073	0.0054	0.0032

Note: Only bonds with a circulating volume of at least 1 billion euro and trades of at least kr. 10 billion are included. 1 tick is defined as kr. 0.01.

Source: Nasdaq OMX, Danish Financial Supervisory Authority and Danmarks Nationalbank.

SHORT-TERM BONDS – PRICE IMPACT OF TRADE (AMIHUD) Chart 1
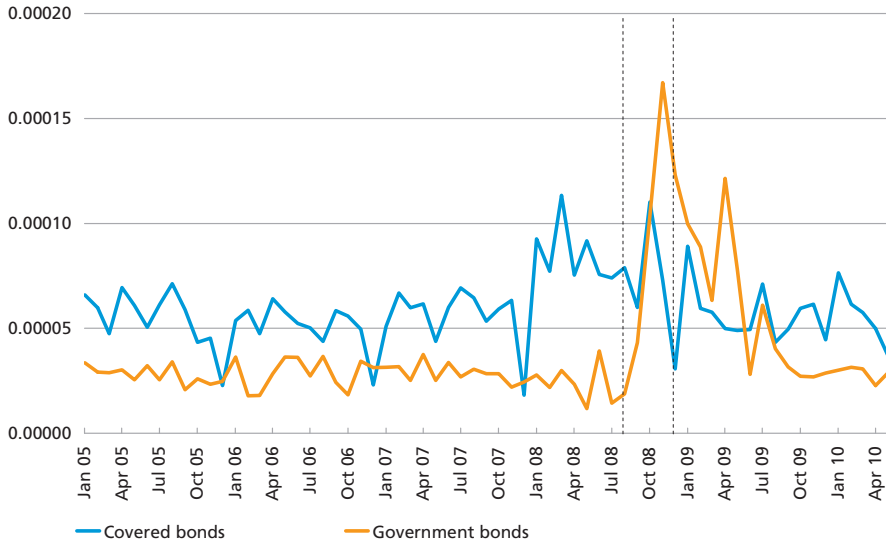
Note: Only bonds with a circulating volume of at least 1 billion euro and trades of at least kr. 10 billion are included.
Source: Nasdaq OMX, Danish Financial Supervisory Authority and Danmarks Nationalbank.

tinued to be higher for government bonds than for covered bonds until June 2009. Though the price impact in the short-term covered bond market is higher than for government bonds, the analysis suggests that liquidity is less likely to deteriorate in periods of market stress.

Liquidity in long-term bonds
The median trade size for government bonds almost halved during the crisis and rose only slowly afterwards. By mid-2009, it had stabilised. Conversely, the median trade size for covered bonds was remarkably stable throughout most of 2008 and in early 2009, albeit at a slightly lower level than before the crisis. The decline during the crisis was less pronounced for covered bonds than for government bonds.

LONG-TERM BONDS, MEDIAN OF LIQUIDITY MEASURES Table 2

	Before the crisis		During the crisis		After the crisis	
	Covered bonds	Govern-ment bonds	Covered bonds	Govern-ment bonds	Covered bonds	Govern-ment bonds
Trade size, million euro	3.81	5.65	3.16	3.80	3.45	6.92
Turnover rate, per cent	18.04	20.78	11.68	14.16	9.93	7.53
Bid-ask spread, ticks	13.14	9.97	26.66	27.51	15.32	27.97
Price impact of trade, per cent	0.0119	0.0067	0.0222	0.0172	0.0149	0.0088

Note: Only bonds with a circulating volume of at least 1 billion euro and trades of at least kr. 10 billion are included. 1 tick is defined as kr. 0.01
Source: Nasdaq OMX, Danish Financial Supervisory Authority and Danmarks Nationalbank.

The turnover rate for covered bonds has been stable from end-2007, also during the crisis. In the same period, the turnover rate for government bonds has fallen and has stabilised at a slightly lower level than for covered bonds. During the crisis, however, the turnover rate for government bonds peaked at around 20 per cent.

The lower turnover rate for government bonds since early 2009 could reflect the rise in the outstanding amount of government bonds since end-2008 when a 30-year government bond was issued for the first time. The turnover rate for this bond has been lower than for other government bonds, as more than 80 per cent of the outstanding amount is held by pension funds.

Bid-ask spreads rose ahead of the crisis and peaked in the covered bond market in November 2008. The peak for government bonds was at the same level, but was reached in February 2009 and not during the crisis. In October 2008, the spreads were largely the same, as it was only a single tick higher for covered bonds than for government bonds. The spread seems to have stabilised for covered bonds, while it is higher and more volatile for government bonds.

The price impact of trade has been higher for covered bonds than for government bonds, cf. Chart 2. It fell drastically during the period after the crisis, and in April 2009 it had stabilised at a slightly higher level than before the crisis.

LONG-TERM BONDS – PRICE IMPACT OF TRADE (AMIHUD)   Chart 2
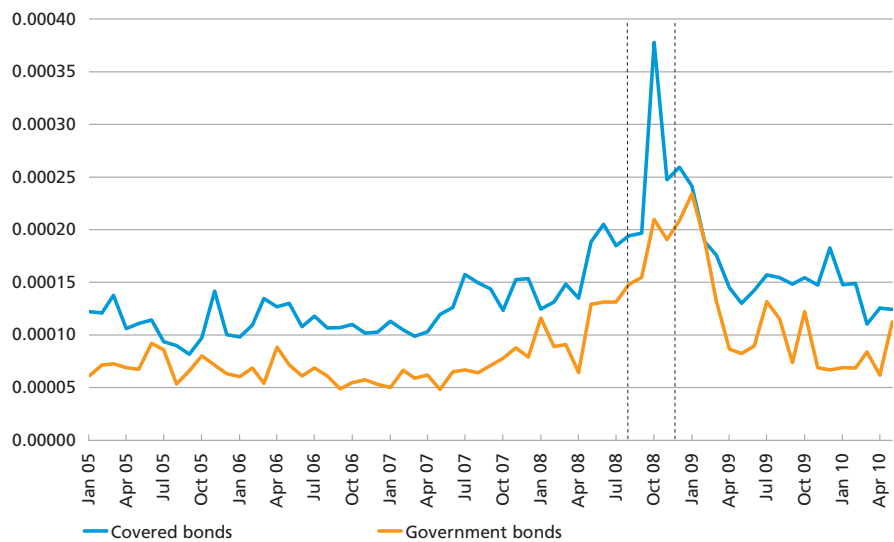
Note: Only bonds with a circulating volume of at least 1 billion euro and trades of at least kr. 10 billion are included.
Source: Nasdaq OMX, Danish Financial Supervisory Authority and Danmarks Nationalbank.

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Macroeconomic Impacts of Financial Regulation

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INTRODUCTION AND SUMMARY

The recent economic crisis – the deepest in the western world since World War II – revealed a number of shortcomings in financial regulation. Most countries' regulation was based on the Basel II rules, which had not yet been implemented in the USA, however.

The crisis prompted the Basel Committee on Banking Supervision, among others, to initiate work on proposals for an amended set of rules aimed at improving the resilience of the financial sector.

The Basel Committee presented its proposals in the autumn of 2010, but the main features were already well-known from a number of consultation papers during the process. The key elements of the proposals are higher capital requirements for the banks, with a better ability to absorb losses, and the introduction of a permanent capital conservation buffer as well as building up a special countercyclical capital buffer in the event of particularly strong lending growth in the economy, cf. e.g. Harmsen (2010). Moreover, the liquidity requirements for the banks are tightened.

The purpose is to prevent inappropriate behaviour in the financial sector causing economic crises. It is hoped that higher capital requirements for the individual institutions can help to avoid government support of the financial sector in the future and to cushion the effects of economic crises.

The economic impacts of the proposed regulation have now been assessed by e.g. two Basel Committee working groups, the financial sector, central-bank staff, international organisations, and researchers. Key elements of the findings and differences between the assessments are summarised in the following with the main emphasis on the findings of the Basel Committee working groups.

The higher capital and liquidity requirements entail not only long-term benefits, but also long-term costs. In addition, the costs in the implementation phase of the new requirements should be taken into account.

It was always considered during the preparation of the proposals that the upcoming regulation could impede the banks' willingness and ability to lend, at least in a transitional period, but also that the regulation should not be so tight that it would make it difficult for the countries involved to emerge from the crisis, let alone that it would set the stage for a new crisis.

In February 2010, the Basel Committee and the Financial Stability Board established the Macroeconomic Assessment Group, MAG, which submitted a preliminary report in August 2010 and a final report in December. The main focus of the reports is on the costs of moving from the 2009 capital and liquidity conditions to the proposed new levels according to the proposed phasing-in plan.

The MAG was chaired by Stephen Cecchetti, Economic Adviser at the Bank for International Settlements, BIS, and was otherwise composed of representatives from a number of international organisations, as well as central banks and supervisory authorities in 15 major economies in the world.

The permanent costs and benefits are assessed with focus on the report completed by the Basel Committee Long-term Economic Impact working group in August 2010. The working group was chaired by Claudio Borio, BIS, and Thomas Huertas from the UK Financial Services Authority, FSA, and otherwise composed of representatives from a number of international organisations as well as the central banks and supervisory authorities of 11 countries.

In some respects, the analyses of the two working groups are closely coordinated. A case in point is the assessments of the banks' costs related to stronger liquidity and common equity requirements and their interest-rate responses, provided that the rules are implemented in all countries at the proposed pace.

The working groups find that the permanent benefits of the proposed tighter regulation clearly exceed the costs, but also that the costs are temporary and rather modest and occur during the phasing-in process.

These and other reports draw a clear picture. The proposals entail benefits to the whole economy in terms of fewer financial crises and thus more modest fluctuations in output and unemployment. In comparison, the costs to the whole economy of tightening the common equity requirements for the banks are primarily temporary and limited. Higher capital requirements imply a lower leverage ratio for the banks. Given the reduced risk of banking per unit of common equity, the requirement of expected return per unit will presumably fall, which will dampen the costs of the proposals.

PERMANENT COSTS AND BENEFITS

The principal benefit in the long term is that banking crises, i.e. economic crises stemming from inappropriate behaviour in the banking system, will be rarer and less deep. In so far as a banking crisis implies lower socioeconomic activity for a prolonged period, compared to what would otherwise have been the case, or if the lower level of activity is permanent, the benefits of the proposed regulation will be even greater than the immediate costs of a crisis that are saved, cf. BIS (2010b).

However, the banks' higher interest margins will also imply costs. The working group expects that, despite the higher capital and liquidity requirements, the banks will retain their earnings via wider interest margins, which will reduce the volume of lending in the long term. Viewed in isolation, the impact is found to be a modest, but permanent loss of activity.

The net effect of these opposite factors is assessed as clearly positive even if there is no permanent positive impact on activity of the reduced frequency and depth of banking crises. In the absence of permanent activity effects, a common equity requirement of around 10 per cent of risk-weighted assets would be optimum in the long term, and capital requirements above 16-17 per cent would even out the net gain completely. In the event of persistent negative impacts of a banking crisis, increasing capital requirements to up to 15 per cent will imply a small further gain.

The costs and benefits are assessed on the basis of various analyses and models, and the results stated constitute the median of the results across the various models, i.e. one half of the analyses produces a greater or the same effect, while the other half produces the opposite result. The modelling work is described in more detail in Angelini et al. (2011).

The calculated net effects do not take into account the long-term benefits in that the tighter regulation, including the proposed building up and breaking down of countercyclical capital buffers, will reduce the normal cyclical fluctuations in the economy. This entails a direct improvement of welfare.

Another important element of the proposal is the introduction of a genuine buffer against losses, i.e. the capital conservation buffer of 2.5 per cent of risk-weighted assets in the period 2016-18. Restrictions are imposed, as regards dividends to shareholders, on banks which have to make impairments that eat into the capital conservation buffer, and they apply until the buffer has been re-established. This reduces the need for raising capital in periods of stress, compared with today.

Moreover, it should be mentioned that the benefits will increase if the banks adjust their business models with the aim of more moderate expansion of interest margins than assumed above.

On the other hand, no account is taken of the costs that will occur if – as a consequence of the tighter regulation – certain risks are transferred, to their full extent, from the banking system to an unregulated part of the economy. If crises in the unregulated part have an impact on the whole economy that is as serious as that of crises in the banking system, this transfer, of course, entails a setback. In this connection, it should also be borne in mind that the introduction of new taxes on banking and/or financial transactions is being considered in other contexts concurrently with the proposed new regulation. The combination of the various proposals could adversely affect the functioning of the financial sector in the overall economy even though the stronger capital require-ments are a step forward, viewed in isolation, cf. e.g. Rangvid (2010).

COSTS OF THE TRANSITION TO STRONGER CAPITAL AND LIQUIDITY REQUIREMENTS

The MAG reports, cf. BIS (2010a) and BIS (2010c), about the macro-economic impact of the transition to stronger capital and liquidity re-quirements are based on calculations using a large number of econom-ic models developed by the participating organisations. The models include structural models, DSGE models with and without a banking sector, and vector autoregressive models or other reduced form models.

There is a negative impact on activity since the banks are assumed to expand their interest margins, which will have a dampening effect on lending and activity. The possibility of the banks tightening their credit standards has been taken into account in some calculations, while in others differences in the gross domestic product, GDP, between a base-line scenario and a scenario with stronger capital requirements lead to variations in monetary policy.

As regards the capital requirements, the specific proposals of the Basel Committee are analysed. The period until 2015 will see the phasing-in of the increased common equity requirement from at least 2 per cent of risk-weighted assets to 4.5 per cent. The new capital conservation buffer of 2.5 per cent will be phased in from 2016 to 2018. On the basis of the capital position of the large international banks at end-2009, when the weighted average common equity amounted to 5.7 per cent of risk-weighted assets, the banks have to raise capital of at least 1.3 per cent of this amount by end-2018. It is noted in the report that the common

equity of the sample of smaller banks whose capital position was examined was, on average, higher than that of the large banks.

According to the calculations, the new requirements for the banks, to be implemented by 2018, will have a modest impact on economic growth. After 35 quarters, the level of GDP is estimated to be 0.17 per cent lower than it would otherwise have been. This corresponds to an annual decrease in economic growth by 0.03 per cent. Growth is then expected to be marginally higher than it would otherwise have been in the following years. If the banks seek to comply with the new, higher capital requirements faster, GDP is estimated to be 0.25 per cent lower than it would otherwise have been after 4½ years, implying 0.05 per cent lower annual growth, before growth begins to increase again once compliance with the new requirements has been achieved.

Since the Basel Committee's proposals regarding liquidity requirements include an observation period, the structure of the future requirements is more uncertain than that of the capital requirements. The MAG has assessed the consequences of the banks increasing their liquid assets by 25 per cent and the duration of their financing in the wholesale markets. This is estimated to entail a widening of the interest margin by 0.14 percentage point and a fall in the GDP level by 0.08 per cent relative to the baseline scenario over 4½ years.

For simultaneous implementation of the capital and liquidity requirements it is not enough just to add up the two results, as compliance with one requirement has a beneficial impact on compliance with the other.

UNCERTAINTY OF THE FINDINGS

As mentioned, the calculations were performed by the various MAG members using a wide range of models. The results stated above represent the median GDP effect. As regards the capital requirement, the 0.17 per cent lower median GDP level after 35 quarters masks differences ranging from no effect to a 1 per cent lower GDP level.

In any case, the results point to modest transition costs compared with the drop in GDP seen during the crisis. GDP i Denmark dropped by more than 7 per cent from the 2nd quarter of 2008 to the 2nd quarter of 2009.

Moreover, the calculations do not take all factors into account. The MAG itself states that the impact on GDP in the transitional phase will be more negative if the banks step up their efforts and achieve compliance with the new requirements ahead of schedule. This also applies if the banks choose to add a buffer.

On the other hand, the banks' strengthening of their base capital during 2010 by refraining from distributing dividend or by issuing shares will reduce the negative transitional effects. In addition, flight to safety or other equivalent adjustments of the business models may entail a smaller capital need than would otherwise have been the case.

In an OECD Working Paper, Slovik and Cournéde (2011) arrive at more negative transitional effects of the new capital requirements compared with the MAG findings. According to their calculations, annual growth is estimated to be around 0.05-0.15 per cent lower than it would otherwise have been. The principal difference relative to MAG is that they assume that the banks will maintain the current excess capital adequacy in relation to the existing minimum requirements. This assumption is not necessarily valid. The current excess capital adequacy reflects, among other things, that that the banks know that stronger capital requirements are in the pipeline, so they have begun the process of compliance in advance of the raising of the existing minimum requirements.

OTHER ASSESSMENTS

In June 2010, the Institute of International Finance, IIF, issued a report, cf. IIF (2010), with a considerably more negative assessment of the costs of the proposed regulation, compared with the results of the Basel Committee working groups. In the event of a long phasing-in period of 10 years, the regulation proposals tabled at the time are found to dampen annual GDP growth by 0.3 per cent on average. The calculations were made for the USA, the euro area and Japan, and since the banks play a larger role as a source of corporate financing in Europe than in the USA and Japan, Europe is exposed to the most negative impact, i.e. 0.5 per cent lower growth for 10 years. A phasing-in period of 5 years would double the annual reduction of growth. The IIF has made calculations based on slightly stricter regulation requirements than those proposed, but on a comparable basis the damper on activity is assessed to be eight times the MAG estimate, cf. BIS (2010a, p. 4).

The primary reason for this very substantial difference is that the IIF predicts that capital will be in scarce supply. Consequently, the costs of raising one additional unit of capital will increase in step with the capital need, entailing a growing need to raise lending rates. The demand for loans is assumed to be sensitive to interest rates, and the lower lending is expected to have a considerable economic impact, given the assumption that lower lending growth implies lower GDP growth.

Others have criticised the assumption of the working groups that the return on capital is not reduced in case of an increase in the volume of

capital. The key argument is that the higher a bank's common equity for a given asset composition, the lower the risk on banking. This will reduce investors' required expected return on equity when buying bank shares. This Modigliani-Miller proposition means that the banks' weighted financing costs are not dependent on the composition of their financing.

As opposed to most other types of businesses, banks have very little common equity relative to their assets, cf. e.g. Kjeldsen (2004). Consequently, the banks are dependent on other sources of financing to make up the rest, typically deposits, bond issuance, etc. A number of studies point out that banks, relative to other types of businesses, have access to particularly inexpensive financing, because the authorities have in many cases *de facto* issued guarantees against losses for depositors and often bond holders as well, should a bank land in difficulties, cf. e.g. Miller (1995), Admati et al. (2010) and Juks (2010). In that case, depositors and bond holders will demand a lower return on funding to banks compared with buying e.g. corporate bonds. On the other hand, the implied guarantee means that there are real costs associated with compliance with higher common equity requirements, given the declining share of financing with implied government support.

Miles et al. (2011) try to calculate the optimum capital requirement for banks, including key elements of the Modigliani-Miller theorem and taking into account the expected costs of banking crises. Their analysis also includes the assumption that outliers occur more frequently than in a normal distribution with the same median and variance. They find that the optimum common equity requirement is 16-20 per cent of risk-weighted assets, i.e. roughly twice as high as the proposed requirement and also somewhat higher than that calculated by the Basel Committee Long-term Economic Impact working group, assuming a permanent, negative impact of banking crises.

CONCLUSION

The various studies do not agree on the costs and benefits, neither in the long term nor the short term, of the proposed amendments to the capital and liquidity requirements for banks.

The analysis by international banks does not include an assessment of the possible long-term benefits to the economy from tighter regulation, but they find that there are substantial costs to the economy in the period of phasing in the tighter requirements.

The authors of other studies consider both the potential long-term net benefits and the transitional costs.

Firstly, the Basel Committee working groups find that tighter regulation has a positive long-term economic impact, including that the capital requirements should optimally be slightly higher than proposed. Secondly, the estimated transitional costs for the banks' adjustment to the tighter requirements should also be taken into consideration. The working group in question finds that the phasing-in does involve economic costs, but that they are negligible, i.e. a decline in GDP growth of 0.03 per cent for a few years. Other studies point to larger transitional costs.

Finally, some academic studies find that there are considerable economic benefits to be gained from tighter regulation, and that the capital requirements should optimally be considerably higher than proposed.

Against the background of the various studies and experience from the financial crisis, the conclusion is that the regulation proposals will have a positive economic impact in the slightly longer term and that the transitional costs are limited. Slightly higher capital requirements than those proposed would probably be even better.

One risk of tighter regulation is that there will be a tendency to transfer banking activities to an unregulated shadow banking sector. However, since the shadow sector is not covered by guarantee schemes, its access to financing is limited, but in any case it is important for the authorities to ensure that such development is contained.

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New Statistics on Structured Bonds

Elena Kabatchenko, Statistics

In February 2011, Danmarks Nationalbank published new statistics on structured bonds. The statistics are based on new information from VP Securities and will in future form part of the Danish monthly securities statistics. Box 1 provides a definition of structured bonds and a brief presentation of the new statistics.

Structured bonds are a type of investment product that was introduced in Denmark in the late 1990s, and which has subsequently become very popular, particularly among private investors. Danmarks Nationalbank has previously analysed structured bonds, in Rasmussen (2007), and in particular the high costs and lack of transparency of the products have been subject to criticism. The purpose of the new statistics is to increase transparency and contribute to creating a better overview of, for instance, developments in and the composition of this market.

According to the new statistics, the volume of structured bonds increased from almost zero in the late 1990s to around kr. 66 billion in 2007-08. The outstanding volume has subsequently declined and today totals about kr. 34 billion, cf. Chart 1. The decrease since 2008 is the result of both fewer and smaller issues of structured bonds. Furthermore the statistics show the distribution of structured bonds by underlying

STRUCTURED BONDS IN DENMARK	Box 1

In the new statistics, a structured bond (also known as an index-linked bond) is defined as a compound financial instrument consisting of a traditional bond and an option, the return on which depends on developments in one or more underlying asset types such as equities, interest rates, currency etc. The bond element in structured bonds is often a zero-coupon bond, and issuers typically guarantee repayment of minimum 100 per cent of the principal on maturity.

The new statistics include the following information:

- Outstanding volume and number of products distributed on a variety of characteristics: underlying asset type, option type, maturity etc. (data is available from December 1999 and onwards)
- Outstanding volume broken down by investor sectors and underlying asset type (data is available from December 1999 and onwards)
- Statistics at ISIN code level with detailed information for individual products/ISIN codes (data is available from August 2010 and onwards).

STRUCTURED BONDS IN DENMARK, END-1999 – EARLY 2011 Chart 1

Kr. billion

Per cent

1. Equity 2. Currency 3. Interest rate 4. Commodities
5. Other 6. Multi 7. Not stated

Structured bonds, nominal outstanding volume
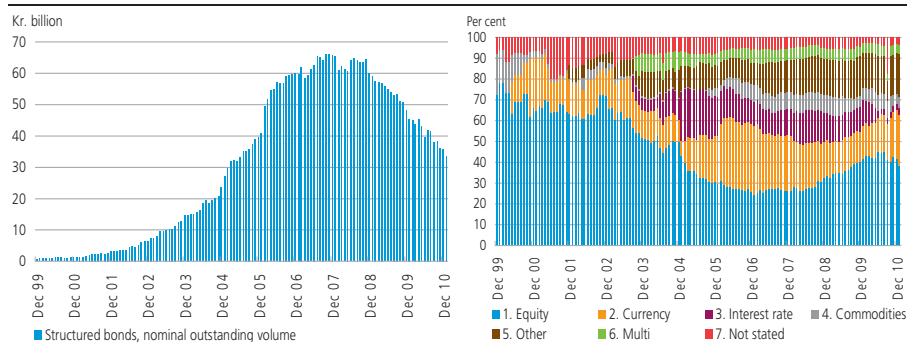
asset types. In early 2000, the bonds were typically based on equities as the underlying asset type, while the variation has been much greater in recent years. In 2006-08, golden years for these products, interest rates, currency, and commodities were to a larger extent used as underlying asset types, whereas their use has receded in recent years.

FACTS ABOUT THE STATISTICS

The new statistics are based on data from VP Securities, where the organisers[1] register detailed information about structured bonds.

Historical data from December 1999 to August 2010 is primarily based on a database, which was prepared for analyses by Rasmussen (2007) and Jørgensen et al. (2009). The database includes detailed information about 347 structured bonds listed on the Copenhagen Stock Exchange in the period 1998-2009. Data for the products that are still in circulation has been confirmed by the bond organisers.

Table 1 shows an overview of the table names, contents and reference regarding the statistics.

LITERATURE

Rasmussen, Anne-Sofie Reng (2007), Index-Linked Bonds, Danmarks Nationalbank, *Monetary Review, 2nd Quarter*.

Jørgensen, Peter Løchte, Henrik Nørholm, David Skovmand and Anne-Sofie Reng Rasmussen (2009), Garantiobligationer for private investorer – Et markedsoverblik, *Finans/Invest*, No. 4 (in Danish only).

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[1] The party that has developed and packaged the structured product.

STATISTICS ON STRUCTURED BONDS, OVERVIEW		Table 1
Table description and name	What they comprise	Where to find them
Instrument characteristics Structured bonds by various characteristics (DNVPSTRS)	Outstanding volume (market value, nominal value, number of products/ISIN codes) of structured bonds broken down by a number of instrument characteristics such as underlying asset type, option type, principal guarantee, maturity and coupon type	**www.statistikbanken.dk** under Money and capital market, Shares and bonds **www.nationalbanken.dk** under Statistics, Database, Securities statistics
Holder information Structured bonds by underlying asset type and investor sector (DNVPSTRH)	Outstanding volume (market value, nominal value) of structured bonds broken down by underlying asset types and investor sectors	**www.statistikbanken.dk** under Money and capital market, Shares and bonds **www.nationalbanken.dk** under Statistics, Database, Securities statistics
Individual ISIN/issues Structured bonds at ISIN code level	All registered information for the individual products/ISIN codes, excluding holder information	**www.nationalbanken.dk**, Statistics, Publications and data, Statistics on structured bonds by ISIN codes

Working Papers Issued

Press Releases

17 DECEMBER 2010: DANMARKS NATIONALBANK'S PUBLICATION OF EXCHANGE RATES

On 1 January 2011 Estonia will become the 17th EU Member State to adopt the euro. Thus, Danmarks Nationalbank will stop publishing the DKK reference exchange rate for the Estonian kroon (EEK) from 3 January 2011.

From the same date the DKK reference exchange rate for Israeli shekel (ILS) will be added to Danmarks Nationalbank's list of exchange rates. On this list ILS will be placed between Indian rupee (INR) and SDR.

Danmarks Nationalbank's exchange rates are normally listed on the basis of information from a number of central banks on a telephone conference call arranged by the European Central Bank (ECB) and held daily at 2.15 p.m. The exchange rates are published for information purposes only. Currency can not be bought from or sold to Danmarks Nationalbank at the published exchange rates.

6 FEBRUARY 2011: STATEMENT BY GOVERNOR NILS BERNSTEIN IN CONJUNCTION WITH THE TAKEOVER OF AMAGERBANKEN BY FINANSIEL STABILITET A/S (THE FINANCIAL STABILITY COMPANY)

Statement by governor Nils Bernstein in conjunction with the takeover of Amagerbanken by Finansiel Stabilitet A/S (The Financial Stability Company):

"Amagerbanken has been under stress several times in the last couple of years and the banking activities have now been taken over by Finansiel Stabilitet A/S according to the arrangements in the Danish Bank Rescue Package 3.

It is satisfactory that we in Denmark have established a contingency mechanism to take care of a bank in distress in a way that gives the least disruption for ordinary banking customers. This mechanism has now been applied.

The protracted vulnerable situation of Amagerbanken and its termination as a independent bank does not change Danmarks Nationalbank's general assessment of the strength of the financial system. The Danish financial sector as a whole is assessed to have sufficient capital and liquidity to meet the outlook for the Danish economy."

16. FEBRUARY 2011: MOODY'S AND DANISH BANKS

Statement by Governor Nils Bernstein:

"Moody's has downgraded a number of Danish banks. It had to come as a logical consequence of Bank Rescue Package III, which has been in force since 1 October 2010", says Nils Bernstein. "In my view, Bank Rescue Package III is the right system. We cannot continue to have the government underpin the banks' major creditors. Moody's downgrade will undoubtedly increase the banks' funding costs, which will to a higher degree reflect the risks assumed by the banks. The combined effects of Bank Rescue Package III will contribute to creating a more robust and self-sustaining financial system that takes fewer risks."

Tables

Symbols and Sources

0   Magnitude nil or less than one half of unit employed.

…   Data not available or of negligible interest.

Some of the most recent statistics may be provisional. Due to rounding-off there may be small differences between the sum of the individual figures and the totals stated.

The Tables section of this publication is closed on 9 March 2011.

Danmarks Nationalbank is the source for Tables 1-15, 17-19 and 24-25, while the Nasdaq OMX Copenhagen is the source for series of bond yields and the share-price index in Table 1. Statistics Denmark is the source for Tables 16 and 20-23. The calculations in Tables 21 and 25 have been made by Danmarks Nationalbank on the basis of data from Statistics Denmark and OECD.

INTEREST RATES AND SHARE-PRICE INDEX   Table 1

Effective end-of-year/ from		Danmarks Nationalbank's interest rates			The ECB's interest rate	End of period	Inter-bank interest rate, 3-months uncol-lateral-ized	Bond yields		Share-price index OMXC20 (prev.KFX)
		Discount rate	Lending	Certifi-cates of deposit	Main refinanc-ing opera-tions, fixed rate[1]			10-year central-govern-ment bond	30-year mort-gage-credit bond	
		Per cent per annum					Per cent per annum			3.7.89 =100
2006		3.50	3.75	3.75	3.50	2006	3.81	3.95	5.24	441.48
2007		4.00	4.25	4.25	4.00	2007	4.65	4.48	5.61	464.14
2008		3.50	3.75	3.75	2.50	2008	4.20	3.31	6.21	247.72
2009		1.00	1.20	0.95	1.00	2009	0.85	3.62	5.19	336.69
2010		0.75	1.05	0.70	1.00	2010	0.87	2.98	4.53	457.58
2009	25 Sep	1.00	1.25	1.15	1.00	Feb 10 ...	0.85	3.42	5.03	354.77
	29 Sep	1.00	1.25	1.00	1.00	Mar 10 ...	0.70	3.37	5.01	383.04
	11 Dec	1.00	1.20	0.95	1.00	Apr 10 ...	0.70	3.21	4.98	411.50
2010	8 Jan	1.00	1.15	0.90	1.00	May 10 ...	0.50	2.69	4.81	388.69
	15 Jan	0.75	1.05	0.80	1.00	Jun 10 ...	0.50	2.68	4.80	393.02
	26 Mar	0.75	1.05	0.70	1.00	Jul 10 ...	0.55	2.76	4.79	410.83
	20 May	0.75	1.05	0.60	1.00	Aug 10 ...	0.62	2.16	4.09	396.38
	27 May	0.75	1.05	0.50	1.00	Sep 10 ...	0.55	2.35	4.15	416.96
	15 Oct	0.75	1.05	0.60	1.00	Oct 10 ...	0.90	2.61	4.31	424.20
	29 Oct	0.75	1.05	0.70	1.00	Nov 10 ...	0.80	2.82	4.47	424.77
						Dec 10 ...	0.87	2.98	4.53	457.58
						Jan 11 ...	0.84	3.15	4.65	462.11
2011	9 Mar	0.75	1.05	0.70	1.00	Feb 11 ...	0.82	3.17	4.71	473.64

[1] Until 7 October 2008 minimum bid rate.

SELECTED ITEMS FROM DANMARKS NATIONALBANK'S BALANCE SHEET Table 2

	The foreign-exchange reserve (net)	Notes and coin in circula-tion	The central govern-ment's account with Danmarks National-bank	The banks' and the mortgage-credit institutes' net position with Danmarks Nationalbank			
				Certifi-cates of deposit	Deposits (current account)	Loans	Total net position
End of period				Kr. billion			
2005	212.3	56.2	56.4	207.6	12.8	135.3	85.1
2006	171.7	59.8	73.8	163.2	8.8	153.7	18.2
2007	168.8	61.6	89.9	200.5	9.4	216.8	-6.9
2008	211.7	61.3	262.8	118.5	9.7	240.9	-112.7
2009	394.5	60.8	212.4	166.2	22.1	104.2	84.1
Feb 10	416.1	58.3	202.0	113.8	12.3	15.5	110.6
Mar 10	417.2	59.4	203.5	116.1	19.2	23.3	112.0
Apr 10	404.1	60.5	190.3	96.9	16.3	3.1	110.1
May 10	440.5	61.3	199.8	120.3	16.8	0.5	136.6
Jun 10	438.4	61.4	220.7	142.1	23.5	47.2	118.4
Jul 10	428.7	61.2	191.5	121.0	16.0	0.1	136.9
Aug 10	429.2	60.9	216.8	95.3	16.0	0.1	111.3
Sep 10	431.3	60.7	218.5	108.2	12.6	9.9	110.9
Oct 10	421.7	61.1	206.3	99.9	16.1	0.1	115.9
Nov 10	419.2	61.1	192.2	111.3	15.3	1.2	125.4
Dec 10	418.6	62.5	177.3	132.5	14.5	9.3	137.8
Jan 11	430.1	60.3	184.0	120.5	14.8	2.4	133.0
Feb 11	446.4	60.7	235.2	66.8	23.9	0.4	90.4

FACTORS AFFECTING THE BANKS' AND THE MORTGAGE-CREDIT
INSTITUTES' NET POSITION WITH DANMARKS NATIONALBANK   Table 3

	Central-government finance			Net purchase of foreign exchange by Danmarks Nationalbank					The banks' and the mortgage-credit institutes' net position with Danmarks Nationalbank	
	Do-mestic gross financ-ing require-ment	Sales of do-mestic central-govern-ment securi-ties, etc.	Liquid-ity effect	Interven-tions to purchase foreign exchange, net	Other	Total	Net pur-chase of bonds by Dan-marks Nation-albank	Other factors	Change in net position	End of period
					Kr. billion					
2006	-14.5	16.2	-30.6	-34.3	4.3	-30.0	-4.9	-1.2	-66.7	18.2
2007	-26.1	2.9	-29.1	-1.7	7.2	5.5	-0.4	-1.4	-25.3	-6.9
2008	-11.9	99.6	-111.5	-19.9	0.1	-19.8	0.6	24.9	-105.8	-112.7
2009	178.6	123.8	54.8	153.6	17.1	170.7	6.5	-35.3	196.8	84.1
2010	169.6	160.7	8.8	45.7	4.3	50.0	-0.4	-4.7	53.7	...
Feb 10	8.6	16.0	-7.4	0.0	2.1	2.1	1.3	-1.6	-5.5	110.6
Mar 10	19.5	22.0	-2.5	3.1	-0.9	2.2	1.2	0.4	1.3	112.0
Apr 10	17.8	17.9	-0.1	0.0	0.3	0.3	0.9	-2.8	-1.8	110.1
May 10	4.4	15.1	-10.7	38.5	-0.7	37.8	1.0	-1.6	26.5	136.6
Jun 10	4.2	26.2	-22.0	0.0	-1.0	-1.0	0.2	4.6	-18.1	118.4
Jul 10	36.5	8.5	28.0	-8.7	0.3	-8.4	0.0	-1.2	18.5	136.9
Aug 10	-15.6	10.1	-25.7	0.0	0.9	0.9	-0.2	-0.7	-25.6	111.3
Sep 10	7.8	10.7	-2.9	3.4	0.1	3.5	-0.5	-0.5	-0.4	110.9
Oct 10	14.2	4.3	9.9	-7.3	0.1	-7.2	-0.2	2.5	5.0	115.9
Nov 10	24.2	10.3	13.9	-2.2	0.0	-2.2	0.0	-2.2	9.5	125.4
Dec 10	20.9	6.3	14.6	0.2	-0.4	-0.2	-0.5	-1.5	12.4	137.8
Jan 11	8.5	14.9	-6.4	0.0	...	...	...	...	...	133.0
Feb 11	-27.5	9.5	-37.0	0.0	...	...	...	...	...	90.4

SELECTED ITEMS FROM THE CONSOLIDATED
BALANCE SHEET OF THE MFI SECTOR   Table 4

		Assets				Liabilities		
		Domestic lending		Domestic securities			Bonds, etc. issued	Foreign assets, net [1]
	Total balance	Public sector	Private sector	Bonds, etc.	Shares, etc.	Domestic deposits		
End of period					Kr. billion			
2006	4,656.2	116.8	2,956.0	51.8	60.3	1,077.0	1,433.4	-223.0
2007	5,446.3	117.5	3,356.1	43.3	63.5	1,219.7	1,505.2	-304.5
2008	6,286.4	129.1	3,724.3	40.6	56.7	1,487.5	1,508.4	-407.9
2009	5,970.1	135.9	3,647.9	78.2	65.5	1,427.9	1,650.9	-417.6
2010	6,151.8	146.6	3,700.7	41.9	79.5	1,410.1	1,711.8	-378.0
Jan 10	6,091.2	133.7	3,660.0	80.1	68.0	1,430.4	1,684.5	-399.5
Feb 10	6,150.8	132.1	3,652.2	72.2	68.6	1,421.9	1,690.3	-403.9
Mar 10	6,143.5	135.3	3,660.2	77.1	69.2	1,419.4	1,713.2	-396.7
Apr 10	6,137.6	136.1	3,651.7	74.9	69.5	1,421.8	1,685.5	-396.3
May 10	6,435.3	136.8	3,679.3	66.3	70.3	1,428.2	1,718.9	-389.5
Jun 10	6,394.5	140.7	3,719.6	54.1	79.5	1,432.8	1,718.2	-396.4
Jul 10	6,398.7	143.7	3,694.1	46.5	80.9	1,443.1	1,719.9	-359.6
Aug 10	6,614.0	138.9	3,716.7	64.5	81.3	1,471.3	1,763.6	-332.5
Sep 10	6,511.8	143.1	3,713.9	66.2	74.3	1,430.8	1,792.8	-337.4
Oct 10	6,347.1	141.5	3,705.3	56.1	77.3	1,446.4	1,765.6	-309.4
Nov 10	6,325.0	142.4	3,702.8	29.9	77.8	1,415.4	1,700.4	-385.2
Dec 10	6,151.8	146.6	3,700.7	41.9	79.5	1,410.1	1,711.8	-378.0
Jan 11	6,094.8	144.2	3,668.1	42.8	81.5	1,400.0	1,702.5	-311.9
		Change compared with previous year, per cent						
2006	...	8.3	14.4	-31.8	12.8	10.9	8.7	...
2007	...	0.6	13.5	-16.4	5.2	13.3	5.0	...
2008	...	9.8	11.0	-6.2	-10.7	22.0	0.2	...
2009	...	5.3	-2.1	92.4	15.5	-4.0	9.4	...
2010	...	7.9	1.4	-46.4	21.4	-1.2	3.7	...
Jan 10	...	3.4	-1.8	111.1	19.0	-3.3	12.1	...
Feb 10	...	3.9	-1.4	60.7	22.5	-2.8	11.9	...
Mar 10	...	5.4	-1.8	54.3	26.1	-0.7	9.7	...
Apr 10	...	5.2	-1.5	33.6	23.2	-1.2	7.4	...
May 10	...	6.5	0.2	11.1	21.6	-0.3	8.8	...
Jun 10	...	5.4	0.2	-10.4	34.0	1.9	6.0	...
Jul 10	...	5.9	0.5	-26.8	38.5	-0.1	5.9	...
Aug 10	...	6.5	1.7	-4.1	38.0	3.4	9.1	...
Sep 10	...	9.2	1.2	-8.5	20.6	1.6	7.5	...
Oct 10	...	7.5	1.7	-24.4	22.7	2.3	8.3	...
Nov 10	...	9.1	1.5	-60.0	22.9	1.7	3.4	...
Dec 10	...	7.9	1.4	-46.4	21.4	-1.2	3.7	...
Jan 11	...	7.8	0.2	-46.6	19.9	-2.1	1.1	...

Note: The MFI sector includes Danish monetary financial institutions, i.e. banks and mortgage-credit institutes, other
       credit institutions, money-market funds and Danmarks Nationalbank.
[1] The net foreign assets of the MFI sector has been compiled as the difference between all assets and liabilities vis-a-vis
    non-residents.

MONEY STOCK   Table 5

End of period	Bank-notes and coin in circula-tion[1]	Deposits on demand	M1	Time deposits with original maturity =<2 years	Deposits at notice with original maturity =< 3 months	M2	Repur-chase agree-ments	Bonds, etc. issued with original maturity =< 2 years	M3
				Kr. billion					
2006	50.7	648.6	699.3	143.0	17.9	860.2	8.0	21.3	889.5
2007	51.9	703.2	755.1	199.7	18.0	972.8	6.2	61.5	1,040.6
2008	50.4	704.8	755.2	286.4	18.4	1,060.0	4.0	57.0	1,121.1
2009	48.5	772.0	820.5	183.2	19.6	1,023.3	10.9	143.0	1,177.3
2010	52.6	771.4	824.0	139.8	18.0	981.8	58.2	241.2	1,281.5
Jan 10	47.4	792.9	840.4	185.5	17.2	1,043.0	6.9	172.3	1,222.2
Feb 10	47.5	791.3	838.8	174.6	17.3	1,030.7	6.5	162.3	1,199.6
Mar 10	50.7	788.4	839.1	156.9	17.5	1,013.4	19.9	187.3	1,220.8
Apr 10	51.1	806.4	857.5	157.4	16.2	1,031.1	17.2	177.0	1,225.5
May 10	51.3	811.8	863.1	161.3	16.6	1,041.0	4.4	201.1	1,246.7
Jun 10	51.4	800.1	851.5	144.3	17.2	1,013.1	15.3	210.5	1,239.0
Jul 10	51.5	814.6	866.1	154.4	17.2	1,037.8	31.8	245.6	1,315.3
Aug 10	51.1	811.8	862.9	151.3	17.2	1,031.3	40.6	254.2	1,326.2
Sep 10	51.2	789.8	840.9	128.8	16.6	986.3	43.2	236.4	1,266.0
Oct 10	51.8	797.0	848.8	156.3	17.9	1,023.0	33.8	231.8	1,288.6
Nov 10	52.1	787.4	839.5	145.2	18.2	1,002.9	38.4	230.3	1,271.7
Dec 10	52.6	771.4	824.0	139.8	18.0	981.8	58.2	241.2	1,281.5
Jan 11	50.6	767.3	817.9	136.1	18.0	972.0	49.9	127.0	1,149.1
			Change compared with previous year, per cent						
2006	...	...	8.7	...	...	10.8	...	...	11.4
2007	...	...	8.0	...	...	13.1	...	...	17.0
2008	...	...	0.0	...	...	9.0	...	...	7.7
2009	...	...	8.6	...	...	-3.5	...	...	5.0
2010	...	...	0.4	...	...	-4.1	...	...	8.9
Jan 10	...	...	9.1	...	...	-3.7	...	...	2.9
Feb 10	...	...	7.8	...	...	-4.4	...	...	0.4
Mar 10	...	...	9.1	...	...	-4.0	...	...	3.1
Apr 10	...	...	9.1	...	...	-2.5	...	...	3.0
May 10	...	...	7.9	...	...	-2.8	...	...	2.9
Jun 10	...	...	6.4	...	...	-3.1	...	...	3.8
Jul 10	...	...	6.7	...	...	-2.7	...	...	6.5
Aug 10	...	...	3.7	...	...	-3.5	...	...	8.6
Sep 10	...	...	4.6	...	...	-4.4	...	...	4.0
Oct 10	...	...	2.2	...	...	-2.6	...	...	5.7
Nov 10	...	...	0.7	...	...	-3.4	...	...	5.9
Dec 10	...	...	0.4	...	...	-4.1	...	...	8.9
Jan 11	...	...	-2.7	...	...	-6.8	...	...	-6.0

[1] Notes and coin in circulation, excluding the banks' holdings.

SELECTED ITEMS FROM THE BALANCE SHEET OF THE BANKS   Table 6

		Assets					Liabilities	
			Domestic lending					
				of which:				
	Total balance	Lending to MFIs	Total	House-holds, etc.	Non-financial compa-nies	Holdings of securities	Loans from MFIs	Deposits
End of period				Kr. billion				
2006	3,216.1	715.0	1,124.3	475.0	458.0	889.6	1,133.4	1,148.3
2007	3,940.0	924.3	1,333.6	557.4	551.8	1,065.8	1,441.8	1,345.6
2008	4,568.5	974.6	1,546.3	586.8	603.3	1,092.1	1,444.2	1,424.2
2009	4,147.6	876.1	1,359.1	575.7	529.7	1,203.5	1,186.0	1,410.2
2010	4,196.6	902.7	1,334.6	570.2	494.7	1,156.3	1,118.3	1,489.7
Jan 10	4,263.3	950.4	1,361.4	565.4	523.6	1,200.6	1,257.2	1,427.2
Feb 10	4,287.3	969.2	1,344.9	560.9	534.6	1,180.7	1,258.2	1,415.9
Mar 10	4,293.0	949.6	1,347.2	566.5	532.3	1,241.8	1,264.5	1,417.4
Apr 10	4,226.3	916.4	1,333.6	560.0	528.0	1,189.8	1,149.0	1,440.4
May 10	4,485.0	958.3	1,352.7	558.9	527.0	1,216.5	1,180.2	1,456.0
Jun 10	4,485.9	917.9	1,388.3	569.5	531.6	1,275.3	1,204.8	1,421.3
Jul 10	4,437.4	935.8	1,361.4	563.1	510.8	1,243.5	1,152.5	1,490.6
Aug 10	4,611.5	965.2	1,370.5	563.3	518.5	1,221.8	1,165.3	1,540.0
Sep 10	4,537.0	910.0	1,362.2	570.9	504.6	1,223.7	1,297.3	1,463.6
Oct 10	4,347.9	921.8	1,349.0	563.9	496.3	1,154.1	1,174.2	1,513.3
Nov 10	4,398.6	977.7	1,338.9	560.7	498.6	1,179.5	1,235.7	1,509.7
Dec 10	4,196.6	902.7	1,334.6	570.2	494.7	1,156.3	1,118.3	1,489.7
Jan 11	4,079.1	833.4	1,300.3	560.8	488.8	1,159.7	1,050.1	1,476.3
		Change compared with previous year, per cent						
2006	...	9.7	22.2	19.8	23.8	3.2	16.2	7.8
2007	...	29.3	18.6	17.4	20.5	19.8	27.2	17.2
2008	...	5.4	15.9	5.3	9.3	2.5	0.2	5.8
2009.................	...	-10.1	-12.1	-1.9	-12.2	10.2	-17.9	-1.0
2010	...	3.0	-1.8	-1.0	-6.6	-3.9	-5.7	5.6
Jan 10	...	0.8	-11.3	-2.3	-10.6	3.7	-12.2	-1.8
Feb 10	...	6.9	-10.2	-2.0	-7.2	0.1	-9.2	-0.6
Mar 10	...	0.8	-10.6	-2.0	-7.2	4.7	-11.0	1.1
Apr 10	...	-5.5	-9.5	-1.6	-7.0	-2.1	-20.9	1.7
May 10	...	9.2	-5.4	-0.8	-4.3	-8.6	-14.3	0.8
Jun 10	...	9.9	-5.0	-0.1	-4.4	-4.8	-12.9	1.2
Jul 10	...	12.9	-4.1	0.5	-4.7	-3.8	-6.8	3.8
Aug 10	...	20.3	-0.6	1.2	-2.3	-5.0	3.5	6.0
Sep 10	...	15.8	-2.1	0.4	-3.4	-1.3	13.4	5.0
Oct 10	...	17.5	-0.6	0.2	-4.1	-6.7	9.3	5.1
Nov 10	...	13.4	-1.2	0.0	-5.8	-2.1	7.0	5.7
Dec 10	...	3.0	-1.8	-1.0	-6.6	-3.9	-5.7	5.6
Jan 11	...	-12.3	-4.5	-0.8	-6.6	-3.4	-16.5	3.4

Note: Excluding Danish banks' units abroad.

SELECTED ITEMS FROM THE BALANCE SHEET OF
THE MORTGAGE-CREDIT INSTITUTES   Table 7

		Assets					Liabilities	
		Domestic lending						
			of which:					
	Total balance	Lending to MFIs	Total	House-holds, etc.	Non-financial compa-nies	Holdings of securities	Loans from MFIs	Bonds, etc. issued
End of period				Kr. billion				
2006	2,699.9	245.1	1,834.8	1,420.2	358.2	574.1	226.5	2,297.9
2007	3,088.2	362.8	2,015.5	1,549.2	404.0	649.2	344.2	2,495.2
2008	3,322.7	428.5	2,164.6	1,629.6	466.7	633.5	474.4	2,582.3
2009	3,827.1	512.2	2,278.8	1,712.2	501.0	927.6	539.3	3,048.3
2010	3,951.5	563.9	2,351.3	1,753.3	532.0	926.1	576.9	3,139.8
Jan 10	3,074.5	429.2	2,283.2	1,714.0	504.2	278.4	484.6	2,418.2
Feb 10	3,120.7	438.3	2,288.9	1,716.5	506.6	290.8	495.5	2,444.5
Mar 10	3,235.7	500.4	2,293.2	1,718.4	507.4	344.5	502.9	2,540.3
Apr 10	3,122.4	424.8	2,298.2	1,718.0	512.8	286.9	477.7	2,453.6
May 10	3,171.6	460.2	2,305.5	1,723.4	517.3	289.5	496.8	2,491.3
Jun 10	3,263.7	523.3	2,315.2	1,730.0	518.3	315.6	529.3	2,538.8
Jul 10	3,229.2	477.8	2,320.4	1,734.5	519.5	315.9	515.7	2,516.5
Aug 10	3,288.0	502.8	2,328.9	1,742.0	519.8	332.4	534.2	2,561.6
Sep 10	3,398.8	583.7	2,336.6	1,743.5	524.8	361.9	530.4	2,648.3
Oct 10	3,277.5	498.8	2,340.0	1,747.4	525.6	337.2	520.3	2,564.0
Nov 10	3,384.5	524.7	2,347.7	1,752.5	528.8	401.5	541.4	2,634.0
Dec 10	3,951.5	563.9	2,351.3	1,753.3	532.0	926.1	576.9	3,139.8
Jan 11	3,209.3	454.4	2,350.5	1,751.4	533.2	302.4	515.7	2,481.6
		Change compared with previous year, per cent						
2006	...	141.7	10.2	10.8	7.2	-11.0	49.3	2.7
2007	...	48.0	9.9	9.1	12.8	13.1	52.0	8.6
2008	...	18.1	7.4	5.2	15.5	-2.4	37.8	3.5
2009	...	19.5	5.3	5.1	7.4	46.4	13.7	18.0
2010	...	10.1	3.2	2.4	6.2	-0.2	7.0	3.0
Jan 10	...	27.4	4.9	4.7	6.4	-6.9	18.2	6.7
Feb 10	...	30.7	4.6	4.4	6.4	18.5	21.9	9.6
Mar 10	...	36.1	4.1	3.9	5.8	32.1	20.4	11.2
Apr 10	...	12.5	3.7	3.4	5.7	19.7	12.3	6.9
May 10	...	18.0	3.6	3.2	6.2	21.7	17.8	7.3
Jun 10	...	16.5	3.5	3.2	5.8	20.1	20.0	6.8
Jul 10	...	22.3	3.2	3.0	5.2	18.9	20.7	6.2
Aug 10	...	25.0	3.1	3.0	4.2	10.7	19.3	6.1
Sep 10	...	31.2	3.1	2.9	4.6	9.6	20.9	6.8
Oct 10	...	21.4	3.0	2.9	4.4	-2.0	13.7	4.6
Nov 10	...	24.9	3.0	2.8	4.9	-5.9	18.7	3.0
Dec 10	...	10.1	3.2	2.4	6.2	-0.2	7.0	3.0
Jan 11	...	5.9	3.0	2.2	5.7	8.6	6.4	2.6

LENDING TO RESIDENTS BY THE BANKS AND
THE MORTGAGE-CREDIT INSTITUTES   Table 8

End of period	Total lending			The banks' lending			The mortgage-credit institutes' lending		
	Total	House-holds, etc.	Business	Total	House-holds, etc.	Business	Total	House-holds, etc.	Business
	Kr. billion								
2006	3,000.8	1,895.2	1,002.6	1,166.0	475.0	636.9	1,834.8	1,420.2	365.7
2007	3,387.8	2,106.7	1,173.0	1,372.3	557.4	760.5	2,015.5	1,549.2	412.4
2008	3,787.5	2,216.4	1,456.4	1,622.9	586.8	978.3	2,164.6	1,629.6	478.1
2009	3,682.4	2,287.9	1,283.8	1,403.6	575.7	770.0	2,278.8	1,712.2	513.8
2010	3,708.4	2,323.6	1,281.8	1,357.2	570.2	738.6	2,351.3	1,753.3	543.1
Jan 10	3,684.5	2,279.4	1,297.1	1,401.3	565.4	780.3	2,283.2	1,714.0	516.9
Feb 10	3,673.7	2,277.4	1,291.9	1,384.8	560.9	772.6	2,288.9	1,716.5	519.3
Mar 10	3,680.4	2,285.0	1,289.5	1,387.1	566.5	769.6	2,293.2	1,718.4	519.9
Apr 10	3,661.2	2,278.0	1,276.6	1,363.0	560.0	751.7	2,298.2	1,718.0	524.9
May 10	3,687.6	2,282.3	1,300.0	1,382.1	558.9	771.0	2,305.5	1,723.4	529.0
Jun 10	3,732.9	2,299.5	1,324.5	1,417.7	569.5	794.8	2,315.2	1,730.0	529.7
Jul 10	3,701.4	2,297.6	1,292.8	1,381.1	563.1	761.8	2,320.4	1,734.5	531.1
Aug 10	3,719.0	2,305.3	1,307.4	1,390.1	563.3	776.1	2,328.9	1,742.0	531.3
Sep 10	3,718.4	2,314.3	1,294.6	1,381.8	570.9	758.8	2,336.6	1,743.5	535.8
Oct 10	3,711.6	2,311.3	1,295.7	1,371.6	563.9	759.1	2,340.0	1,747.4	536.6
Nov 10	3,709.2	2,313.2	1,293.5	1,361.5	560.7	753.6	2,347.7	1,752.5	539.9
Dec 10	3,708.4	2,323.6	1,281.8	1,357.2	570.2	738.6	2,351.3	1,753.3	543.1
Jan 11	3,673.4	2,312.2	1,262.0	1,322.9	560.8	717.8	2,350.5	1,751.4	544.3
Change compared with previous year, per cent									
2006	14.8	12.9	17.7	22.7	19.8	24.8	10.2	10.8	7.0
2007	12.9	11.2	17.0	17.7	17.4	19.4	9.9	9.1	12.8
2008	11.8	5.2	24.2	18.3	5.3	28.6	7.4	5.2	15.9
2009	-2.8	3.2	-11.9	-13.5	-1.9	-21.3	5.3	5.1	7.5
2010	0.7	1.6	-0.2	-3.3	-1.0	-4.1	3.2	2.4	5.7
Jan 10	-2.1	2.9	-9.4	-11.6	-2.3	-17.6	4.9	4.7	6.8
Feb 10	-1.7	2.7	-8.2	-10.5	-2.0	-16.0	4.6	4.4	6.6
Mar 10	-2.1	2.4	-8.9	-10.9	-2.0	-16.7	4.1	3.9	5.8
Apr 10	-2.3	2.1	-9.1	-10.9	-1.6	-17.0	3.7	3.4	5.1
May 10	-0.7	2.2	-5.1	-7.0	-0.8	-11.2	3.6	3.2	5.6
Jun 10	-0.6	2.4	-5.0	-6.6	-0.1	-10.7	3.5	3.2	5.0
Jul 10	-0.3	2.4	-4.5	-5.7	0.5	-9.9	3.2	3.0	4.4
Aug 10	1.0	2.6	-1.6	-2.4	1.2	-4.7	3.1	3.0	3.5
Sep 10	0.4	2.3	-2.8	-3.8	0.4	-6.9	3.1	2.9	3.7
Oct 10	1.1	2.2	-0.6	-2.2	0.2	-3.3	3.0	2.9	3.5
Nov 10	0.8	2.1	-0.9	-2.8	0.0	-4.1	3.0	2.8	3.8
Dec 10	0.7	1.6	-0.2	-3.3	-1.0	-4.1	3.2	2.4	5.7
Jan 11	-0.3	1.4	-2.7	-5.6	-0.8	-8.0	3.0	2.2	5.3

Note: Including lending in Danish banks' units abroad.

THE MORTGAGE-CREDIT INSTITUTES' LENDING BROKEN DOWN BY TYPE — Table 9

End of period	Index-linked lending	Fixed-rate lending	Adjustable-rate lending			of which:	
			Total	of which =<1 year	Total	Lending in foreign currency	Instal-ment-free lending [1]
	Kr. billion						
2006	83.5	797.5	951.7	720.5	1,832.7	85.7	432.2
2007	77.9	889.2	1,045.6	796.6	2,012.7	123.8	547.3
2008	72.4	903.9	1,189.1	900.3	2,165.4	155.3	626.4
2009	68.3	740.2	1,472.7	1,106.6	2,281.2	211.4	695.1
2010	63.9	648.3	1,641.0	1,190.7	2,353.2	232.3	740.6
Jan 10	68.5	729.5	1,487.3	1,092.9	2,285.3	214.2	697.5
Feb 10	68.7	719.2	1,504.0	1,103.6	2,291.9	216.1	702.5
Mar 10	68.8	697.5	1,529.8	1,137.4	2,296.1	220.3	703.2
Apr 10	69.0	684.4	1,548.1	1,147.9	2,301.5	221.8	706.2
May 10	68.8	680.3	1,560.0	1,155.3	2,309.0	224.3	710.0
Jun 10	66.7	666.2	1,585.6	1,170.7	2,318.4	228.1	716.4
Jul 10	66.7	661.5	1,595.4	1,175.4	2,323.5	228.9	719.6
Aug 10	66.6	664.5	1,600.5	1,176.7	2,331.6	229.5	722.9
Sep 10	66.6	658.2	1,614.1	1,182.7	2,338.9	231.0	727.2
Oct 10	66.5	655.6	1,619.8	1,177.3	2,341.8	231.3	731.8
Nov 10	66.1	657.5	1,626.3	1,180.5	2,349.9	232.1	736.7
Dec 10	63.9	648.3	1,641.0	1,190.7	2,353.2	232.3	740.6
Jan 11	64.0	644.4	1,643.6	1,159.3	2,352.0	231.2	741.6

Note: The Table includes the mortgage-credit lending to residents only, whereas Tables 7 and 8 include the institutes' total lending to residents.

[1] The mortgage-credit institutes' instalment-free lending to owner-occupied dwellings.

THE BANKS' EFFECTIVE INTEREST RATES   Table 10

	Lending				Deposits			
	All sectors	House-holds, etc.	Non-financial compa-nies	Financial compa-nies	All sectors	House-holds, etc.	Non-financial compa-nies	Financial compa-nies
	Per cent, per annum							
Q1 06	4.8	6.2	4.5	2.8	1.9	1.5	2.0	2.4
Q2 06	5.0	6.4	4.7	3.1	2.1	1.8	2.3	2.6
Q3 06	5.2	6.6	5.0	3.3	2.4	2.1	2.5	2.8
Q4 06	5.4	6.8	5.2	3.5	2.7	2.4	2.9	3.2
Q1 07	5.7	7.1	5.5	3.6	3.1	2.8	3.2	3.4
Q2 07	5.9	7.2	5.7	4.0	3.4	3.1	3.4	3.8
Q3 07	6.1	7.4	6.0	4.1	3.6	3.3	3.6	4.0
Q4 07	6.2	7.4	6.1	4.3	3.7	3.4	3.7	4.1
Q1 08	6.2	7.5	6.1	4.5	3.7	3.5	3.8	4.2
Q2 08	6.5	7.7	6.3	4.6	3.8	3.6	3.9	4.2
Q3 08	6.6	7.8	6.5	4.9	4.0	3.6	4.1	4.5
Q4 08	7.0	8.4	7.1	5.2	4.4	3.9	4.5	5.0
Q1 09	6.0	7.4	6.3	4.0	3.3	2.8	3.2	4.1
Q2 09	5.1	6.4	5.4	2.7	2.2	2.0	2.0	2.6
Q3 09	4.5	6.0	5.0	2.1	1.7	1.7	1.5	1.9
Q4 09	4.1	5.6	4.6	1.7	1.4	1.5	1.1	1.5
Q1 10	3.9	5.5	4.4	1.5	1.2	1.4	0.9	1.3
Q2 10	3.6	5.3	4.2	1.3	1.0	1.2	0.7	1.0
Q3 10	3.5	5.1	4.1	1.2	0.9	1.1	0.6	0.8
Q4 10	3.6	5.1	4.2	1.2	0.9	1.1	0.6	0.9
Jan 10	3.9	5.6	4.4	1.5	1.3	1.4	1.0	1.4
Feb 10	3.9	5.4	4.4	1.5	1.2	1.3	0.9	1.3
Mar 10	3.8	5.4	4.4	1.4	1.2	1.3	0.9	1.3
Apr 10	3.7	5.4	4.3	1.3	1.1	1.3	0.8	1.1
May 10	3.7	5.4	4.3	1.3	1.0	1.2	0.8	0.9
Jun 10	3.5	5.1	4.1	1.2	0.9	1.1	0.6	0.9
Jul 10	3.5	5.2	4.1	1.1	0.9	1.1	0.6	0.8
Aug 10	3.5	5.1	4.1	1.2	0.9	1.1	0.6	0.8
Sep 10	3.5	5.1	4.1	1.2	0.9	1.1	0.6	0.8
Oct 10	3.5	5.2	4.2	1.1	0.9	1.1	0.6	0.8
Nov 10	3.7	5.2	4.3	1.2	0.9	1.1	0.6	0.9
Dec 10	3.5	5.1	4.1	1.1	0.9	1.0	0.7	0.9
Jan 11	3.8	5.2	4.2	1.3	0.9	1.1	0.6	0.9

DANMARKS NATIONALBANK'S LENDING SURVEY   Tabel 11

	Changes in banks and mortgage-credit institutes' credit policies			
	Corporate lending		Lending to households	
	Development in current quarter	Expectations for the coming quarter	Development in current quarter	Expectations for the coming quarter
	Net balance			
Q4 08	-68.0	-56.6	-38.0	-18.1
Q1 09	-59.8	-27.6	-23.1	-5.2
Q2 09	-10.4	-6.7	-1.0	-5.0
Q3 09	-3.7	-0.9	-0.1	-4.7
Q4 09	2.4	-4.1	-4.5	0.0
Q1 10	-7.3	-0.2	-4.5	-4.8
Q2 10	0.6	0.9	0.0	4.7
Q3 10	1.1	-0.1	-0.3	4.6
Q4 10	8.4	10.1	0.0	0.1

Note: A negative net balance indicates that, overall, the institutions have tightened their credit policies, thus making it more difficult to obtain loans, while a positive net balance indicates an overall easing of credit policies. The net balance indicates the institutions' assessment of quarter-on-quarter changes and not absolute changes. For a detailed presentation of the lending survey, see Carina Moselund Jensen and Tania Al-Zagheer Sass, Danmarks Nationalbank's Lending Survey – New Statistics for Changes in Banks' and Mortgage-Credit Institutes' Credit Policies, Danmarks Nationalbank, *Monetary Review*, 1st Quarter 2009.

SELECTED ITEMS FROM THE BALANCE SHEET OF INVESTMENT FUNDS   Table 12

		Assets		Liabilities			
		Holdings of securities		Investment fund shares/units broken down by sector			
	Total balance	Bonds, etc.	Shares, etc.	House-holds	Insurance compa-nies and pension funds	Other	Abroad
End of period	Kr. billion.						
2006	924.7	431.8	385.4	294.3	289.4	305.3	28.8
2007	1,020.7	477.9	411.6	295.2	336.8	322.1	29.2
2008	773.2	425.3	222.5	211.4	266.9	238.1	14.6
2009	865.5	487.5	301.4	252.7	357.8	185.1	22.7
2010	1,286.3	760.7	384.9	299.0	653.0	235.0	24.6
Jan 10	895.0	515.5	290.8	253.6	366.5	191.0	22.5
Feb 10	906.5	522.4	299.5	256.3	368.5	190.7	26.0
Mar 10	934.3	525.4	316.9	265.8	388.8	198.3	27.3
Apr 10	955.9	535.2	332.6	269.9	398.6	204.8	27.3
May 10	967.1	554.7	313.5	268.2	412.7	198.7	27.0
Jun 10	992.0	586.0	311.0	271.3	447.2	196.4	27.2
Jul 10	1,010.0	591.9	322.0	276.2	454.9	200.9	27.0
Aug 10	1,031.8	625.1	307.2	276.8	472.6	204.3	27.4
Sep 10	1,115.1	676.1	319.7	281.9	539.1	210.0	26.7
Oct 10	1,165.8	713.0	334.3	286.7	578.1	214.6	27.1
Nov 10	1,217.2	729.5	360.7	291.1	606.4	218.9	27.5
Dec 10	1,286.3	760.7	384.9	299.0	653.0	235.0	24.6
Jan 11	1,295.1	770.3	385.8	299.5	652.8	237.2	26.5

SECURITIES ISSUED BY RESIDENTS BY OWNER'S HOME COUNTRY Table 13

| | Bonds, etc. | | | | | | Shares | |
| | Total | | Central-government securities | | Mortgage-credit bonds | | | |
End of period	Denmark	Abroad	Denmark	Abroad	Denmark	Abroad	Denmark	Abroad
	Market value, kr. billion							
2006	2,541.3	464.7	380.1	172.6	2,034.9	285.9	989.4	361.8
2007	2,701.2	475.8	301.9	176.2	2,247.1	287.7	996.1	445.4
2008	2,981.5	405.0	363.1	158.5	2,419.2	227.4	529.9	244.4
2009	3,415.2	431.4	394.2	159.8	2,803.0	251.7	641.0	347.5
2010	3,534.3	555.9	474.2	172.9	2,828.8	358.7	784.4	545.7
Jan 10	2,744.7	455.3	414.1	156.4	2,123.6	280.5	677.6	367.0
Feb 10	2,770.4	471.0	418.1	168.7	2,146.3	282.3	673.3	374.0
Mar 10	2,894.8	464.8	432.9	170.5	2,252.0	274.3	705.7	407.5
Apr 10	2,767.4	507.3	440.2	181.1	2,117.4	307.1	739.2	435.8
May 10	2,864.3	490.5	473.7	177.9	2,174.6	293.7	666.3	445.0
Jun 10	2,977.3	495.3	486.2	191.1	2,261.3	282.5	670.5	463.9
Jul 10	2,931.1	527.1	483.3	193.9	2,188.1	312.3	688.3	475.6
Aug 10	3,001.6	537.6	500.2	213.4	2,243.2	301.6	652.7	460.3
Sep 10	3,075.1	532.7	494.5	207.6	2,348.9	299.3	682.9	491.9
Oct 10	2,941.1	544.0	483.6	195.8	2,227.1	322.2	718.9	518.5
Nov 10	3,176.6	494.1	471.0	179.3	2,479.3	290.4	725.5	522.0
Dec 10	3,534.3	555.9	474.2	172.9	2,828.8	358.7	784.4	545.7
Jan 11	2,770.0	599.3	461.8	190.6	2,084.4	385.6	789.1	549.9

Note: Comprise quoted and unquoted securities registered with the VP Securities Services (VP).

HOUSEHOLDS' FINANCIAL ASSETS AND LIABILITIES   Table 14

End of period	Assets					Liabilities		
	Currency and bank deposits, etc.	Bonds, etc.	Shares and certific-ates issued by invest-ment associa-tions, etc.	Life-insurance and pension-scheme savings, etc.	Total	Loans, etc.	Net financial assets	Total
	Kr. billion							
2005	785	173	1,121	1,617	3,696	1,891	1,805	3,696
2006	839	181	1,560	1,681	4,260	2,075	2,185	4,260
2007	902	188	1,445	1,723	4,258	2,282	1,976	4,258
2008	907	178	794	1,787	3,665	2,463	1,202	3,665
2009	928	171	911	1,923	3,933	2,581	1,352	3,933
Q3 09	913	174	906	1,874	3,867	2,552	1,315	3,867
Q4 09	928	171	911	1,923	3,933	2,581	1,352	3,933
Q1 10	945	168	1,025	2,010	4,149	2,639	1,510	4,149
Q2 10	956	156	996	2,102	4,209	2,660	1,549	4,209
Q3 10	949	153	1,017	2,178	4,297	2,686	1,610	4,296

COMPANIES' FINANCIAL ASSETS AND LIABILITIES   Table 15

| | Assets | | | | Liabilities | | | | |
| | | | | | Debt | | | | |
End of period	Curren-cy, bank deposits and granted credits, etc.	Bonds, etc.	Shares and certific-ates issued by invest-ment associa-tions, etc.	Total	Loans, etc.	Bonds, etc. issued	Shares, etc. issued	Net financial assets	Total
				Kr. billion					
2005	792	162	2,197	3,151	1,345	143	3,218	-1,554	3,150
2006	817	148	3,082	4,046	1,580	139	4,428	-2,101	4,047
2007	919	133	2,921	3,974	1,727	118	4,281	-2,153	3,973
2008	1,086	104	1,765	2,956	1,942	109	2,507	-1,600	2,957
2009	1,090	104	1,920	3,114	1,889	138	2,638	-1,552	3,113
Q3 09	1,063	115	1,927	3,105	1,908	123	2,639	-1,565	3,105
Q4 09	1,090	104	1,920	3,114	1,889	138	2,638	-1,552	3,113
Q1 10	1,126	110	2,177	3,413	1,949	140	2,993	-1,669	3,413
Q2 10	1,159	105	2,102	3,367	1,971	129	2,915	-1,649	3,367
Q3 10	1,165	109	2,076	3,350	1,984	132	2,924	-1,690	3,350

Note: Companies are defined as non-financial companies.

	Goods (fob)	Services	Goods and services	Wages and property income	Current transfers	Total current account
			Kr. billion			
2006	18.2	42.0	60.2	16.8	-28.4	48.6
2007	2.1	40.3	42.5	9.7	-29.2	23.0
2008	4.2	51.6	55.8	18.2	-27.8	46.2
2009	42.7	23.6	66.4	21.0	-28.4	59.0
2010	50.5	49.4	99.9	23.9	-30.1	93.6
Jan 09 - Dec 09	42.7	23.6	66.4	21.0	-28.4	59.0
Jan 10 - Dec 10	50.5	49.4	99.9	23.9	-30.1	93.6
Dec 09	3.4	1.7	5.1	1.6	-1.9	4.8
Jan 10	1.2	1.3	2.5	1.7	-4.0	0.2
Feb 10	4.7	2.1	6.9	1.7	-3.7	4.8
Mar 10	9.1	2.1	11.2	-1.4	-3.1	6.8
Apr 10	4.2	5.1	9.3	1.1	-2.3	8.1
May 10	1.8	3.5	5.4	3.1	-2.2	6.2
Jun 10	3.8	4.4	8.2	1.9	-2.2	7.9
Jul 10	7.0	4.0	11.0	1.2	-2.3	9.9
Aug 10	3.5	6.3	9.8	1.1	-2.2	8.7
Sep 10	5.7	5.4	11.1	3.4	-2.2	12.3
Oct 10	3.8	5.0	8.8	3.3	-2.1	10.0
Nov 10	4.7	5.0	9.7	3.2	-1.8	11.1
Dec 10	1.0	5.2	6.2	3.6	-2.0	7.8

CURRENT ACCOUNT OF THE BALANCE OF PAYMENTS (NET REVENUES)   Table 16

FINANCIAL ACCOUNT OF THE BALANCE OF PAYMENTS
(NET PAYMENTS FROM ABROAD)   Table 17

	Current account and capital account, etc., total	Capital import				Other[2]	Danmarks National-bank's transac-tions with abroad[3]
		Direct investments		Portfolio invest-ments[1]	Other capital import		
		Danish abroad	Foreign in Denmark				
	Kr. billion						
2006	48.6	-50.2	16.1	-103.3	83.4	-33.0	-38.3
2007	23.3	-112.3	64.3	-32.0	56.5	-1.0	-1.2
2008	46.6	-72.1	11.4	53.0	-66.7	-43.5	-71.4
2009	58.8	-36.9	15.9	74.3	195.4	-19.4	288.0
2010	94.4	-24.8	0.3	-4.4	71.7	-110.7	26.5
Jan 09 - Dec 09	58.8	-36.9	15.9	74.3	195.4	-19.4	288.0
Jan 10 - Dec 10	94.4	-24.8	0.3	-4.4	71.7	-110.7	26.5
Dec 09	4.9	24.8	-13.1	-44.4	16.1	17.1	5.4
Jan 10	0.2	-7.0	6.3	-19.4	53.0	-13.0	20.0
Feb 10	4.9	-12.7	-11.5	16.3	8.1	-4.9	0.3
Mar 10	6.8	1.1	2.0	-39.4	33.1	-3.2	0.4
Apr 10	8.1	-8.3	5.4	43.7	-52.6	-10.1	-13.8
May 10	6.3	-2.3	14.1	-10.0	23.6	3.1	34.7
Jun 10	7.9	-4.9	-0.4	29.5	-22.1	-19.7	-9.7
Jul 10	9.9	-9.5	4.5	19.1	-2.7	-27.3	-6.0
Aug 10	8.8	1.5	2.7	-22.9	3.7	9.6	3.3
Sep 10	12.3	-8.3	4.3	-69.3	88.5	-25.2	2.3
Oct 10	10.0	29.2	-11.6	15.0	-50.9	1.1	-7.1
Nov 10	11.1	-11.1	18.0	-65.5	35.4	14.0	2.0
Dec 10	7.9	7.4	-33.3	98.5	-45.6	-34.9	0.1

[1] This item may differ from the total of Table 18, as portfolio investments are published 1-2 weeks earlier than the rest of the balance of payments.
[2] Including errors and omissions.
[3] Including transactions on *all* Danmarks Nationalbank's accounts with abroad and not only transactions on accounts included by compilation of the foreign-exchange reserve. The latter is published by press release on the 2nd banking day of each month and included in Table 2 of this section.

PORTFOLIO INVESTMENTS OF THE BALANCE OF PAYMENTS
(NET PAYMENTS FROM ABROAD)   Table 18

	Danish securities			Foreign securities		
	Krone-denominated bonds, etc.	Foreign currency denominated bonds, etc.	Shares	Bonds, etc.	Shares	Total [1]
	Kr. billion					
2006	16.3	70.0	-34.4	-21.5	-133.8	-103.4
2007	26.2	73.1	15.0	-96.0	-49.8	-31.5
2008	-59.1	141.2	11.4	-91.1	50.7	53.1
2009	-5.6	162.6	43.1	-83.4	-42.4	74.3
2010	79.5	-34.5	41.0	-58.0	-32.6	-4.6
Jan 10	0.2	16.9	1.2	-31.8	-5.9	-19.4
Feb 10	10.3	-10.2	5.3	2.3	8.5	16.2
Mar 10	-6.8	5.3	5.3	-36.8	-6.4	-39.4
Apr 10	27.7	16.8	2.2	0.4	-3.3	43.8
May 10	-13.4	-17.8	-1.2	23.2	-0.8	-10.0
Jun 10	6.2	25.8	6.5	-7.3	-1.7	29.5
Jul 10	25.3	3.2	-3.3	0.3	-6.5	19.0
Aug 10	14.0	-45.9	1.0	5.1	2.9	-22.9
Sep 10	5.3	-94.3	3.0	14.6	2.1	-69.3
Oct 10	19.1	9.8	9.5	-17.5	-5.9	15.0
Nov 10	-26.0	-12.9	-0.9	-20.0	-5.6	-65.4
Dec 10	17.7	68.9	12.3	9.4	-10.1	98.2
Jan 11	43.6	-0.1	0.7	-12.9	-10.9	20.4

Note: A negative sign (-) indicates residents' net purchase of foreign securities, or non-residents' net sale of Danish
      securities.
[1] This item may differ from "Portfolio investments" in Table 17, as the rest of the balance of payments is published
1-2 weeks later.

DENMARK'S EXTERNAL ASSETS AND LIABILITIES   Table 19

	Direct investments		Portfolio investments		Finan-cial deriva-tives, net	Other investments			Dan-marks Natio-nalbank	Total
	Equity	Inter-compa-ny debt, etc.	Shares, etc.	Bonds, etc.		Trade credits	Loans and deposits	Other		
End of period	Kr. billion									
Assets										
2005	566	254	558	685	85	37	720	19	217	3,141
2006	579	260	746	678	47	41	823	30	178	3,383
2007	651	287	794	733	0	47	1,035	32	176	3,755
2008	643	378	448	782	84	45	1,101	37	226	3,744
2009	718	375	608	925	23	38	927	32	400	4,044
Q3 09	722	370	566	889	33	41	956	33	400	4,010
Q4 09	718	375	608	925	23	38	927	32	400	4,044
Q1 10	779	388	653	1,014	41	43	987	34	423	4,362
Q2 10	821	405	648	1,031	70	46	968	32	483	4,505
Q3 10	795	424	663	1,025	90	46	1,067	34	474	4,618
Liabilities										
2005	504	230	310	1,019	•	27	967	21	3	3,081
2006	482	270	356	1,066	•	32	1,142	35	4	3,386
2007	543	276	422	1,123	•	36	1,409	37	5	3,851
2008	507	295	242	1,198	•	42	1,398	40	121	3,842
2009	478	302	348	1,361	•	35	1,402	38	5	3,969
Q3 09	480	306	337	1,427	•	34	1,366	38	8	3,996
Q4 09	478	302	348	1,361	•	35	1,402	38	5	3,969
Q1 10	486	300	411	1,410	•	30	1,576	42	2	4,256
Q2 10	514	309	431	1,510	•	34	1,495	39	42	4,374
Q3 10	518	304	453	1,396	•	37	1,660	41	37	4,446
Net assets										
2005	62	24	247	-333	85	11	-247	-2	214	61
2006	98	-11	390	-387	47	10	-319	-5	174	-3
2007	108	12	372	-390	0	11	-374	-5	171	-96
2008	136	84	206	-416	84	3	-297	-3	105	-99
2009	240	73	260	-437	23	3	-476	-6	395	76
Q3 09	242	64	229	-537	33	6	-410	-6	392	14
Q4 09	240	73	260	-437	23	3	-476	-6	395	76
Q1 10	293	88	242	-396	41	13	-589	-8	421	106
Q2 10	307	96	217	-478	70	12	-527	-7	441	131
Q3 10	277	121	210	-371	90	9	-593	-7	437	173

Note: As a key principle, the market value has been used for the compilation.

GDP BY TYPE OF EXPENDITURE   Table 20

		Final domestic demand						
	GDP	Private consump-tion	General-govern-ment consump-tion	Gross fixed capital formation	Change in invent-ories	Total	Exports of goods and services	Imports of goods and services
		Kr. billion						
2006	1,631.7	786.6	422.6	356.0	14.6	1,579.8	849.6	797.7
2007	1,695.3	820.4	440.0	371.4	24.8	1,656.5	885.2	846.5
2008	1,740.8	840.3	464.8	365.5	15.2	1,685.7	959.0	903.8
2009	1,656.1	813.6	496.3	303.4	-20.3	1,592.9	792.8	729.6
2010	1,747.7	852.5	516.5	287.5	-3.9	1,652.7	875.4	780.3
Q4 09	429.3	212.9	129.2	75.8	-5.4	412.5	202.0	185.2
Q1 10	417.2	209.1	126.2	65.8	-3.3	397.9	199.0	179.7
Q2 10	438.3	210.8	129.7	74.1	2.3	416.9	219.5	198.1
Q3 10	439.5	208.7	128.8	70.7	0.5	408.7	230.1	199.3
Q4 10	452.8	223.9	131.8	76.9	-3.4	429.2	226.8	203.3
		Real growth compared with previous year, per cent						
2006	3.4	3.6	2.8	14.2	...	5.2	9.0	13.4
2007	1.6	3.0	1.3	0.4	...	2.3	2.8	4.3
2008	-1.1	-0.6	1.6	-3.2	...	-1.2	2.8	2.7
2009	-5.2	-4.5	3.1	-14.3	...	-6.5	-9.7	-12.5
2010	2.1	2.1	1.7	-4.1	...	1.8	2.4	1.9
Q4 09	-3.3	-0.7	2.8	-14.5	...	-4.3	-8.7	-11.0
Q1 10	-0.7	3.0	2.3	-16.4	...	-1.2	-2.7	-3.9
Q2 10	2.8	1.5	2.9	1.2	...	3.9	2.6	5.1
Q3 10	3.5	1.7	1.3	-2.0	...	2.5	4.8	2.7
Q4 10	2.7	2.4	0.5	1.3	...	2.1	4.8	3.7
		Real growth compared with previous quarter (seasonally adjusted), per cent						
Q4 09	0.5	0.3	0.5	-2.6	...	0.3	-0.4	-0.8
Q1 10	0.9	1.9	0.3	-3.2	...	0.2	1.2	-0.3
Q2 10	1.3	-0.9	0.7	6.8	...	2.5	1.6	4.3
Q3 10	0.9	0.5	-0.3	-2.0	...	-0.6	2.5	-0.6
Q4 10	-0.4	0.8	-0.2	0.1	...	0.0	-0.5	0.3

EU-HARMONIZED INDEX OF CONSUMER PRICES (HICP) AND UNDERLYING INFLATION (IMI)

Table 21

	HICP							Index of net retail prices[1]		
		Subcomponents:								
					Administered prices		HICP excl. energy, food and administered prices[3]	Index of net retail prices	Split into[4]:	
								excl. energy, food and administered prices[3]		
	Total	Energy	Food	Core infla- tion[2]	Rent	Public services			Import content[5]	IMI[6]
	Weights, per cent									
	100	10.4	17.4	72.2	7.4	3.9	60.9	53.2	16.8	36.4
	Year-on-year growth, per cent									
2006	1.9	5.3	2.2	1.2	2.1	0.9	1.1	1.3	3.1	0.4
2007	1.7	0.3	3.7	1.3	2.1	0.6	1.2	1.4	1.4	1.4
2008	3.6	7.7	6.7	2.1	2.8	3.5	1.9	2.1	4.0	1.1
2009	1.1	-4.0	0.5	2.0	3.1	4.8	1.7	1.9	-4.3	5.1
2010	2.2	9.2	2.1	1.2	2.8	3.9	0.8	0.9	1.7	0.5
Q1 08	3.2	7.5	6.0	1.7	2.2	2.4	1.6	2.0	3.6	1.2
Q2 08	3.7	9.7	7.4	1.7	2.6	4.0	1.4	1.8	4.2	0.6
Q3 08	4.6	10.4	8.6	2.5	3.9	3.7	2.2	2.2	5.0	0.9
Q4 08	3.0	3.1	5.0	2.4	2.4	3.8	2.3	2.3	3.2	1.8
Q1 09	1.7	-4.6	3.2	2.2	2.7	4.2	2.0	2.3	-1.9	4.4
Q2 09	1.1	-5.5	0.7	2.2	3.1	5.0	1.9	2.1	-4.2	5.2
Q3 09	0.6	-5.9	-0.5	2.0	3.5	5.1	1.6	1.9	-6.0	6.0
Q4 09	0.9	0.3	-1.5	1.6	2.9	4.9	1.2	1.6	-5.0	4.9
Q1 10	1.9	8.9	0.0	1.4	2.9	3.7	1.0	1.2	-1.3	2.3
Q2 10	2.0	10.1	0.8	1.1	2.8	3.9	0.7	0.7	1.0	0.6
Q3 10	2.3	8.8	3.2	1.1	2.5	4.0	0.8	0.9	3.2	-0.2
Q4 10	2.5	9.1	4.5	1.1	2.9	4.0	0.7	0.8	3.8	-0.6

Note: The weights reflect the weighting basis as of January 2009.

[1] Prices in the index of net retail prices are compiled excluding indirect taxes and subsidies.

[2] Core inflation is defined as the increase in HICP excluding energy and food.

[3] Goods and services excluding energy, food and administered prices constitute 60.9 per cent of HICP's weight basis and 53.2 per cent of the index of net retail prices. The difference reflects that the same goods and services do not count equally in the two indices, and does not express the indirect taxation content of the consumer prices.

[4] The division of the index of net retail prices into import and IMI is based on Statistics Denmark's input-output table.

[5] The indirect energy content is included in the import content.

[6] IMI expresses the domestic market-determined inflation. For a detailed presentation of IMI, see Bo William Hansen and Dan Knudsen, Domestic Market-Determined Inflation, Danmarks Nationalbank, *Monetary Review*, 4th Quarter 2005.

SELECTED MONTHLY ECONOMIC INDICATORS   Table 22

	Unemployment Per cent of labour force		Quantity index		Forced sales of real property	New passenger car registrations	Consumer confidence indicator	Composite cyclical Indicator for		
			Manufacturing industry[2]	Retail trade				Manufacturing industry	Building and construction	Service
	Gross[1]	Net	2005=100	2005=100	Number			Balance per cent		
2006	···	3.9	105.7	103.5	1,231	156,719	10.5	9	21	24
2007	3.7	2.8	107.0	104.9	1,392	162,481	7.5	5	9	20
2008	2.7	1.9	106.7	101.7	2,840	150,663	-7.7	-7	-16	3
2009	4.7	3.5	88.2	97.0	4,140	112,249	-5.0	-17	-44	-13
2010	6.0	4.2	90.5	96.7	5,222	153,60	1.8	3	-35	4
Seasonally adjusted										
Feb 10	5.9	4.3	87.1	96.1	463	10,576	3.3	2	-47	3
Mar 10	5.9	4.3	88.8	98.6	486	12,619	0.8	6	-41	0
Apr 10	5.9	4.2	87.0	93.9	371	11,762	2.4	5	-33	1
May 10	5.9	4.1	91.0	97.6	460	12,828	1.7	8	-33	5
Jun 10	6.0	4.1	95.3	95.9	444	12,612	-1.7	6	-34	6
Jul 10	6.2	4.2	94.7	96.2	438	12,241	3.5	5	-33	4
Aug 10	6.1	4.1	91.0	96.5	382	13,038	4.7	4	-32	3
Sep 10	6.2	4.2	94.1	96.3	419	13,339	2.1	5	-28	5
Oct 10	6.2	4.2	91.2	96.7	445	13,759	1.2	2	-32	4
Nov 10	6.1	4.2	90.4	96.6	411	14,392	2.5	-2	-33	9
Dec 10	6.1	4.1	89.6	96.6	429	13,919	1.8	-1	-30	4
Jan 11	6.1	4.2	92.9	96.8	436	14,632	1.9	4	-31	8
Feb 11	...	...	...	...	441	...	1.0	3	-21	11

[1] Including persons in activation programmes.
[2] Excluding shipbuilding.

SELECTED QUARTERLY ECONOMIC INDICATORS   Table 23

	Employment		Hourly earnings			Property prices (purchase sum, one-family dwellings)
	Total	Private	All sectors in Denmark, total	Manufac-turing industry in Denmark	Manufac-turing industry abroad	As a per-centage of property value 2006
	1,000 persons		1996=100			
2006	2,825	1,980	145.7	146.1	134.2	100.3
2007	2,903	2,061	151.4	152.1	138.4	104.8
2008	2,958	2,120	158.0	158.6	143.0	100.1
2009	2,866	2,016	162.9	163.2	145.7	88.1
2010	2,808	1,948	166.6	167.3	149.5	...
	Seasonally adjusted					
Q4 09	2,811	1,955	164.1	164.9	147.1	88.3
Q1 10	2,808	1,948	165.6	166.5	149.1	88.9
Q2 10	2,818	1,956	166.0	166.7	148.9	91.1
Q3 10	2,805	1,943	167.0	168.1	149.7	91.0
Q4 10	2,799	1,946	167.7	168.9	150.3	...
	Change compared with previous year, per cent					
2006	2.1	2.9	3.1	3.1	2.7	21.6
2007	2.8	4.1	3.8	4.0	3.2	4.6
2008	1.9	2.9	4.4	4.2	3.3	-4.5
2009	-3.1	-4.9	3.1	2.9	1.9	-12.0
2010	-2.0	-3.3	2.3	2.5	2.6	...
Q4 09	-5.1	-7.9	2.3	2.5	2.1	-5.1
Q1 10	-4.0	-6.3	2.5	2.7	3.2	1.6
Q2 10	-2.3	-4.0	2.2	2.6	2.6	3.6
Q3 10	-1.3	-2.4	2.2	2.5	2.4	2.7
Q4 10	-0.4	-0.5	2.2	2.4	2.2	...

EXCHANGE RATES   Table 24

	EUR	USD	GBP	SEK	NOK	CHF	JPY
	Kroner per 100 units						
	Average						
2006	745.91	594.70	1,094.32	80.62	92.71	474.22	5.1123
2007	745.06	544.56	1,089.81	80.57	92.99	453.66	4.6247
2008	745.60	509.86	939.73	77.73	91.02	469.90	4.9494
2009	744.63	535.51	836.26	70.18	85.39	493.17	5.7296
2010	744.74	562.57	869.02	78.15	93.02	540.60	6.4299
Feb 10	744.40	543.98	849.77	74.83	91.94	507.39	6.0308
Mar 10	744.16	548.49	825.42	76.50	92.59	513.89	6.0496
Apr 10	744.27	555.17	851.40	77.05	93.83	518.83	5.9429
May 10	744.16	591.90	868.22	76.97	94.26	524.43	6.4246
Jun 10	744.09	609.55	899.03	77.74	94.12	540.65	6.7050
Jul 10	745.22	583.72	891.83	78.49	92.92	553.71	6.6710
Aug 10	744.95	577.90	904.51	79.07	93.91	555.68	6.7733
Sep 10	744.76	570.26	886.92	80.74	94.09	569.07	6.7591
Oct 10	745.67	536.57	850.91	80.36	91.93	554.34	6.5603
Nov 10	745.47	545.99	871.93	80.02	91.51	554.70	6.6164
Dec 10	745.28	563.81	879.47	82.23	94.22	580.90	6.7607
Jan 11	745.18	558.00	879.82	83.62	95.30	583.22	6.7529
Feb 11	745.55	546.27	880.93	84.84	95.34	574.71	6.6116

EFFECTIVE KRONE RATE   Table 25

	Nominal effective krone rate	Consumer-price indices		Real effective krone rate based on consumer prices	Real effective krone rate based on hourly earnings	Consumer-price index in the euro area
		Denmark	Abroad			
Average			1980=100			2005=100
2006	101.6	246.2	233.4	107.3	110.3	102.2
2007	103.2	250.5	238.7	108.3	112.7	104.4
2008	105.8	259.0	246.9	111.1	116.8	107.8
2009	107.8	262.4	243.8	116.5	120.6	108.1
2010	104.0	268.4	246.8	113.8	116.4	...
Feb 10	105.7	266.6	244.7	115.6	...	108.4
Mar 10	105.4	268.2	245.9	115.5	118.1	109.4
Apr 10	104.8	268.6	246.5	114.7	...	109.9
May 10	103.3	268.6	246.9	113.4	...	110.0
Jun 10	102.2	268.2	246.9	112.3	116.0	110.0
Jul 10	102.9	268.2	246.7	112.8	...	109.7
Aug 10	102.8	269.0	246.9	112.7	...	109.9
Sep 10	102.8	270.1	247.5	112.9	115.5	110.1
Oct 10	104.4	269.9	248.0	114.0	...	110.5
Nov 10	103.9	270.1	248.3	113.5	...	110.6
Dec 10	102.7	270.3	249.6	111.9	116.2	111.3
Jan 11	102.5	270.6	249.5	111.8	...	110.5
Feb 11	102.9	...	...	...	...	...
		Change compared with previous year, per cent				
2006	0.0	1.9	2.1	-0.1	0.6	2.2
2007	1.6	1.7	2.3	0.9	2.2	2.2
2008	2.5	3.4	3.4	2.6	3.6	3.3
2009	1.9	1.3	-1.2	4.9	3.2	0.3
2010	-3.6	2.3	1.2	-2.3	-3.4	...
Feb 10	-1.0	1.9	-0.6	1.2	...	0.9
Mar 10	-2.4	2.2	-0.2	-0.3	-2.1	1.4
Apr 10	-2.4	2.4	1.8	-2.1	...	1.5
May 10	-3.9	2.2	1.8	-3.2	...	1.6
Jun 10	-5.4	1.7	1.6	-4.5	-3.7	1.4
Jul 10	-4.6	2.3	1.7	-3.7	...	1.7
Aug 10	-4.3	2.3	1.6	-3.2	...	1.6
Sep 10	-4.8	2.6	1.8	-3.6	-4.1	1.8
Oct 10	-3.7	2.5	1.9	-3.1	...	1.9
Nov 10	-4.2	2.6	2.0	-3.3	...	1.9
Dec 10	-5.0	2.8	2.2	-4.0	-3.9	2.2
Jan 11	-4.2	2.7	2.4	-3.6	...	2.3
Feb 11	-2.7	...	...	...	...	...

Note: The nominal effective krone rate index is a geometric weighting of the development in the Danish krone rate against currencies of Denmark's 27 most important trading partners. However, only 25 countries are included in the calculation of consumer prices abroad and the real effective krone rate based on consumer prices and hourly earnings, respectively.
As from April 2010 the weights are based on trade in manufactured goods in 2009 and earlier on trade in manufactured goods in 2002.
An increase in the index reflects a nominal or a real appreciation of the krone.

Danmarks Nationalbank's Statistical Publications

Periodical electronic publications
Danmarks Nationalbank releases new financial statistics to the public in electronic publications composed of 2 elements:
"Nyt" (News) describing the key development trends.
Tabeltillæg (Tables Supplement) containing tables with as detailed specifications as possible.

"Nyt" is available in Danish only, whereas the tables supplement and the corresponding sources and methodologies also are available in English.

Statistics databank
The above publications are supplemented by a statistics database comprising all time series which are updated concurrent with a release. The time series include data as far back in time as possible. The statistical data from Danmarks Nationalbank are published through Statistics Denmark's "StatBank Denmark". Danmarks Nationalbank's part of the "StatBank Denmark" is available directly via:
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