



Danmarks
Nationalbank

Monetary Review
2nd Quarter

2010

D A N M A R K S
N A T I O N A L
B A N K 2 0 1 0



MONETARY REVIEW 2nd QUARTER 2010

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

Text may be copied from this publication provided that Danmarks Nationalbank is specifically stated as the source. Changes to or misrepresentation of the content are not permitted.

The Monetary Review is available on Danmarks Nationalbank's website:
www.nationalbanken.dk under publications.

Managing Editor: Jens Thomsen
Editor: Peter Birch Sørensen

This edition closed for contributions on 4 June 2010.

The Monetary Review can be ordered from:

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

Telephone +45 33 63 70 00 (direct) or +45 33 63 63 63.

Inquiries: Monday-Friday 9.00 a.m.-4 p.m.

E-mail: kommunikation@nationalbanken.dk

Rosendahls - Schultz Grafisk A/S
ISSN 0011-6149
(Online) ISSN 1398-3865

Contents

Recent Economic and Monetary Trends	1
---	---

THE DANISH AND INTERNATIONAL ECONOMY

Can Crises be Predicted?	35
--------------------------------	----

Morten Spange, Economics

In 2008, the global economy was hit by a crisis that caught almost all economists in Denmark and abroad by surprise. Against this backdrop, it is discussed why it was not possible to predict this sharp reversal of the economy, which was the result of certain underlying imbalances. Looking ahead, a key issue is how to improve the ability to identify economic imbalances with negative consequences for growth and employment. In this connection, the Bank for International Settlements, BIS, and the International Monetary Fund, IMF, have constructed indicators of economic imbalances.

Financing, Investment and Consumption in Denmark and the Euro Area	49
--	----

Agnethe Christensen, Carina Kjersgaard Friis and Elena Kabatchenko, Statistics

With the introduction of quarterly financial sector accounts from January 2010 consistency has been achieved between the real and financial sides of the quarterly sectoral national accounts. This paves the way for one consistent framework for analysing developments in important financial and real macro-economic elements, which may contribute to a better understanding of the interaction between the financial sector and the real economy. This article focuses on the financial and real transactions of Danish households and business enterprises and the related significant development in consumption and investment during the most recent economic cycle. A comparison is made with the euro area.

Foreign-Exchange Earnings in the Shipping Sector	63
--	----

Anders Ejstrup and Caroline Bindlev, Statistics

Sea freight has been of increasing significance to Denmark's exports and imports. This article focuses on the shipping sector's foreign-exchange earnings. Sea freight revenue and expenditure are both included in the Danish balance of payments, but are distributed on several items. This article provides a comprehensive overview and highlights the items of significance to foreign-exchange earnings.

Fiscal Challenges in Advanced Countries 73

Jakob Ekholdt Christensen and Rasmus Tommerup, Economics

The global economic crisis has led to historical deterioration of the public finances of the advanced countries. In the countries most severely affected, the development has generated concerns about an outright debt crisis. For many advanced countries, government debt as a ratio of the gross domestic product, GDP, will rise to more than 100 per cent if they fail to implement fiscal consolidation in the coming years. The higher debt as a result of higher interest payments will make future consolidation more difficult. Moreover, new research shows that a large debt impedes economic growth through such factors as elevated real interest rates. The extent and duration of the necessary fiscal consolidation are of a magnitude rarely seen in recent times. The need for consolidation is most pronounced in Japan, Greece, the USA, Ireland and the UK.

Gross Domestic Product and Welfare 89

Paul Lassenius Kramp, Economics

The gross domestic product, GDP is regularly criticised for not presenting a fair view of welfare, and for not including sustainability. This article discusses the strengths and weaknesses of GDP as a measure of economic prosperity. It also discusses the relations between prosperity and welfare, as well as alternative indicators of welfare and sustainability.

FINANCIAL CONDITIONS

Do Long-Term Bonds Offer a Higher Return than Short-Term Bonds? 105

Søren Schrøder and Christian Stampe Sørensen, Financial Markets

Long-term bonds have on average yielded a higher return than short-term bonds since 1975 so that it has paid off to assume interest-rate risk. However, the excess return has varied widely over time. It is not certain that long-term bonds will always yield a higher return than short-term bonds. This article describes the relation between the current yield curve and the expected excess return, and explains why the excess return has varied over time.

Pledging of Collateral to Danmarks Nationalbank 117

Astrid Henneberg Poffet, Payment Systems

In the wake of the financial crisis attention has increasingly turned to the collateral framework for credit granted by central banks. The increased focus on central banks' collateral frameworks entails a need to communicate Danmarks Nationalbank's underlying considerations when determining which assets monetary-policy counterparties may pledge as collateral for credit, i.e. the collateral basis. This article explains why central banks require collateral in return for credit facilities, as well as the considerations and country-specific circumstances to be taken into account when determining the collateral basis, including at Danmarks Nationalbank. This is followed by an overview of Danmarks Nationalbank's rules for asset eligibility and the temporary credit facilities introduced during the financial crisis.

Non-Callable Loans for Cooperative Housing Societies 131

Ib Hansen and Hans Henrik Knudsen, Market Operations

In recent years, the range of mortgage-credit products has been developed substantially and in some cases the consequences of the financing structures are not easy to understand. Some, especially new, cooperative housing societies have taken out quite risky non-callable loans with rising interest payments. The structure of these loans makes it difficult to understand the financial consequences, such as potential price losses if interest rates decline and the impact of rising debt service payments.

DOCUMENTATION

New Calculation of Danmarks Nationalbank's Effective Krone-Rate Index..... 139

Erik Haller Pedersen and Mikkel Plagborg-Møller, Economics

From time to time changing trade patterns make it necessary to revise the weights used for calculating the effective krone-rate index and real effective krone-rate index published by Danmarks Nationalbank. This article presents the 2009 weights. The most important changes are that the weight of the Chinese yuan has been increased, while the weight of the pound sterling has been reduced.

Speech by Governor Nils Bernstein at the Annual Meeting of the Danish Mortgage Banks' Federation, 24 March 2010 145

Speech by Governor Nils Bernstein at the Annual Meeting of the Association of Danish Mortgage Banks, 22 April 2010 151

Press Releases 159

Tables

Recent Economic and Monetary Trends

SUMMARY

The global economic upswing has gained momentum, particularly in the Asian emerging economies. In the OECD countries it is more moderate and remains fragile and uncertain.

In the spring the financial markets were characterised by nervousness due to mounting government debt problems in a number of southern European countries. Growing uncertainty about Greece's public finances spread to the financial markets. On 9 May, the International Monetary Fund, IMF, and the euro area member states approved a loan package for Greece based on an extensive consolidation plan for the Greek economy. On the same day, the EU ministers of finance at an extraordinary Ecofin meeting decided to establish a financial stabilisation mechanism. The background was concerns that the debt crisis in Greece would have a knock-on effect on other EU member states, initially Portugal and Spain.

Across the OECD countries, fiscal consolidation will be necessary in the coming years in order to ensure long-term fiscal sustainability. Consolidation is most likely to have positive confidence effects, and thus lead to falling long-term market interest rates, if it is part of a credible medium-term plan which also includes relevant structural reforms to increase the long-term output potential.

Denmark has seen positive growth in the last three quarters. This should be viewed against the backdrop of a preceding fall in output of just over 7 per cent. Private consumption is also picking up, and the housing market seems to have stabilised following a strong adjustment of house prices. Confidence indicators for both the corporate sector and households also point to renewed growth. However, there is considerable spare capacity in the economy, and output is not likely to be back at the level seen at the eruption of the crisis until 2013.

Unemployment has been more or less flat in recent months. It is unusual for unemployment to stabilise so early in an economic downturn, but the development in recent months is not necessarily an indication that the tide has turned in the labour market. The relatively modest increase in unemployment reflects factors such as a reduction of the labour force by around 100,000.

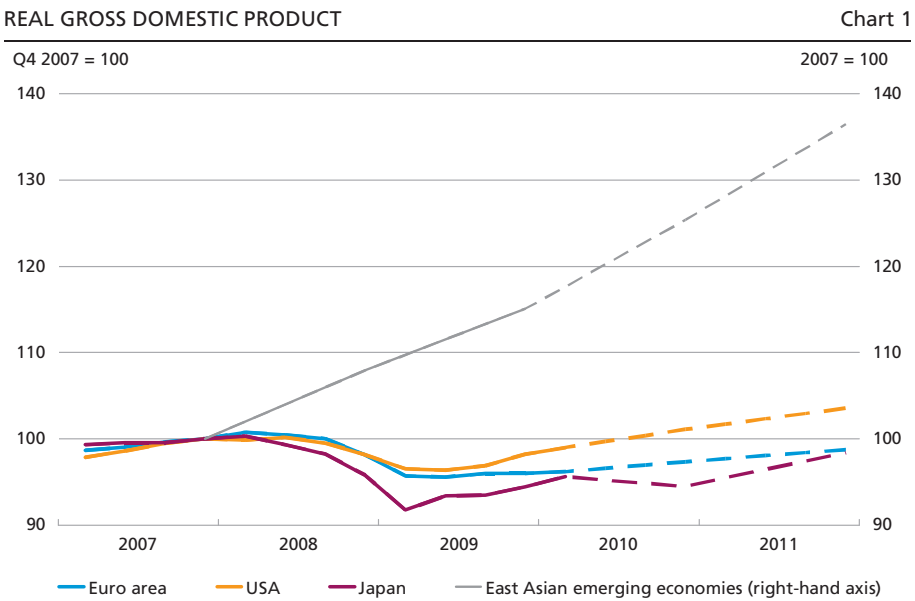
The crisis has had a considerable negative impact on public finances, and Denmark's 2010 budget deficit is expected to be as high as kr. 100 billion, corresponding to more than 5 per cent of the gross domestic product, GDP. Consequently, political agreement has been reached to consolidate public finances by a total of kr. 24 billion over the period from 2011 to 2013 inclusive. The tendency for private domestic demand and exports to pick up means that gradual consolidation of public finances from 2011 onwards will not stifle the budding upswing.

In a situation where international investors are increasingly focusing on government budget problems, it is important for confidence in the Danish economy and the fixed exchange rate that Denmark indicates willingness and ability to implement consolidation measures that will eliminate the government budget deficit within a few years.

THE INTERNATIONAL ECONOMY

In the spring the global economy was characterised by substantial financial turbulence due to mounting government debt problems in a number of European countries. Nevertheless, the global economic upswing has so far been stronger than previously anticipated.

The upswing is particularly evident in the Asian emerging economies, cf. Chart 1. As in previous recoveries after financial crises, the OECD



Note: GDP for the East Asian emerging economies comprises weighted annual GDP data (2007 weights) for the Philippines, India, Indonesia, China, Malaysia, Thailand and Vietnam. Since the data is published on an annual basis, the development appears flat during the crisis. Broken lines are estimates.

Source: Reuters EcoWin, UNStat and IMF, *World Economic Outlook*, April 2010.

countries are experiencing more modest economic growth. The upswing remains fragile and uncertain, especially in Europe and Japan. Several of Denmark's major trading partners, such as Germany and the UK, are still in a tentative upswing.

In recent forecasts the international organisations have adjusted their GDP growth estimates upwards across the board. The IMF expects global GDP to increase by more than 4 per cent in 2010 and 2011, cf. Table 1. The Asian emerging economies have taken the lead with growth rates of just under 9 per cent in 2010 and 2011, while GDP for the OECD overall is expected to increase by just over 2 per cent. In general, growth is expected to be higher in the USA than in Europe and Japan.

There are considerable downside risks to the economic upswing in the OECD countries, where rapidly mounting government debts are reducing the fiscal scope to counter future negative shocks to the economies. The downside risks are particularly strong in the euro area, where budget deficits substantially in excess of the limits set in the Stability and Growth Pact have weakened market confidence in the economic policies pursued. Debt problems are forcing a great many countries to tighten their fiscal policies, which may dampen the economic development. At the same time, efforts are underway to tighten the framework conditions for the financial sector, which may also reduce global GDP growth for a while.

Until now, the economic recovery in the OECD countries has mainly been driven by accommodative economic policies and inventory adjustment. Inventories are still being built up or reduced at a slower rate than previously, following massive reductions during the recession. This is reflected in (temporary) positive growth contributions. In the USA, private consumption contributed significantly to GDP growth in the 1st

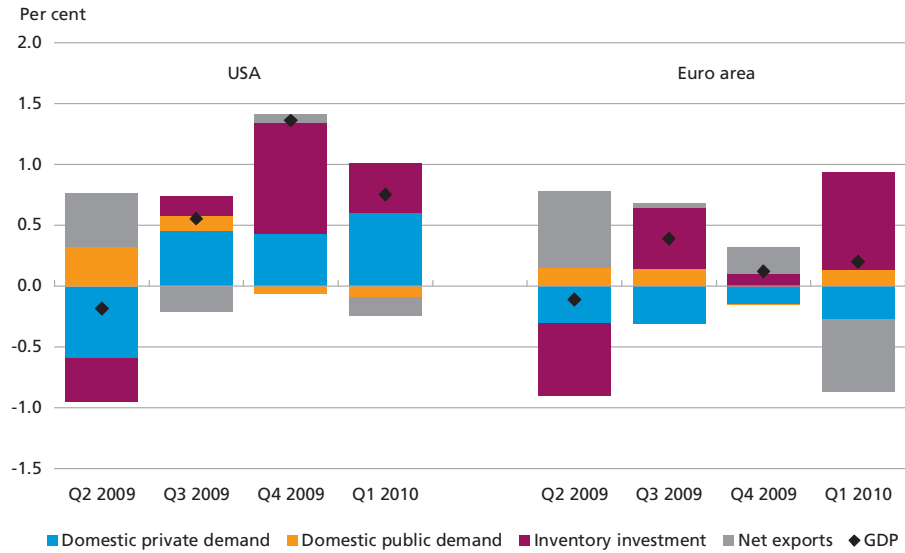
FORECASTS OF GDP GROWTH IN SELECTED AREAS AND COUNTRIES Table 1

Per cent	2010			2011		
	IMF	EU	OECD	IMF	EU	OECD
USA	3.1	2.8	3.2	2.6	2.5	3.2
Euro area	1.0	0.9	1.2	1.5	1.5	1.8
Germany	1.2	1.2	1.9	1.7	1.6	2.1
UK	1.3	1.2	1.3	2.5	2.1	2.5
Sweden	1.2	1.8	1.6	2.5	2.5	3.2
Japan	1.9	2.1	3.0	2.0	1.5	2.0
China	10.0	10.3	11.1	9.9	9.4	9.7
India	8.8	8.1	8.3	8.4	8.0	8.5
World	4.2	4.0	n.a.	4.3	4.0	n.a.

Source: IMF, *World Economic Outlook*, April 2010, European Commission's spring forecast, May 2010, OECD, *Economic Outlook*, No. 87, May 2010.

GROWTH CONTRIBUTIONS IN THE USA AND THE EURO AREA

Chart 2



Note: Growth contributions in percentage points to quarterly GDP growth. Domestic demand is the sum of investments and consumption.

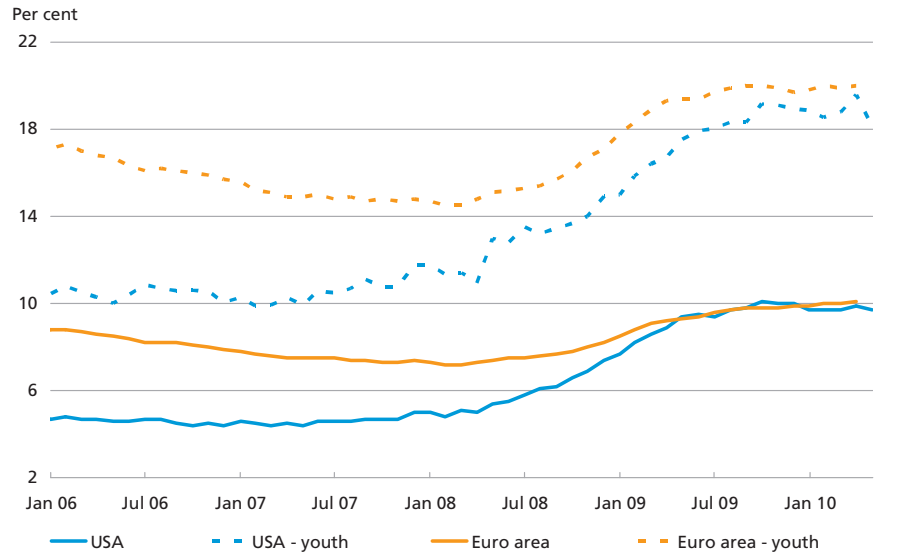
Source: Reuters EcoWin and Eurostat.

quarter, but the positive growth contributions from inventories also remained considerable, cf. Chart 2. Euro area GDP growth in the 1st quarter was driven purely by inventory investments and domestic government demand.

Rising employment since the turn of the year could indicate that the US labour market is recovering, but unemployment remains high at around 10 per cent in both the USA and the euro area, cf. Chart 3. In the USA the falling trend in unemployment is countered by a massive flow back into the labour force, following a pronounced decrease during the crisis. Especially in Europe, actual unemployment may be higher than the registered rate due to involuntary reductions in working hours, particularly in Germany and Italy. High youth unemployment is a growing problem, both in the euro area and in the USA, where approximately 20 per cent of young people under 25 are jobless. In Spain the figure is as high as 40 per cent or so.

In the period leading up to the crisis in 2008-09, considerable global imbalances accumulated. This resulted in large current-account deficits in e.g. the USA, the UK and several southern European euro area member states, which were offset by substantial surpluses in countries such as China, Japan and Germany. The imbalances were to a significant extent attributable to the economic policies pursued in both deficit and surplus countries. Following a temporary cyclical reduction, there are indications

UNEMPLOYMENT IN THE USA AND THE EURO AREA Chart 3



Note: Youth unemployment comprises the age group 16-24 years in the USA and <25 years in the euro area. The most recent observations are from May for the USA and April for the euro area.

Source: Reuters EcoWin.

that the global imbalances are increasing again, although China has taken certain measures to stimulate domestic demand. Large global imbalances typically indicate that deficit countries are accumulating debt at a rate exceeding their increase in income. A period of debt accumulation must at some point make way for a period of debt stabilisation or reduction relative to income. Experience shows that this shift is often brought on by a sharp fall in foreign capital inflows into the deficit countries because international investors suddenly lose confidence in the sustainability of the situation. This may lead to financial crises and debt crises in the deficit countries, which could trigger an international economic downturn.

A return to large global imbalances would thus pose a threat to economic stability. The international economic organisations have therefore repeatedly emphasised the need to strike a better balance between savings and investment in the various parts of the global economy. In countries with savings deficits, this could mean increasing public savings by tightening fiscal policy, possibly in combination with structural reforms to increase potential earnings and thus the overall savings potential in the long term. A reduction of the deficit countries' current-account deficits (savings deficits) is, however, only feasible if the present surplus countries reduce their current-account surpluses, i.e. if they increase domestic demand relative to their output potential. Not least China

plays a key role in this respect. China has experienced a long period with considerable structural current-account surpluses because the propensity for households to save is very high in an international context. An actual revaluation of the Chinese currency could help to boost Chinese consumption by making imports cheaper relative to output. This is the background to the political pressure from other countries for China to revalue the renminbi.

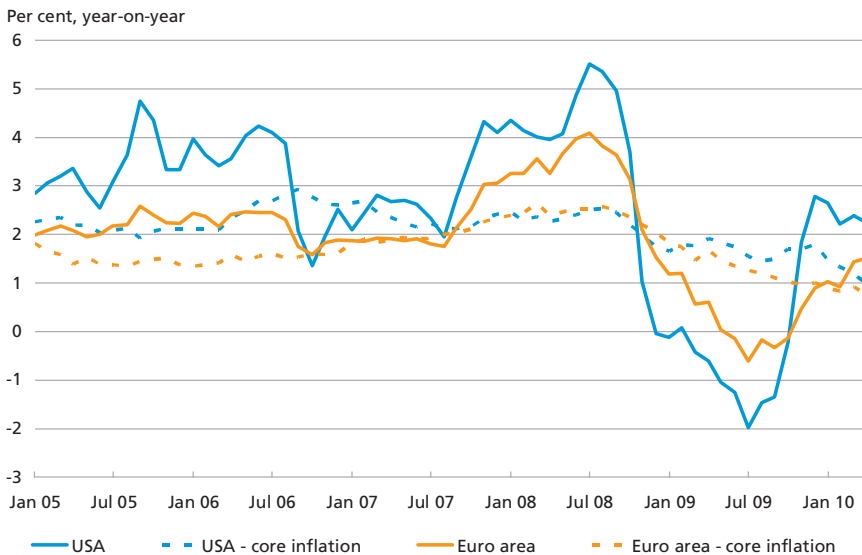
Price developments

Consumer price inflation in the OECD countries has risen since late 2009, albeit at a slow pace. In April, consumer prices in the USA and the euro area rose by 2.2 and 1.5 per cent, respectively, relative to the same month of the preceding year, cf. Chart 4. If the volatile energy and food prices are excluded, inflation was 0.9 and 0.8 per cent, respectively, and has been receding since the summer of 2008. Continued low capacity utilisation in the manufacturing sector and the labour market and moderate inflation expectations are dampening inflationary pressures.

Commodity prices, especially oil prices, gradually increased during the spring, but the turbulence resulting from Greece's budget problems caused prices to dive in early May. At the beginning of June, the price of a barrel of Brent crude oil was around 73 dollars, down from just over 88 dollars in early May.

CONSUMER PRICE INFLATION

Chart 4



Note: Core inflation is consumer price inflation excluding energy and food. The most recent observations are from April 2010.

Source: Reuters EcoWin.

Financial markets

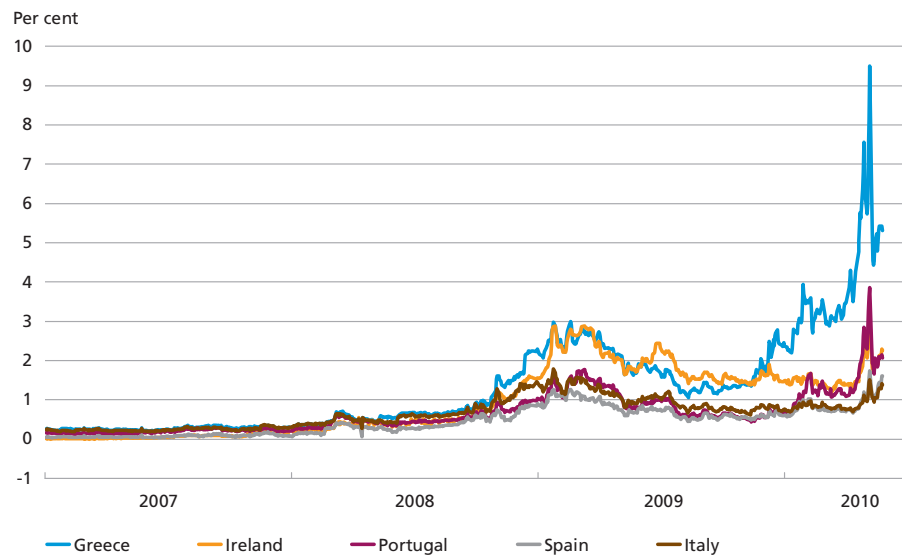
The financial markets have increasingly focused on the fiscal imbalances and the risk related to purchase of government securities. This is clearly illustrated by developments in Greece, where the escalating debt crisis in the spring led to massive widening of the yield spread vis-à-vis Germany. However, the yield spread also widened in other southern European countries and in Ireland amid fears that these countries would incur similar debt problems, cf. Chart 5.

On 23 April, Greece applied to the euro area member states and the IMF for assistance within the framework of an agreed economic stabilisation programme. Initially the yield spreads continued to widen, and focus increasingly turned to other countries whose debts gave rise to concern, notably Portugal and Spain. Nervousness spread from the European to the global financial markets, reflected in falling risk appetite and surging volatility. When the EU on 9 May announced an ambitious financial stabilisation package, cf. Box 1, and the European Central Bank, ECB, announced extraordinary monetary-policy measures, including purchase of government bonds in the secondary market, the markets calmed down only temporarily.

As the growth outlook improved and risk appetite grew, the benchmark stock indices rose in the first months of the year, but the debt crisis in Greece and increased uncertainty about the extent of the budget problems led to falling global stock indices in May. The stabilisation

YIELD SPREADS TO GERMANY FOR 10-YEAR GOVERNMENT BONDS

Chart 5



Note: 10-year benchmark government bonds. The most recent observations are from 3 June 2010.

Source: Reuters EcoWin.

THE LOAN PROGRAMME FOR GREECE AND THE EU STABILISATION PACKAGE

Box 1

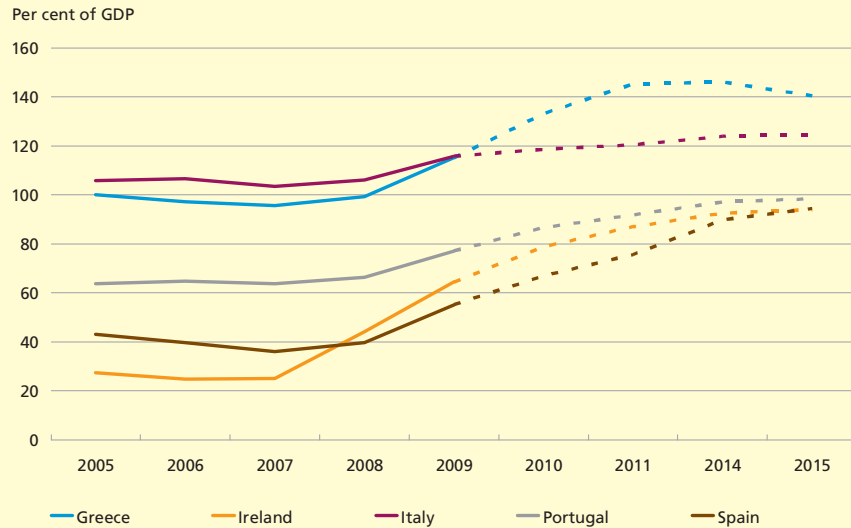
In the spring, rising uncertainty about Greece's public finances rippled through the financial markets, reflected in rising yield spreads to Germany and thus strongly rising refinancing costs (and globally increasing volatility). On 23 April, Greece applied to the euro area member states and the IMF for a loan programme. However, the application and the publication of the loan programme did not reassure the financial markets, which still believed debt restructuring to be a genuine risk and saw considerable risk of similar problems in other euro area member states, notably Portugal and Spain. On 9 May, when the EU announced a large-scale financial stabilisation package (and the ECB indicated that it would purchase government bonds), volatility in the financial markets declined, and yield spreads to Germany narrowed, although some degree of nervousness soon re-emerged.

The loan programme for Greece

The loan programme for Greece is a 3-year programme for a total of 110 billion euro, of which 80 billion euro is financed by the euro area member states and 30 billion euro by the IMF. The three programme areas are ensuring sustainable public finances, strengthening the banking sector and strengthening the economy's competitiveness and growth potential via structural policy reforms. Greece commits itself to massive fiscal consolidation, for a total of 11 per cent of GDP over the 3-year period. On top of that, savings plans amounting to 5.5 per cent of GDP were presented in the spring. Debt is expected to continue to rise, from 115 per cent of GDP in 2009 to 146 per cent in 2014, and then to decline to 140 per cent in 2015, cf. Chart 6.

DEBT RATIOS OF GIIPS¹

Chart 6



Note: Gross public debt. Broken lines indicate estimates. The IMF does not publish estimates for 2012 and 2013. The data does not reflect the extra consolidation measures announced by Spain and Portugal on 9 May. Source: IMF Fiscal Monitor, May 2010.

¹ GIIPS is an acronym for Greece, Ireland, Italy, Portugal and Spain.

CONTINUED

Box 1

The economic adjustment programme is ambitious and will put heavy demands on the Greeks in terms of implementing painful reforms. There is also a risk that debt dynamics turn out to be worse than expected due to lower growth and inflation or higher real interest rates.

The EU financial stability package

At the extraordinary Ecofin meeting on 9 May, the EU ministers of finance decided to establish a European financial stability package by giving member states access to credit facilities of more than 500 billion euro. This step was taken in response to concerns that the budget crisis in Greece would spread to other EU member states, initially Portugal and Spain.

The package comprises a permanent financial stability mechanism, under which loans and credits of up to 60 billion euro can be granted, financed through the European Commission's direct loans. The Commission's loans are guaranteed within the disposable margin in the EU budget and ultimately by the EU member states. In addition, a large part of the stabilisation package will comprise a pool of 440 billion euro, to be financed by way of a temporary special financing unit backed by guarantees from the euro area member states on the basis of their capital contributions to the ECB. The IMF will participate in financing arrangements and is, according to the Ecofin conclusions, expected to contribute at least half of the EU's contribution through the normal IMF lending facilities, as has been the case for recent European IMF borrowing programmes.

Denmark's share of the total financing is in the form of an implied guarantee related to the smaller credit facility of 60 billion euro, to which Denmark may have to contribute up to approximately 1.2 billion euro.

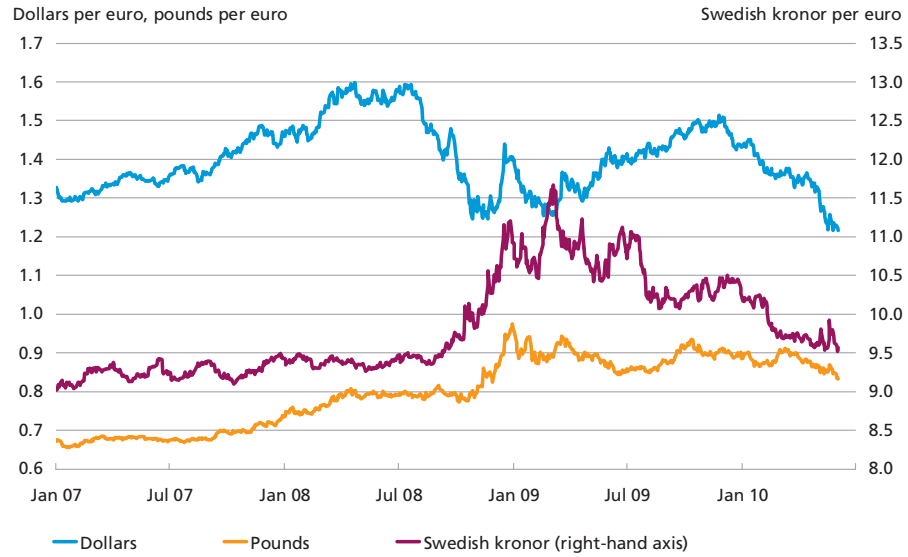
The adoption of the stabilisation programme by the EU was followed by the announcement of further fiscal tightening in Spain and Portugal.

package that was announced on 9 May only briefly halted the downward trend. The benchmark stock indices in the USA and Europe rose a little from end-May, but in early June they were approximately 3 per cent lower than at the turn of the year. 10-year government bond yields, which have fluctuated considerably, have fallen by approximately 0.5 per cent in the USA and approximately 0.4 per cent in the UK, to 3.4 and 3.6 per cent, respectively, in early June. German government bond yields have, on account of their status as a "safe haven" in Europe, fallen by approximately 0.7 per cent since the turn of the year, to 2.7 per cent in early June.

A rising yield spread in favour of the USA and uncertainty about the Greek economy, combined with concerns that the problems will spread to other euro area member states, have weakened the euro by approximately 15 per cent vis-à-vis the dollar from January to early June, cf. Chart 7. Following the euro area member states' and the IMF's agreement on a loan programme for Greece and also the announcement of

EXCHANGE RATES

Chart 7



Note: A lower value implies strengthening of the currencies vis-à-vis the euro. The most recent observations are from 3 June 2010.

Source: Reuters EcoWin.

the European stabilisation package on 9 May, the euro temporarily strengthened, but subsequently it has fallen to its lowest level against the dollar since the spring of 2006. Since the turn of the year, the euro has weakened by approximately 6 per cent vis-à-vis the pound sterling and the Swedish krona.

Lending surveys for the 1st quarter of 2010 from the Federal Reserve and the ECB indicate that the banks have all but stopped tightening their credit standards for corporate loans, especially to large corporations, while credit standards for loans to households are still being tightened. Credit conditions remain restrictive after two years' accumulated tightening that has not yet been reversed. Despite the economic rebound, no easing of credit policies has been announced. However, US data point to a tendency to ease credit policy through ordinary lending activities, although no active decision is made to do so. Hence the figures may indicate a more restrictive credit policy than is actually the case. The demand for loans from the corporate sector and the households continues to fall.

Due to the global economic upswing, among other factors, the IMF has lowered its estimate for the banks' write-downs in the period 2007-10 from approximately 2,800 billion dollars in October to 2,300 billion dollars in April. Two thirds of the losses are estimated already to have been realised, mostly in the USA. Assuming the expected economic de-

velopment, both US and European banks can be expected still to have exposures that will give rise to considerable write-downs. US banks could face further write-downs since one in four US homeowners is technically insolvent. The increasing fiscal imbalances also pose a downside risk to financial stability.

In the USA, the authorities have become involved in the financial sector in response to the financial crisis – via the Federal Reserve's easing of monetary policy and via the Treasury's extraordinary injection of capital into troubled banks (TARP, Troubled Asset Relief Program). Unwinding of these measures is now well underway. The exit from TARP has been more rapid than expected, especially because of repayments from many banks and the Treasury's proceeds on the sale of bank securities. In April the banks had repaid 70 per cent of the total TARP funds received. Unwinding of government involvement in the mortgage finance enterprises Freddie Mac and Fannie Mae and the insurance company AIG is, however, still in the early stages.

On 16 April the IMF's Executive Board completed the second review under the stand-by arrangement with Iceland and approved the related loan disbursement. Prior to the approval, Iceland had confirmed its commitment to observing its obligations vis-à-vis holders of guaranteed deposits with the nationalised Icelandic banks and expeditiously completing the negotiations with the governments of the UK and the Netherlands in this respect. This paved the way for releasing the second instalment of the loans from the other Nordic countries.

Monetary policy

Monetary policy is strongly expansionary in most countries. In the USA, the euro area and the UK, policy interest rates remain record low at 0.25, 1.0 and 0.5 per cent, respectively. Due to extraordinarily ample liquidity, short-term money-market interest rates in the euro area are considerably lower than the ECB's key interest rate. With the prospects of a moderate economic upswing and dampened inflation, market participants and international organisations expect central banks in most OECD countries to keep their accommodative monetary policies unchanged throughout 2010.

In addition to historically low policy interest rates, many central banks have introduced quantitative easing by supplying ample liquidity and purchasing securities. As conditions in the financial markets have normalised, certain measures have been phased out – either directly by the central banks or indirectly by way of reduced demand. Renewed financial turbulence in the spring in response to euro area budget problems has, however, led to the reintroduction of some of these measures.

The Federal Reserve ceased to purchase mortgage-backed securities at end-March. This had practically no market effect. Moreover, the Federal Reserve has discontinued most of its extraordinary liquidity facilities and plans to terminate the last one at end-June.

The ECB has mainly operated with extraordinary liquidity allotments during the crisis and had very gradually begun to phase out these measures. To stem the rising tide of uncertainty in the financial markets concerning the debt problems in several euro area member states, the ECB on 10 May decided to reintroduce longer-term refinancing operations (3 and 6 months) and full liquidity allotment in the tenders on 12 May, 26 May and 30 June. In addition, the Federal Reserve, at the request of the ECB (and the central banks of Canada, England, Switzerland and Japan), has reactivated its temporary swap facilities in order to ensure ample dollar liquidity. So far these facilities, which will expire in January 2011, have been used only to a limited extent. As a new, extraordinary measure, the Eurosystem has also begun to purchase government and corporate bonds in the secondary market to boost the depth and liquidity of these market segments. The ECB will conduct special liquidity-absorbing operations to neutralise the overall monetary-policy impact.

Fiscal policy

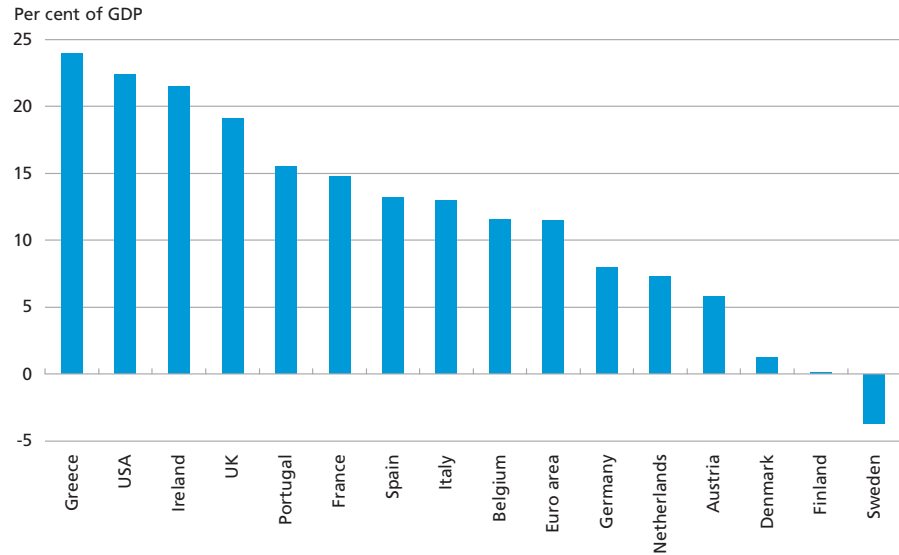
Loss of tax revenue and increased government spending in the wake of the financial crisis, combined with massive fiscal stimulation, have led to increasing budget deficits and government debt in OECD countries. As a result, almost simultaneous fiscal consolidation is called for across the OECD countries, although the need varies somewhat from country to country, cf. Chart 8. The long-term consolidation requirement is most acute in countries such as Greece, the USA, Ireland and the UK. However, due to its status as a reserve-currency country and a "safe haven" for international investors, the USA currently has greater fiscal scope than the other countries.

The Stability and Growth Pact, which is at the core of the EU's fiscal surveillance of the member states, has really come into play. In 2009, the vast majority of member states exceeded the Pact's limit for budget deficits, i.e. 3 per cent of GDP. Consequently, the Commission has given or will give these member states notice to reduce their deficits to below 3 per cent of GDP within a few years.

The majority of EU member states submitted convergence and stability programmes in the spring. Most of them envisage fiscal consolidation from 2011 onwards, but already from 2010 in the most severely affected member states, where the budget crisis has evolved into a confidence crisis in the financial markets. A case in point is Greece, but also Portugal

NEED FOR FISCAL CONSOLIDATION IN A NUMBER OF OECD COUNTRIES

Chart 8



Note: Required tightening of structural primary budget balance 2012-20 to bring government debt down to 60 per cent of GDP by 2020. Until 2011, the European Commission's May forecasts are applied for EU member states and OECD data from November 2009 for the USA. The extra consolidation measures announced by Spain and Portugal on 9 May have not been included in the calculations.

Source: See Jakob Ekholdt Christensen and Rasmus Tommerup, *Fiscal Challenges in Advanced Countries*, p.73.

and Spain have brought forward and stepped up their planned fiscal consolidation.

For the EU overall, the average budget deficit is expected to decline from 7.2 per cent of GDP in 2010 to 6.5 per cent in 2011, while debt is expected to mount further, from 75 to 84 per cent of GDP. In Denmark, prior to the conclusion of the recent political agreement to consolidate the Danish economy, the Ministry of Finance expected the budget deficit to fall from 5.1 per cent of GDP in 2010 to 4.4 per cent in 2011, while debt was expected to increase from 42 to 45 per cent of GDP.

It is difficult to assess the extent to which tightening of fiscal policy will impede the economic upswing. Several studies indicate that tightening of fiscal policy may be less contractive, and in some cases even expansionary, if the fiscal starting point is very weak, cf. Box 2. The reason is that interest rates may drop and confidence in the future rise when a country that has been on an unsustainable debt path gets its public finances back under control.

In any case, the debt problems in many countries are already so extensive that there is no other option but to introduce sizable fiscal tightening measures. This has already been done in e.g. Greece, Ireland, Portugal, Spain and Latvia, but also countries such as the UK and the USA have so large budget deficits that austerity measures must be imple-

REAL ECONOMIC EFFECTS OF FISCAL TIGHTENING

Box 2

The extensive international need for fiscal consolidation raises the issue of how the real economy will be affected in the coming years. While economists agree that the impact is positive in the long term, opinions differ somewhat more as to the short-term effects. Alesina (2010), Alesina and Ardagna (2002) and the European Commission (2007) point out that fiscal tightening may have a less contractive effect, and may in some cases even be expansionary, when:

- consolidation takes place after a period of strong budget deterioration and high government debt (i.e. a weak fiscal starting point)
- consolidation takes place on the expenditure side (particularly public-sector payroll costs).

The expansionary effects of fiscal consolidation that counter the traditional dampening effect on demand are attributable to positive effects on expectations and wealth. Consolidation may underpin the view that the need for future consolidation will be smaller, and thus also the need for future economic tightening measures. In addition, a favourable impact may be seen by way of lower interest rates as confidence in fiscal sustainability increases, thereby reducing the risk premium on government bonds.

The fiscal tightening measures implemented by Ireland and Denmark in the 1980s are often used to exemplify how fiscal consolidation can have a positive impact on the real economy. However, interest rates are considerably lower today, e.g. in the USA. All other things being equal, countries with low interest rates and a "safe haven" status can achieve only a modest positive impact from fiscal consolidation. The potential gain from consolidation is greater in countries that pay high risk premiums due to low confidence in the financial markets, or where lack of consolidation will lead to rising risk premiums.

Another interesting issue is how simultaneous fiscal tightening worldwide will affect growth. When many countries tighten their fiscal policies at the same time, the individual country cannot achieve a gain from real depreciation and the resultant improvement in competitiveness, as is the case for individual tightening. On the other hand, more global fiscal consolidation may lead to greater gains by way of lower real interest rates. Overall it may, however, weaken the international economy when so many countries tighten their fiscal policies at the same time, including countries without confidence problems, where interest rates and risk premiums are low.

Source: Alberto Alesina, Fiscal adjustments: lessons from recent history, background paper for the Ecofin meeting in Madrid on 15 April 2010. A. Alesina and S. Ardagna, Tales of Fiscal Adjustment, *Economic Policy*, Vol. 13, No. 27, 2002, pp. 487-545. European Commission, Lessons from successful fiscal consolidations, Part IV, and Public Finances in EMU 2007, *European Economy*, No. 3, 2007.

mented soon in order to rein in their debts. Government budget deficits of the magnitude seen in the wake of the financial crisis are only possible for a very brief period if fiscal sustainability is not to be jeopardised.

Fiscal consolidation will thus be on the agenda across the OECD countries in the coming years. The international economic organisations have emphasised that consolidation is most likely to have positive confidence effects, and thus lead to falling long-term market interest rates, if it is part of a credible medium-term plan that also comprises relevant structural reforms to increase the long-term output potential.

In a situation where international investors are increasingly focusing on government budget problems, it is important that Denmark indicates willingness and ability to implement consolidation measures that will eliminate the government budget deficit within a few years. If not, confidence in the Danish economy and the fixed-exchange-rate policy might be jeopardised.

MONETARY AND EXCHANGE-RATE CONDITIONS

In recent months, the krone has been stable vis-à-vis the euro at a rate close to its central rate in ERM II.

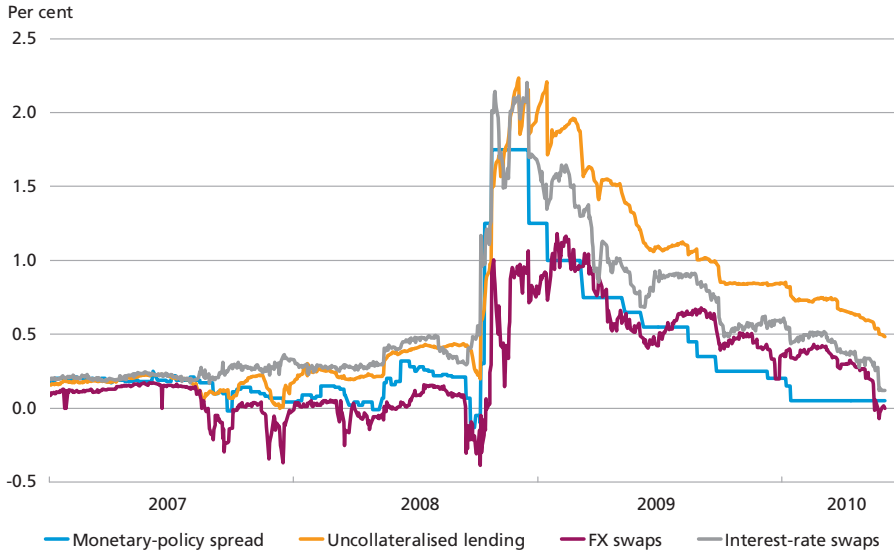
Danmarks Nationalbank has reduced the rate of interest on certificates of deposit and the current-account rate on several occasions, namely on 26 March, 20 May and 27 May, both rates being reduced by 0.10 percentage point on all three occasions. The rate of interest on certificates of deposit is now 0.50 per cent, while the current-account rate is 0.40 per cent. The lending and discount rates have been kept unchanged at 1.05 per cent and 0.75 per cent, respectively.

The interest-rate cuts took place against the background of purchases of foreign exchange in the market. From March up to and including May, Danmarks Nationalbank purchased foreign exchange for a total of kr. 42 billion in connection with interventions in the market. At end-May the foreign-exchange reserve was kr. 441 billion, having increased by kr. 24 billion since the beginning of March.

Spreads between money-market interest rates in kroner and euro have narrowed in recent months, cf. Chart 9. Due to the recent turbulence, the implied interest-rate spread for FX swaps between kroner and euro has narrowed more than the other spreads.¹ Normally a premium applies when trading euro for kroner forward, but at the end of May this premium was around zero. This should be viewed in the light of falling demand for hedging in euro. From the 2nd half of 2007 until October 2008, the implied interest-rate spread was negative at times, reflecting shortage of euro liquidity.

Although interest-rate spreads between both collateralised loans (interest-rate swaps) and uncollateralised loans in Denmark and the euro area have narrowed, they remain wider than the corresponding monetary-policy spread, cf. Chart 9. The reason is that since the autumn of 2008 the ECB has provided substantial liquidity to euro area banks in response to the tight liquidity situation that arose in connection with

¹ Box 3 in the chapter Recent Economic and Monetary Trends in Danmarks Nationalbank, *Monetary Review*, 2nd Quarter 2008, provides further details about the calculation of the implied interest-rate spread for FX swaps.

SELECTED INTEREST-RATE SPREADS BETWEEN DENMARK AND THE EURO AREA Chart 9

Note: The monetary-policy interest-rate spread is the difference between Danmarks Nationalbank's lending rate and the ECB's marginal interest rate in its main refinancing operations. The spread for uncollateralised interest rates is the difference between 3-month Cibur and Euribor. The interest-rate spread for FX swaps is determined on the basis of the forward premium on 3-month forward FX contracts between kroner and euro. The interest-rate spread for interest-rate swaps is based on a 3-month interest-rate swap applying the overnight interest rate. The most recent observations are from 4 June 2010. See Danmarks Nationalbank, *Monetary Policy in Denmark*, 2009, pp. 89-94, for a description of interest rates on various money-market products.

Source: Reuters EcoWin and Danmarks Nationalbank.

the financial turmoil. Short-term money-market interest rates in the euro area are therefore considerably lower than the ECB's rate of interest on its main refinancing operations. As the liquidity situation normalises, this may lead to rising money-market interest rates in the euro area and narrowing of the spread between monetary-policy interest rates in Denmark and the euro area.

On account of the turbulence in the financial markets, the ECB has temporarily put its normalisation of the liquidity situation in the euro area on hold. Consequently, a 6-month liquidity operation was conducted in May, although the 6-month operation in March was to have been the last one. Furthermore, the ECB decided to reintroduce full allotment at a fixed rate of interest in the 3-month operations in May and June. In April the ECB had held one tender with allotment of 3-month liquidity at a variable rate as part of its effort to normalise the liquidity situation.

The changes in monetary-policy interest rates have widened the spread between the lending rate and the rate of interest on certificates of deposit to 0.55 percentage point. This margin gives banks and mortgage-credit institutes an incentive to settle liquidity differences among

themselves in the money market rather than resorting to Danmarks Nationalbank's facilities.

The interest-rate margin¹ has contributed to reducing gross accumulation on Danmarks Nationalbank's balance sheet, and monetary-policy lending has more or less been reduced to zero. Since 8 June 2009, when the interest-rate margin was introduced, the banks and mortgage-credit institutes have reduced their monetary-policy loans from Danmarks Nationalbank by kr. 170 billion, which is far more than warranted by the kr. 81 billion increase in the net position in connection with capital inflows. This is reflected in a kr. 89 billion reduction in the institutions' holding of certificates of deposit and current-account deposits, cf. Chart 10.

On 8 April Danmarks Nationalbank announced that the temporary credit facilities for banks and mortgage-credit institutes at Danmarks Nationalbank – the option to borrow on the basis of excess capital adequacy and the expansion of the list of assets eligible as collateral – will be extended until 26 February 2011.

Danmarks Nationalbank regularly assesses the collateral rules applying to credit facilities at Danmarks Nationalbank. The framework for credit operations and the temporary facilities during the financial crisis are elaborated on in the article on p.117.

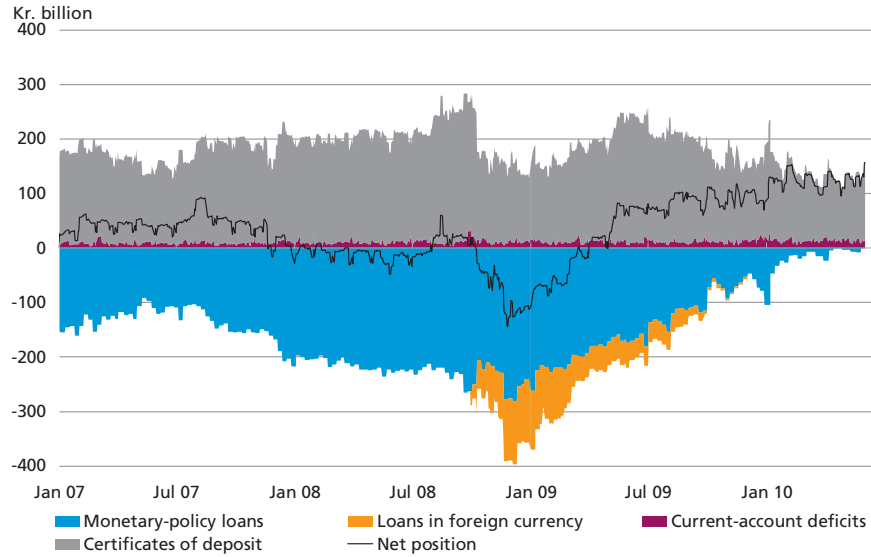
Money and capital market developments

A new scheme (Bank Rescue Package 3) for management of ailing banks will be introduced with effect from 1 October 2010, when the general government guarantee expires. The Financial Stability Company will still be able to acquire ailing banks with a view to winding them up in a controlled manner. The scheme does not include any government guarantee as it is based on writing down equity, subordinated capital and creditor claims corresponding to the value of the assets, as well as sector contributions via the Guarantee Fund for Depositors and Investors. Under the Act, the individual bank must be able to provide the necessary overviews of accounts, etc. within 24 hours. This means that a crisis situation can rapidly be addressed. Depositors with net deposits of up to 100,000 euro, approximately kr. 750,000, will not initially notice any practical changes in their day-to-day banking activities. The Dankort and direct debit services will remain in operation. The individual bank has no obligation to apply this model in the event of problems, but at the first general meeting after the commencement of the Act it must decide

¹ When introduced on 8 June 2009, the interest-rate margin was 0.10 percentage point, increasing to 0.25 percentage point on 29 September 2009, 0.35 percentage point on 26 March 2010, 0.45 percentage point on 20 May and 0.55 percentage point on 27 May.

THE BANKS' AND MORTGAGE-CREDIT INSTITUTES' USE OF DANMARKS NATIONALBANK'S FACILITIES

Chart 10



Note: The banks' and mortgage-credit institutes' loans in foreign currency from Danmarks Nationalbank are not included in the net position vis-à-vis Danmarks Nationalbank. Loans in foreign currency are loans granted to banks and mortgage-credit institutes by Danmarks Nationalbank under swap lines with the Federal Reserve and the ECB. The swap facility with the former expired on 1 February 2010, while the ECB swap facility is still in force. The most recent observations are from 3 June 2010.

Source: Danmarks Nationalbank.

whether it wishes to announce whether or not it will use the model in the event of a crisis.

Effective 1 October 2010, the Guarantee Fund will cover depositors with ordinary deposits of up to 100,000 euro net. Special deposits, including pension schemes, will still be fully covered. The deposit guarantee will eliminate uncertainty for the vast majority of depositors. Depositors with larger deposits can be expected to seriously assess their banks so that banks deemed to be risky will find it more difficult to attract deposits.

The Credit Package, also known as Bank Rescue Package 2, gives banks and mortgage-credit institutes the option, under certain conditions, to acquire an individual government guarantee covering their own fixed-term bonds against payment of commission. This will facilitate the transition to normal market conditions for unsecured creditors. The status as at 20 May 2010 was that agreements had been concluded with 31 institutions that had received guarantee commitments totalling kr. 260 billion. 25 institutions had issued for a total of kr. 105 billion under the scheme. The guarantee scheme comprises bonds issued until 31 December 2010.

The Danish government intends to increase the commission payable by banks and mortgage-credit institutes for issuing bonds with a government guarantee. This is a response to an initiative from the Commission,

which believes that the financial markets have stabilised to an extent that makes it appropriate to give participating institutions a stronger incentive to deselect government guarantees. The increase in commission will depend on the credit rating of the individual institution. Those with the highest ratings will have to pay an extra 0.2 percentage point for new guarantees, while those with the lowest ratings will have to pay an extra 0.4 percentage point compared with today, bringing the maximum commission payable to 1.35 per cent. The increase is expected to take effect in July 2010. Banks that are members of the Danish Contingency Association will still receive a discount on the part of the guarantee that relates to non-subordinated unsecured debt until the expiry of the general government guarantee on 30 September 2010. The discount is calculated on the basis of the institution's contribution to the Danish Contingency Association.

The Commission has tabled a number of proposals for amendment of the existing rules on banks' liquidity and capital adequacy with a view to boosting the financial sector's resilience to future financial crises. The proposed liquidity regulation distinguishes between various asset types, depending on their liquidity. Mortgage-credit bonds are assessed to be less liquid than government bonds, which may weaken the Danish mortgage-credit market. In a joint consultation response with the Danish Financial Supervisory Authority, Danmarks Nationalbank has pointed out that Danish mortgage-credit bonds should be regarded as fully liquid assets as they are to a large extent comparable to government bonds.¹

Another proposal calls for more stable funding for financial institutions. This means that mortgage-credit bonds with a remaining maturity of less than one year are not regarded as stable funding. At the same time, loans with a maturity of more than one year are subject to a stable funding requirement. This could put a stop to adjustable-rate mortgages in their current form.

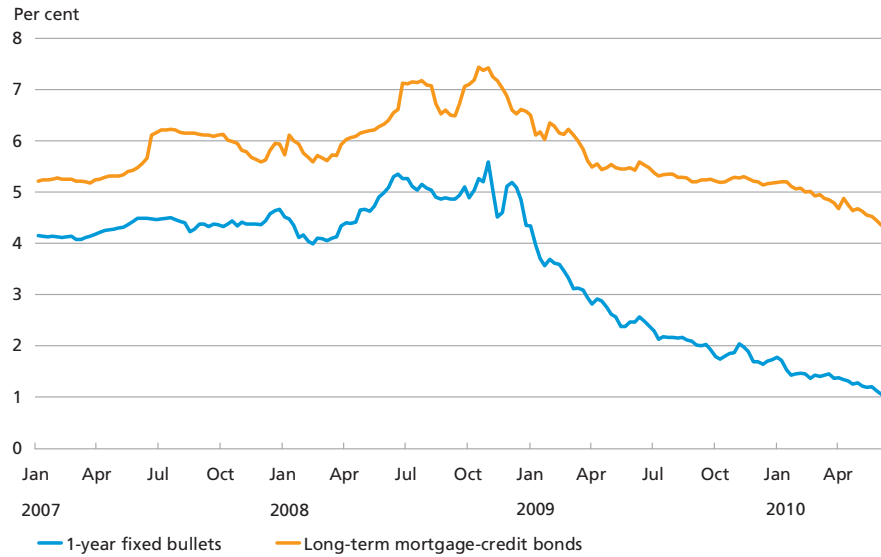
The banks' and mortgage-credit institutes' interest rates

Yields on Danish mortgage-credit bonds have continued to fall in recent months. In the first week of June, the average yield on a 1-year non-callable fixed-rate bond ("fixed bullet") for financing adjustable-rate mortgages was 1.06 per cent, while the long-term yield was 4.36 per cent. Both levels are very low, cf. Chart 11.

¹ The joint consultation response from Danmarks Nationalbank and the Danish Financial Supervisory Authority can be found at Danmarks Nationalbank's website under the heading of Memorandum - Danish Mortgage Credit and International Regulation.

YIELDS ON MORTGAGE-CREDIT BONDS

Chart 11



Note: The yield on 1-year fixed bullets is a weekly average. The yield on long-term bonds is an average effective yield based on 30-year callable mortgage-credit bonds, calculated on a weekly basis. The most recent observations are from 4 June 2010.

Source: Nordea Analytics and Association of Danish Mortgage Banks.

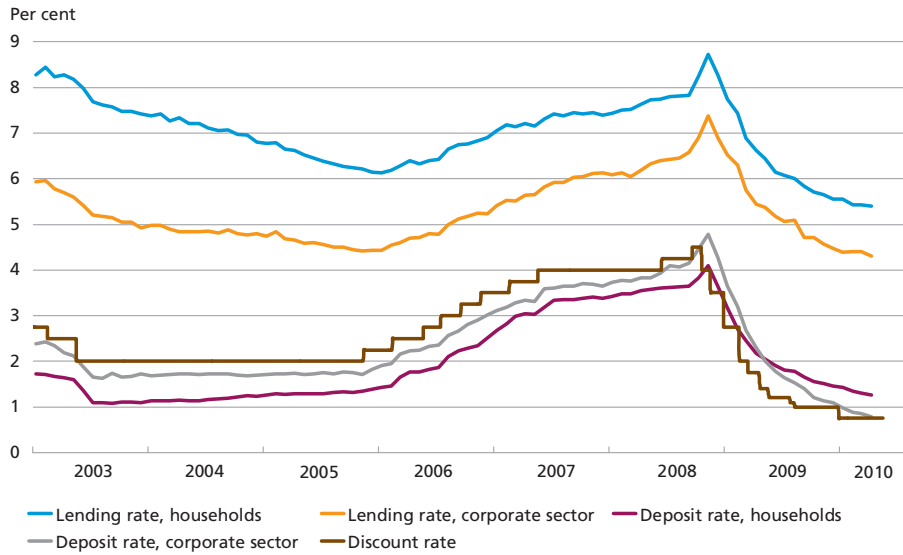
Auctions for fixed bullets were held in the spring. This reduces the refinancing burden at the turn of the year, so that a more suitable and even distribution profile is achieved for refinancing of adjustable-rate mortgages. Sales in the March auctions totalled around kr. 50 billion. Adjustable-rate mortgages now account for two thirds of total Danish mortgage lending, and three quarters of these loans have a remaining term to maturity of less than one year.

Following Danmarks Nationalbank's reductions of its monetary-policy interest rates, the banks have also cut their interest rates, but there has not been a one-to-one relationship in the period under review, cf. Chart 12. The banks only to a limited extent followed suit when Danmarks Nationalbank reduced its interest rates in the months following the eruption of the financial crisis in the autumn of 2008. The turmoil rapidly evolved from a liquidity crisis to a credit crisis with a greater risk of losses. The spreads between Danmarks Nationalbank's monetary-policy interest rates and the banks' lending rates thus widened and have not subsequently narrowed, cf. Chart 13.

The banks' interest-rate margins have increased since the autumn of 2008, which should be viewed in the light of the economic recession. Historically, interest-rate margins have widened in recessions, e.g. in

THE BANKS' AVERAGE INTEREST RATES AND THE DISCOUNT RATE

Chart 12

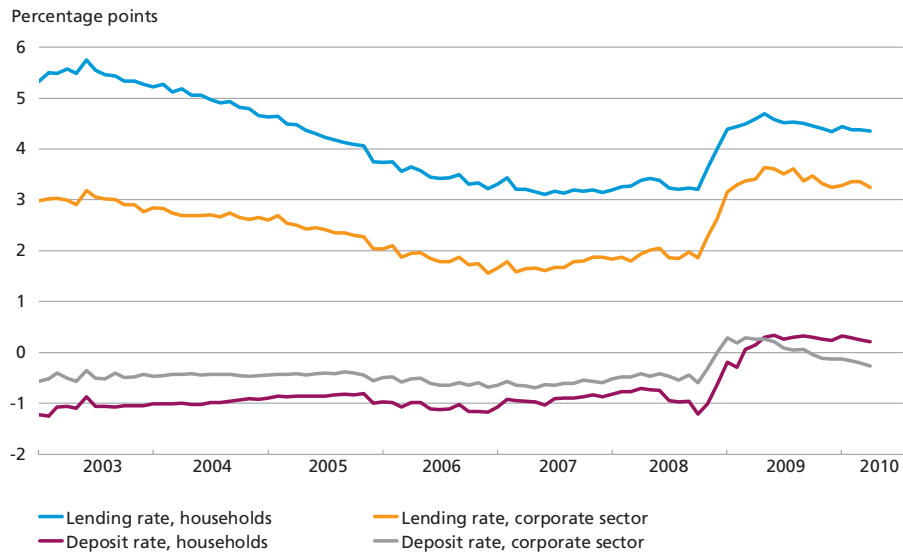


Note: The discount rate is stated on a daily basis. The most recent observation is from 4 June 2010. Other interest rates are monthly averages for outstanding business. The latest observations are from April 2010.

Source: Danmarks Nationalbank.

SPREAD BETWEEN THE BANKS' AVERAGE INTEREST RATES AND DANMARKS NATIONALBANK'S LENDING RATE

Chart 13

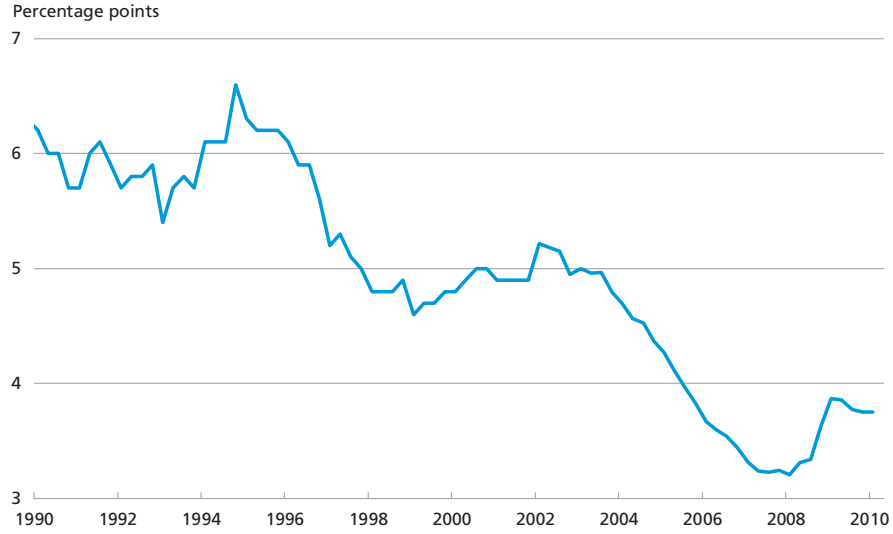


Note: The spread is calculated on the basis of the banks' interest rates, which are monthly averages for outstanding business. The most recent observations are from April 2010.

Source: Danmarks Nationalbank.

THE BANKS' INTEREST-RATE MARGIN

Chart 14



Note: Quarterly data. The interest-rate margin is calculated on the basis of the banks' average deposit and lending rates, which are weighted averages of the rates of interest on outstanding business with general government, non-financial corporations and households. The MFI sector and other financial corporations are thus not included. Adjustment has been made for data breaks back in time. The most recent observation is from the 1st quarter of 2010. A discussion of the development in the interest-rate margin over time can be found in Maria Carlsen and Charlotte Franck Fæste, *The Pass-Through from Danmarks Nationalbank's Interest Rates to the Banks' Retail Interest Rates*, *Monetary Review*, 2nd Quarter 2007.

Source: Danmarks Nationalbank.

1993-94, cf. Chart 14. The most recent widening masks an increase in the interest-rate margin for the corporate sector by more than 1 percentage point since the summer of 2008, while the interest-rate margin for households has fallen back to the 2007 level. An underlying factor is that the banks' write-downs relate primarily to corporate customers.

Credit developments

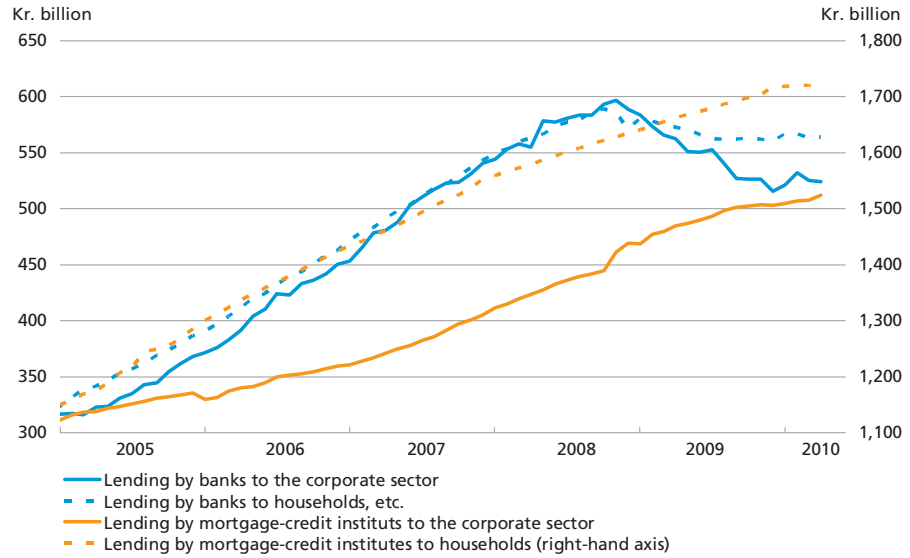
Bank lending has ceased to fall. In fact, growth in lending to the corporate sector has been marginally positive since the turn of the year, while lending to households has been more or less flat, cf. Chart 15. At the same time, the mortgage-credit institutes continue to lend more to the corporate sector. Total lending to the corporate sector has risen since the turn of the year, while it has been virtually unchanged for households.

According to Danmarks Nationalbank's lending survey, the banks and mortgage-credit institutes have maintained the tighter credit policies introduced in the 4th quarter of 2008 and the 1st quarter of 2009. Hence, according to the credit institutions there has not been any easing of credit policies in the past year.

The lending survey shows that the banks and mortgage-credit institutes overall recorded slightly higher demand for loans from both the

LENDING BY BANKS AND MORTGAGE-CREDIT INSTITUTES TO HOUSEHOLDS AND THE CORPORATE SECTOR

Chart 15



Note: Seasonally adjusted data. Outstanding lending by banks and mortgage-credit institutes domiciled in Denmark. Households, etc. also includes sole proprietorships, including farms. The corporate sector consists of non-financial corporations. The most recent observations are from April 2010.

Source: Danmarks Nationalbank.

corporate sector and the households in the 1st quarter of 2010 than in the 4th quarter of 2009. Moreover, they generally expect the demand for loans from both sectors to increase further in the 2nd quarter of 2010. This supports the view that the economy is rebounding.

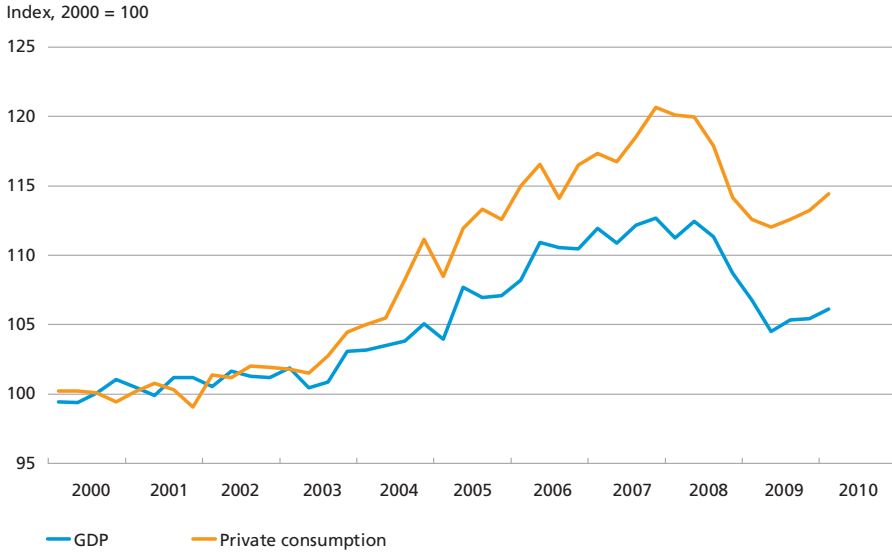
THE DANISH ECONOMY: REAL ECONOMY

Economic activity

Growth in the Danish economy continued in the 1st quarter of 2010, when seasonally adjusted GDP in volume terms was 0.6 per cent higher than in the preceding quarter. Growth has thus been positive for three quarters running, but this follows a fall in GDP by just over 7 per cent, cf. Chart 16. Like output, private consumption has been rising since mid-2009 after having declined sharply in the preceding period. Although the economy is now rebounding, both activity and private consumption remain far below the pre-crisis levels. It will probably take until 2013 for output to return to the level seen at the eruption of the crisis. In late May 2010 political agreement was reached on a consolidation plan for the Danish economy. The agreement is expected to have only limited impact on economic activity in 2011 and 2012, cf. Box 3.

GROSS DOMESTIC PRODUCT AND PRIVATE CONSUMPTION

Chart 16



Note: Chained values. The most recent observations are from the 1st quarter of 2010.
 Source: Statistics Denmark.

ACTIVITY EFFECTS OF THE AGREEMENT TO CONSOLIDATE THE DANISH ECONOMY

Box 3

At the end of May 2010, the Danish government and the Danish People's Party concluded an agreement to consolidate the Danish economy. The agreement seeks to improve public finances by kr. 24 billion until 2013. The key consolidation measures are that overall public-sector expenditure in 2011-13 should not increase more than prices and wages; that the tax thresholds are maintained in the period 2011-13; that the agreed increase in the threshold for top-rate tax is postponed until 2014; and finally that the maximum period for receipt of unemployment benefits is reduced from four to two years. The agreement also comprises reallocation of kr. 10 billion in public expenditure until 2013. If the narrow growth limits set out for public consumption are observed, real growth in public consumption is expected to be around ½ per cent in 2011 and 2012 and marginally negative in 2013.

Below, the activity effects of the agreement are assessed on the basis of a calculation using Danmarks Nationalbank's macroeconomic model, MONA. The baseline scenario is an update of Danmarks Nationalbank's forecast from March 2010, applying the economic and financial statistics published until mid-May, except that the baseline scenario assumes growth in public consumption of 1 per cent in 2011 and 2012, as in the Danish government's 2015 plan. The baseline scenario takes into account the phasing-in of the financing elements of the tax reform and the planned reduction of public-sector investments over the next couple of years.

CONTINUED

Boks 3

If the agreement to consolidate the Danish economy is fully incorporated, GDP growth is calculated at 1.7 and 1.9 per cent in 2011 and 2012, respectively, cf. Table 2. Unemployment reaches a higher level and peaks a little later than in the baseline scenario. Nevertheless, unemployment falls substantially from 2011 to 2012. In 2012 the government deficit is reduced by kr. 10 billion relative to the baseline scenario.

In addition to the direct effects of the agreed changes, the MONA calculation also includes the spill-over effects on the economy. For example, higher revenue from income tax will, all other things being equal, reduce private consumption, which in turn entails lower VAT receipts for the government. The improvement of the government budget balance is therefore lower than the direct proceeds resulting from the agreement. The model calculation does not take into account that the Danish yield spread to abroad could narrow due to the confidence-enhancing impact of fiscal consolidation, which would have an expansionary effect.

Since Denmark's Nationalbank's most recent forecast only goes as far as 2012, the expected effects of the consolidation plan in 2013 have not been calculated. However, it can be expected that the plan will have a more contractive impact in 2013 than in 2012, one reason being that marginally negative real growth in public consumption is planned for 2013.

MACROECONOMIC EFFECTS

Table 2

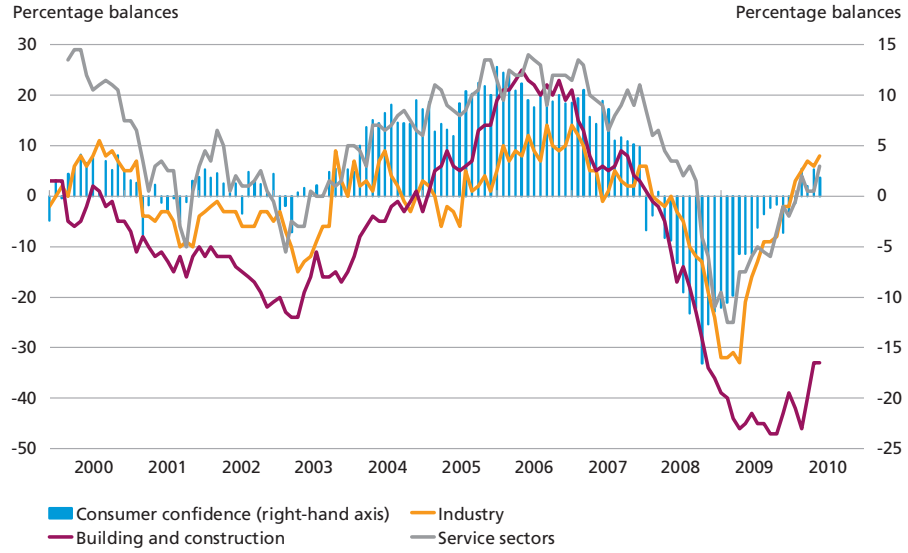
	Baseline scenario	Agreement to consolidate the Danish economy
<i>2011</i>		
GDP, per cent year-on-year ...	1.9	1.7
Unemployment, thousands ...	146	151
Government budget balance, kr. billion	-83	-76
<i>2012</i>		
GDP, per cent year-on-year ...	2.1	1.9
Unemployment, thousands ...	118	129
Government budget balance, kr. billion	-68	-58

Growth in private consumption is supported by a considerable increase in disposable incomes, following the income-tax cuts that took effect in January 2010. In addition, low interest rates boost consumption opportunities for households with variable-rate loans, while also providing an incentive to consume rather than save. Furthermore, rising stock indices combined with stabilisation of house prices have contributed to increasing household wealth after the strong decline in 2008 and 2009.

The moderate upswing in the economy is reflected in confidence indicators. Expectations in both the service sectors and the industrial sector have been rising over the past year and confidence indicators are now positive for both sectors, cf. Chart 17. The construction sector, which is

CONSUMER AND BUSINESS CONFIDENCE INDICATORS

Chart 17



Note: The most recent observations are from May 2010.
 Source: Statistics Denmark.

severely hit by the crisis, is still characterised by widespread pessimism, although this indicator is also showing signs of picking up. In spite of these positive signals, the number of bankruptcies remains high.

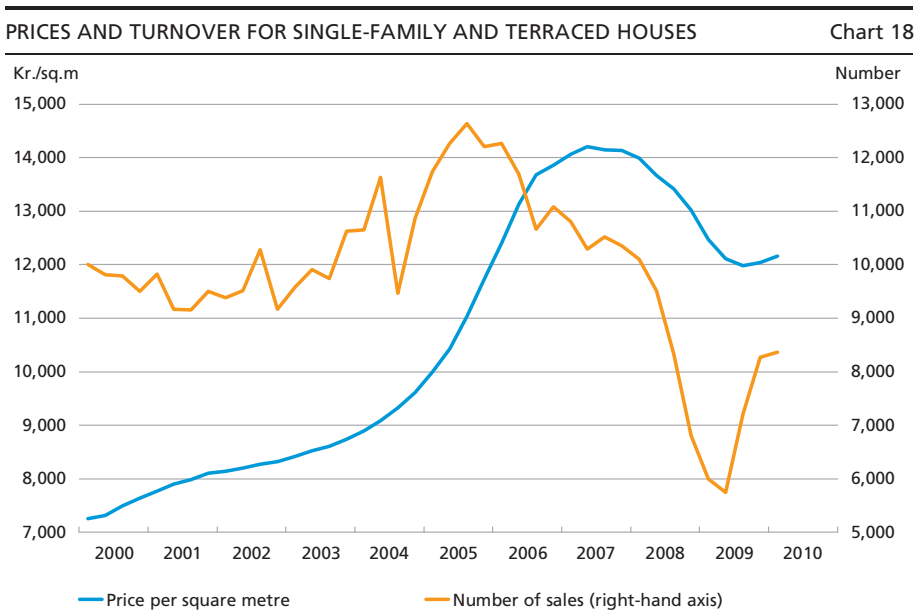
Industrial production seems to have stabilised after having declined sharply in 2008 and the 1st half of 2009. Nevertheless, the level remains more than 20 per cent below the peak in early 2008, and in spite of rising industrial expectations output cannot be expected to return to the pre-crisis level in the near future. In addition, companies may to some extent have seen the downturn as an opportunity to adjust output and relocate parts of their production to low-cost countries.

Retail sales fell by 4.2 per cent from March to April after a strong increase in March. This unusual pattern of a surge followed by an abrupt fall is presumably to some extent attributable to the fact that Wednesday before Easter, when retail sales are high, was on the last day of March, so that all Danish public holidays around Easter were in April. This factor can be eliminated by looking at March and April as a whole. Total retail sales in March-April were 0.1 per cent higher than in January-February. Dankort transactions point to retail sales remaining flat in May. Consumer confidence has picked up notably over the last year and is now above its average since 1987. Consumers expect the Danish economy to be better one year ahead than it is now, but at the same time they believe that the economy is worse today than it was one year ago.

Sales of passenger cars were higher in April 2010 than in the same month of 2009. Sales to the corporate sector have risen more than sales to households, which may reflect the increasing popularity of leasing to households. Overall the confidence indicators point to favourable conditions for the households. Since the consumption-to-income ratio resulting from rising disposable incomes is also relatively low when viewed in a longer-term perspective, there are signs that private consumption will develop favourably in the coming quarters.

The housing market

According to seasonally adjusted data from the Association of Danish Mortgage Banks, prices for single-family and terraced houses continued to rise in the 1st quarter of 2010, cf. Chart 18. Moreover, turnover in the housing market has increased since the trough in the 2nd quarter of 2009. It thus looks as if the housing market has stabilised following a strong adjustment of the price level. Seasonally adjusted prices are now on average just over 14 per cent lower than at the peak in the 2nd quarter of 2007, while the negative tide has turned. The rebound is most pronounced in the Copenhagen area, which was also where the largest price drops were seen previously. However, the supply of homes on the market remains high and the number of sales is below the average since 2000.



Note: The most recent observations are from the 1st quarter of 2010.

Source: Association of Danish Mortgage Banks.

House prices are supported by low interest rates and rising disposable incomes in the households and remain high relative to the historical trend. The number of enforced sales has increased since 2007, but remains far below the level seen in previous downturns. A major difference compared with previously is that a larger share of homes are now financed via variable-rate mortgages, which are currently very cheap. Consequently, a further increase in the number of enforced sales cannot be ruled out when interest rates begin to rise.

Foreign trade and balance of payments

Exports of goods rose by 10.1 per cent in March after having been virtually flat since the summer of 2009. This could imply that the rebound in the global economy is beginning to be reflected in Danish exports. All the same, exports remain well below the level seen before the financial crisis, and it is too early to draw any firm conclusions on the basis of data from just one month. However, the assumption that exports of goods are beginning to pick up is supported by a more favourable view of export order books in the industrial sector. Imports of goods have been rising since late 2009, but have fallen more than exports over the last couple of years. Hence, the balance of goods still shows a large surplus.

In the last 12 months, the current account has shown a surplus totalling kr. 71.1 billion, compared with a surplus of kr. 43.3 billion in the preceding 12 months. Particularly the surplus on trade in goods has increased relative to the year before, but investment income has also increased. Conversely, the surplus on trade in services has diminished, reflecting that the fall in global trade has had a severe impact on earnings from sea freight. The current-account surplus is expected to decline as domestic demand increases. In the longer term, falling income from energy exports will also reduce the current-account surplus.

Labour market

When adjusted for seasonal fluctuations, registered unemployment has been more or less flat over the past six months. In April, seasonally adjusted unemployment was 114,300, corresponding to 4.1 per cent of the labour force. According to the labour-force survey, EU-harmonised unemployment, which also includes job seekers not registered as unemployed, was 7.5 per cent in the 1st quarter of 2010 (own seasonal adjustment).

It is unusual for unemployment to stabilise so early during a downturn. The trend in unemployment in recent months is, however, not necessarily an indication that the labour market is rebounding. Box 4

UNEMPLOYMENT DYNAMICS DURING THE ECONOMIC DOWNTURN

Box 4

Registered unemployment has been practically unchanged for the past six months. However, this does not necessarily mean that the labour market is rebounding, as registered unemployment does not include all groups of unemployed people.

Since the summer of 2008, the number of people in activation schemes has increased by 24,000. This group is not included in registered unemployment, and the influx to the schemes therefore reduces the rise in unemployment. Gross unemployment, which is the sum of those in activation and the unemployed, increased marginally during the winter of 2009-10. This means that more people previously registered as unemployed are now in activation.

Unemployed people who receive neither unemployment benefits nor cash benefits are not included in registered unemployment. A fall in the number of actively insured in the period since 1995 means that fewer people are entitled to unemployment benefits than in previous economic downturns. Persons with cash deposits exceeding a good kr. 10,000 or a spouse whose income exceeds two times the cash benefits are not entitled to cash benefits either. According to the labour-force survey, the number of self-supporting unemployed people who are entitled to neither unemployment nor cash benefits has increased by 30,000 since the summer of 2008.

Frontier workers and other foreign labour are not registered as unemployed if they return to their home countries after having lost their jobs in Denmark. The number of foreign VAT-registered firms in Denmark has declined, and so has the number of frontier workers living in Germany. Indicators of the number of frontier workers living in Sweden have also declined. Overall, this indicates that some of the foreign workers who came to Denmark during the most recent boom have now left the country.

The influx of unemployed people to educational programmes entitling them to student grants ("SU") or state adult education grants ("SVU") has risen significantly during the most recent downturn. In contrast, the number of people transferring to permanent public benefit schemes, such as early retirement, social pensions and flexible jobs has not increased much. Consequently, there is reason to believe that there will be spare labour available once the economy really begins to pick up again, perhaps even with higher productivity levels than demographics would warrant.

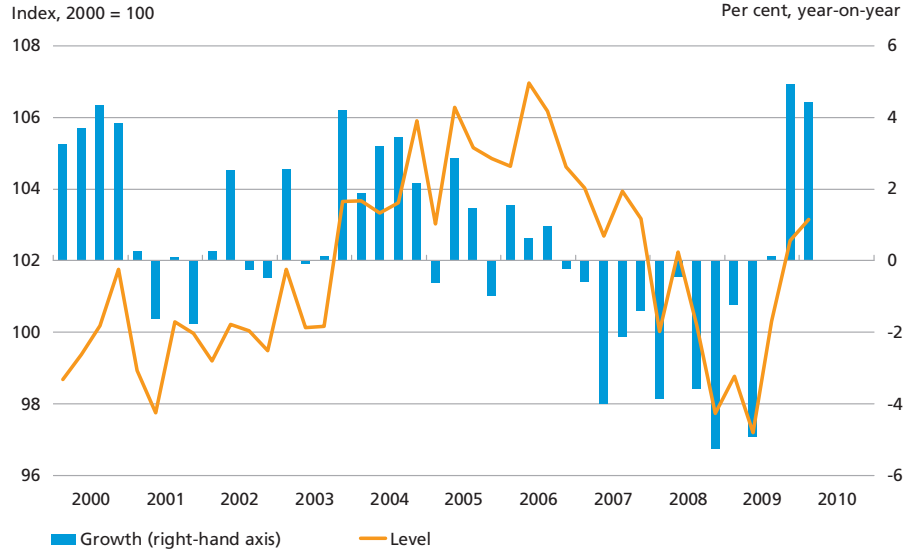
analyses a number of potential factors underlying the moderate increase in registered unemployment. For example, the labour force has shrunk by around 100,000.

The decline in employment is purely attributable to the private sector, whereas public-sector employment overall has risen by 16,000 since the 1st quarter of 2008. The number of new jobs advertised has stabilised at around a trough of 14,000 per month, seasonally adjusted. This figure was more than twice as high towards the end of the most recent boom.

Unemployment has fallen by less than output, meaning that productivity growth has been weak until recently, cf. Chart 19. A characteristic of the Danish labour market is that it is relatively easy for companies to adjust the number of employees to current requirements. Hence, employment protection legislation cannot explain why companies seem to

PRODUCTIVITY IN THE PRIVATE NON-AGRICULTURAL SECTOR

Chart 19



Note: Gross value added per person employed. The most recent observations are from the 1st quarter of 2010.
Source: Statistics Denmark and own calculations.

be hesitant to adapt to lower output. One explanation could be that they expect to increase production again before too long.

The newly concluded collective agreements introduce severance pay to employees that have been with a company for at least three years. This will make it more expensive to adjust the number of employees in future downturns.

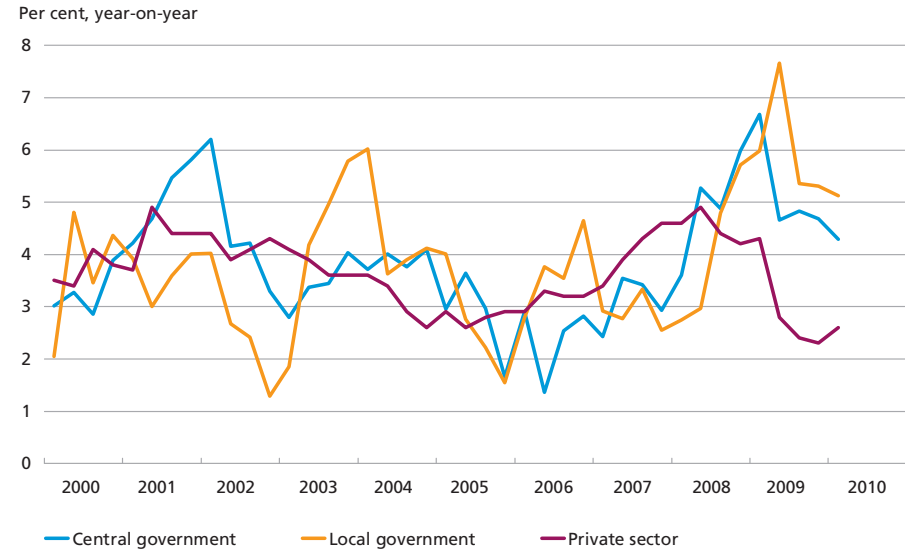
Wages and prices

Wage inflation in the private sector has moderated substantially as labour market pressures have eased. For members of the Confederation of Danish Employers (DA), annual wage inflation was 2.6 per cent on average in the 1st quarter of 2010, cf. Chart 20. In comparison, wage inflation peaked at 4.9 per cent in the 2nd quarter of 2008. The lowest wage increases were seen in the building and construction sector, which has been particularly severely affected by the crisis.

Wages in the public sector have risen substantially more than wages in the private sector in recent quarters. This trend will presumably reverse, as a special regulatory arrangement ensures that wage inflation in the public sector mirrors the private labour market with a certain lag. Wage inflation in the private labour market is now considerably lower than expected when the collective agreements for the public sector were concluded. This will be reflected in a very weak trend in public-sector wages in the coming quarters.

WAGE INFLATION IN THE PRIVATE AND PUBLIC SECTORS

Chart 20



Note: Hourly wages. The most recent observations are from the 1st quarter of 2010.
Source: Statistics Denmark and Confederation of Danish Employers (DA).

Despite the dampening trend, wage inflation in the highly competitive industrial sector remains higher than in Denmark's major trading partner countries, as has been the case for quite a few years. Combined with weak productivity development, this has for some time eroded the sector's international competitiveness.

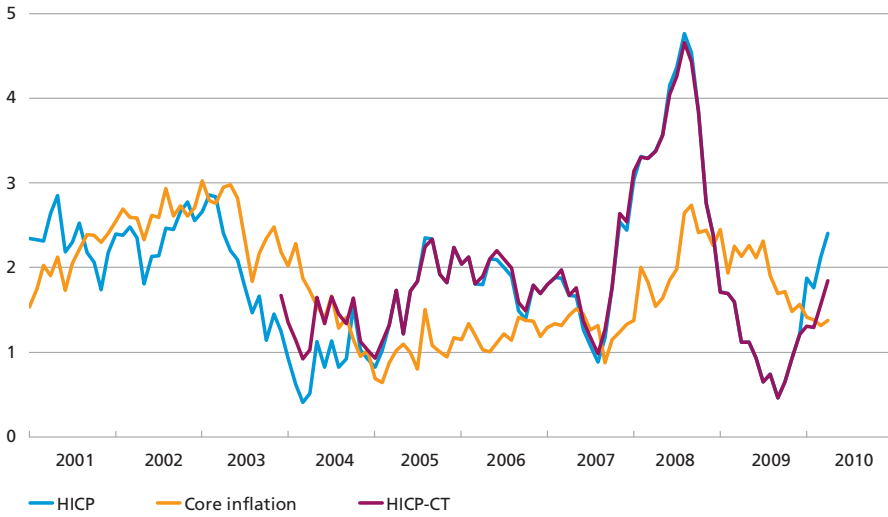
Two-year collective agreements have been concluded for large parts of the private labour market. Wages in the minimum-wage system, to which most of the agreements pertain, must subsequently be negotiated at enterprise level. Therefore, actual wage increases cannot be predicted on the basis of the agreements alone, but judging from the agreements concluded in the normal-wage system, where wage increases are laid down in central agreements, modest wage increases are scheduled for the remainder of the collective agreement period. The moderate wage increases reflect the competitive situation, but as foreign wage increases are also declining strongly, competitiveness is expected to deteriorate further.

Consumer prices measured by the HICP were 2.4 per cent higher in April compared to the same month of 2009, cf. Chart 21. So, despite the weak domestic capacity pressure, the rate of inflation has risen since mid-2009, when it bottomed out at 0.5 per cent. The higher taxes on tobacco and other goods that took effect at New Year are assessed to have increased inflation by approximately 0.5 percentage points. HICP at constant tax rates, HICP-CT, is thus only 1.8 per cent higher than in the

INFLATION

Chart 21

Per cent, year-on-year



Note: The most recent observations are from April 2010.

Source: Statistics Denmark.

same month of 2009. Recently, rising energy prices have added to inflation. Both the higher taxes and the higher energy prices will, however, have only a temporary impact on inflation.

Unlike consumer price inflation, core inflation, which excludes changes in the prices of energy and food, has declined since mid-2009, to stand at 1.4 per cent in April. Since core inflation excludes the categories of goods that are traditionally most volatile in price, it can be seen as an expression of underlying inflation. Low core inflation thus indicates that the increase in consumer price inflation is a temporary phenomenon.

Economic policy

Following a sharp downturn in the wake of the international crisis, both the global and the Danish economy are now picking up. The financial turbulence in recent months and the prospects of substantial fiscal tightening do, however, pose downside risks to the budding upswing in Europe so it cannot be ruled out that growth in Denmark's export markets will be weak in the next few years. Nevertheless, trends in overall demand are assessed to be sufficiently strong to ensure a continued upswing in the Danish economy, although it will probably take until some time in 2013 for activity to return to the pre-crisis level.

Current economic policy is strongly expansionary. Policy interest rates are historically low, and the market expects them to remain so for a while. In addition, fiscal policy was eased considerably in 2009 and 2010.

This was achieved by bringing forward public-sector investments and by phasing in the tax reform so that the income-tax cuts primarily take effect this year, while financing is phased in gradually. Moreover, public consumption is substantially higher than originally planned.

In this way both monetary and fiscal policies help to mitigate the impact of the economic downturn. Statistics from recent months indicate that unemployment will not rise as much as previously predicted before the labour market rebounds in earnest.

Denmark's government deficit for 2010 is expected to be in the range of kr. 100 billion, corresponding to around 5 per cent of GDP. This means that fiscal consolidation is necessary, not only in order to comply with the formal requirements of the Stability and Growth Pact, but also to ensure continued international confidence in the Danish economy. The financial market turbulence in the spring emphasised that countries with weak public finances risk being burdened with high interest rates on their government debt. Credible economic policy is a safeguard against pressure on the krone in periods of financial turbulence. Confidence is best ensured by initiating the consolidation process before the government debt has become too large. Furthermore, the fiscal tightening measures required will increase, the further a country has travelled along the path of deficit and debt.

Against this background it is positive that political agreement has been reached to consolidate public finances by a total of kr. 24 billion over the period from 2011 to 2013 inclusive. It is also positive that the agreement contains elements that can be expected to increase labour supply in the longer term. The upward trends in private domestic demand and exports mean that gradual consolidation of public finances from 2011 onwards will not stifle the budding upswing, cf. the calculations in Box 3 above.

A key element of the recent political agreement to consolidate the Danish economy is that growth in public consumption must be significantly more subdued than previously. Recent years' repeated over-expenditure relative to the growth framework for public consumption shows that it is a considerable challenge to tighten expenditure as planned. The consolidation plan includes certain adjustments to the framework for agreements on local-government finances, which will give the municipalities a greater incentive to observe the limits agreed with the central government. If, in spite of these measures, growth in public consumption is not kept within the agreed limits, new economic policy initiatives will be required in order to ensure the necessary consolidation of government budgets.

Can Crises Be Predicted?

Morten Spange, Economics

INTRODUCTION AND SUMMARY

In 2008, the global economy was hit by a crisis unrivalled since the Great Depression in the 1930s. The onset of the crisis was unexpected after a period of exceptionally favourable conditions with solid growth rates and low inflation in the major economies. This period was even referred to as "the Great Moderation" due to the notably more stable economic environment compared with previous decades.

From the summer of 2007, it became increasingly clear that all was not as well as previously assumed. In record time, a problem with US mortgages – that had seemed relatively limited on the surface – had caused liquidity problems for financial institutions all over the world. This quickly escalated into a full-blown financial crisis with serious economic repercussions. The crisis and the subsequent economic slowdown took virtually all economists in Denmark and abroad by surprise.¹ Their pre-crisis forecasts later came to reflect badly on them.

Against this backdrop, the question is why practically no economists saw that a worldwide crisis of this magnitude was looming. This article first discusses the Danish experience. Neither Danmarks Nationalbank, the Ministry of Finance, the Economic Council or the banks, nor the international organisations predicted that Denmark would be hit by a financial crisis. Once the crisis had set in, its real economic consequences were consistently underestimated. From a narrow Danish perspective, it can be tempting to view the crisis as the result of external factors that could not be predicted. But there is likely to be more to it than that.

The crisis seems to be the outcome of two interconnected imbalances that had been accumulating for some time. One was the prevailing global imbalances, i.e. mainly a large current-account deficit in the USA, while Germany and a number of Asian economies, notably China and Japan, posted large surpluses. Secondly, it is now clear that the financial system suffered from serious imbalances. The US mortgage problems

¹ A few prominent economists pointed out the risks associated with growing global imbalances, notably Raghuram G. Rajan, former Chief Economist at the IMF, Rajan (2005), William R. White, former head of the Economic Department at BIS, White (2006 and 2008), and Nouriel Roubini, professor at New York University and founder of Roubini Global Economics, Roubini (2006).

were presumably only the trigger of a crisis that would have come in any case.

Economic forecasts will always be subject to considerable uncertainty, not least in turbulent times. The typical forecasting models are based on a number of economic correlations that have held up over time. Nevertheless, the economy is sometimes affected by sudden reversals often related to financial market events. This was the case with the financial crisis. These reversals cannot be predicted by macroeconomic forecasting models.

Hence, a key issue is how to improve the ability to identify imbalances generating substantial corrections of e.g. house and stock prices and ultimately resulting in an economic downturn. Studies by the Bank for International Settlement, BIS, and the International Monetary Fund, IMF, among others, have attempted to identify indicators of financial imbalances. These studies find that factors such as strong credit growth, increasing residential investment and large current-account deficits may be indicators of imbalances that will, in the slightly longer term, lead to a correction with negative economic consequences.

However, the relationship between indicator signals and subsequent crises is far from perfect. And although the indicators may give early warning about financial imbalances, they cannot say exactly when a possible crisis will erupt. Consequently, it is not really possible to predict sharp economic reversals with a reasonable degree of certainty. However, if the indicators point to an increased risk of a financial crisis, they may prompt further analyses. Moreover, in periods when the indicators are in warning mode, a correction of financial imbalances should be included in risk scenarios.

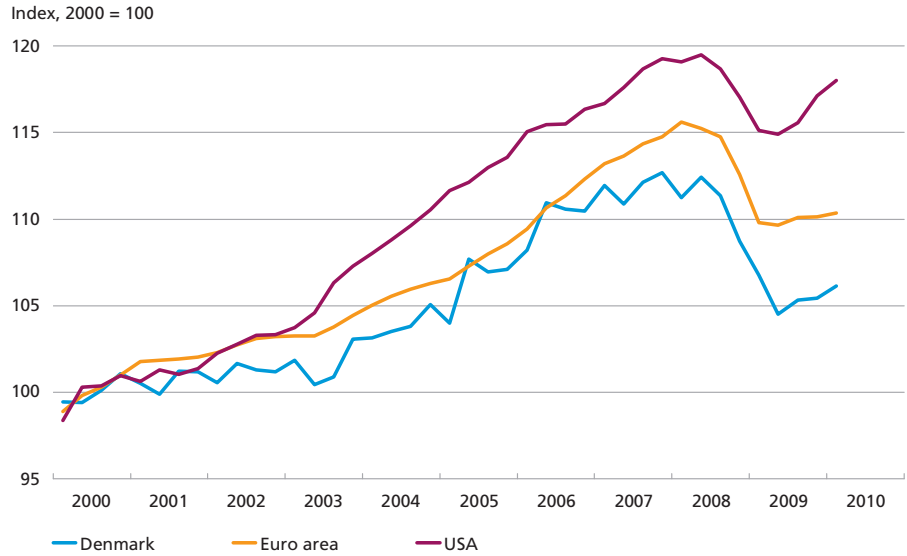
THE DOWNTURN IN DENMARK

Like most other countries, Denmark has been severely hit by the international crisis. Activity dropped by 7 per cent from the 2nd quarter of 2008 to the 2nd quarter of 2009, cf. Chart 1. Although growth has been back in positive territory in the last three quarters, the gross domestic product, GDP, has not risen above the level seen at the beginning of 2007. Denmark has not experienced a downturn of this magnitude since World War II. In terms of GDP, the downturn has been slightly more pronounced in Denmark than in the USA and the euro area, cf. Chart 1. The likely cause is that the Danish economy was overheated prior to the financial crisis due to the strong expansion in the preceding years.¹

¹ See Sørensen (2010) for an analysis of the downturn in Denmark.

GROSS DOMESTIC PRODUCT

Chart 1

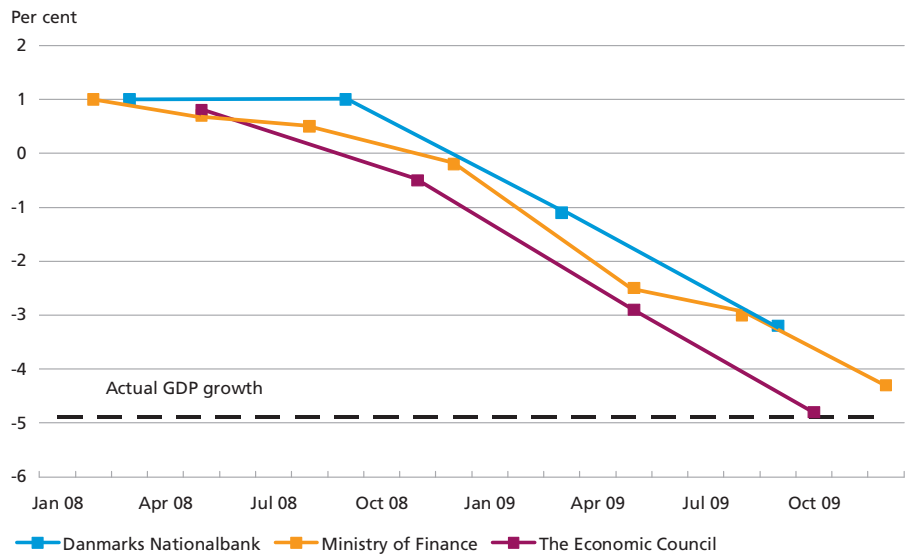


Note: Seasonally adjusted data.
Source: Reuters EcoWin.

The strength of Denmark's cyclical downturn caught all forecasters by surprise. Danmarks Nationalbank, the Ministry of Finance and the Economic Council reduced their growth estimates for the Danish economy in 2009 as the crisis evolved, cf. Chart 2. At the beginning of 2008, forecasters agreed that growth in 2009 would be relatively moderate at

GDP GROWTH FORECASTS 2009

Chart 2



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

around 1 per cent. The modest expectations reflected the assessment that at that time the Danish economy was stretched considerably beyond its capacity limit.¹

This entailed pressure on the production resources, which was not sustainable in the longer term, and a period of low growth was found to be unavoidable. But it turned out that GDP fell by 4.9 per cent in 2009 compared with the forecast increase of 1 per cent. Instead of gradual adjustment to more sustainable capacity utilisation, the Danish economy went through a sharp correction, resulting in a far stronger downturn than a mere correction of an excessive capacity pressure.

WHY WERE THE FORECASTS WRONG?

A brief outline of the forecasting process is useful for better insight into how the forecasts could be so misguided. Like most other institutions producing macroeconomic forecasts, Danmarks Nationalbank uses an economic model, MONA, which is a quarterly model. MONA describes economic relations by means of a large number of equations estimated on historical data for the Danish economy.²

An economic model is merely a tool. It can generate a prediction on the basis of a number of assumptions, but it cannot capture all relevant aspects. Hence, it is up to the model users to find out how the final forecast should look. The users also incorporate information not included in the model, such as confidence indicators. Moreover, all forecasts have a strong element of judgement.

The economic variables of MONA can be divided into two main categories, endogenous and exogenous variables. Endogenous variables are determined by the model, while the user chooses the values of the exogenous variables in the projection period. Some of the key exogenous variables are export market growth, interest and exchange rates and oil prices.

In order to produce a forecast, the model user must choose the trajectory of these variables over the projection period. Usually, the development is not assumed to diverge dramatically from the historical path. This also applied when Danmarks Nationalbank compiled an internal forecast in May 2008. But at that time, export market growth had become subject to considerable uncertainty. Against this backdrop, an alternative scenario was discussed, in which export market growth was assumed to be weaker than what was regarded as the most likely path.³

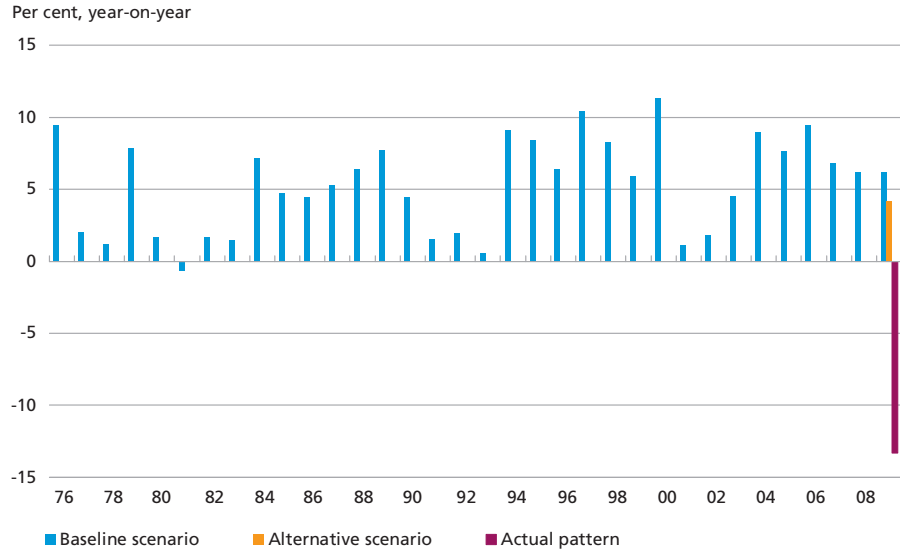
¹ See e.g. Danmarks Nationalbank (2008), p. 25f.

² See Danmarks Nationalbank (2003).

³ See Danmarks Nationalbank (2008), p. 27.

EXPORT MARKET GROWTH

Chart 3



Source: MONA data bank.

The actual development in export market growth was much weaker than Denmark's Nationalbank had envisaged, cf. Chart 3. Since a large part of the goods and services manufactured in Denmark is for export, a significant weakening of export markets will have a negative impact on economic growth in Denmark.

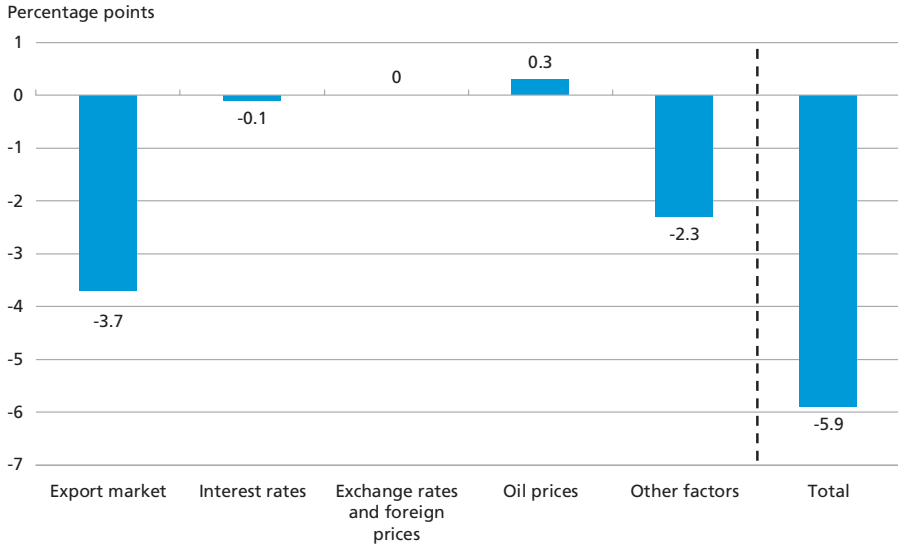
In MONA, the evolution of some of the economic variables is regarded as exogenously given. As mentioned above, it is up to the model user to choose the trajectory for these variables over the forecast period. A different realisation compared with that expected at the time of forecasting may be one factor explaining why the development in the endogenous variables also differed from the expected path. Consequently, MONA may be used to identify the assumption errors that led to the erroneous estimate of the variables explained by the model, such as GDP growth.

According to Statistics Denmark's preliminary estimates, GDP growth in 2009 was 5.9 percentage points lower than the projection in Denmark's Nationalbank's spring forecast from the 1st quarter of 2008. Using MONA, Denmark's Nationalbank has broken down the deviation by exogenous factors. According to the mechanical breakdown in MONA, the substantial drop in export market growth accounts for almost two thirds of the forecast error for 2009, cf. Chart 4. Interest rates, exchange rates, foreign prices and oil prices all play an insignificant role. Instead, the remaining third is explained by "other factors".

"Other factors" potentially cover a wide range of factors, e.g. fiscal policy, changes in the consumption and investment behaviour of the

BREAKDOWN OF FORECAST ERROR

Chart 4



Source: MONA data bank and own calculations.

private sector as well as revisions of previously released data. The cause of the substantial contribution from "other factors" may be that the financial crisis resulted in a strong drop in consumer and business confidence in future developments. This may have led to a stronger contraction of demand compared to a normal cyclical downturn.

CAN CRISES BE PREDICTED?

One possible interpretation is that the crisis was primarily caused by external factors. Danmarks Nationalbank's projection for economic developments outside Denmark is primarily based on forecasts from international organisations such as the OECD, the IMF and the European Commission. None of them expected a strong global downturn prior to the onset of the crisis. A natural conclusion is therefore that Danmarks Nationalbank's forecasting error can be attributed to the erroneous estimates of the international organisations.

Yet it is too simple to place all responsibility for the forecast error on the international organisations. Some of the factors that triggered the international crisis also characterised the Danish economy. For example, the Danish banks encountered difficulties remarkably early in the downturn. This points to imbalances in the Danish financial system that would inevitably lead to a correction.

The overriding question is why almost nobody saw the crisis coming. All was calm on the surface. For a prolonged period the global economy

had enjoyed favourable conditions with solid growth rates and low inflation. The fact that central banks kept interest rates fairly low supported the favourable development. Risk premia in financial markets fell as investor confidence in economic stability strengthened. At the same time, risk appetite increased as low interest rates induced investors to chase higher yields.

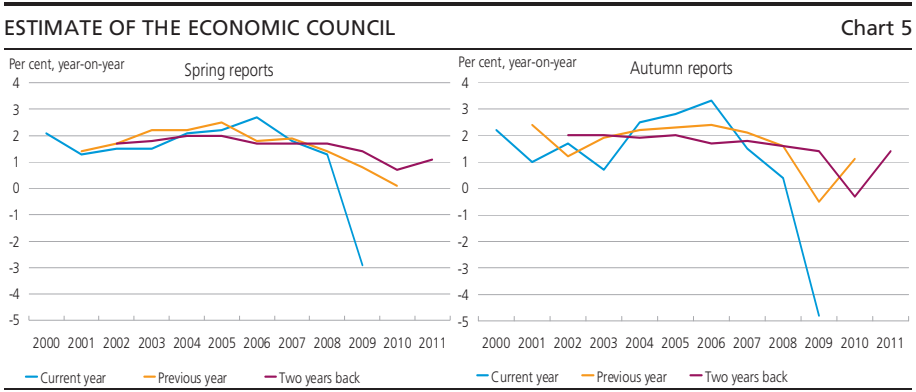
Today it is clear that all was not as well as it seemed. Much evidence indicates that the crisis was the outcome of two interconnected imbalances that had been accumulating for some time. One was the prevailing global imbalances, i.e. mainly a large current-account deficit in the USA, while Germany and a number of Asian economies, including China, posted large surpluses. These imbalances attracted a fair amount of attention before the outbreak of the crisis, but their significance in the longer term was far from clear. Secondly, it has become evident that the financial system suffered from serious imbalances. These imbalances would presumably have resulted in a crisis anyway at some point. It could be a mere coincidence that the crisis was triggered by US mortgage problems.¹

If major forecasting errors are to be avoided in future, it is paramount to find the best method of identifying imbalances that will at some point lead to a correction with consequences for the real economy. It is clear that traditional economic forecasting models are not suitable for analysing macroeconomic imbalances. Nor are they suitable for predicting strong economic reversals. They operate with economic relations that seem to hold in "normal" times when the economy is slowly moving towards its long-term growth trend in the absence of major fluctuations.

This gradual return to trend growth will typically be accepted as the most likely result. The reason is that not much is known about what will happen two years ahead. Consequently, there is rarely any substantial reason to assume that the economy will develop either more strongly or more weakly than its historical trend. That is why e.g. the Economic Council's growth estimate two years ahead is, in most cases, close to the estimate of annual trend growth of just under 2 per cent, cf. Chart 5.² However, the probability of growth matching trend growth two years ahead is relatively small because in the meantime, the economy will be affected by events with positive or negative impacts. It is not possible to predict events several years ahead, but if the numbers of positive and

¹ See Kramp (2009) for a discussion of the role of the imbalances in the financial crisis.

² This point is illustrated by estimates from the Economic Council since Danmarks Nationalbank's own forecasts were not published until 2007. However, a chart based on Danmarks Nationalbank's estimate would present a similar picture.



negative surprises are equal, the forecasts should, on average, be right over time.

The traditional models are primarily useful when the economy is in "normal" conditions, whereas they fail in case of more unusual events that suspend the known correlations. For example, a financial crisis may have such a strong impact on consumer confidence that consumer demand will fall more sharply than during a normal cyclical downturn. Moreover, economic and financial globalisation may cause the crisis to spread faster across borders than previously. As a result, the estimated relations in the models no longer hold, so the model users have to add their own assessments of the expected path of the economy.

Another aspect of the current crisis is that the economic forecasting models typically used by central banks and other institutions take the financial sector into account only to a very limited extent. Hence, financial crises cannot arise in these models. In addition, the existing models do not provide for satisfactory analysis of the relations between the financial sector and the real economy. Alternative methods are therefore called for if crises are to be foreshadowed.

Indicators of financial crises

In order to predict financial crises that cause strong economic reversals it is necessary to supplement the traditional macroeconomic models with tailored methods. For example, a number of studies have attempted to identify indicators of financial imbalances. The typical method is to identify a number of financial crises for various countries as the first step. The second step is to examine whether there are relations between the crises and the evolution of certain economic variables in the period up to the outbreak of the crisis. If such relations can be identified, they can potentially be used as warning indicators of future crises.

For a number of years, senior BIS employees have focused on how to identify financial imbalances, see e.g. Borio and Lowe (2002 and 2004). Their key message is that financial crises have often arisen after periods of strong credit growth combined with rising asset prices. It seems that this particular combination can be damaging to the real economy, whereas a strong increase in asset prices, for example, has a less pronounced effect if it is not associated with above-normal credit extension.

Borio and Lowe have constructed indicators of financial imbalances that give early warning when simultaneous credit growth and increases in asset prices exceed a certain limit, which has been determined on the basis of two opposing considerations. If the limit is set too high, the signal will be given only rarely and the indicator will not predict many crises. On the other hand, if the limit is set too low, there will be a large number of false alarms. According to Borio and Lowe (2004), these indicators could have predicted almost three quarters of the identified crises with a horizon of 4-5 years. Moreover, the number of false alarms is low; only around 2 per cent would have been "noise".

The crisis has reinforced focus on the subject. For example, the IMF has studied potential indicators of financial crises.¹ The study is based on data for 21 industrialised countries, including Denmark, for the period 1970-2008. The IMF defines a crisis as a decline in the 4-quarter moving average of either house prices or stock prices in excess of 5 per cent for house prices and 20 per cent for stock prices. On this basis, they have identified 47 corrections in the housing market and 98 in the stock market. In the first year after a correction of house prices, GDP on average falls by 4.25 per cent below the trend, while the corresponding decline after a correction in stock prices is 1.25 per cent. It follows that both types of correction have important real economic consequences.

Overall, the IMF finds that the period before a correction in the stock or housing market is typically characterised by strong lending growth, a considerable increase in investment as a ratio of GDP and soaring prices of financial assets. On the other hand, the IMF could not identify any specific pattern of inflation and growth prior to a correction. The IMF's conclusions on this issue are thus very close to those of BIS. On the basis of the established correlations, the IMF has constructed an indicator of a forthcoming correction. This indicator will give early warning if a combination of credit, current-account deficit and residential investment reaches a certain level.

This indicator is to give early warning if there is a supernormal probability that a correction will soon take place in the housing or stock

¹ See IMF (2009).

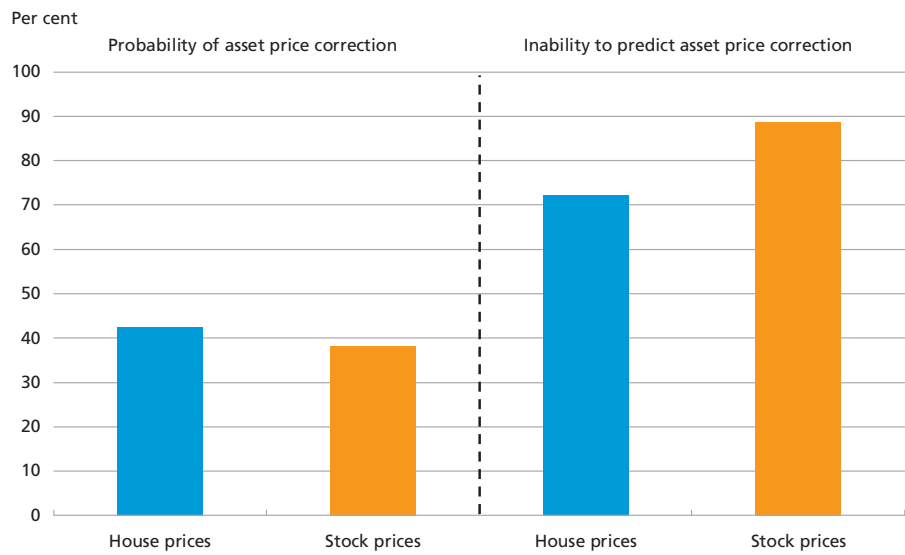
market. With or without early warning, the probability of a correction within a horizon of 1-3 years is approximately 14 per cent for house prices and 29 per cent for stock prices. Hence, the probability of a correction if early warning is given must be higher than 14 per cent and 29 per cent, respectively, for the indicator to be useful.

Based on data for 1985-2008, the IMF finds that an early warning increases the probability of a correction by around 40 percentage points for both house prices and stock prices, cf. the two bars on the left-hand side of Chart 6. The probability of correction is thus significantly higher if the indicator has given early warning. As a minimum, an early warning should therefore prompt the authorities to be even more alert to any accumulating imbalances.

Not all crises are captured by the indicator. It misses more than 70 per cent of house price corrections and almost 90 per cent of stock price corrections, cf. the two bars on the right-hand side of Chart 6. It follows that the indicator is fairly weak, and the IMF results do not seem to support the BIS' more optimistic view on finding ways to predict financial crises, although there is general agreement on which indicators should be looked into. In addition, it can be argued that a horizon of 1-3 years is not exactly precise.

The results of other studies seem to be even less promising. For example, on the basis of a comprehensive study of more than 60 poten-

INDICATORS OF ASSET PRICE CORRECTION Chart 6



Note: The bars on the left indicate the increase in the probability of a correction within a horizon of 1-3 years with early warning, compared with the probability of a correction irrespective of early warning. The bars on the right indicate the probability of the indicator, in a given quarter, failing to capture a crisis arising 1-3 years later.

Source: IMF.

tial indicators for 107 countries, Rose and Spiegel (2009) have examined whether country-specific factors can explain the extent to which the individual countries have been affected by the recent crisis. Based on the IMF and BIS results, it would seem that countries with strong credit growth would have been relatively hard hit by the crisis. But Rose and Spiegel find no correlation between the value of the indicators and the extent to which the individual countries were affected by the crisis.

The study by Rose and Spiegel is different from the analyses by BIS and the IMF in several respects. Among other things, Rose and Spiegel focus on the most recent crisis only, while also including a larger set of countries. Furthermore, the different conclusions can be explained by differences in methodology. In view of their results, Rose and Spiegel are sceptical about the possibilities of developing indicators of financial crises. However, interest in this issue can be expected to increase in future.

DANISH INDICATORS OF IMBALANCES

As appears from the discussion above, there is no general agreement on the ability to identify financial crises. On the basis of the empirical studies, interest focuses on lending growth, the investment-to-GDP ratio, stock prices and house prices. In the following, the development in these factors in Denmark in the time leading up to the outbreak of the crisis will be compared with previous expansions.¹

Rising house prices have been identified as a possible indicator of financial imbalances. In Denmark, house prices rose almost continually from 1993 to 2007, but the increase was particularly strong in the years up to the outbreak of the crisis, cf. Chart 7.

Stock prices almost doubled over a 4-year period up to the onset of the crisis, cf. Chart 8. This is a strong increase compared with developments during previous booms and can be viewed, alongside the increases in house prices, as a signal of potential imbalances.

The BIS studies mentioned above have concluded that rising asset prices are particularly risky when they coincide with soaring credit. During the most recent boom, the surge in total lending as a ratio of GDP was far stronger than in previous expansions, cf. Chart 9.

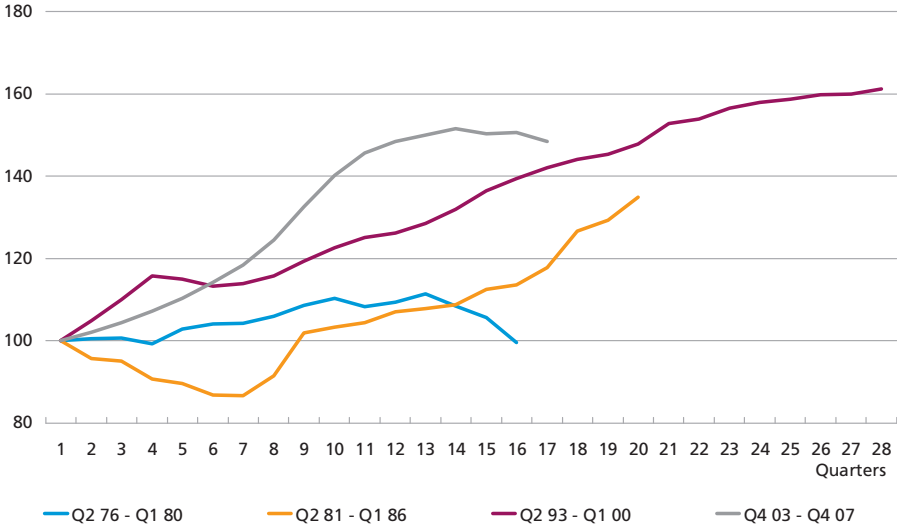
In Denmark, bank lending rose concurrently with a strong rise in the banks' customer funding gap. In 2003, total bank deposits almost matched total lending, but in 2008 the banks had a customer funding gap

¹ See also Pedersen and Sørensen (2009).

REAL HOUSE PRICES

Chart 7

Onset of upswing = 100



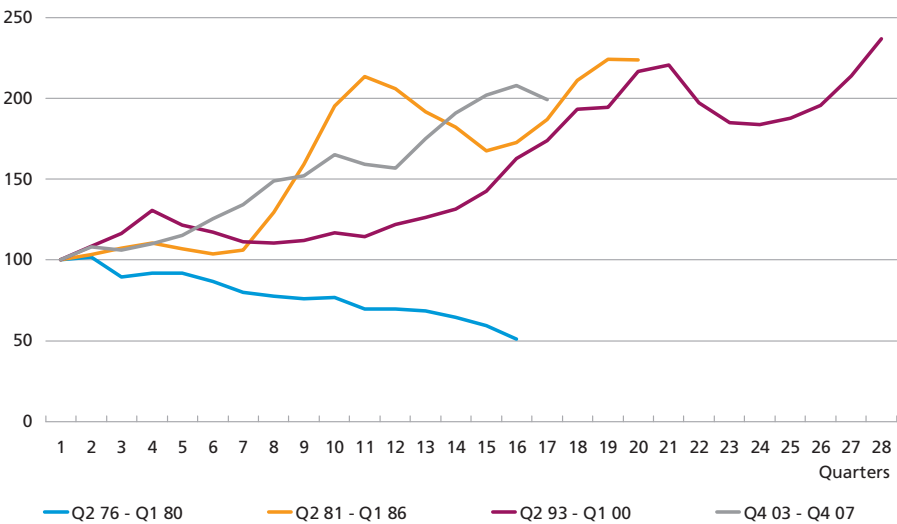
Note: The X axis shows the number of quarters since the onset of the upswing.
Source: MONA data bank.

of approximately 25 per cent of total lending, cf. Chart 10. The substantial gap was probably one of the reasons why the banks so soon experienced problems when it became difficult to obtain market-based financing.

STOCK PRICES

Chart 8

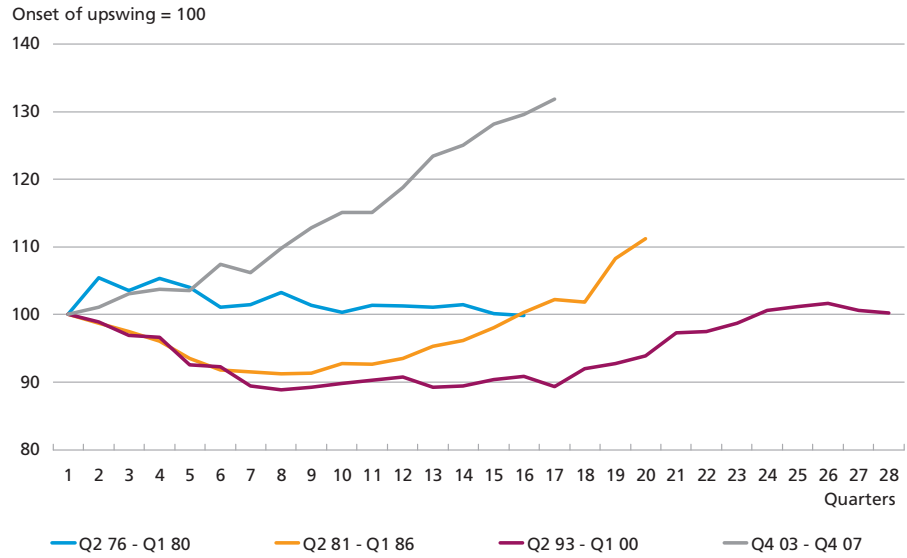
Onset of upswing = 100



Note: The X axis shows the number of quarters since the onset of the upswing.
Source: MONA data bank and own calculations.

TOTAL LENDING RELATIVE TO GDP

Chart 9

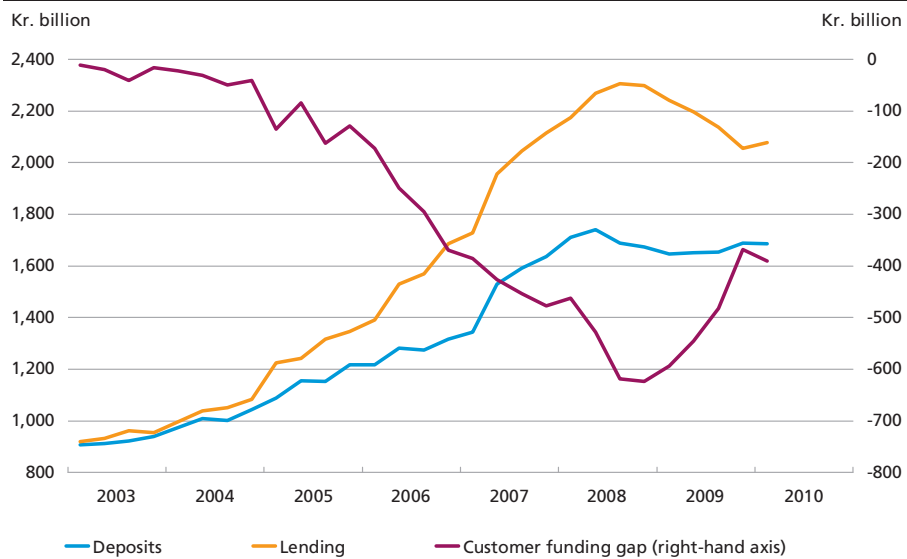


Note: The X axis shows the number of quarters since the onset of the upswing.
 Source: Statistics Denmark, Danmarks Nationalbank and own calculations.

Hence, it is clear that in the period up to the outbreak of the crisis the Danish economy was characterised by a number of the features that have been identified in BIS and IMF studies as potential indicators of financial imbalances. But as discussed above, these factors far from always lead to a crisis.

DEPOSITS AND LENDING, DANISH BANKS

Chart 10



Source: Danmarks Nationalbank.

LITERATURE

Borio, Claudio and Philip Lowe (2002), *Asset prices, financial and monetary stability: exploring the nexus*, *BIS Working Paper*, No. 114.

Borio, Claudio and Philip Lowe (2004), *Securing sustainable price stability: should credit come back from the wilderness?*, *BIS Working Paper*, No. 157.

Danmarks Nationalbank (2003), *MONA – a quarterly model of the Danish economy*.

Danmarks Nationalbank (2008), *Monetary Review*, 1st Quarter.

Kramp, Paul Lassenius (2009), *Global Imbalances and the Financial Crisis*, Danmarks Nationalbank, *Monetary Review*, 2nd Quarter.

International Monetary Fund (2009), *Lessons for monetary policy from asset price fluctuations*, *World Economic Outlook*, October, Chapter 3.

Pedersen, Erik Haller and Søren Vester Sørensen (2009), *Economic Activity, Asset Prices and Credit*, Danmarks Nationalbank, *Monetary Review*, 4th Quarter.

Rajan, Raghuram G. (2005), *Has financial development made the world riskier?*, *Proceedings*, Federal Reserve Bank of Kansas City, August, p. 369.

Rose, Andrew K. and Mark M. Spiegel (2009), *Cross-country causes and consequences of the 2008 crisis: early warning*. *NBER Working Paper*, No. 15357.

Roubini, Nouriel (2006), *Speech at IMF meeting*, 7 September.

Sørensen, Peter Birch (2010), *The downturn in the Danish economy: How much was homemade? (in Danish only)*, *Samfundsøkonomen*, No. 1, March.

White, William R. (2006), *Is price stability enough?*, *BIS Working Paper*, No. 205.

White, William R. (2008), *Globalisation and the determinants of domestic inflation*, *BIS Working Paper*, No. 250.

Financing, Investment and Consumption in Denmark and the Euro Area

Agnethe Christensen, Carina Kjersgaard Friis and Elena Kabatchenko, Statistics

INTRODUCTION AND SUMMARY

The interaction between the real and the financial spheres of the economy is essential for understanding a business cycle. This interaction has become increasingly important in step with recent years' rise in households' financial balance sheets and the resulting increased exposure to financial market developments. The build-up of financial balance sheets is to some extent a result of the wide opportunities to finance investment against real and financial assets as collateral.

Since the turn of the year Danmarks Nationalbank and Statistics Denmark have published integrated quarterly data for the financial and non-financial sectoral national accounts. This new analytical framework makes it possible to provide a consistent picture of Danish households' incomes, consumption, wealth, savings, investment and borrowing. It also sheds new light on investment by business enterprises and the underlying internal and external financing. The consistent national accounts thus provide a better basis for analysing and understanding the business cycle.

Since 2007 the ECB has published integrated quarterly national accounts for the entire euro area. Another ambition is to produce similarly uniform accounts for the individual euro area member states. The new consistency in the Danish quarterly sectoral national accounts therefore also improves the basis for international comparison¹.

This article focuses primarily on the past six years, during which the Danish economy has undergone a significant cyclical upturn as well as a sharp setback. The significant development in the financing, investment and consumption of households and non-financial corporations (business enterprises) is described, drawing parallels to the development in the euro area.

¹ The USA is working on similarly consistent national accounts.

Overall, the period has been characterised by persistent net borrowing among Danish households. It increased from 2004-05 and fell again from end-2008. The net borrowing requirement has arisen because real investment (households' expenditure for e.g. home improvements and new-builds) has exceeded savings throughout the period. Similar cyclical fluctuations in the households' financial and real investment are also seen in the euro area, but here savings exceed real investment. Euro area households therefore have a current net lending requirement. The difference in levels between Denmark and the euro area may reflect a number of structural differences in e.g. access to mortgage credit and pension systems. However, this article focuses primarily on relative changes rather than absolute levels.

Danish households have borrowed extensively to fund rising financial investment in e.g. equities and bonds. This has resulted in a significant increase in balance sheets and thus the households' exposure to financial market developments. This is also mirrored in the wide fluctuations in financial net wealth. Developments in wealth have proved to have a close correlation with consumption and real investment.

Like the households, Danish business enterprises have been net borrowers during much of the period. The reason is that real investment in capital equipment and inventory build-up continuously exceeded savings from 2006 until the autumn of 2009. Here, too, there is a correlation with economic trends. Due to declining investment and rising savings at the end of the period, net borrowing by business enterprises has turned into net lending.

Developments in the net financing need and corporate financial investment should be viewed in the context of funding in the financial markets (external financing). During 2009 – concurrently with the decline in the net borrowing requirement – financial investment fell sharply amid deceleration in external financing. In 2009, business enterprises thus repaid short-term loans and reduced growth in long-term loans.

NEW CONSISTENCY IN THE QUARTERLY SECTORAL NATIONAL ACCOUNTS

Since the turn of the year, Danmarks Nationalbank has, together with Statistics Denmark, released quarterly accounts with a single consistent compilation of the net lending/net borrowing of the individual sectors, cf. Box 1.

Net lending/net borrowing is calculated for all sectors of the Danish economy and for the rest of the world versus Denmark. Net lending/net

NET LENDING/NET BORROWING IN THE NATIONAL ACCOUNTS

Box 1

Net lending/net borrowing links the real and financial sides of the national accounts. On the real side, net lending/net borrowing expresses whether there is a surplus after consumption and real investment and thus a net *investment* need in the financial markets, or whether there is a deficit and thus a net *financing* need. On the financial side, Net lending/net borrowing is an expression of the difference between transactions in financial assets and liabilities. If net transactions are positive, capital is invested in the financial markets and vice versa. Net lending/net borrowing calculated from the financial and the real side must therefore necessarily be the same.

HOUSEHOLDS' NET LENDING/NET BORROWING

Table 1

Kr. billion	Q4 2009
Gross disposable income (B.6g)	208.8
Adjustment for the change in net equity of households in pension fund reserves (P.8)	19.7
Gross disposable income, adjusted (B.6g+P.8)	228.5
Individual consumption expenditure (P.31)	213.7
Gross saving (B.8g)	14.9
Capital transfers, net (D.9)	-0.4
Real investment (P.5+K.2)	21.1
Net lending/net borrowing (B.9)	-6.6
Transactions in financial assets	46.3
Transactions in financial liabilities	52.9

Note: Selected transactions from the financial and the real side of the national accounts. The parenthesis after the name of the line indicates the item's ESA 95 national account code, if any.

Source: Statistics Denmark and Danmarks Nationalbank.

The elements of net lending/net borrowing on the real and the financial sides of the national accounts are illustrated in the following, based on the household sector.

During a quarter, households receive income in the form of e.g. wages, (net) interest income and dividends, and they pay taxes. Together, these transactions constitute the households' disposable gross income adjusted for the change in net equity in pension fund reserves. Due to the adjustment, payments to pension funds and interest and dividend from investment of pension fund reserves form part of the adjusted disposable income¹. Thus, the calculations of both the adjusted disposable gross income and the savings and investment ratios are independent of the selected form of investment (via the pension fund or direct investment in equities, bonds, etc.), which facilitates cross-border comparability.

If households' consumption of e.g. food, clothing and durable consumer goods, including cars and white goods is deducted from disposable income, the gross saving is found. Net lending/net borrowing is then found by adding capital transfers and deducting expenses for real investment in e.g. new-builds and home improvements.

On the financial side of the national accounts net lending/net borrowing is the households' net financial transactions on the assets side less net transactions on the liabilities side. Net transactions include purchase and sale of equities and bonds, payments to pension funds, transactions in bank deposits and loans.

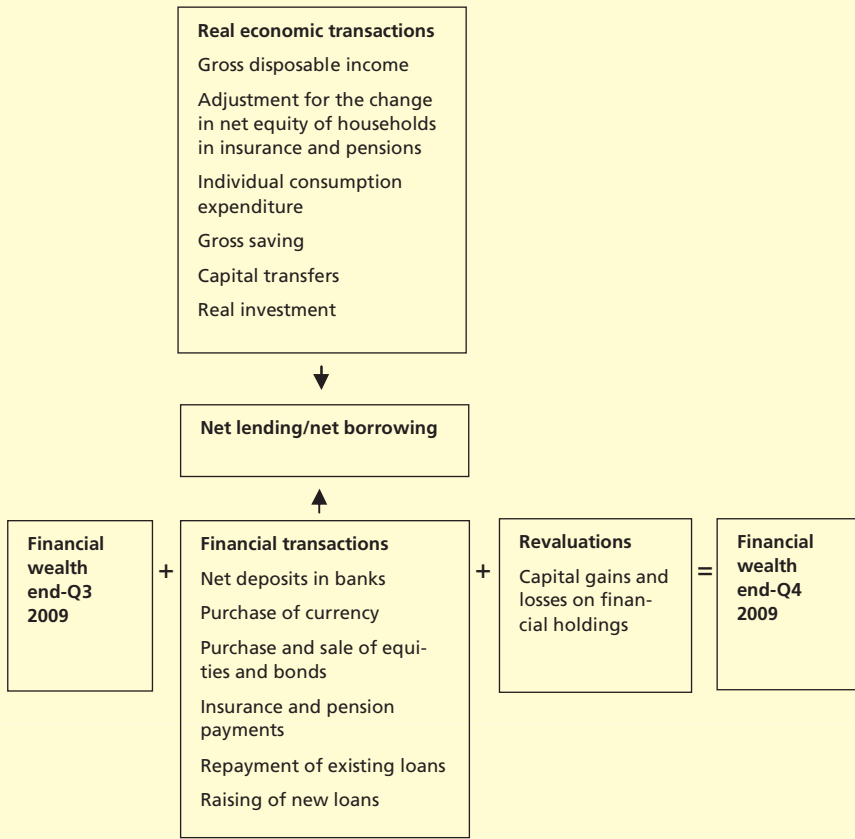
CONTINUED

Box 1

In addition to statements of transactions, financial sector accounts also comprise statements of revaluations and wealth (balance sheets). The net transactions that create the link to the real economy therefore also constitute an element in the explanation of households' financial balance sheets and net wealth². Revaluations, which are capital gains and losses on for instance equities, bonds and pension assets, are not included as current income in national accounts terminology and are therefore not included in the calculation of the real accounts.

COHERENT NATIONAL ACCOUNTS (HOUSEHOLD SECTOR)

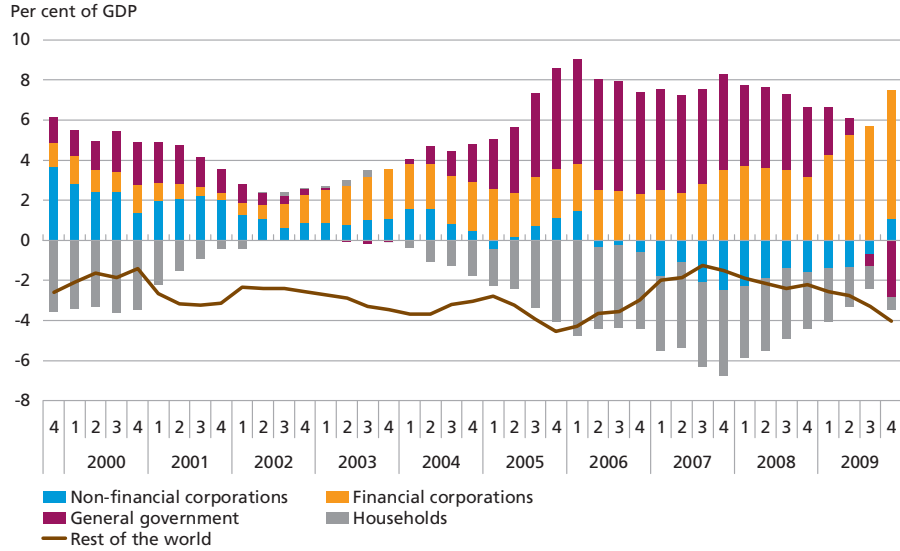
Chart 1



¹ Both reinvested dividend and interest income from investment of pension fund reserves and net payments are included in financial transactions in insurance technical reserves.
² Moreover, there is an account for "other changes in volume", to which changes in household wealth attributable to e.g. loans that are declared worthless or units that change sector are entered.

NET LENDING/NET BORROWING IN THE ECONOMY

Chart 2



Note: Sectoral net lending/net borrowing is calculated as a percentage of GDP. The series are calculated as 4-quarter moving averages.
 Source: Statistics Denmark.

borrowing shows whether each sector has been a net lender or a net borrower in a given period, and hence shows the need for financial investments or injections. It is thus a central key figure in describing economic behaviour, cf. Chart 2¹.

Over the past six years, Denmark has been a net lender to other countries as a consequence of the sustained current-account surplus. This is to some extent reflected in a reduction of Denmark's foreign debt². Net lending in the public sector and the financial enterprises has contributed strongly to this reduction. While the public sector surplus has been clearly procyclical, it is worth noting the financial sector's³ rising net lending, which indicates that the sector's operating profit and income from other interest and dividends have risen. The increase from 2002 until 2007 is mainly a result of the sector's increased activity, while the significant growth in net lending in 2009 was driven by the banks' higher interest margins – due to higher risk premiums – as well as declining dividend payments. Increased provisions for loans and realised losses do not affect

¹ The charts in this article generally show financial or real concepts relative to a relevant income term, such as the gross domestic product (GDP), sectoral gross value added or households' adjusted disposable income. The relative concepts allow for comparison with the euro area and meaningful comparison over time, as e.g. the quarterly accounts are published in current prices only.
² Developments in total foreign debt are also driven by value changes, such as revaluations of equities and bonds.
³ The financial sector includes banks, pension and insurance companies, investment funds and financial holding companies.

net lending/net borrowing directly, but increase the requirement for operating profit, implying that net lending/net borrowing rises¹.

Unlike the public and the financial sectors, households increased their net borrowing during the cyclical upturn in 2003-07², but it has fallen sharply in step with the deceleration in economic activity.

Business enterprises paint a more diverse picture with a general pattern of net lending until end-2005, after which it changes to net borrowing as a consequence of rising investment in capital equipment. However, the sector's financing need is reduced during 2009 and finally ceases.

The next section discusses the households' borrowing in the years ahead of the financial crisis. As regards the corporate sector, focus is on the cyclical pattern in the financing structure and the net lending/net borrowing requirement.

HOUSEHOLDS

After several years of economic growth with financial wealth outgrowing disposable incomes, the households' financial net wealth declined from mid-2007 until early 2009. Subsequently, net wealth measured relative to disposable incomes has again begun to rise, cf. Chart 3.

Generally, developments in financial net wealth have been driven by capital gains and losses on securities and on pension wealth. Therefore, a relatively close correlation is seen between equity prices and the value of households' financial assets³.

Unlike financial assets, households' liabilities change primarily a result of transactions, mainly borrowing. The households have gradually increased their debt and have continued to take out new loans – albeit at a slower pace – after 2007 when the value of their financial assets began to fall.

The build-up of balance sheets on both the assets and liabilities sides has increased households' exposure to financial market developments.

If trends in financial net wealth are compared with the households' propensity to consume and consumer confidence, cf. Charts 4a and 4b, a relatively close correlation is observed during the most recent economic

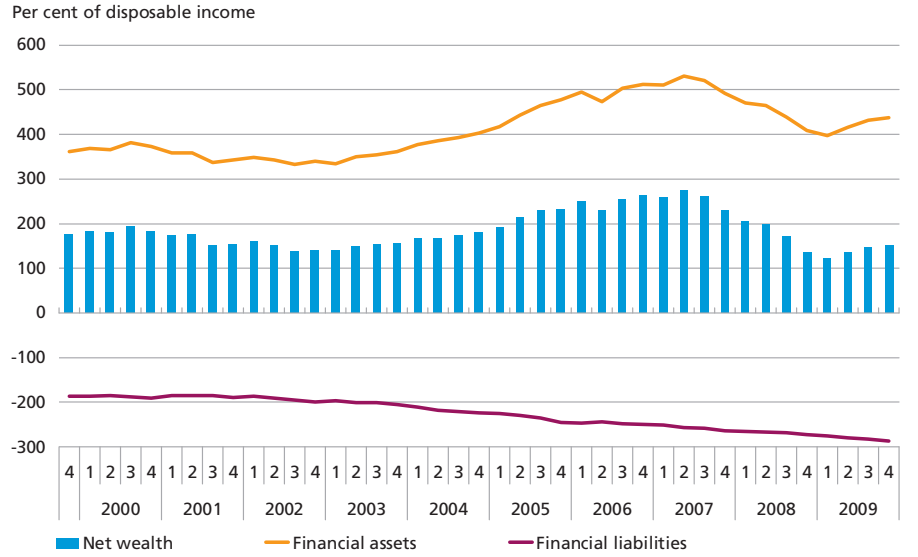
¹ Neither provisions nor realised losses affect net lending/net borrowing. Provisions for loan losses are not registered in the national accounts. When a loss is realised, the financial assets are written down in the account for other volume changes – outside the transaction account.

² In the period 2003-07, there was an economic upturn defined as an increasing output gap. See Pedersen and Sørensen (2009).

³ In addition to financial assets, households' total wealth comprises real assets, including housing wealth. Prices peaked at end-Q3 2006 for owner-occupied flats and in mid-2007 for single-family houses 2007 (source: Statistics Denmark).

DANISH HOUSEHOLDS' FINANCIAL WEALTH

Chart 3



Note: Financial net wealth, that is the financial assets less liabilities, is shown as holdings at the end of the quarter compared with the adjusted disposable income for the year (calculated as running sums), cf. Box 1.
 Source: Statistics Denmark and Danmarks Nationalbank.

cycle. This could reflect the possibility of realising both real and financial wealth gains by borrowing against collateral.

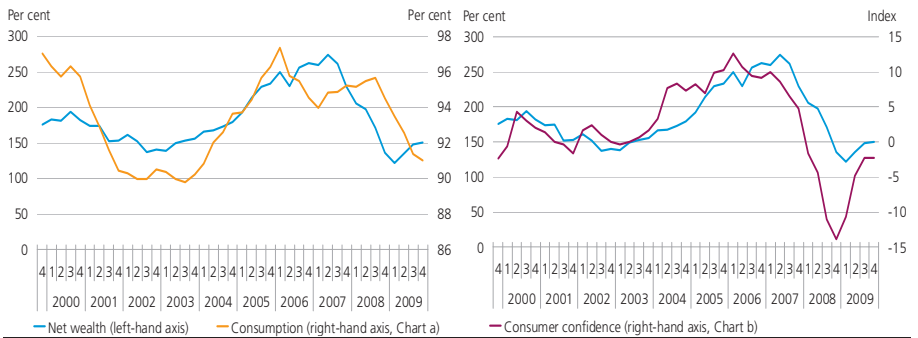
The correlation between income, consumption, investment and financing is described in detail in the following section.

Danish households are net borrowers

In the most recent economic cycle, Danish households' real investment in the form of e.g. home improvements and new-builds has continuously exceeded their gross savings, i.e. the part of the income left after con-

DANISH HOUSEHOLDS' CONSUMPTION AND WEALTH

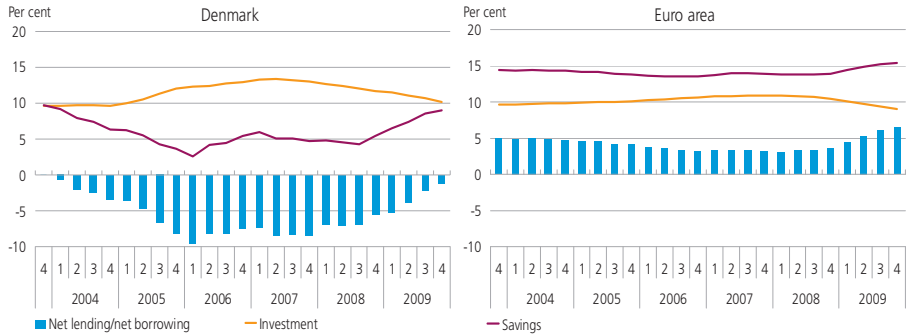
Charts 4a and 4b



Note: Consumption relative to adjusted disposable income, cf. Box 1. Consumption and the adjusted disposable income are included as 4-quarter moving averages. The financial net wealth is defined in the note to Chart 3.
 Source: Statistics Denmark and Danmarks Nationalbank.

HOUSEHOLDS' NET LENDING/NET BORROWING, INVESTMENT AND SAVINGS

Chart 5



Note: Net lending/net borrowing, investment and savings relative to adjusted disposable income, cf. Box 1. The series are calculated as 4-quarter moving averages. Net lending/net borrowing for the euro area is represented by net lending/net borrowing from the real side of the national accounts.

Source: Statistics Denmark, Danmarks Nationalbank, Eurostat and European Central Bank.

sumption. Therefore, they have raised net funding in the financial markets, which results in net borrowing, cf. Chart 5.

From 2003 onwards, a decline and subsequently a turn in households' gross savings interacting with developments in real investment caused a countercyclical development in their net borrowing. Thus, net borrowing was greatest in the period 2006-07 when the value of financial assets also peaked. In connection with the financial crisis, especially the households' increased savings have contributed to reducing net borrowing.

Unlike their Danish counterparts, euro area households are generally net lenders. The difference in levels may reflect a number of structural differences in e.g. access to mortgage credit and pension systems.

However, the dynamics of investment and saving are comparable to developments in Denmark¹. This applies especially to the increased propensity to save in connection with the financial crisis.

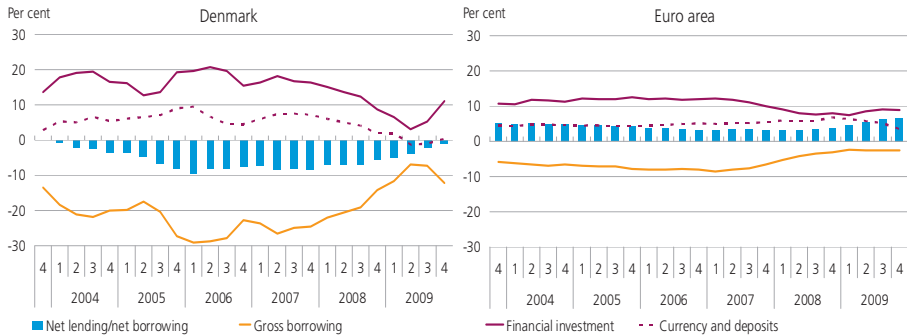
Households have borrowed money for financial investment

Gross borrowing by households contributes to covering both negative net lending/net borrowing and investment in financial assets e.g. equities and bonds. In 2006-07 when gross borrowing peaked, it totalled about 25 per cent of household incomes in each quarter, cf. Chart 6. In the same period, financial investment totalled 15-20 per cent of incomes. The dynamics in households' gross borrowing and financial investment are the same. Following the economic upturn until 2007 and concurrently with the incipient decline in financial wealth, financial in-

¹ The more steady development in the euro area is partly attributable to the difference in business cycles in the 16 euro area member states. Fluctuations in the individual member states may therefore offset each other.

HOUSEHOLDS' NET LENDING/NET BORROWING, FINANCIAL INVESTMENT AND GROSS BORROWING

Chart 6



Note: The series are calculated relative to the adjusted disposable income, cf. Box 1 and are included as 4-quarter moving averages. Net lending/net borrowing for the euro area is represented by net lending/net borrowing from the real side of the national accounts.

Gross borrowing covers the households' total transactions in financial liabilities.

Source: Statistics Denmark, Danmarks Nationalbank, Eurostat and European Central Bank.

vestment and borrowing decelerated. This deceleration was reinforced by the financial turmoil.

During 2009, as turmoil in the financial markets abated, renewed growth could be observed in households' build-up of balance sheets, i.e. in their financial investment and gross borrowing.

The dynamics in the build-up of balance sheets in the euro area are comparable to developments in Denmark – albeit much less pronounced.

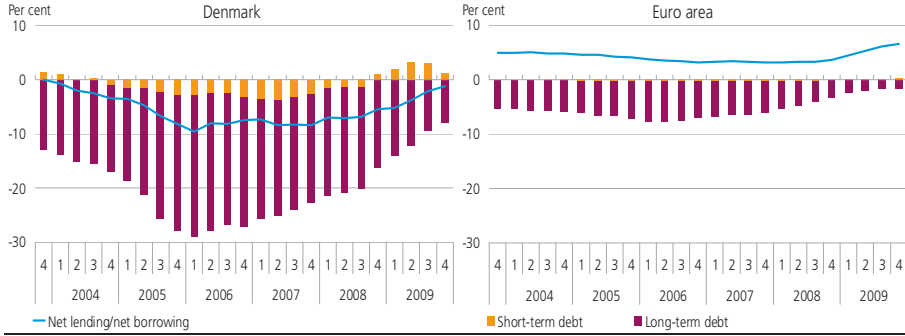
The extent of and growth in loan-financed financial investment in Denmark until 2008 is partly a result of the mortgage-credit system, which for a long period has reduced households' liquidity constraints and therefore increased their scope for consumption and investment. The reason for the subsequent slowdown in borrowing could be that the financial crisis and deteriorating finances in some households have entailed a need for consolidation. The slowdown may thus indicate that declining wealth, more focus on the risk of losses, increasing exposure to the financial markets and uncertain employment prospects have reduced households' risk appetite. Renewed growth in financial investment after the 2nd half of 2009 coincides with an increase in financial wealth and generally rising consumer confidence.

Households have repaid short-term debt during the crisis

Danish households' loans primarily consist of mortgages (long-term debt), cf. Chart 7. During the most recent economic upturn, mortgages rose sharply, but consumer credits and other short-term debt also grew significantly. From mid-2007, net growth in both short- and long-term debt was reduced, and from end-2008, households have actually reduced their aggregate short-term debt.

HOUSEHOLDS' GROSS BORROWING

Chart 7



Note: Gross borrowing is shown with a negative sign, implying that an observation of less than 0 denotes increased borrowing. The series are calculated relative to the adjusted disposable income, cf. Box 1, and are included as 4-quarter moving averages. Net lending/net borrowing for the euro area is represented by net lending/net borrowing from the real side of the national accounts.

Source: Statistics Denmark, Danmarks Nationalbank, Eurostat and European Central Bank.

Developments in short-term debt are not mirrored in the euro area, where households have primarily taken out long-term loans over the past six years. However, the dynamics of long-term debt match developments in Denmark.

In connection with the financial crisis, euro area households have changed the composition of their financial investment. Thus, in a period around the turn of the year 2008/09, they significantly increased bank deposits as a share of total investment, cf. Chart 6.

Households in the euro area seem to have reduced their exposure to financial market developments by seeking more liquid investment opportunities¹. Danish households have more or less done the same by reducing their short-term debt. Both these trends seem to decelerate as the financial turmoil eases.

BUSINESS ENTERPRISES' INVESTMENT AND FINANCING

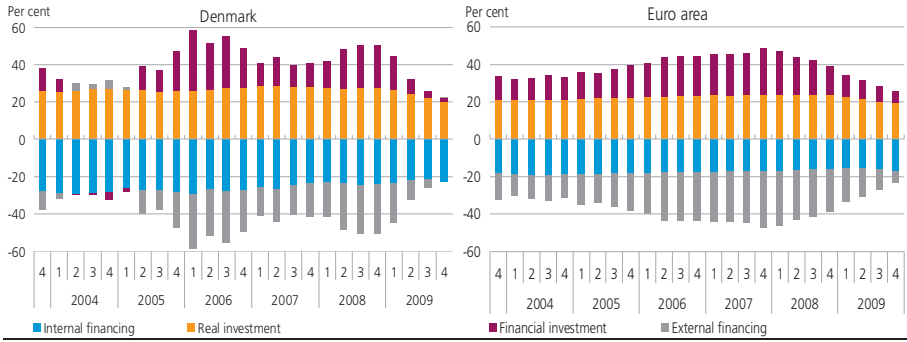
Total investment by business enterprises² is dominated by real investment, meaning investment in capital equipment (gross fixed investment) and inventories, cf. Chart 8. However, financial investment, e.g. direct investment in other companies, portfolio investment and increased bank deposits, has played an important role in some periods. Financial and real investment can be financed either via internal financing (gross savings) or via external financing (borrowing, equity issues, etc.).

Both in Denmark and in the euro area, financial investment and external financing became increasingly significant from mid-2005 to 2008.

¹ See ECB (2009).

² In the following, the term "business enterprises" refers to non-financial corporations.

BUSINESS ENTERPRISES' INVESTMENT AND FINANCING Chart 8



Note: The series are calculated relative to the non-financial corporations' gross value added and are calculated as 4-quarter moving averages.

Source: Statistics Denmark, Danmarks Nationalbank, Eurostat and European Central Bank.

However, developments have been more erratic for Denmark due to a relatively stronger impact from a few major M&A transactions, such as Carlsberg's acquisition of Scottish & Newcastle in 2008. From 2008, financial investment fell markedly. This is reflected in a similar decline in external funding.

While internal financing declined in connection with the outbreak of the financial crisis, the corporate sectors in both Denmark and the euro area have succeeded in adjusting costs to market conditions, so that internal financing has increased again and net borrowing has been reduced.

Real investment grew during the economic upturn

During the 2003-07 economic upturn, the investment ratio (real investment relative to gross value added) rose steadily in both Denmark and the euro area. From end-2008, it fell drastically – especially in Denmark. The investment ratio of Danish business enterprises in 2009 stood at just over 20 per cent, while it was 26-28 per cent in 2003-07. This is in line with the procyclical process generally observed for real investment¹, cf. Chart 9.

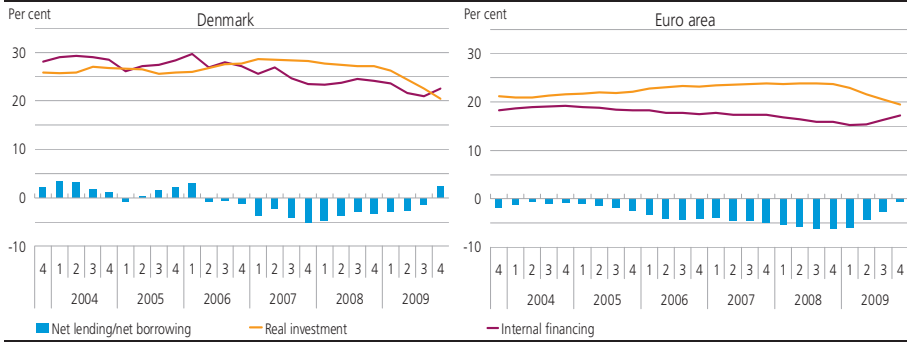
At the early stage of the cyclical upturn, Danish business enterprises largely funded capital equipment and inventories internally, meaning that real investment was typically covered by gross savings. Business enterprises therefore had a net lending requirement. From 2006, the increase in real investment meant that investment exceeded internal financing, and a net borrowing requirement arose². As enterprises adapt

¹ ECB (2008).

² See e.g. Petersen and Risbjerg (2009), which shows that business enterprises primarily use internal funding for maintaining and expanding capital equipment and inventory investment at the beginning of a cyclical upturn, while they to a higher extent take out loans at later stages of the upturn.

BUSINESS ENTERPRISES' REAL INVESTMENT AND INTERNAL FINANCING

Chart 9



Note: The series are calculated relative to the non-financial corporations' gross value added and are calculated as 4-quarter moving averages. Net lending/net borrowing for the euro area is represented by non-financial net lending/net borrowing.

Source: Statistics Denmark, Danmarks Nationalbank, Eurostat and European Central Bank.

to the economic slowdown, both real investment and costs are adjusted to the changed market and funding conditions. Thus, from end-2009 savings again exceed real investment, contributing to turning net borrowing into net lending.

For European business enterprises, real investment exceed internal funding throughout the period. However, net borrowing is reduced in step with economic activity.

Increasing financial balance sheets

Turning to business enterprises' financial investment and external financing, it appears that trends are closely correlated. This applies to both the euro area and Denmark, cf. Chart 8.

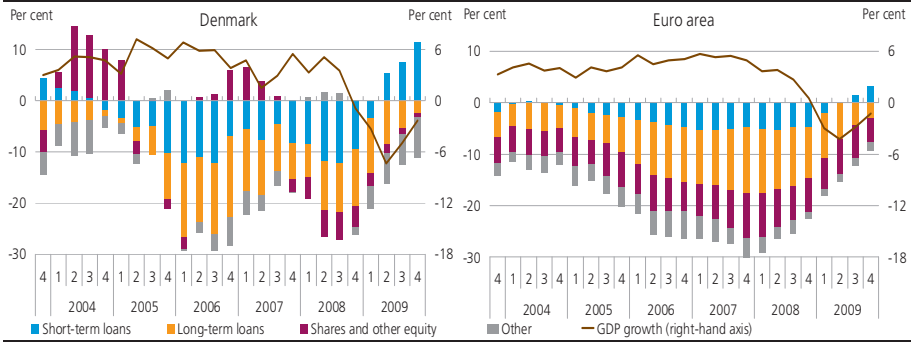
Financial investment, such as purchase of shares and other equity in connection with mergers and acquisitions, tends to increase during an economic upturn. Conversely, business enterprises reduced their financial investment and external financing during 2008. This could reflect more uncertain market conditions and fewer funding options due to the financial and economic crisis.

The slowdown in financial investment in both Denmark and the euro area is much more abrupt than the slowdown in real investment.

On the funding side, business enterprises in Denmark and the euro area have since 2003 used borrowing as their main external source of financing, cf. Chart 10, but in contrast to the euro area, Danish enterprises have made more extensive use of short-term debt, including intra-group loans and overdraft facilities with banks.

Throughout the period euro area enterprises have obtained financing via equity issuance. Conversely, Danish enterprises – taken as one – long disregarded this source of funding, which was not used seriously until

BUSINESS ENTERPRISES' EXTERNAL FINANCING AND GDP GROWTH Chart 10



Note: External financing relative to the non-financial corporations' gross value added, calculated as 4-quarter moving averages. "Other" covers e.g. corporate bonds and trade credits. GDP growth is calculated as year-on-year growth.

Source: Statistics Denmark, Danmarks Nationalbank, Eurostat and European Central Bank.

end-2007. Nevertheless, total stocks of shares and other equity issued by Danish business enterprises accounted for about 60-70 per cent of the balance sheet total in the period 2006-09, while the corresponding figure for the euro area was about 50 per cent.

Equity issuance in Denmark and the euro area continued throughout 2009 when the business enterprises' financing pattern otherwise changed significantly. Thus, the sector has reduced its total borrowing – primarily by reducing short-term debt.

Empirical analyses of financing patterns for business enterprises relative to economic trends show that net borrowing of short-term debt usually rises at the beginning of an economic downturn¹. The pattern is different in the period 2008-09 when the recession was triggered by a financial crisis.

CONCLUSION

Households and business enterprises in Denmark have changed their financial and real behaviour in step with economic developments. Until 2008, both sectors built up their financial balance sheets via increased gross borrowing, which financed both higher financial investment and an increasing net borrowing requirement. During 2008, trends reversed, and borrowing by both households and business enterprises declined.

The integrated national accounts describe both real and financial movements in the economy. Therefore, they can be used for highlighting the behaviour of households and business enterprises throughout the most recent economic cycle. The statistics do not directly say any-

¹ See Petersen and Risbjerg (2009).

thing about causality, but provide a good basis for modelling more theoretically based correlations – for instance between households' financial wealth and their consumption and investment. The possibilities of modelling will improve when transactions dating back to 1998 are incorporated into the quarterly financial accounts in the coming years.

LITERATURE

ECB (2008), Business Investment in the Euro Area and the Role of Firms' Financial Positions, *Monthly Bulletin*, April.

ECB (2007), The Introduction of Quarterly Sectoral Accounts Statistics for the Euro Area, *Monthly Bulletin*, November.

ECB (2009), Integrated Euro Area accounts for the fourth quarter of 2008, *Monthly Bulletin*, May.

Mian, Atif and Amir Sufi (2010), Household Leverage and the Recession of 2007 to 2009, *NBER Working Paper*, No. 15896.

Palumbo, Michael G. and Jonathan A. Parker (2009), The integrated financial and real system of national accounts for the United States: Does it presage the Financial Crisis, American Economic Association, *American Economic Review*, Vol. 99(2), May, pp. 80-86.

Palumbo, Michael G., Matthew J. Eichner and Donald L. Kohn (2010), Financial Statistics for the United States and the Crises: What Did They Get Right, What Did They Miss, and How Should They Change?, Federal Reserve Board, *Finance and Economic Discussion Series*, No. 20.

Pedersen, Erik Haller and Søren Vester Sørensen (2009), Economic Activity, Asset Prices and Credit, Danmarks Nationalbank, *Monetary Review*, 4th quarter.

Petersen, Christina and Lars Risbjerg (2009), The financing of Danish corporations in a macroeconomic perspective, Danmarks Nationalbank *Working Papers*, No. 62.

Silva, Nuno and Gabriel Quirós (2009), What can quarterly euro area accounts tell us about the financial crisis in the euro area, contribution to International Statistical Conference in Prague, 14-15 September.

Foreign-Exchange Earnings in the Shipping Sector

Anders Ejstrup and Caroline Bindslev, Statistics

INTRODUCTION AND SUMMARY

Sea freight has been of increasing significance to Denmark's exports and imports in recent years. It is now the second-largest export sector after manufacturing industry. Advantageous tax rules combined with favourable cyclical developments, especially the expansion of world trade, paved the way for growth in the sea freight sector in the years prior to the financial crisis. Compared with e.g. manufacturing industry, shipping is less labour-intensive, and wage competitiveness therefore has less impact on sea freight exports than on e.g. manufactured exports¹.

This article focuses on the shipping sector's foreign-exchange earnings, i.e. revenue and expenditure denominated in foreign exchange. The figures are not directly reflected in the Danish balance of payments. Sea freight revenue and expenditure are distributed on several items in the balance of payments. This article provides a comprehensive overview.

Danish shipping companies exported sea freight services in excess of kr. 190 billion in 2008. The shipping sector's foreign-exchange earnings for Denmark are calculated by deducting shipping expenditure incurred abroad. In 2008 the shipping companies earned kr. 11 billion in foreign exchange.

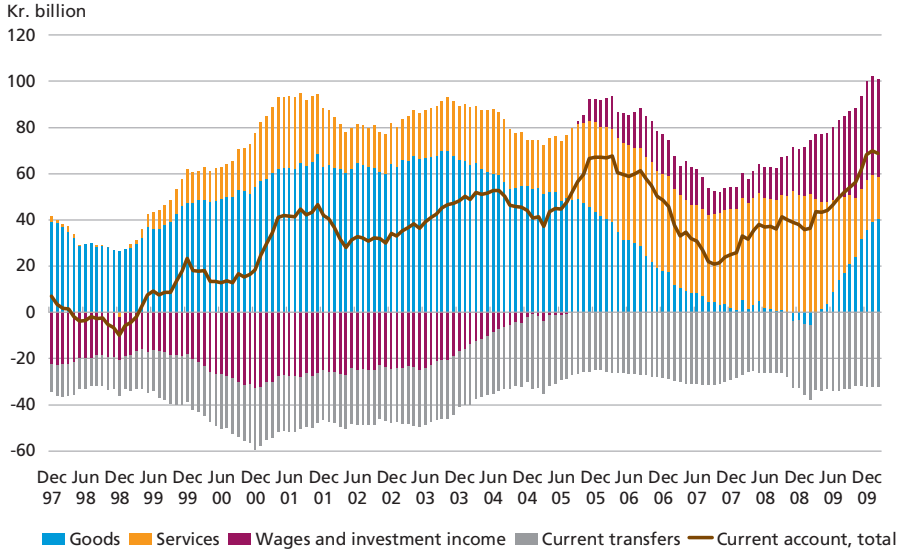
The shipping companies' foreign-exchange earnings for Denmark are estimated at kr. 4 billion in 2009. The global economic slowdown has also affected the shipping sector, as fewer goods and less fuel were transported around the world in 2009.

The shipping companies' foreign-exchange expenditure consists mainly of chartering of ships with or without crews, and fuel (bunkering), amounting to kr. 122 billion and kr. 38 billion, respectively, in 2008. Wages, provisioning and repairs are minor foreign-exchange expenditure items for the shipping companies.

¹ Kristensen, Riishøj and Sørensen (2010).

ITEMS ON DENMARK'S BALANCE OF PAYMENTS, NET

Chart 1



Note: Calculated on a 12-month accumulated basis.

Source: Statistics Denmark.

BALANCE-OF-PAYMENTS STATISTICS AND SEA FREIGHT¹

In general terms, the current-account balance is an expression of the difference between the value of exports and imports of goods and services, wages and investment income and net current transfers to abroad².

The development in the Danish current-account surplus from 1997 onwards shows an increasing contribution from the services item, cf. Chart 1. A considerable reduction can be seen in the latter half of 2009, however.

The growing contribution from services up to 2008 is primarily attributable to Denmark's net exports, i.e. exports minus imports, of sea freight, cf. Chart 2.

Net current revenue from sea freight peaked in 2008 with net income for Denmark of kr. 58 billion.

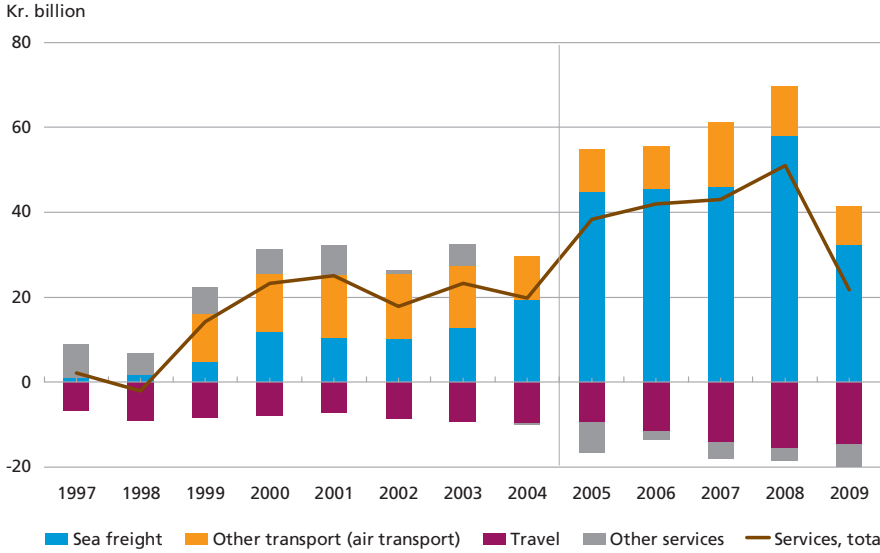
The growth in net revenue is driven by increased exports, cf. Chart 3. The shift in level for imports and exports in 1999 and 2005 can be explained by A.P. Møller Mærsk's acquisition of Sealand, a US container division, in 1999 and the Dutch/British container shipping company P&O Nedlloyd in 2005. Danish exports of sea freight increased from around kr. 50 billion in 1997 to more than kr. 190 billion in 2008, making sea

¹ This article equates sea freight with shipping.

² See Pedersen (2003) for further details.

BALANCE-OF-PAYMENTS SERVICES – SUBITEMS, NET

Chart 2

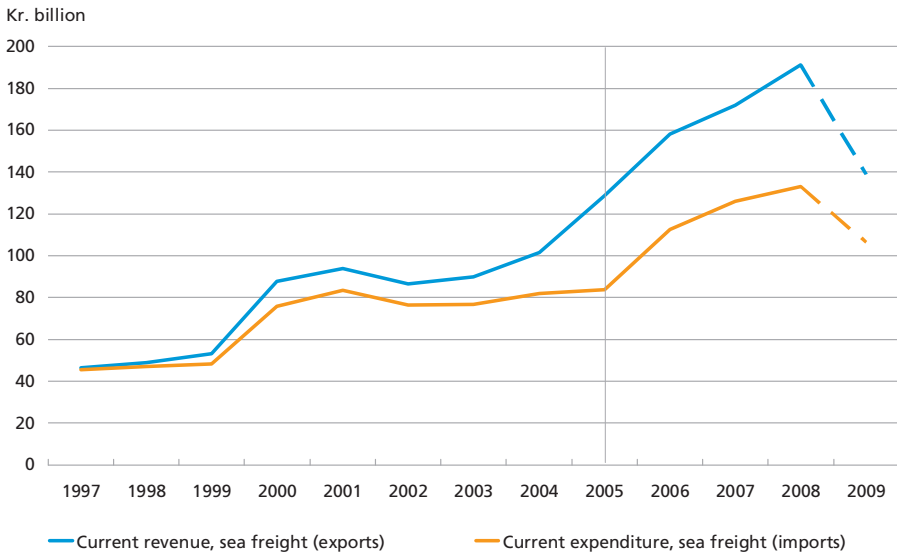


Note: "Other transport" includes air transport. "Other services" includes communication, information, etc., procurement of goods, consultation, etc. and financial and cultural services. New sources and methodologies are applied from January 2005.

Source: Statistics Denmark.

EXPORTS AND IMPORTS OF SEA FREIGHT

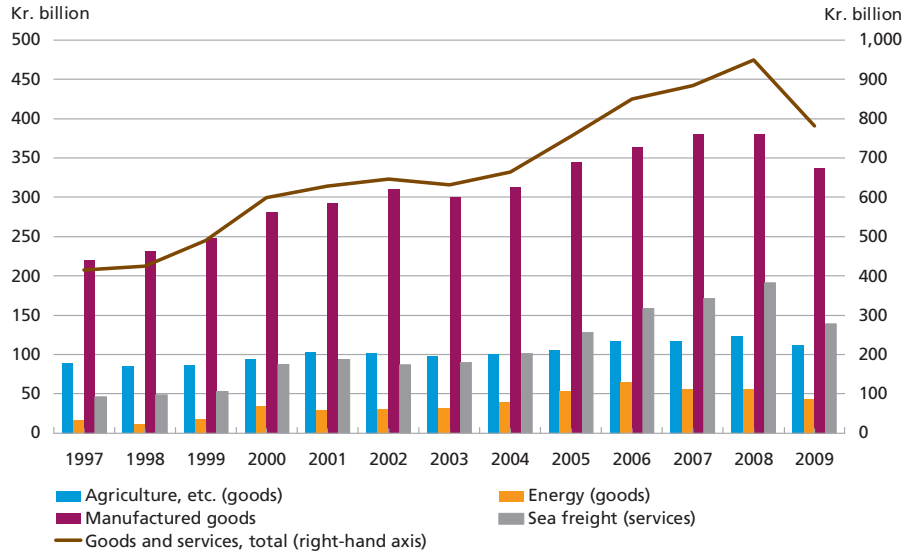
Chart 3



Note: Annual observations, with the exception of the 2009 figures, which are preliminary, compiled on a quarterly basis and shown as a broken line. The shift in level in 1999 is attributable to A.P. Møller Mærsk's acquisition of Sealand, a US container division. New sources and methodologies are applied from January 2005. A.P. Møller Mærsk acquired P&O Nedlloyd that same year.

Source: Statistics Denmark.

DANISH EXPORTS OF GOODS AND SERVICES Chart 4



Note: Quarterly observations. "Agriculture, etc.", "Energy" and "Manufactured goods" are calculated on the basis of the foreign-trade statistics SITC categorisation as SITC 0-2 and 4, SITC 3 and SITC 5-9, respectively. From 2007, Statistics Denmark changes from SITC, Rev. 3 to SITC, Rev. 4. "Other services" is not included. "Sea freight" for 2009 is compiled on a quarterly basis; otherwise annual observations are used. From 1997 to 2004, the data series for "Goods and services, total" is calculated according to BET6, annual observations, and from 2005 to 2009 according to BOP3, quarterly observations.

Source: Statistics Denmark.

freight Denmark's second-largest export sector, cf. Chart 4. From 2005, the Danish shipping sector's exports of "Sea freight" is exceeded only by "Manufactured goods".

The economic slowdown has also affected the shipping sector. Generally falling demand for goods transport, excess capacity and the weaker dollar contributed to the decline in Danish exports of sea freight in 2009. Nevertheless, the Danish shipping sector's exports of sea freight amounted to several hundred billions in 2009 or 18 per cent of total Danish exports of goods and services.

Denmark has several large shipping companies with different competences, including Maersk Line, the world's largest container shipping company. Danish container freight accounts for approximately 60 per cent of the total Danish merchant fleet capacity. Denmark's share of the global merchant fleet was 1.3 per cent in 2009, cf. Box 1.

Denmark's sea freight imports are also increasing. This should be viewed in the light of the fact that several Danish shipping companies are increasingly chartering (leasing) foreign ships with or without crews. When Danish shipping companies charter ships abroad for shipping operations, this appears in the statistics as Danish imports of sea freight.

THE DANISH AND INTERNATIONAL MERCHANT FLEETS IN 2009

Box 1

The Danish merchant fleet totalled 547 ships in October 2009. 404 of these sailed under Danish colours, cf. Table 1. The Danish shipping sector's most important markets are the EU, East Asia (Japan), China, including Hong Kong, and the USA, taking 27, 15, 15 and 12 per cent of gross freight, respectively.

The Danish merchant fleet is dominated by container freight, accounting for approximately 60 per cent of the total Danish fleet. The main part (63 per cent) is in liner traffic, i.e. regular traffic between specific ports. The Danish dominance in the container shipping market is attributable to Maersk Line, the world's largest container shipping company, cf. Table 2.

The average age of the Danish merchant fleet was 7.2 years in October 2009. In comparison, the global merchant fleet averages 11.4 years. Danish shipping companies employed 30,000 people in 2009.

GLOBAL MERCHANT FLEET FIGURES 2009

Table 1

	Tonnage (GT)	Danish share (per cent)	Ships sailing under Danish colours
Total	815,369	1.3	404
Tankers	295,181	1.1	135
Bulk carriers, etc. (dry cargo/bulk cargo) ...	247,390	0.1	4
Container ships	142,473	4.2	83
General cargo ships (small amounts of dry cargo/mixed cargo)	90,889	0.4	85
Other ships	39,436	1.4	97

Note: Tonnage is measured as 1,000 GT (gross tonnage). Tonnage is the international term for the cubic capacity of all closed compartments of a ship. "Other ships" sailing under Danish colours comprises passenger ships and ferries (83), reefer ships (7) and cargo ferries (Ro-Ro ships) (7).

Source: Danish Shipowners' Association (2009b).

THE WORLD'S SEVEN LARGEST CONTAINER SHIPPING COMPANIES IN 2009

Table 2

	Country	Number of ships	TEU capacity	Share of global capacity (per cent)
Total	World	11,162	15,327,034	-----
Maersk Line	Denmark	454	1,766,506	11.5
Mediterranean Shipping Co SA .	Switzerland	388	1,487,474	9.7
CMA CGM	France	249	898,146	5.9
Evergreen Marine Corp.	China (Taiwan)	160	588,895	3.8
APL Ltd	USA	126	500,900	3.3
Hapag-Lloyd AG	Germany	132	491,669	3.2
COSCON	China	140	478,656	3.1

Note: TEU (Twenty feet Equivalent Unit) is an international container measurement converted into units with a length of 20 feet and calculated in 1,000 TEU.

Source: Danish Maritime Authority (2009).

Source: Danish Shipowners' Association (2009b).

Shipping companies chartering ships abroad contribute to inflating both imports and exports of sea freight.

Sea freight is viewed in an import and export perspective above. When calculating the shipping companies' foreign-exchange earnings, it is not enough to consider sea freight exports, however. Relevant shipping expenditure incurred abroad must be deducted, and other income abroad, e.g. from foreign subsidiaries, must be included.

FOREIGN-EXCHANGE EARNINGS IN THE SHIPPING SECTOR¹

Foreign-exchange earnings in the shipping sector are calculated by compiling the shipping companies' foreign-exchange revenue and expenditure. The shipping companies' foreign-exchange revenue is achieved mainly by selling sea freight services to foreign companies, while a minor share is attributable to investment income and the sale of ships. Foreign-exchange expenditure, on the other hand, is distributed on many different items, cf. Box 2.

A significant sea freight expenditure item is chartering of foreign ships with or without crews by Danish shipping companies². The costs incurred increased from kr. 78 billion in 2005 to kr. 122 billion in 2008. Expenditure in 2009 is estimated at kr. 100 billion. Another considerable expenditure item is fuel (bunkering) for ships in foreign ports, which is included in foreign-trade statistics as imports of goods. Fuel expenditure doubled in the period 2005-08, from kr. 15 billion to kr. 38 billion. This should be viewed in the light of A.P. Møller Mærsk's acquisition of P&O Nedlloyd in 2005 and the increase in the price of oil from around 42 dollars per barrel in January 2005 to 145 dollars in July 2008 when oil prices peaked. The remaining expenditure, e.g. for provisioning and repairs of ships in foreign ports, was relatively stable in the period under review, averaging approximately kr. 2 billion.

All in all, Danish shipping companies in 2008 earned around kr. 11 billion in foreign exchange, adjusted for shipping operation expenditure, cf. Chart 6. Based on preliminary figures, the shipping companies' foreign-exchange earnings in 2009 are estimated at kr. 4 billion.

¹ Access to sector data relating to sea freight activities abroad is essential when compiling foreign-exchange earnings in the shipping sector. Such data has been supplied by Statistics Denmark.

² Chartering of foreign ships with or without crews by Danish shipping companies comprises imports of sea freight, excluding "Supporting and auxiliary transport services" and operational leasing. The former relates to chartering of foreign ships with crews (time charter) and several shipping companies' joint chartering of ships (pools), while the latter relates to chartering of ships without crews and other unmanned equipment.

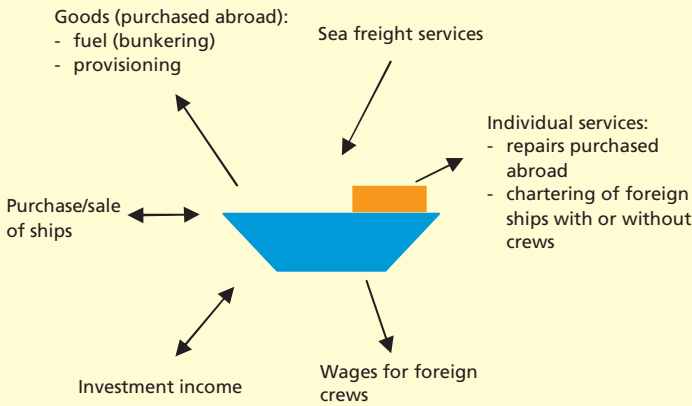
BALANCE OF PAYMENTS AND SHIPPING COMPANIES Box 2

The balance of payments can be seen as an account between Denmark and abroad that records net transactions with abroad. The balance of payments comprises four main components: goods, services, investment income¹ and wages and current transfers.

The shipping companies' foreign-exchange revenue is achieved mainly by selling sea freight services, while a minor share is attributable to investment income and the sale of ships. Foreign-exchange expenditure, on the other hand, is distributed on many different items, cf. Chart 5. Fuel and provisioning purchased abroad, among other items, are entered under goods. Services include sea freight-related services such as repairs in foreign ports and chartering of ships abroad.

Wages and investment income represent wages for foreign crews and investment income between Danish shipping companies and abroad and between foreign shipping companies and Danish shipping companies. They are specified in Table 3.

THE SHIPPING COMPANIES' FOREIGN-EXCHANGE REVENUE AND EXPENDITURE Chart 5



Note: Arrows pointing away from the ship indicate expenditure outflows; arrows pointing towards the ship indicate revenue inflows.
 Source: Danmarks Nationalbank.

¹ Investment income records the return on Denmark's external assets and liabilities. Investment income includes interest, dividend and reinvested profits. Danish shipping companies pay investment income to abroad and receive investment income from their foreign subsidiaries.

CONTINUED

Box 2

FOREIGN-EXCHANGE EARNINGS IN THE SHIPPING SECTOR

Table 3

Kr. billion	2005	2006	2007	2008	2009 estimate
Revenue					
<i>Goods</i>					
Goods, including the sale of ships	N/A	N/A	N/A	N/A	N/A
<i>Services</i>					
Exports of sea freight ¹	119.2	148	160.4	176.6	129
<i>Wages and investment income</i>					
Interest and dividend from Danish-owned foreign subsidiaries	2.9	3.8	3.3	3.5	3
Expenditure					
<i>Goods</i>					
Bunkering in foreign ports	-14.5	-24.1	-26.9	-38.0	-23
Provisioning in foreign ports	-0.8	-1.2	-1.0	-0.9	-1
Goods, including the purchase and sale of ships (net expenditure)	-1.0	1.1	0.0	-1.1	-1
<i>Services</i>					
Repairs in foreign ports	-0.9	-1.2	-1.1	-1.0	-1
Chartering of ships with or without crews ²	-77.6	-106.6	-116.7	-122.0	-100
<i>Wages and investment income</i>					
Wages for foreign crews	-0.4	-0.4	-0.6	-0.5	0
Interest and dividend paid to abroad ...	-1.9	-3.8	-6.0	-5.2	-2
Shipping companies' foreign-exchange earnings (revenue minus expenditure)	25.0	15.6	11.4	11.4	4

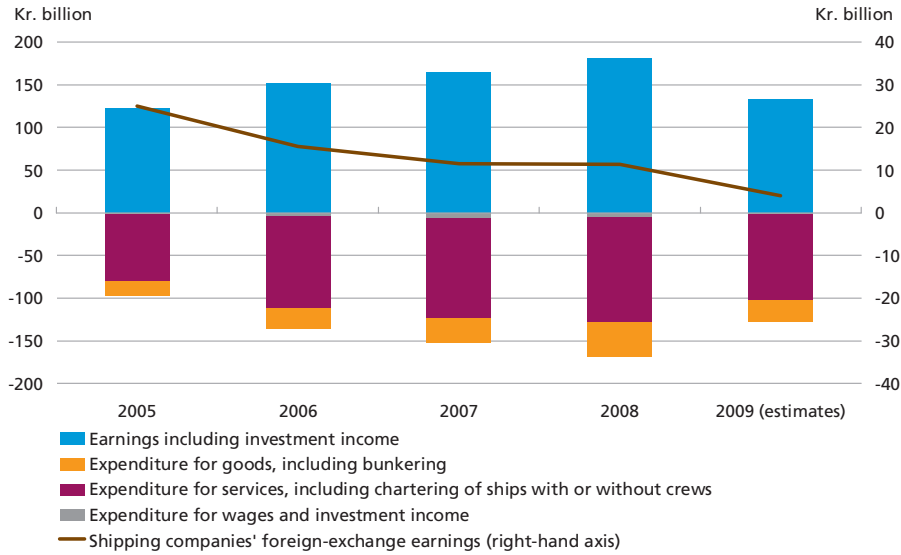
Note: Net figures are entered on the expenditure side, i.e. gross figures on the revenue side are entered as N/A. The table contains data and special calculations from Statistics Denmark. The figures are based on data broken down by sector from the foreign-exchange statistics for goods and services, wage statistics and Danmarks Nationalbank's compilation of investment income. The figures have been adjusted for CIF/FOB before being broken down by sector. It should be noted that the 2009 figures include estimates. The bunkering item has been reduced by 40 per cent due to falling oil prices and activity. The remaining estimated items have been set at 2005 level. Reservation is made for rounding of figures.

Source: Statistics Denmark and Danmarks Nationalbank.

¹ Exports of sea freight do not include "Supporting and auxiliary transport services", which primarily covers expenditure for ship brokers, etc. Accordingly, the figures are not directly comparable with total exports of sea freight.

² Chartering of ships with or without crews comprises imports of sea freight, excluding "Supporting and auxiliary transport services" and operational leasing, the former relating primarily to chartering of foreign ships with crews by Danish shipping companies, and the latter relating to chartering without crews.

DANISH SHIPPING COMPANIES' FOREIGN-EXCHANGE EARNINGS Chart 6



Note: 2009 figures include estimates.
 Source: Statistics Denmark and Danmarks Nationalbank.

Overall, the shipping companies' foreign-exchange earnings declined by more than half in the period 2005-08, from kr. 25 billion in 2005 to kr. 11 billion in 2008. This reflects the increase in the shipping companies' chartering expenditure in step with export growth, as well as rising bunkering expenditure due to higher oil prices. The sea freight sector is generally characterised by fluctuating revenue and expenditure, as freight rates, exchange rates and oil prices may vary substantially from year to year.

LITERATURE

Beier, Niels C. and Erik Haller Pedersen (2005), *Sea Freight and the Danish Economy*, Danmarks Nationalbank, *Monetary Review*, 4th Quarter.

Danish Shipowners' Association (2009a), *Danish Shipping*, April.

Danish Shipowners' Association (2009b), *Shipping Figures*, November (in Danish only).

Statistics Denmark (2007), *Foreign trade – Goods and Services*, November (in Danish only).

Statistics Denmark (2008), *Foreign Trade in Goods and Services – Sources and Methods*, November (in Danish only).

Statistics Denmark (2009), *10-year Statistical Overview*, August (in Danish only).

Kristensen, Kamilla, Johanne Dinesen Riishøj and Jonas Sørensen (2010), *Manufactured Exports and Wage Competitiveness*, Danmarks Nationalbank, *Monetary Review*, 1st Quarter.

Pedersen, Erik Haller (2003), *The Balance of Payments – from Sustained Deficit to Sound Surplus*, Danmarks Nationalbank, *Monetary Review*, 2nd Quarter.

Danish Maritime Authority (2009), *Facts about Shipping*, November (in Danish only).

Sørensen, Rewal Schmidt (1999), *Method Manual – Foreign Trade Statistics*, Statistics Denmark, September (in Danish only).

Sørensen, Rewal Schmidt (2001), *Denmark's Foreign Economy*, Handelshøjskolens Forlag, 6th edition (in Danish only).

Fiscal Challenges in Advanced Countries

Jakob Ekholdt Christensen and Rasmus Tommerup, Economics

INTRODUCTION AND SUMMARY

The global economic crisis has led to historical deterioration of the public finances of the advanced countries. Debt is mounting at a pace not seen since World War II. Even countries such as Ireland, Portugal, Spain and the UK, which entered the crisis with reasonably strong fiscal positions, are now in dire fiscal straits. Denmark's public finances have also deteriorated significantly. However, Denmark posted considerable government budget surpluses in the years up to the crisis.

In the countries most severely affected, the development has generated concerns about an outright debt crisis. These concerns have been exacerbated by the most recent turn of events in Greece – the extremely large widening of interest-rate spreads and the need for urgent implementation of austerity measures. Ultimately, it was necessary to introduce a financial support programme from the International Monetary Fund, IMF, and the euro area member states. There are now clear signs of the market concerns having a spill-over effect on other countries.

The largest emerging economies have been less affected by the economic downturn. Coupled with less pronounced automatic stabilisers, this has limited the deterioration of public finances.

For many advanced countries, government debt as a ratio of the gross domestic product, GDP, will rise to more than 100 per cent if they fail to implement fiscal consolidation in the coming years. The higher debt as a result of higher interest payments will make future consolidation more difficult. Moreover, new research shows that a large debt impedes economic growth through such factors as elevated real interest rates.

Using stylised projections, this article examines the fiscal challenges of these countries if they are to stabilize or reduce their debt. The extent and duration of the necessary fiscal consolidation are of a magnitude rarely seen in recent times. The need for consolidation is most pronounced in Japan, Greece, the USA, Ireland and the UK.

Denmark enjoys a good position in an international context. However, it should be remembered that many other advanced countries are facing serious fiscal challenges. Moreover, recent years' developments in e.g. the UK and Ireland illustrate how public finances can deteriorate strong-

ly in a very short time. It is thus paramount to rein in fiscal policy in time, so as to ensure that the debt is kept under control and that there is scope for tackling future fiscal challenges, especially against the backdrop of the age-related increases in public expenditure facing the advanced countries.

Ambitious tightening of fiscal policy in the advanced countries will require unprecedented fiscal discipline and probably dampen growth temporarily. The need for synchronous fiscal tightening across the countries will exacerbate the negative economic effects, especially in strongly export-oriented countries. However, it is not unlikely that the countries facing the greatest fiscal challenges will see positive effects of their fiscal tightenings already in the short term. In the longer term, there is no doubt that tighter fiscal control and sustainable government debt will benefit the advanced countries substantially.

GOVERNMENT DEFICIT AND DEBT DYNAMICS DURING THE CRISIS

Prior to the crisis, many countries¹ posted strong economic growth without sufficient fiscal consolidation. Budget deficits remained considerable and some countries experienced mounting government debts. This made many countries more vulnerable to the subsequent cyclical downturn.

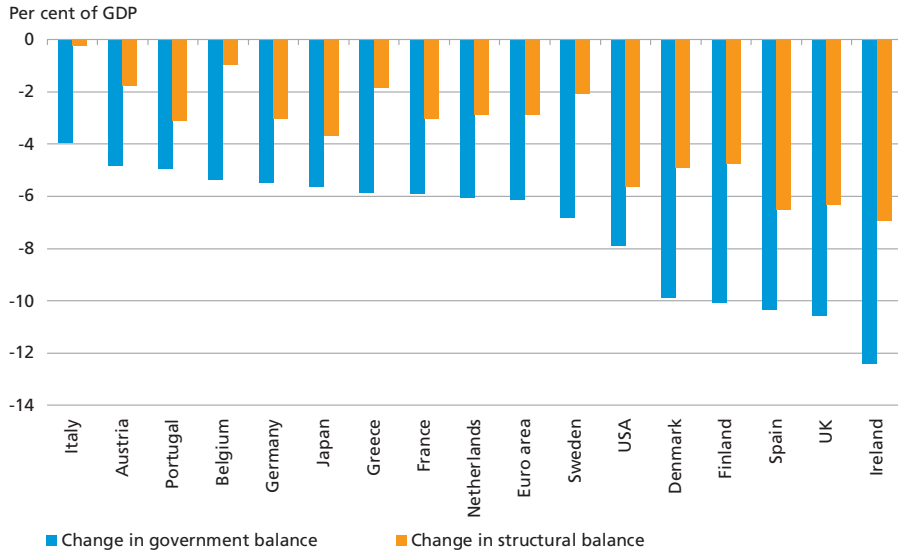
The crisis has brought the deficit of the OECD countries from 1.3 per cent of GDP in 2007 to 8.3 per cent in 2010, which is the highest level in the post-war period. Ireland, Spain, the UK, Finland and Denmark account for the strongest deteriorations of public finances, as their balances have worsened by around 10 per cent from 2007 to 2010, cf. Chart 1.

Part of the increase can be attributed to falling output and rapidly growing unemployment, which has resulted in reduced tax revenue and rising expenditure. Cases in point are Denmark, Ireland, Spain, the UK and the USA. Moreover, the latter two countries are also severely affected by reduced tax revenue from their relatively large financial sectors.

In addition, several countries have eased fiscal policy as a consequence of the crisis. While fiscal accommodation has been particularly pronounced in the USA, the European countries have shown more restraint, relying on the automatic stabilisers instead. Exceptions are Denmark, Sweden and the Netherlands, where the automatic stabilisers are relatively substantial, but where discretionary fiscal expansion has also been considerable, cf. Winther (2009).

¹ Focus is on the following advanced countries: Denmark, Japan, Sweden, the UK, the USA and major euro area member states, including Austria, Belgium, Finland, France, Germany, Italy, the Netherlands (also called *other euro area member states*) and Greece, Ireland, Portugal and Spain (*GIPS*).

DEVELOPMENT IN GOVERNMENT BALANCES, 2007-10 Chart 1



Source: OECD, *Economic Outlook*, No. 86, November 2009.

Some of the accommodative measures are temporary and will expire over the coming years. Nevertheless, the OECD assesses that three quarters of the government deficits in the OECD countries are structural and will not be reversed automatically when the economies return to more normal economic growth rates. Finally, crisis packages¹ to the financial sector have contributed to the rising deficits.

A number of countries are now facing a very difficult fiscal situation with large structural deficits combined with substantial government debts², cf. Chart 2. This also applies to countries that had moderate debt before the financial crisis, such as Ireland, Portugal, Spain and the UK, while Greece has struggled with a debt ratio in excess of 100 per cent of GDP for many years. Unemployment continues to be elevated, and the sustainability of the economic upswing remains uncertain.

On top of the immediate fiscal challenges, another threat is notable increases in age-related expenditure³ over the next decades, cf. Chart 3.

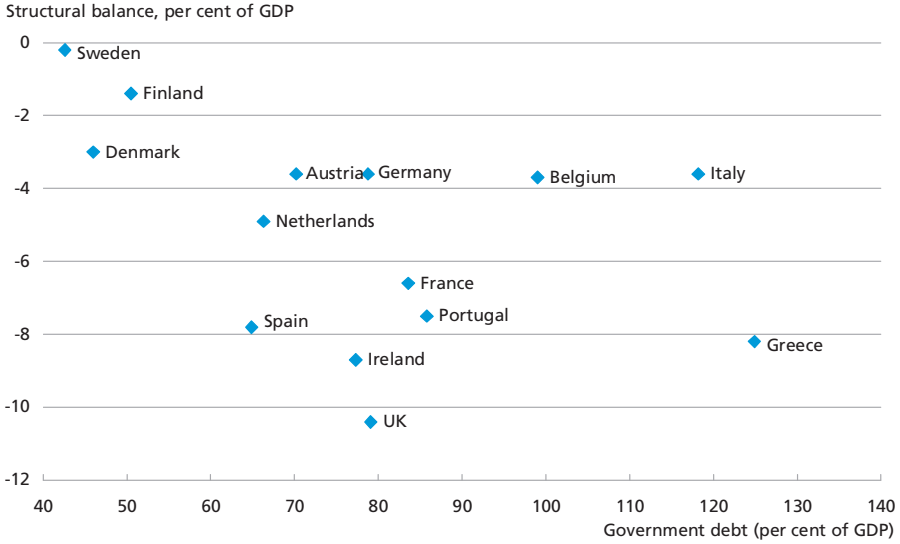
¹ The crisis packages have comprised capital injections to banks, guarantees for selected issues of debt, deposits with banks and government purchases of illiquid assets. Initially, the budget deficit will increase only in the event of capital injections, while guarantees and government purchases of illiquid assets will result in higher debt. These investments will lead to a larger deficit only if the government suffers losses in the longer term, cf. IMF (2009a).

² The gross government debt is considered in the following. Especially in Japan, there are considerable differences between the gross government debt and the net debt, which takes the government's financial assets into account.

³ Age-related expenditure refers to the proportion of a country's public expenditure that is affected by a change in population life expectancy. European Commission (2008) lists expenditure for unemployment benefits, the healthcare system, pensions, care for the elderly and education as key public expenditure areas affected by changing demographics.

EXPECTED STRUCTURAL BUDGET BALANCE AND GROSS GOVERNMENT DEBT, 2010

Chart 2

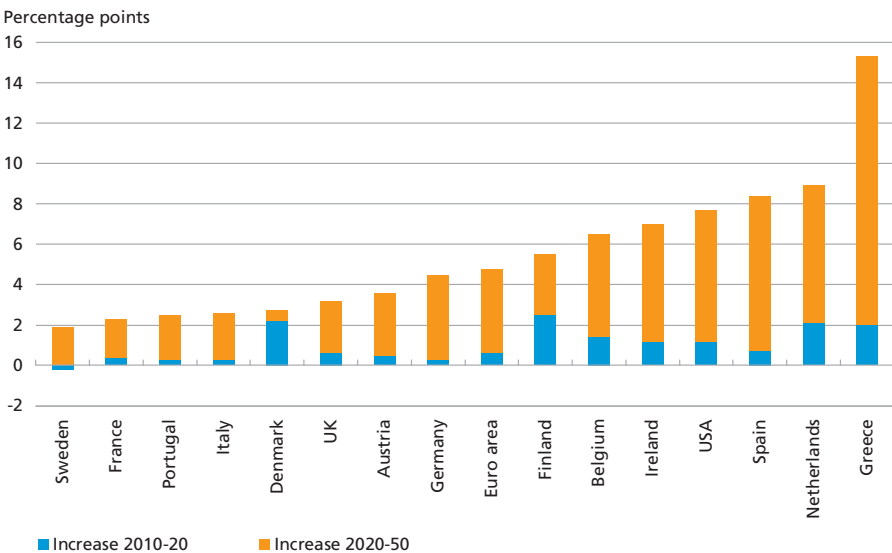


Source: European Commission Spring Forecast, May 2010.

The average increase is expected to be around 5.5 per cent of GDP in the period 2009-50. The largest increases are expected in some of the countries that already have heavy debt burdens, particularly the GIPS countries. However, the timing of the surges in age-related expenditure varies.

INCREASE IN AGE-RELATED EXPENDITURE, 2009-50

Chart 3



Source: European Commission (2009), Congressional Budget Office (2009) and IMF (2009a).

ies across the countries. In the coming decade, age-related expenditure is expected to rise most substantially in Denmark, Finland, the Netherlands and Greece.¹

The historical deterioration of public finances has generated concerns about a government debt crisis in several advanced countries². These concerns were amplified by Greece's experience of such a crisis since the autumn of 2009 with rising interest rates, austerity measures and ultimately a financial support programme from the IMF and the euro area member states. This has had a knock-on effect on other GIPS countries and affected the global financial markets. The concerns have caused risk premiums and Credit Default Swap, CDS, spreads to soar, increasing the financing costs for the sovereign issuers. Moreover, fiscal sustainability is also a concern in countries traditionally regarded as having a high credit standing, including the USA and the UK. This has led to renewed focus on the risks associated with a large government debt, cf. Box 1.

As a result of the deterioration of public finances, substantial fiscal consolidation is required in these countries. The consolidation in EU member states whose deficits exceed the reference value of 3 per cent of GDP will be governed by the requirement in the Stability and Growth Pact of an annual reduction of the structural (cyclically adjusted) budget deficit of at least 0.5 per cent of GDP. However, considerably stronger tightening measures are required of most of the EU member states that have already received notice to correct their excessive deficits as from 2010. This applies especially to Greece³, Ireland and Spain. The UK and the USA are also planning relatively extensive tightening measures in 2010-11, in the range of 2 and 2.1 per cent of GDP, while Japan's deficit continues to grow. Despite the tightening measures, all the countries under review, except Sweden, are expected to post continually rising debt as a ratio of GDP until 2011.

¹ Since the figures are from 2009, they do not take into account e.g. the change in retirement age in Greece proposed in the spring of 2010. As regards Denmark, the surge in age-related expenditure until 2020 is mainly attributable to pension-related expenditure. From 2020 to 2050, pension-related expenditure will decline due to such factors as the welfare reform.

² These countries' debt burdens become even heavier if measured as a ratio of e.g. tax revenue. Although Ireland and the USA have not yet posted particularly large debt-to-GDP ratios, their ratios already correspond to more than two years' tax revenue due to a relatively small tax intake. Japan's gross debt is equivalent to five years' tax revenue. Like Greece and Italy, Japan and the USA will end up spending more than 10 per cent of their tax revenue on interest payments in 2011, given the envisaged path of government debt.

³ In Greece, the implementation of the loan programme from the IMF and the euro area member states has entailed additional fiscal tightening, bringing the tightening measures to 11 per cent of GDP until 2013.

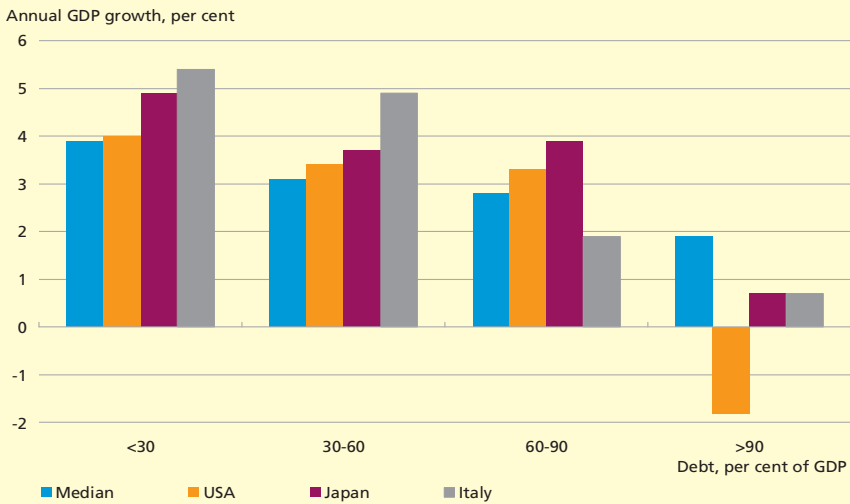
RISKS ASSOCIATED WITH A LARGE GOVERNMENT DEBT

Box 1

Government debt of a certain size can enhance the efficiency of capital markets by acting as a benchmark for other financial instruments, but a large debt burden entails the risk of rising interest rates with detrimental effects on the economy. Higher real interest rates contribute to reducing private investment and thus the long-term growth potential of the economy. This is called the *crowding-out* effect. IMF (2010) finds that an increase of 10 percentage points causes long-term real interest rates to rise by 50 percentage points in the medium term. The analysis in Reinhart and Rogoff (2010) of 44 advanced countries and emerging economies over the last 200 years shows that the negative effect is particularly pronounced when the debt exceeds 90 per cent of GDP, cf. Chart 4.

RELATIONSHIP BETWEEN DEBT AND ECONOMIC GROWTH IN ADVANCED COUNTRIES

Chart 4



Note: Debt and growth are compiled for the following periods: USA 1790-2009, Italy 1880-2009 and Japan 1885-2009. Source: Reinhart and Rogoff (2010).

A large government debt makes public finances more vulnerable to rising interest rates in view of the considerably larger interest expenditure. This amplifies the "snowball effect", which forces the government to raise further loans to service the debt or to tighten fiscal policy. For example, in Italy and Greece interest expenditure on government debt amounted to approximately 10 per cent of GDP in the early 1990s when interest rates were high. For comparison, the healthcare expenditure of the advanced countries averaged 9 per cent of GDP in 2007¹.

A large government debt also reduces the government's fiscal scope, making it more difficult to help the economy out of a recession by means of expansionary fiscal policy. A case in point was Italy during the most recent crisis, cf. Winther 2009. This could also be the result in many advanced countries if the economic upswing turns out to be weaker than expected after the stimulus packages have been withdrawn. In this situation, the countries will not have the means to stimulate the economy to the extent seen during the most recent crisis.

Concerns about the sustainability of the government debt may also lead to increasing inflation expectations, which may exert upward pressure on real interest rates, cf. Box 2.

¹ OECD Health at a glance 2009

DEBT DYNAMICS, PRIMARY DEFICIT, NOMINAL INTEREST RATE,
INFLATION AND GROWTH

Box 2

The debt-to-GDP ratio, or debt ratio, of a country develops over time according to the equation below, where D is the absolute debt, Y is GDP, i is the nominal interest rate, g is the nominal GDP growth rate, and PD is the primary government budget deficit (i.e. net of interest expenditure):

$$D_t/Y_t = ((1+i_t)/(1+g_t)) * D_{t-1}/Y_{t-1} + PD_t/Y_t \quad (1)$$

D_t/Y_t is the debt ratio at the end of period t , and $i_t * D_{t-1}$ is interest expenditure during the period on the debt at the beginning of the period.

(1) shows that:

- viewed in isolation, a higher interest rate entails upward pressure on the debt ratio a higher growth rate, g , contributes to reducing the debt ratio as the higher GDP growth enables the government to service a larger absolute debt
- even without a primary deficit, the debt ratio may rise if the interest rate exceeds the GDP growth rate. This is called the snowball effect as heavy interest expenditure can cause the debt to rise continually, so that the debt dynamics may spin out of control.

INFLATION CONCERNS

In situations with a large government debt, it is sometimes argued that the government will try to reduce the debt burden by means of higher inflation. In theory, higher inflation can support debt servicing through two channels:

1. **Seigniorage:** An elevated inflation rate means more seigniorage to the money-issuing institution. According to the IMF's estimate, an increase in inflation of 5 percentage points will boost seigniorage by an average of 0.5 per cent of GDP, cf. IMF (2009b).
2. A higher inflation rate will initially increase the nominal growth, g , thus reducing the debt burden, cf. equation (1). However, in the slightly longer term, this should be expected to lead to a higher nominal interest rate, which reduces the beneficial effects of the higher nominal growth. The IMF has estimated that a rise in inflation over the coming years from the expected 1.75 per cent to 6 per cent will reduce the debt of the advanced countries by around 8-9 percentage points, cf. IMF (2009b).

Consequently, it would take a considerable increase in inflation to achieve even a minor reduction of the debt burden.

GENERAL DISCUSSION OF GOVERNMENT DEBT

In limited periods, central-government expenditure may exceed revenue, which requires borrowing. A government may have good reason not always to aim at a balanced budget. Economic and financial crises may require expansionary fiscal policy or measures to support financial enterprises in order to mitigate the detrimental effects of the crisis, cf. Winther (2009).

In the long term, however, government revenue and expenditure must balance. Otherwise the government may at some point be forced to default on some of its obligations, by failing to service its debt or failing to honour its obligations to citizens, e.g. pensions.

Recent decades have seen relatively few examples of governments failing to honour their obligations and service their debts. Consequently, government bonds in advanced countries have been perceived historically as some of the most secure investment objects with a low credit risk, high credit rating and relatively low return compared with e.g. debt instruments issued by large corporations, cf. Thomsen (2005).

Fiscal policy is often examined by looking at fiscal sustainability, which is a measure of the solvency of the public sector economy. Public finances are regarded as sustainable if the present value of all future public expenditure, including interest payments on the debt, does not exceed the present value of all future public revenues, cf. the Economic Council (2004).

It follows that the sustainability concept does not take liquidity into account, i.e. current financing of the government debt. However, the two concepts are connected. Difficulties in connection with current financing of the government debt and consequent higher interest costs will put solvency under pressure. Moreover, uncertainty about long-term fiscal sustainability may result in difficulties in financing the current debt.

DEBT SCENARIOS FOR SELECTED COUNTRIES

This section discusses the need for fiscal tightening on the basis of stylised projections of government debt under various assumptions (see the Appendix for details). Since the assumptions may not hold true, the sensitivity of the results to the various parameters is also examined.

The projections are based on equation 1 in Box 2. Until 2011, the European Commission's May estimate is used for the EU member states and OECD data from November 2009 is used for the USA and Japan. The data thus incorporates the convergence programmes of the EU member states. The growth-adjusted interest rate (the interest rate less the GDP growth rate) is assumed to be 1 per cent for all of the countries. The primary deficit is assumed to be back at its structural level in 2012 in step with the recovery of output to its structural level.¹ Consequently, the projection envisages fiscal adjustments of the primary structural balance from 2012 to 2020. The projections include estimated increases in age-

¹ This assumption is relatively optimistic, as it is expected to take several years for the growth rates of the advanced countries to return to the potential.

related expenditure, except in Japan. The exact estimated need for fiscal tightening should, however, not be given too much weight, as the need depends heavily on the assumptions in the projections. The key issue is the magnitude of the fiscal challenges and the differences between the countries.

The first scenario envisages stabilisation of the government debt by 2015. However, several arguments foresee that stabilisation of the debt ratio is not enough, in view of the considerable negative real economic consequences of a high debt ratio, cf. Box 1. A reduction of the debt ratio to 90 per cent has thus been chosen as the second scenario. The last scenario illustrates the extent of the fiscal tightening required to reduce the debt to 60 per cent of GDP, i.e. the reference value in the Maastricht Treaty. It has been chosen that the debt targets of 60 and 90 per cent of GDP must be met in 2020.

PROJECTION RESULTS

Even the softest scenario with debt stabilisation by 2015 requires considerable tightening of the primary structural balance in a number of countries. 10 out of 16 countries thus have to tighten fiscal policy by more than 0.5 per cent of GDP annually from 2012 to 2015, cf. Table 1.

The need for fiscal tightening is greatest in countries with large deficits, e.g. the UK, the USA, Ireland, Spain and Japan, as such countries suffer from both considerable deficits and large interest expenditure due to the high debt. For a number of member states in southern Europe with excessive deficits, including Greece and Portugal, the need for fiscal tightening from 2012 is smaller than could have been expected. The reason is the smaller structural element in their primary deficits¹, which entails a substantial improvement from 2011 to 2012 given the assumption that the primary balance will return to its structural level in 2012. The debt stabilisation level in 2015 ranges from 40-60 per cent of GDP in the Nordic countries to more than 140 per cent in Greece and more than 210 per cent in Japan. For many countries, the debt stabilisation level is above 90 per cent. Consequently, the target of debt stabilisation is only an emergency solution. This is also emphasised by the expectation that interest expenditure will exceed 5 per cent of GDP in Greece, Italy and the USA and 3 per cent of GDP in the other countries (except the Nordic countries).

¹ The Commission's most recent estimate includes fiscal tightening from 2009 to 2011 of 5.9 percentage points in Greece, 2.6 percentage points in Spain and 1.3 percentage points in Portugal.

OVERVIEW OF FISCAL TIGHTENING NEEDS IN THE SCENARIOS¹

Table 1

Per cent of GDP	Gross debt in 2009	Debt stabilisation by 2015		Debt ratio of 90 per cent by 2020		Debt ratio of 60 per cent by 2020	
		Annual tightening	Cumulative	Annual tightening	Cumulative	Annual tightening	Cumulative
Japan	189	3.2	12.8	5.5	43.9	6.3	50.5
Greece	115	1.3	5.2	2.2	17.5	3.0	24.0
USA	84	2.3	9.2	2.0	15.9	2.8	22.4
Ireland	64	2.6	10.4	1.9	15.0	2.7	21.5
UK	68	2.2	8.8	1.6	12.6	2.4	19.1
Portugal	77	1.5	5.9	1.1	9.0	1.9	15.5
France	78	1.4	5.7	1.0	8.2	1.8	14.8
Spain	53	1.8	7.0	0.8	6.7	1.7	13.2
Italy	116	0.0	0.1	0.8	6.5	1.6	13.0
Belgium	97	0.4	1.7	0.6	5.1	1.4	11.6
Euro area	79	0.9	3.5	0.6	5.0	1.4	11.5
Germany	73	0.5	2.1	0.2	1.5	1.0	8.0
Netherlands	61	0.9	3.5	0.1	0.8	0.9	7.3
Austria	67	0.5	1.9	-0.1	-0.7	0.7	5.8
Denmark	42	0.6	2.4	-0.7	-5.3	0.1	1.2
Finland	44	0.2	0.8	-0.8	-6.4	0.0	0.1
Sweden	42	0.0	0.0	-1.3	-10.2	-0.5	-3.7

Note: Tightening of the primary structural balance. The Table has been sorted by the 90-per-cent scenario.
Source: Own calculations.

A debt ratio of below 90 per cent in 2020 requires further tightening for a longer period: five countries need to apply tightening measures in excess of 1.5 per cent of GDP annually, and seven countries need to tighten by more than 1 per cent, cf. Table 1. Japan may find it extremely difficult to meet either of these debt targets within the chosen time horizon since this would require fiscal tightening in excess of 5 per cent of GDP annually.

For the Nordic countries as well as Germany, the Netherlands and Austria, the Maastricht target is within reach in 2020, while Ireland, the UK, Greece, Italy, France, Spain and Portugal would need to implement drastic tightening measures.

As evidenced by the above, many advanced countries are facing a fiscal challenge of historical magnitude. This requires immediate decisions. Only 10 advanced countries have tightened their primary structural balances by more than 10 per cent in cumulative terms in recent times, cf. IMF (2009c). For Japan, the USA, Ireland and the UK, tightening of this magnitude is required just to stabilise the debt, cf. Table 1.

¹ The greater fiscal tightening need in Denmark than in Sweden in the scenarios, despite identical debt ratios in 2009, is attributable to the smaller structural deficit in Sweden relative to Denmark.

Sensitivity to the projection assumptions

Lower growth entails a need for more extensive fiscal consolidation, while also making consolidation more difficult for the countries. The extent to which the financial crisis has reduced the growth potential in the advanced countries is highly uncertain. Overall, the OECD expects 0.9 per cent lower growth on average in 2011-17, compared with the eight years up to the crisis. A particularly pronounced decline in growth is expected in Ireland, Greece and Spain.

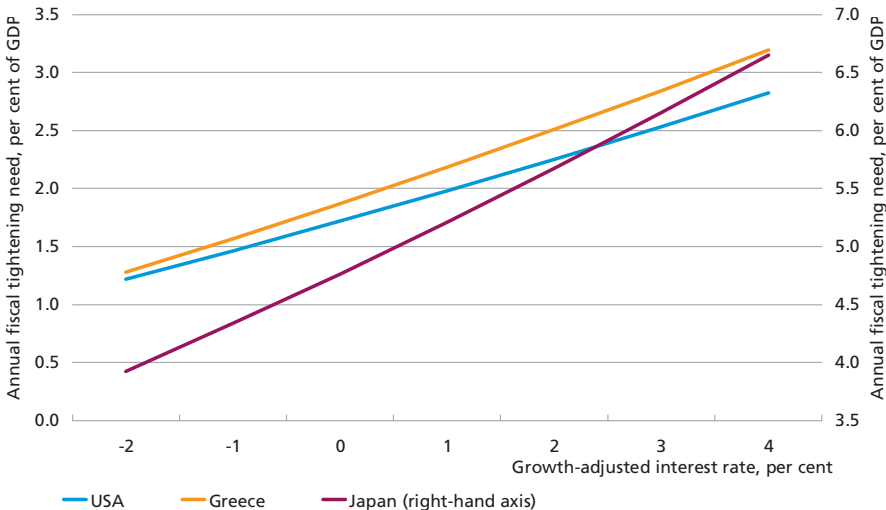
Relative to growth, interest rates have an opposite impact on public finances, cf. Box 2, since higher interest rates entail higher current interest expenditure, thus impeding fiscal improvement.

The initial debt ratio and the relationship between interest rates and growth determine the extent of fiscal tightening required to meet a given debt target. The higher the level of debt, the more significant is the role of the growth-adjusted interest rate, cf. Chart 5.

From 1990 to 2009, the growth-adjusted interest rate in the countries under review varied from -2 to 2.5 per cent, cf. Chart 6, compared with a growth-adjusted interest rate of 1 per cent in the projections.

For Greece, continuation of the last 10 years' highly favourable growth and interest rate environment would, assuming a debt target of 90 per cent in 2020, reduce the necessary cumulative reduction of the primary structural balance from 17.5 per cent of GDP to around 10 per cent, cf.

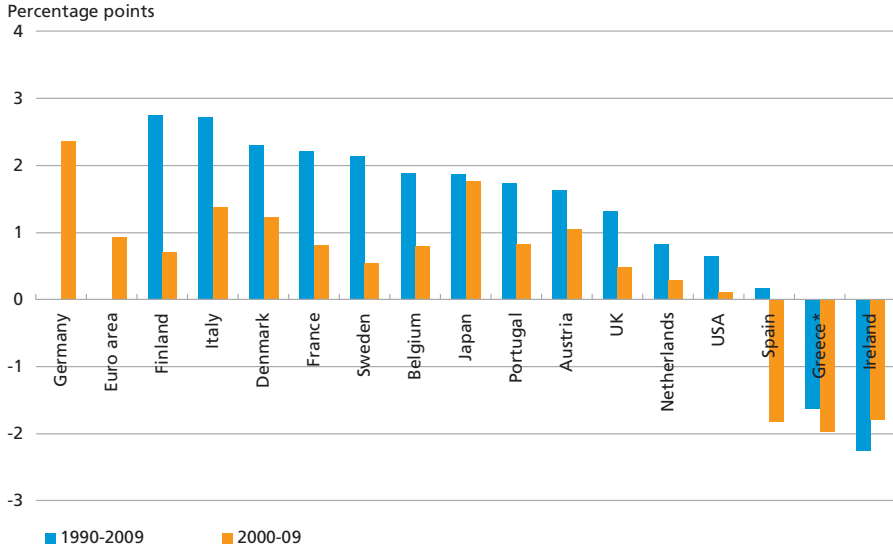
SENSITIVITY TO THE GROWTH-ADJUSTED INTEREST RATE IN THE 90-PERCENT SCENARIO Chart 5



Source: Own calculations.

GROWTH-ADJUSTED INTEREST RATE

Chart 6



Note: Observations are missing for the euro area and Germany due to insufficient data. *The data for Greece goes back only to 1997.

Source: OECD, *Economic Outlook*, No. 86.

Table 2. Conversely, continuation of Greece's current wide interest-rate spreads or a significant decline in growth could increase the magnitude of consolidation to more than 25 per cent of GDP.

This emphasises the role of the growth-adjusted interest rate in fiscal consolidation. Looking ahead, countries such as Spain, Greece and Ireland will probably see a debt environment completely different from the highly favourable conditions that prevailed from 2000 to 2009, cf. Chart 6 and Table 2. This will result in considerably tougher fiscal consolidation requirements.

Impact of simultaneous fiscal tightening in the advanced countries

Never before in recent times has fiscal consolidation of such magnitude been required of so many countries at the same time.

The OECD has modelled the GDP effects of isolated fiscal tightening in the USA, Japan and the euro area relative to the effects of simultaneous

CUMULATIVE FISCAL TIGHTENING NEED IN THE 90-PER-CENT SCENARIO

Table 2

Per cent of GDP	Growth-adjusted interest rate of 1 per cent	Historical growth-adjusted interest rate
Spain	6.7	2.4
Ireland	15.0	9.6
Greece	17.5	10.4

Source: Own calculations.

EFFECTS OF NATIONAL AND SIMULTANEOUS FISCAL CONSOLIDATION

Table 3

Effect of fiscal consolidation equivalent to 1 per cent of national GDP	First-year change in GDP (per cent) in:				
	USA	Japan	Euro area	OECD area	Of which effect on own country ¹
<i>Tightenings in:</i>					
USA	-0.9	-0.2	-0.1	-0.5	-0.3
Japan	0.0	-0.8	0.0	-0.2	-0.1
Euro area	-0.1	-0.1	-0.8	-0.3	-0.2
OECD	-1.2	-1.3	-1.1	-1.1	
Effect of tightenings in other countries as a percentage of effect of own tightening .	33	63	38		

¹ GDP effect in the OECD area as a result of a decline in GDP in the country implementing the tightening.

Source: OECD, *Economic Outlook*, No. 86, November 2009, Table 1.7.

fiscal tightening in all OECD countries. In the short term, growth in these countries will be dampened by national fiscal consolidation. The other countries' simultaneous fiscal consolidation will further reduce growth by around 30-60 per cent relative to purely national consolidation, cf. Table 3. The most pronounced impact on growth will be seen in export-oriented economies such as Japan, since such economies are more exposed to a decline in global demand.

However, the OECD model calculation does not take into account that fiscal consolidation may cause long-term interest rates to fall, which may offset the dampening effect on demand. It has been observed, especially in countries with heavy debt burdens and very large or rapidly increasing budget deficits, that the contractive effects of fiscal consolidation may be mitigated by drops in interest rates and positive confidence effects, cf. Alesina and Ardagna (1998) and ECB (2010). It also appears from the previously mentioned empirical study by Reinhart and Rogoff (2010) that economic growth may be impeded if the government debt ratio exceeds a critical level. In any case, conventional economic theory argues that fiscal consolidation will increase output in the longer term because it paves the way for lower real interest rates, which will boost investment.

APPENDIX: PROJECTION ASSUMPTIONS

The fiscal projections have been made on the basis of the European Commission's spring forecast of May 2010 for the EU member states and the database for the OECD's Economic Outlook, No. 86 of November 2009 for Japan and the USA. The figures for age-related public expenditure for the EU member states are from the European Commission (2010), while the corresponding figures for the USA are from Congressional Budget Office (2009). Age-related expenditure has not been included for Japan.

It has been assumed that the advanced economies will have normalised in 2012 to such an extent that the output gap has closed and the primary balance has returned to its structural level. For several advanced countries with very large output gaps, this is an optimistic assumption, while it is closer to the expected path for other countries.

Moreover, for the sake of simplicity, it has been assumed that the spread between the nominal interest rate and the growth rate is 1 per cent in all the countries throughout the projection period. This figure has been 1.4 per cent on average from 1990 to 2009 for the selected countries, albeit with substantial variation across the countries, cf. Chart 5. In some countries, this figure has been negative due to high growth rates. However, it is extremely difficult to predict country-specific developments in this spread, so country differences have been excluded from the baseline scenario.

LITERATURE

Alesina and Ardagna (1998), Tales of fiscal contractions, *Economic Policy*, No. 27, pp. 487-545.

Blommestein, H.J. and A. Gok (2009), The Surge in Borrowing Needs of OECD Governments: Revised Estimates for 2009 and 2010 Outlook, OECD.

Congressional Budget Office (2009), The Long-Term Budget Outlook, June 2009.

Danmarks Nationalbank (2001), *Danish Government Borrowing and Debt*.

Danmarks Nationalbank (2009), Recent Economic and Monetary Trends, *Monetary Review*, 3rd Quarter.

Danske Research (2010), Debt on a dangerous path, Research Euroland.

Economic Council (2004), The Sustainability of the Danish Fiscal Policy, *Danish Economy*, Spring, Chapter 2.

Deutsche Bank (2010), Global Economic Perspectives: The Public Debt Challenge, 13 January.

ECB (2010), Euro area fiscal policies and the crisis, *Occasional Paper series*, No. 109, April.

European Commission (2008), The 2009 Ageing Report: Underlying Assumptions and Projection Methods, No. 7.

European Commission (2009), Sustainability Report, *European Economy* No. 9.

European Commission (2010), European Economic forecast, spring.

IMF (2009a), Fiscal Implications of the Global Economic and Financial Crisis, *Occasional Paper*, No. 269.

IMF (2009b), A Strategy for Renormalizing Fiscal and Monetary Policies in Advanced Countries, *IMF Staff Position Note*, No. 22.

IMF (2009c), The State of Public Finances Cross-Country Fiscal Monitor, *IMF Staff Position Note*, No. 25, November.

IMF (2010), *World Economic and Fiscal Surveys: Fiscal Monitor*, May.

OECD (2009a), *Economic Outlook* No. 86, Paris.

OECD (2009b), Health at a glance, Paris.

OECD (2009c), Tax Factbook.

Reinhart, Carmen and Kenneth Rogoff (2010), Growth in a time of debt, forthcoming in *American Economic Review Papers and Proceedings*.

Thomsen, Jens (2005), Yield and Risk, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter.

Winther, Ann Louise (2009), Impact of Fiscal Policy during the Crisis, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter.

Gross Domestic Product and Welfare

Paul Lassenius Kramp, Economics

INTRODUCTION AND SUMMARY

The overall objective of political activities in democratic societies is to ensure the highest possible level of welfare for the country's citizens now and in the future. When politicians, macroeconomists and others discuss welfare and economic development in Denmark they often focus on the gross domestic product, GDP. For example, the overall goal of the government's 2020 plan is for Denmark to be among the 10 richest countries in the world in 2020 in terms of GDP per capita.

GDP is a measure of the economic prosperity of a country compiled as output or income. There is a strong correlation between the development in GDP and changes in several important social factors, including tax payments and unemployment and, to a lesser extent, health and education. It is therefore no mere coincidence that GDP plays a key role in the public debate.

However, GDP is regularly criticised for not presenting a fair view of welfare. If GDP is a poor measure of welfare, focusing one-sidedly on increasing GDP may lead to misguided political decisions. For example, Nobel laureate Joseph Stiglitz has argued that the objective of the highest possible GDP growth will result in reduced welfare. The criticism of GDP is not new, and over the last 30-40 years efforts have been made to put together alternative objectives. The debate has revived recently, partly as a result of the publication of a recent report concerning the limitations of GDP as a measure of economic performance and social progress. The report was written by the two Nobel laureates for economy, Joseph Stiglitz and Amartya Sen, among others.

The criticism of GDP as a measure of welfare is two-fold. Firstly, there are a number of compilation problems, including the breakdown by price and quantity changes and the calculation of public output. These problems can cause both the level of GDP and GDP growth to deviate from actual output. Furthermore, changes in the terms of trade may cause income to develop differently from output. As a result, applying

the level of GDP and GDP growth as measures of economic prosperity is not fully possible.

Secondly, a number of factors of major significance to welfare are not included in GDP. Accordingly, a number of alternative measures of welfare, so-called welfare indicators, have been proposed. Some welfare indicators are based on the national accounts. A number of other factors affecting welfare, e.g. leisure time, health condition and level of education, are subsequently included. These welfare indicators do not seem to provide a significantly better picture of welfare due to the strong correlation between e.g. health and education and GDP.

Instead, other welfare indicators attempt to measure welfare directly, including by means of questionnaires on the subjective feeling of happiness. The patterns of these indicators are different from that of GDP. There is a strong cross-country correlation between GDP and happiness, but measured over time, happiness seems to be independent of the development in GDP. One explanation of this apparent paradox is that happiness is related to the relative position in the income hierarchy rather than to the absolute level of income. Consequently, the feeling of happiness is not increased by higher income if everyone else has also become more affluent.

In addition to being a poor measure of welfare, GDP is also criticised of not including sustainability. Sustainability can be viewed as ongoing maintenance of necessary resources, e.g. the capital stock, the "natural capital" measured by the quantity of natural resources and environmental quality as well as the amount of human capital. Indicators illustrating sustainability should be analysed in parallel with welfare indicators, however, in order not to conflate current welfare with indicators of potential future output.

Despite a number of reservations, GDP as an indicator of prosperity should play a key role in the welfare debate. Increased prosperity can be used to improve areas that are deemed to be central to welfare. Furthermore, GDP is strongly correlated with a number of factors of importance to welfare, including unemployment, health and education. Aspects affecting welfare but not included in GDP should be part of the political debate, but they should not necessarily be comprised by a single welfare indicator.

This article has the following structure: a review of the strengths and weaknesses of GDP and other elements of the national accounts as a measure of economic prosperity is followed by an analysis of the correlation between prosperity and welfare, and various welfare indicators are discussed. The third section focuses on sustainability, and the last section provides a conclusion.

NATIONAL ACCOUNTS, GDP AND PROSPERITY

The national accounts provide an overall picture of the economy by showing how output generates income that is subsequently spent on consumption or savings. The savings can be invested in either real or financial assets. The national accounts describe all these transactions within a balanced account system.

GDP is the key element of the national accounts and can be compiled from three different perspectives: the output perspective, the application perspective and the income perspective. GDP compiled from the output perspective represents the market value, measured in kroner, of final output in a given period, i.e. the value of total output less the value of the commodities and intermediate goods consumed in the production process. Alternatively, GDP can be viewed from the application perspective where GDP is equal to the sum of consumption, investment and net exports. Finally, GDP can be viewed as the value of total income that is distributed among employees, companies and the government.

The monetary valuation makes it easy to add up a diversity of goods and services. Moreover, market prices are more than just an accounting instrument. According to economic theory, the relationship between the prices of different products reflects consumers' relative assessment of the utility of the products, so the market value is a good measure of the utility value of consumption.

The development in GDP adjusted for inflation is a well-established systematic way of compiling how the prosperity of a society develops over time, as consumption opportunities are ultimately determined by output.

Classic GDP issues

A number of factors complicate the use of GDP as an indicator of economic prosperity over time and across countries, however. This is due to inaccuracies in GDP compilation caused by insufficient data as well as differences in compilation methods across countries.

Statistical agencies regularly develop and standardise the compilation methods, thereby improving the concordance between measured and actual output and the opportunities to make international comparisons.

Breakdown by price and quantity changes

A number of national accounts terms, including GDP, may be perceived as values created as the product of prices and quantities. For national accounts purposes, enhanced quality is regarded as increasing quantities.

It is hard to identify exactly how quality change affects the price development, particularly for services, cf. Stiglitz, Sen and Fitoussi (2009, p. 87f.). Unless quality enhancements are identified, rising prices resulting from enhanced quality will be misregistered as inflation. As a consequence, real growth will be underestimated, while the rate of inflation will be overestimated.

Compilation of output in the public sector

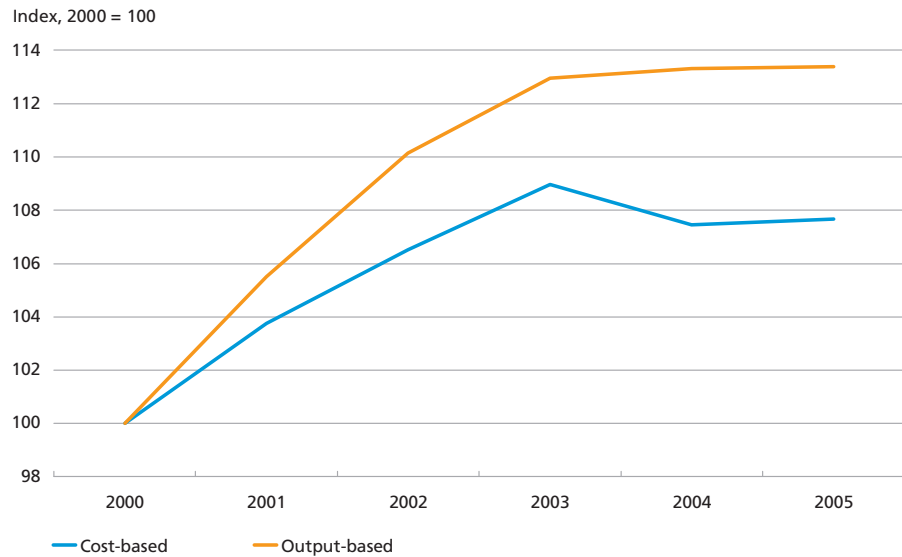
The value of public-sector output of goods and services is difficult to compile as this output is not sold in a market and market prices are consequently non-existent. Instead, the output value in Denmark is compiled based on costs. As a result, registered public output can only be increased by increasing costs. Thus productivity growth is by definition zero. For the healthcare sector, among others, this compilation method will underestimate true output, cf. Deveci, Heurlén and Sørensen (2008) and Chart 1. A large public sector therefore reduces registered growth and productivity in the economy overall.

Compilation of final output

Only the volume of goods and services that go into consumption, exports or investment is included in GDP. To avoid being counted twice, intermediate goods, on the other hand, are not included. The breakdown by consumption, intermediate goods and investment gives rise to

VOLUME OF HEALTHCARE SERVICES IN DENMARK

Chart 1



Note: Output is not adjusted for quality.

Source: Deveci, Heurlén and Sørensen (2008).

cross-country differences. Cases in point are the breakdown of financial-sector output by consumption and intermediate goods, the breakdown of software input by investment and intermediate goods and the volume of military investments included in GDP, cf. Ahmad et al. (2003).

Different compilation methods may cause variations in levels across countries. In the long term, GDP growth rates are not affected by consistent variations in levels. In the short term, however, different compilation methods of output levels may affect growth rates.

Delineation of the market

There is considerable output of mainly services that account for large labour and capital resources but are not sold in a market. Households cooking, cleaning and taking care of children at home maintain their homes and receive a return on owner-occupied housing (rents). The public sector provides free services such as the fire service, the police, education and healthcare. These services would all create substantial earnings if they were subject to market conditions.

In order to avoid that GDP is affected by who provides a particular product or service, this output must be included. This would also give a more complete picture of the economy. Some elements of non-market-related output, including services provided by the public sector and owner-occupied rents, are included in GDP. On the other hand, household production at home, e.g. cooking, cleaning and childcare, is not included.

As a consequence, if households purchase services previously produced by themselves, GDP will grow, while output will remain the same, cf. Stiglitz, Sen and Fitoussi (2009, p. 89f.). Furthermore, it will be difficult to compare GDP across countries with different participation rates. For example, in countries where elderly care and childcare to a large extent takes place at home, GDP will be lower than in countries where this production mainly takes place outside the home. A cross-country comparison of GDP may thus overestimate the difference in actual output.

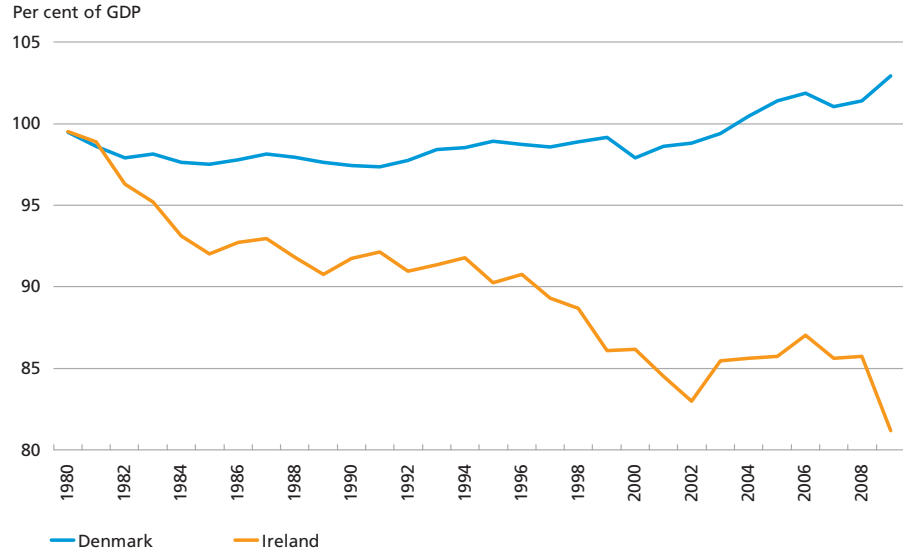
GDP and national income

In a globalised world there may be considerable differences between output development (GDP) and the income that accrues to the country's citizens (the gross national income, GNI). There are two significant reasons for this.

Firstly, part of the income created in a country is sent to owners abroad, and revenue from investment abroad is received. Adjustment of GDP for these flows results in GNI. Compared with GDP, GNI in Denmark has increased slightly since the early 1980s, cf. Chart 2, while the oppo-

GROSS NATIONAL INCOME

Chart 2



Note: GDP and GNI are both at current prices.
Source: OECD, OECD.Stat.

site has been true in, say, Ireland. The development in Ireland is attributable to the fact that GDP growth has been driven by a large influx of foreign companies whose profits are in part sent out of the country. In the long term, transfers to and from abroad will mainly affect the level of GNI and not GNI growth.

Secondly, import and export prices may develop differently. For example, if import prices decline relative to export prices, it will be possible to purchase a larger volume of imported goods for the same volume of exported goods, resulting in improved terms of trade. This can be illustrated by comparing the development in volumes in GDP and GNI.

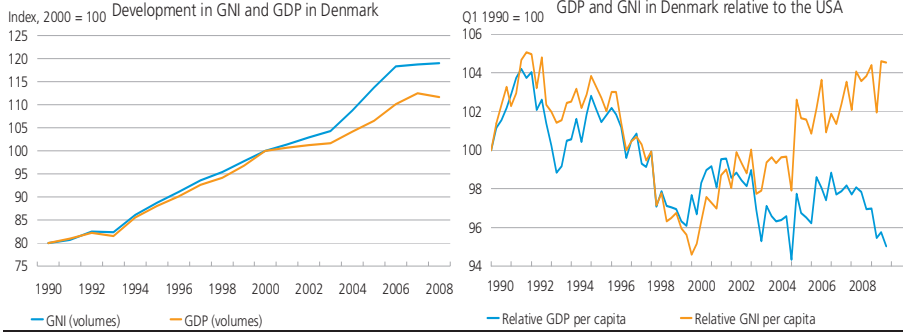
Since the millennium rollover, Denmark has seen a substantial improvement of the terms of trade, cf. Chart 3 (left-hand side). GNI growth exceeded GDP growth by just over 7 percentage points from 2000 to 2008. Thanks to the improvement of the Danish terms of trade, Denmark actually experienced slightly higher GNI growth than the USA from the 1st quarter of 1990 to the 4th quarter of 2009, despite the lower growth in GDP per capita in Denmark than in the USA, cf. Chart 3 (right-hand side).

Cross-country comparison

Adjusting for population growth is necessary when comparing both levels and growth rates across countries. All other things being equal, population growth results in more output and thus higher GDP growth.

GDP AND GNI IN DENMARK AND THE USA

Chart 3



Note: The calculation of GNI in volumes is adjusted for changes in the terms of trade. See e.g. Statistics Denmark (2008), p. 262f., for a more detailed description. Left-hand side: annual data; right-hand side: quarterly data.
 Source: Statistics Denmark and Reuters EcoWin.

Since the higher output is to be shared by a larger population, this does not necessarily lead to an increase in individual prosperity.

To compare GDP levels across countries it is also necessary to translate GDP into a single currency. Market exchange rates not only reflect the relative prices of goods and services, they are also affected by interest-rate spreads, financial flows, etc. Accordingly, the prices of identical goods and services will vary considerably from country to country if market exchange rates are applied. Instead, artificial exchange rates can be constructed to ensure that a basket of goods and services costs the same in all countries, thereby adjusting for differences in purchasing power. Comparing quality differences in related products across countries is notoriously difficult, cf. Stiglitz, Sen and Fitoussi (2009), and may therefore cause uncertainty in connection with international comparisons.

At the market rate in 2008, Danish GDP per capita amounted to approximately 130 per cent of US GDP. Allowing for the fact that kr. 1,000 buys fewer goods in Denmark than in the USA due to high Danish prices, Danish GDP per capita amounted to only just under 80 per cent of US GDP.

WELFARE INDICATORS

A number of different welfare indicators have been proposed over the last 30 years, see e.g. Jensen (1995). While some are based on economic prosperity as measured in the national accounts with a number of subsequent adjustments, others attempt to measure happiness outright.

Welfare indicators based on the national accounts

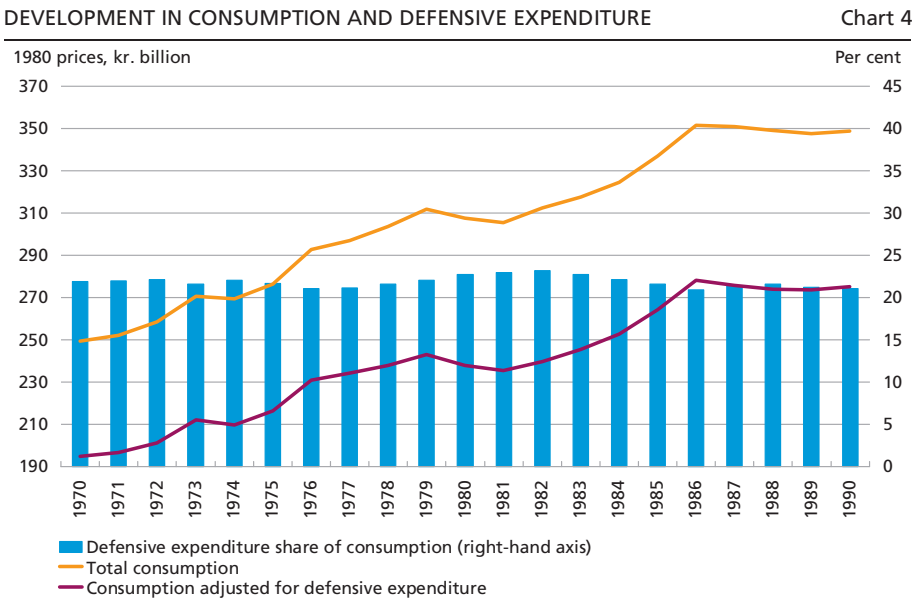
Indicators based on the national accounts typically use consumption as a starting point, including individual public consumption of day care, edu-

cation, healthcare and elderly care, etc., and adding the value of production at home. A number of adjustments are subsequently made so that the indicators reflect the development in welfare as accurately as possible.

Defensive expenditure

Defensive expenditure can be defined as expenditure incurred solely to offset negative external impacts. Typical examples are public consumption such as the provision of police services, military services and the prevention of pollution. Such expenditure has value only by virtue of countering decreases in welfare caused by the behaviour of others. It has been proposed that defensive expenditure should be regarded as intermediate products and hence excluded from GDP. Expenditure for police services should thus be regarded as a resource consumed in connection with other output. Others propose that defensive expenditure should be regarded as reinvestment, cf. Stiglitz, Sen and Fitoussi (2009), p. 103f.

Adjustment for defensive expenditure reduces the level of consumption, but seems to constitute a relatively constant share of consumption, cf. Chart 4. Consequently, growth in consumption is not affected significantly. Furthermore, adjustment will probably lead to a weaker correlation between GDP and unemployment, among other factors, as some economic activity is excluded.



Note: The series are at constant prices.
 Source: Jensen (1995).

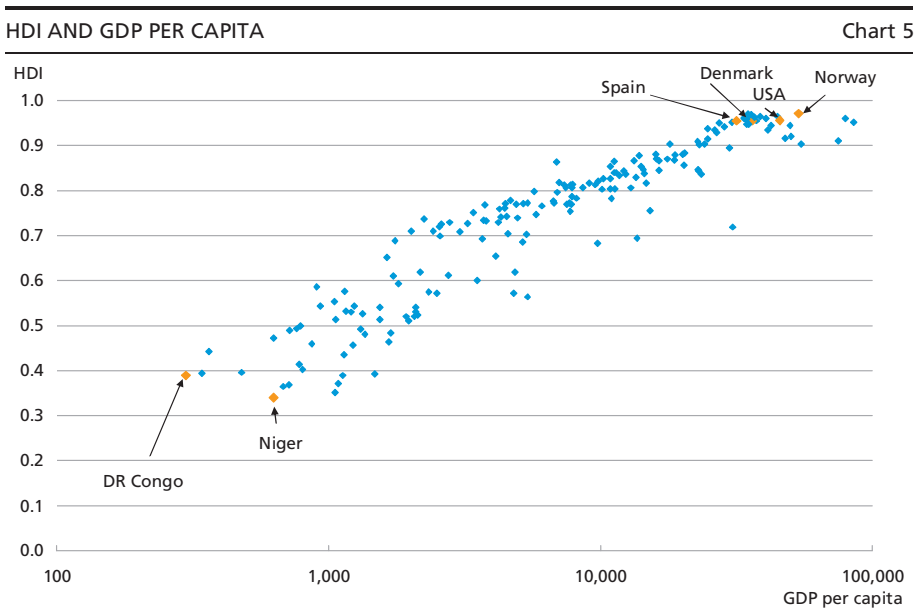
Leisure

Most people's welfare depends not only on consumption, but also on the amount of leisure time. Leisure can therefore be included in a welfare indicator.

Calculations of the value of leisure are subject to great uncertainty, and its development and level will to a great extent be determined by quantitative assumptions, cf. Jensen (1995). Firstly, time spent off work is not necessarily leisure time – for example, increased time spent on commuting will result in reduced welfare. Secondly, no unequivocal price of leisure is available. Presumably, leisure time due to unemployment increases welfare less than a voluntary reduction of working hours. It can therefore be argued that the price of leisure in connection with unemployment is lower than for those in employment.

Human Development Index

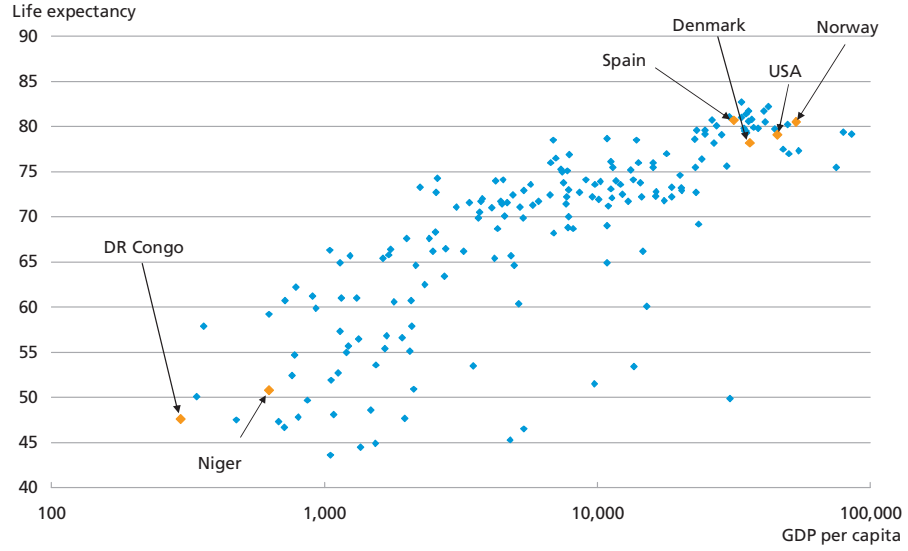
The UN computes a measure of welfare, the Human Development Index, HDI, which includes material goods (GDP per capita), health (including life expectancy) and education (including the average level of education). HDI and GDP per capita are very closely correlated, cf. Chart 5, as to a large extent life expectancy and the average level of education both fluctuate with material prosperity, cf. Chart 6. Accordingly, the HDI does not provide a significantly better picture of welfare across coun-



Note: The data is for 2007. GDP per capita is purchasing-power-parity adjusted and measured in dollars.
 Source: UN Development Programme (2009).

LIFE EXPECTANCY AND GDP PER CAPITA

Chart 6



Note: The data is for 2007. GDP per capita is purchasing-power-parity adjusted and measured in dollars.
 Source: UN Development Programme (2009).

tries. Separate comparisons of each sub-component may contribute to a more faceted picture of welfare, however.

Prosperity and happiness

Traditional economic theory usually assumes that it is impossible to measure and compare the welfare or "happiness" of individual citizens. This means that making normative statements about distributional issues is not possible. Assuming instead that happiness can be compared across individuals, it is possible to construct welfare indicators based directly on happiness.

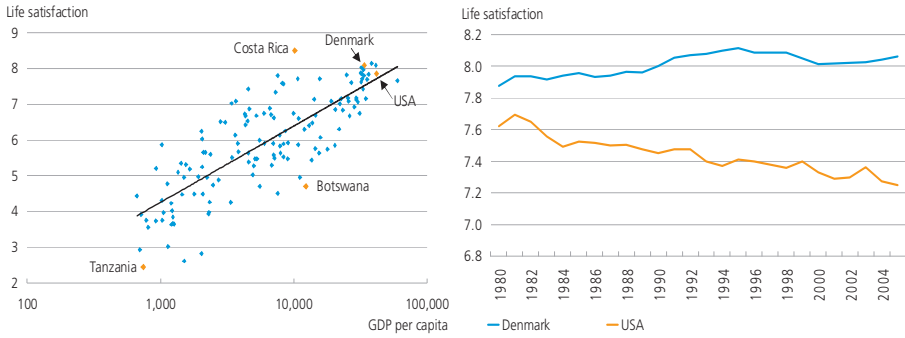
The welfare indicators are constructed by asking the citizens of various countries a number of questions about their happiness. The results are compiled into an indicator for each country. Happiness is compared across individuals where an increase in the "happiness index" of 1 for five individuals is better than an increase of 4 for one individual.

An analysis of the happiness indicators results in a paradox. Happiness and income are very closely correlated across countries, i.e. the richest countries are the happiest, cf. Chart 7 (left-hand side). At the same time, happiness and income are not correlated over time, cf. Chart 7 (right-hand side). Apparently, multiplication of income over time does not increase the feeling of happiness.

There does not seem to be a specific explanation of this paradox. The variance in happiness across countries is explained by differences in the

HAPPINESS AND WEALTH

Chart 7



Note: The data on the right-hand side is not directly comparable with the data on the left-hand side, as they are based on different data sources. Left-hand side: The data is for 2007. GDP per capita is purchasing-power-parity adjusted and measured in dollars.
 Source: Abdallah et al. (2009).

access to material goods (i.e. differences in income) and the health level. Two general explanations are put forward as to why the feeling of happiness does not increase over time, cf. Layard (2003). Firstly, consumption may be addictive. Increased consumption only leads to increased happiness for a short period of time after which people get used to the higher level of consumption and their feeling of happiness falls again.

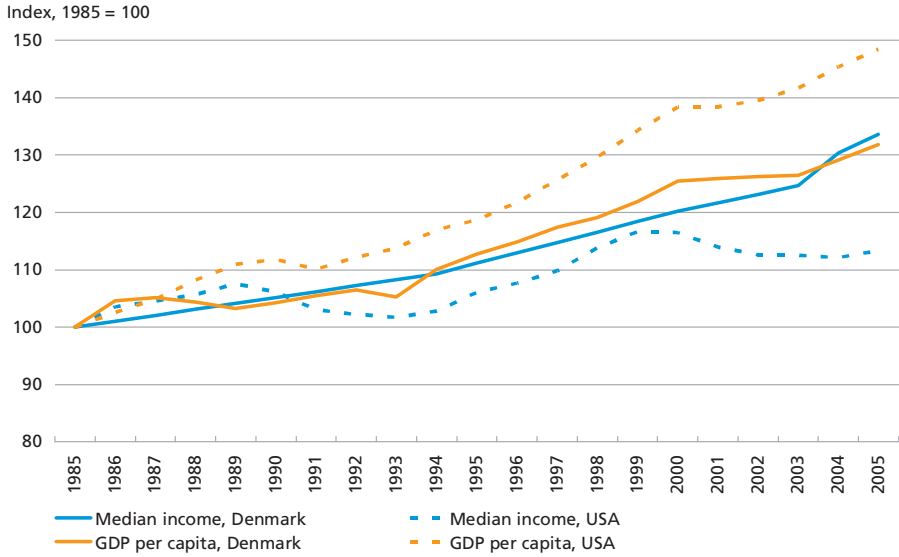
Secondly, the feeling of happiness is related to the relative position in the income hierarchy rather than to the absolute level of income. Citizens of rich countries are happy because they are richer than citizens of other countries, but their feeling of happiness does not increase over time. The same applies in countries where citizens compare themselves with a reference group, e.g. work colleagues, family or neighbours. Increased income for a few members of the reference group reduces the feeling of happiness of all other members. Accordingly, a high degree of income inequality will reduce the overall feeling of happiness.

The development in the average and median income in Denmark has been largely the same over the last 20-30 years, cf. Chart 8. This means that most income groups have experienced consistent increases in income. In the USA the most affluent part of the population has experienced the strongest income growth and the median income in the USA has consequently increased less than in Denmark. The higher degree of income inequality in the USA may help explain the registered fall in life satisfaction.

The happiness indicators enable a number of interesting analyses and can shed light on which factors may affect the subjective feeling of happiness the most at any given time. The indicators should not be used alone, however, as subjective assessments of happiness may hide objective inequalities, cf. e.g. Fleurbaey (2009).

DEVELOPMENT IN AVERAGE AND MEDIAN INCOME

Chart 8



Note: The series are at constant prices. Median income in the USA is compiled per household, whereas in Denmark it is compiled per capita. Data points for median income in Denmark are only available for 1983, 1994, 2000, 2003, 2004 and 2005. A linear trend between the data points is assumed.
 Source: Statistics Denmark, Reuters EcoWin and Ministry of Finance (2008).

Pollution

Pollution can be viewed as a negative side effect of output. Welfare is reduced if pollution affects health, increases the extent of extreme weather conditions or prevents access to nature areas, etc. In the longer term, continued accumulation of pollution may reduce global welfare considerably, e.g. if global warming leads to increased drought, rising water levels and more extreme weather conditions.

In an analysis of the welfare level in any given year only the immediate negative effect of pollution should be included in the welfare indicators. Thus, the opportunities of maintaining output and welfare in the future should not be conflated with welfare today. Instead, sustainability should be treated separately.¹

SUSTAINABLE ECONOMIC DEVELOPMENT

A high GDP level now does not necessarily ensure that the living conditions of future generations will be as good as they are now, i.e. there is no guarantee of sustainable development. Standards of living can be sustained over time by maintaining the existing production facilities and

¹ Conflating welfare and sustainability corresponds to having a single indicator in a car for the current speed of the vehicle and the remaining amount of petrol.

by ensuring future access to the necessary commodities, environmental benefits and well-educated labour (human capital).

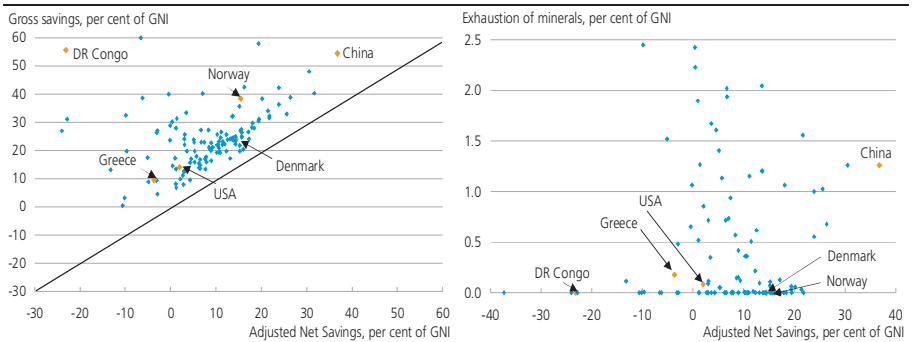
Accordingly, sustainable development can be measured through changes in a number of "stocks" such as the capital stock, the oil reserves, the accumulated amount of pollution and the amount of human capital.

The World Bank computes a sustainability indicator, Adjusted Net Savings, ANS, based on variations in stocks. The idea is to estimate the development in so-called extended wealth, which includes the capital stock as calculated in the national accounts, raw materials, human capital and "nature" (increased pollution reduces the value of nature), cf. Bolt, Matete and Clemens (2002). An ANS value above zero indicates sustainable development in as much as the value of extended wealth increases.

For all countries, depreciation on the capital stock, raw material reserves and "nature" exceeds savings in human capital. As a result, ANS falls below gross savings so that all observations are above the 45° line in Chart 9 (left-hand side). Furthermore, most of the variance in ANS across countries is caused by gross savings so that the observations are to a large extent parallel to the 45° line.

The development in low-income countries that strongly rely on oil exports is typically non-sustainable (ANS < 0). On the other hand, the development in most developed countries with high GDP per capita is sustainable. In 2007, ANS for the world as a whole was just under 9 per cent of GNI. ANS in Denmark was 14.5 per cent of GNI in 2007 – oil extraction reducing the figure by as much as 2.3 percentage points compared to the OECD average of 1.0 percentage point. Building up human capital increases ANS by 7.8 percentage points (OECD average: 4.6 percentage points).

ADJUSTED NET SAVINGS, GROSS SAVINGS AND GDP Chart 9



Note: GNI. The data on the left-hand side is for 2007.
 Source: The World Bank, <http://go.worldbank.org/3AWKN2ZOY0>.

A positive ANS value means an increase in the value of extended wealth but not necessarily in the value of all sub-components. It is thus an implied assumption that the various stocks are substitutes of each other so that e.g. increased pollution can be offset by a larger capital stock. As a result, the relative prices of the various stocks will be key determinants of sustainable development. For example, China has high ANS due to a high level of national savings. But at the same time, China is rapidly exhausting its natural resources, including minerals, cf. Chart 9 (right-hand side).

The level of and development in existing monetary indicators of sustainability, e.g. ANS, both depend entirely on the choice of relative prices which are, unfortunately, subject to extreme uncertainty. Consequently, it may be argued that it is better to review sustainability directly by monitoring the development in a number of key stocks individually, cf. Stiglitz, Sen and Fitoussi (2009), p. 77f., thereby avoiding having to determine relative prices.

CONCLUDING REMARKS

Welfare and utility are complex concepts that are difficult to measure. GDP, which is an indicator of economic activity and thus represents economic prosperity, is often used as a simple measure of welfare. Due to a number of factors, neither the GDP level nor GDP growth can be used unilaterally as a measure of economic prosperity; nor can they be used as measures of welfare.

That said, GDP should play a key role in the Danish welfare debate. Increased prosperity can be used to provide better healthcare, better support for the disadvantaged or better environmental protection. At the same time, GDP is strongly correlated with important social factors such as tax payments and unemployment. In addition, income inequality in Denmark has been relatively stable so that the vast majority of Danes have benefited from increasing prosperity.

Furthermore, international differences in life expectancy and levels of education can to a large degree be explained by differences in GDP, i.e. economic prosperity.

However, GDP is not the only factor to be taken into account in the welfare debate. Analyses of other indicators, e.g. of health, income inequality and sustainability, provides a much more faceted picture of the welfare situation and a far better understanding of which areas to prioritise.

The different factors that influence welfare should not necessarily be comprised by a single welfare indicator in as much as the various factors are implicitly ranked when weighted together. Political priorities may thus be determined by compilation methods and assumptions.

LITERATURE

Abdallah, S., S. Thompson, J. Michaelson, N. Marks and N. Steuer (2009), *The (un)Happy Planet Index 2.0. Why good lives don't have to cost the Earth*, nef: London.

Ahmad, Nadim, François Lequiller, Pascal Marianna, Dirk Pilat, Paul Schreyer and Anita Wölfl (2003), *Comparing growth in GDP and labour productivity: measurement issues*, OECD, *Statistics Brief*, No. 7.

Bolt, Katharine, Mampite Matete and Michael Clemens (2002), *Manual for Calculating Adjusted Net Savings*, Environment Department, World Bank.

Statistics Denmark (2008), *National Accounts*.

Deaton, Angus (2008), *Income, Health, and Well-Being Around the World: Evidence From the Gallup World Poll*, Gallup World Poll.

Deveci, Nursen, Kamilla Heurlén and Henrik Sejerbo Sørensen (2008), *Non-Market Health Care Service in Denmark – Empirical Studies of A, B and C Methods*, article presented at the 30th General Conference of The International Association for Research in Income and Wealth.

The Ministry of Finance (2008), *Income Distribution and Poverty in Denmark 1983-2005 (in Danish only)*.

Fleurbaey, Marc (2009), *Beyond GDP: The Quest for a Measure of Social Welfare*, *Journal of Economic Literature*, Vol. 47, No. 4.

UN Development Programme (2009), *Human Development Report*.

Hobijn, Bart and Charles Steindel (2009), *Do Alternative Measures of GDP Affect Its Interpretation?*, Federal Reserve Bank of New York, *Current Issues in Economics and Finance*, Vol. 15, No. 7.

Jensen, Peter Rørmose (1995), *On the Measurement of a Welfare Indicator for Denmark 1970-1990*, The Rockwool Foundation Research Unit, *Working Paper*, No. 8.

Layard, Richard (2003), *Happiness: Has Social Science a Clue?*, *Lionel Robbins Memorial Lectures*, The London School of Economics and Political Science.

The Government (2010), Denmark 2020, Knowledge, Growth, Prosperity, Welfare.

Stiglitz, Joseph (2009), The great GDP swindle, article at *guardian.co.uk*, 13 September.

Stiglitz, Joseph, Amartya Sen and Jean-Paul Fitoussi (2009), Report by the Commission on the Measurement of Economic Performance and Social Progress, www.stiglitz-sen-fitoussi.fr.

Do Long-Term Bonds Offer a Higher Return than Short-Term Bonds?

Søren Schrøder and Christian Stampe Sørensen, Financial Markets

INTRODUCTION AND SUMMARY

Since the autumn of 2008, the difference between long- and short-term interest rates has been large by historical standards. Thus, the difference between German 10-year and 1-year government bond yields has been almost 2.5 percentage points, cf. Chart 1. This is significantly more than the average historical yield spread, which makes it tempting to buy long-term rather than short-term bonds or to fund short and invest long. Furthermore, some market participants apparently consider the risk to be limited. Long-term bonds, however, are far more price-sensitive than short-term bonds and are associated with higher *interest-rate risk*. If interest rates pick up from the current low levels, long-term bonds may offer a lower return than short-term bonds.

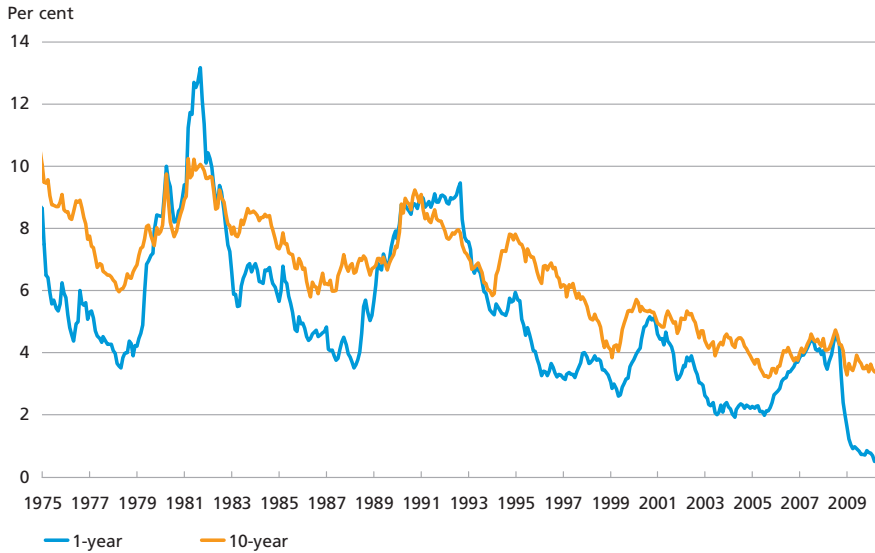
The decision to assume interest-rate risk depends on a variety of factors, the most important being the investor's risk appetite and interest-rate expectations. The risk appetite is to some extent bound up with the investment purpose and horizon. Pension funds, for instance, have long-term liabilities, which can be hedged by buying long-term bonds. For them, the risk associated with buying long-term bonds is lower than for an ordinary wealth investor without long-term liabilities. This article focuses on an ordinary wealth investor who has to choose between investing in short- or long-term bonds.

The first part of the article analyses the connection between return and interest-rate risk in the period 1975-2010 in Germany and the USA. The analysis shows that long-term bonds have on average yielded a higher return than short-term bonds, so that it pays off to assume interest-rate risk. This means that the investor has received compensation – a risk premium – for buying long-term bonds. However, the excess return varies widely over time since it is difficult to predict how the interest rates and the yield curve will develop and since the risk premium is not constant.

The historical relations between return and interest-rate risk can be taken as a guideline for investors and macroeconomic projections. In

GERMAN 1- AND 10-YEAR GOVERNMENT BOND YIELDS

Chart 1



Note: The most recent observations are from 30 April 2010.

Source: Reuters EcoWin.

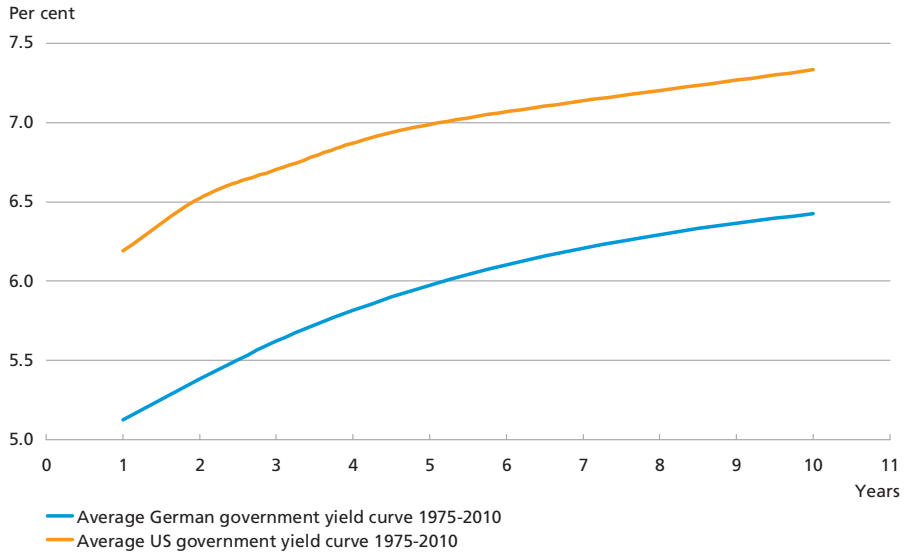
such projections, interest rates are of crucial importance to e.g. economic growth and fiscal sustainability. However, caution is advised when applying historical observations to predictions of future developments. Interest rates could take a different path than indicated by historical experience, especially in the current situation with very low short-term interest rates as a consequence of unconventional monetary policy measures. It is important that the individual investors act on the basis of the present situation and their own expectations of interest rates once monetary policy is normalised. The second part of the article describes the relation between the current yield curve, investors' interest-rate expectations and the *expected* excess return on assuming interest-rate risk.

HISTORICAL RETURN ON SHORT- AND LONG-TERM BONDS

Yield curves in the USA and Germany have on average had positive slopes since the 1970s, cf. Chart 2. The difference between 1- and 10-year yields has since 1975 averaged 1.3 percentage points in Germany and 1.1 percentage points in the USA. This yield spread mainly reflects that investors require a risk premium for the increased risk associated with long-term bonds. The slope may also reflect investors' interest-rate expectations. It is difficult to separate the two, as both risk premiums and interest-rate expectations vary over time.

AVERAGE GERMAN AND US GOVERNMENT YIELD CURVE

Chart 2



Source: Reuters EcoWin.

In order to assess the return on a bond, it is necessary to apply the total return. This is composed of coupon payments and capital gains or losses due, for instance, to changes in the general level of interest rates.

The price of a long-term bond is more sensitive to shifts in the level of interest rates than the price of a short-term bond, cf. Box 1. Therefore, long-term bonds are associated with a higher risk. This risk can be expressed as the volatility of the return.

During the period 1975–2010, total returns in Germany and the USA have been rising in step with volatility, cf. Chart 4. Thus, increasing the interest-rate risk has resulted in excess returns. The excess return can be viewed as a measure of the realised risk premium, meaning the extra return that the investor has obtained for buying long-term bonds. The excess return has been rising with the interest-rate risk, but the increase has decelerated. Thus, the relative gain from increasing the interest-rate risk is highest at the short end.

Excess returns have varied widely since 1975. The period can roughly be divided into two parts. In *the first period*, 1975-85 in the USA and 1975-95 in Germany, assuming interest-rate risk resulted in no or little gain, cf. Chart 5. In *the second period*, from 1985 in the USA and 1995 in Germany until today, there was a gain. However, there are substantial variations even within these two periods.

The excess returns seen over the past 15-25 years have been unusual by historical standards. Viewed over even longer horizons, the excess re-

RETURN AND RISK ASSOCIATED WITH BUYING LONG-TERM BONDS

Box 1

The total return on a bond depends on the coupon rate and changes in the market price of the bond.

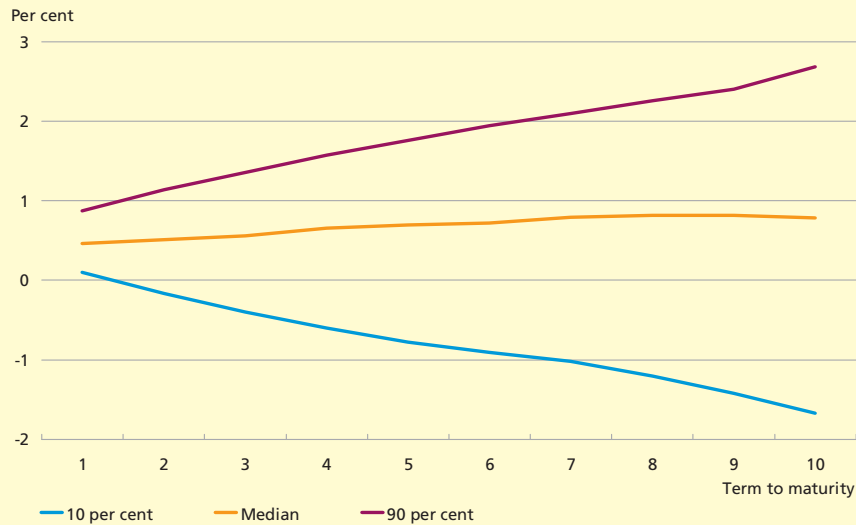
The *coupon rate* is the nominal interest rate of the bond. If the coupon rate does not equal the effective market rate, the price of the bond will not be at par. The price will approach par value as the time of maturity approaches. This type of value adjustment is called maturity reduction or mathematical price adjustment and is often considered part of the interest income.

The *price* of a bond is affected by yield changes. If yields rise, the price will fall and vice versa. The price sensitivity to yield changes is often measured by the *duration* of the bond. Duration expresses how much the price of the bond changes in percentage terms when yields change by 1 percentage point. The higher the duration, the greater the sensitivity to yield changes. Long-term bonds have a higher duration than short-term bonds.

The risk of a bond is not determined by sensitivity to yield changes alone, but also by the movements in yields. The risk can be measured as volatility in the bond return. Volatility expresses the size of the fluctuations to be expected in return over a given horizon. As a consequence of greater price sensitivity, long-term bonds are more volatile, cf. Chart 3, even though long yields are often more stable than short yields.

DISTRIBUTION OF MONTHLY TOTAL RETURN FOR GERMAN GOVERNMENT BONDS, 1975-2010

Chart 3



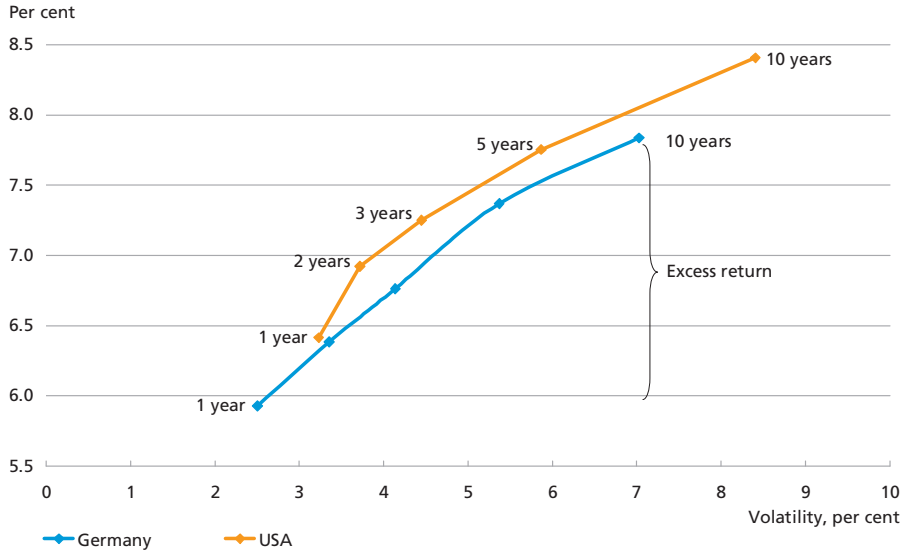
Source: Reuters EcoWin.

turn has been limited. Dimson et al. (2002) shows that in Germany, the excess return was negative during the first half of the 20th century, while it was only slightly positive in the USA.

Although the excess return has been positive on average in recent years, this will not necessarily be the case going forward. A large number

AVERAGE 12-MONTH TOTAL RETURN AND VOLATILITY OF GOVERNMENT BONDS, 1975-2010

Chart 4

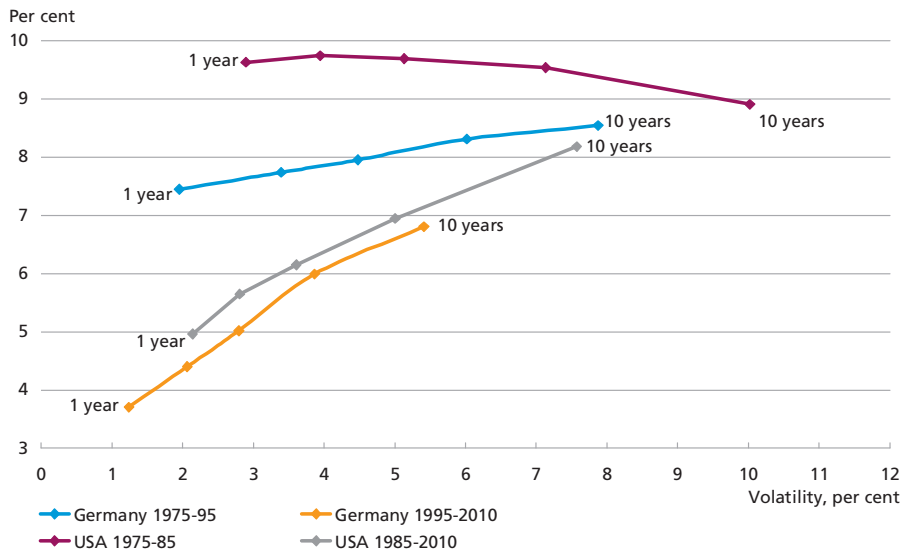


Note: Volatility is calculated as the standard deviation of the annual total returns and expresses the size of the fluctuations to be expected in the return on a 1-year horizon. Total return in the USA from September 2005 is approximated using the method described in Babcock (1984).

Source: Reuters EcoWin and Global Financial Data.

AVERAGE 12-MONTH TOTAL RETURN AND VOLATILITY OF GOVERNMENT BONDS IN SUB-PERIODS SINCE 1975

Chart 5



Note: Volatility is calculated as the standard deviation of the annual total returns and expresses the size of the fluctuations to be expected in the return on a 1-year horizon. Total return in the USA from September 2005 is approximated using the method described in Babcock (1984).

Source: Reuters EcoWin and Global Financial Data.

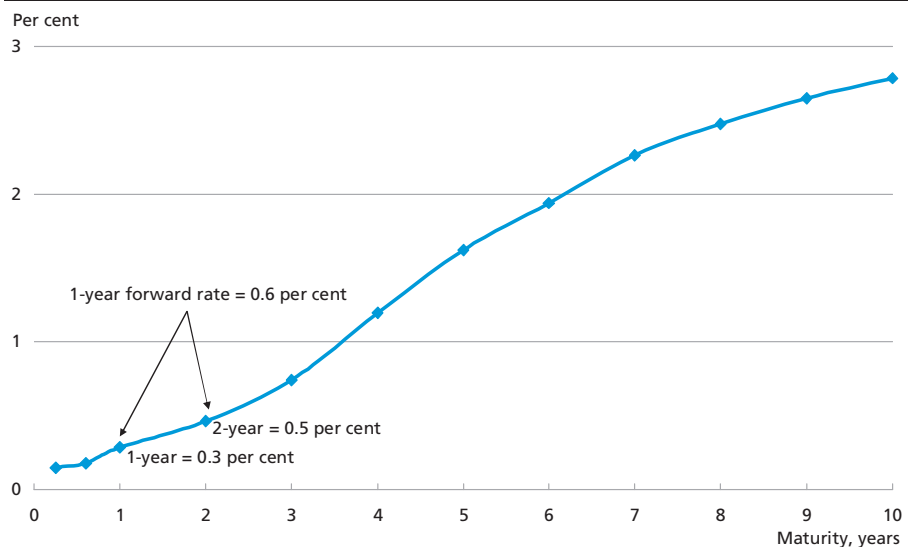
of factors can affect interest rates and lead to significant fluctuations, including changes in monetary policy, inflation and growth. The periodic variations in excess returns mean that it is crucial to compare own interest-rate expectations with the current yield curve.

THE CURRENT YIELD CURVE AND EXCESS RETURNS

Currently, 1- and 2-year yields in Germany (as at 26 May 2010) stand at 0.3 per cent and 0.5 per cent, respectively, cf. Chart 6. By investing in a 2-year bond rather than a 1-year bond, the investor can thus obtain an excess yield of 0.2 per cent in the first year. The excess yield in the second year remains uncertain, though – unless the 1-year yield one year ahead is locked in today. This corresponds to investing in a 2-year bond providing the same security. Without risk aversion, capital market equilibrium requires that the expected return on 1-year and 2-year bonds is the same. The expected return will be the same if the yield on the 1-year bond is expected to have risen by 0.3 percentage point to 0.6 per cent in a year, cf. Chart 6. For the investor, such an increase in yields would result in a price loss on the 2-year bond of 0.2 per cent in the first year, and thus a total return of 0.3 per cent, corresponding to the return on a 1-year bond, cf. Box 2.

The 1-year yield one year ahead observed today is called the *forward rate*. The forward rate indicates the future development in interest rates

YIELD CURVE IN GERMANY, 26 MAY 2010 Chart 6



Source: Bloomberg.

DECOMPOSITION OF THE RETURN INTO YIELD AND VALUE ADJUSTMENTS IF THE FORWARD RATE IS REALISED

Box 2

The rates equalling the return on two bond investments are called forward rates. Forward rates are defined on the basis of an equilibrium argument: an investment in a 2-year bond must offer the same expected return as an investment in for instance a 1-year bond and subsequently a new 1-year bond in a year:

$$(1) \quad (1+r_2)^2 = (1+r_1)*(1+fr_{1,1}), \text{ where}$$

r_2 is the yield on a 2-year bond¹,
 r_1 is the yield on a 1-year bond
 $fr_{1,1}$ is the 1-year forward rate one year ahead

The German 2-year government bond yield was 0.5 per cent on 26 May 2010, cf. Chart 6, while the 1-year government bond yield was 0.3 per cent. (1) gives:

$$(1+0.5/100)^2=(1+0.3/100)*(1+fr_{1,1}/100) \Rightarrow fr_{1,1}= 0.6 \text{ per cent}$$

The 1-year forward rate one year ahead must therefore be 0.6 per cent to equalise the return on the two bond investments.

If the forward rate is realised, there will be a capital loss on the 2-year bond in one year as a consequence of the yield increase, cf. Table 1. In two years, this capital loss will be offset by a corresponding capital gain. The total excess return from assuming interest-rate risk is zero, if the forward rate is realised.

EXAMPLE OF INVESTMENT OF KR. 100 WHEN THE FORWARD RATE IS REALISED

Table 1

Kr.	1-year bond	2-year bond
<i>After the first year</i>		
Yield	0.3	0.5
Value adjustment	0.0	-0.2
Return	0.3	0.3
<i>Gain on interest-rate risk</i>		<i>0.0</i>
<i>After the second year</i>		
Yield	0.6	0.5
Value adjustment	0.0	0.2
Return	0.6	0.6
<i>Gain on interest-rate risk</i>		<i>0.0</i>

Note: The interest payment after year 1 is assumed to be invested at the 1-year yield one year ahead. Rounded figures.

¹ The zero-coupon yield is applied. This is the yield on a bond with only one payment due at maturity.

which results in the capital loss on a long-term bond – in this example a 2-year bond – precisely offsetting the excess return relative to a 1-year bond. More generally, forward rates are equilibrium rates, ensuring the same return on all maturities. Forward rates can be deduced on the basis of the current yield curve. The presence of a risk premium means that

one should be cautious to use them as an exact expression of the market's interest-rate expectations.

An interest-rate increase that exceeds the forward rate results in a loss – and vice versa

Forward rates play a central role for an investor who is considering investing in a longer-term bond. If the investor in the example outlined above finds that forward rates are high relative his own interest-rate expectations, there will be an *expected* gain from buying a 2-year bond today. This reflects an expectation that the actual 1-year yield in one year is lower than the forward rate.

Such an investment can be viewed as a deliberate bet on the future development in interest rates. By buying a 2-year bond, the investor locks in the 1-year yield one year ahead at 0.6 per cent. If the realised 1-year yield in one year is lower, the investor will gain. If it is higher, the investor will suffer a loss.

The expected gain from the bet should be weighed against the increased risk associated with long-term bonds. In this case, the risk is that the 1-year yield one year ahead will have risen to more than 0.6 per cent.

WHY DO EXCESS RETURNS VARY?

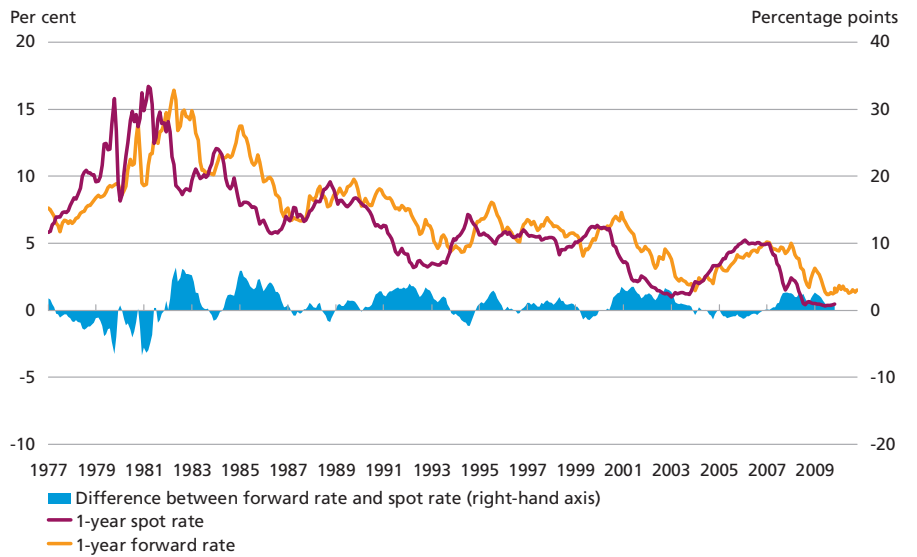
The historical fluctuations in excess returns in Chart 5 can be examined more closely by looking at the variation in the relationship between forward rates and realised rates. For most of the period, realised rates have been lower than forward rates, cf. Chart 7. In continuation of the above example, investments in 2-year bonds have therefore during long periods yielded a higher return than 1-year bonds.

It is expected that realised rates will deviate from forward rates.

Due to the risk premium, a *positive* difference is expected, on average, between the forward rate and the realised spot rate. This reflects the compensation required by the investor for assuming the risk associated with long-term bonds. This is supported by the observations in Chart 7. However, it is difficult to calculate the precise risk premium, as it seems to vary over time. The variations have in some periods accounted for a large share of the aggregate fluctuations in yields, cf. Cook and Hahn (1990). The periods during which the difference is negative can probably not be explained by the changes in the risk premium. Here investors' interest-rate expectations matter.

In Chart 7, interest-rate expectations are based on the information available to the market one year before the realised rate was observed. During the year, new information about for instance macroeconomic data and

1-YEAR FORWARD RATE AND SPOT RATE ONE YEAR LATER IN THE USA Chart 7



Note: The relationship between the 1-year forward rate and the realised spot rate one year later determines when buying a 2-year bond rather than a 1-year bond offers a gain. When the forward rate is higher than the spot rate, buying a 2-year bond is profitable.

Source: Reuters EcoWin.

changes in the risk premium is incorporated. For this reason, too, realised rates are expected to deviate from forward rates. Economic developments, monetary policy, external shocks to the economy, credit risk, liquidity etc. are all factors that have contributed to the deviations between realised rates and forward rates in recent years. These factors are very difficult to predict and take into account in interest-rate expectations.

However, the difference shows a certain pattern. In periods with falling interest rates, the forward rate appears to be higher than the realised rate. In these periods, the interest-rate risk will often result in a gain. Conversely, the forward rate is typically lower than the realised rate in periods when interest rates are rising. The systematic deviations may in part be due to sluggishness in investors' interest-rate expectations.

Sluggishness in interest-rate expectations

Due to sluggishness, long-term rates do not adjust sufficiently quickly to changes in short-term rates, cf. Froot (1989). This can for instance be illustrated by many investors not having expected the massive and prolonged declines in short-term government yields as a consequence of the crisis in the US subprime mortgage market. At the end of the day, the crisis had serious spill-over effects on all financial markets and led to historically accommodative monetary policies. This underlines that it is difficult to predict monetary-policy interest rates, especially over a

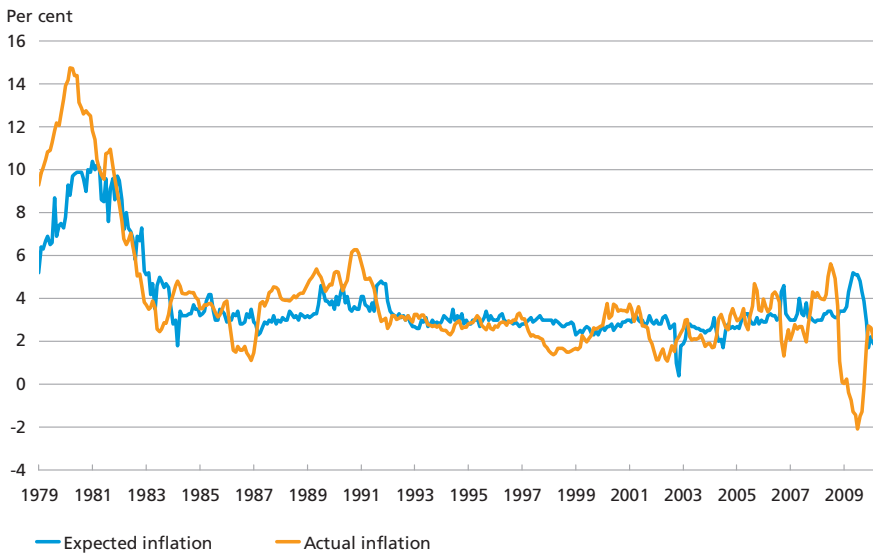
longer-term horizon. The market is typically not able to predict changes beyond a few months, cf. Gürkaynak et al. (2006).

Predictability has probably increased since the mid-1990s in step with the Federal Reserve, for instance, having become more transparent. This means that the market is better prepared to predict changes in monetary-policy interest rates, cf. Poole et al. (2002). This is expected to reduce deviations between forward rates and realised rates and could explain why deviations since the mid-1990s seem to have diminished somewhat, cf. Chart 7. The low level of interest rates is probably also a contributory factor.

Monetary policy also affects investors' inflation expectations. A change in inflation expectations results in an adjustment in the required nominal rate to maintain the real value. At times, it has been difficult to predict inflation. During and after the oil crisis in the late 1970s and the early 1980s, investors underestimated actual inflation, cf. Chart 8. During that period, interest-rate risk led to losses. In the following years, there was a tendency towards excess returns during the periods when inflation was lower than expected, and losses in periods with unexpectedly high inflation. The difference between expected and actual inflation was considerable again in 2008-09 in continuation of the crisis in the financial markets with an unexpectedly sharp drop in inflation. During these years, interest-rate risk resulted in excess returns.

EXPECTED AND REALISED INFLATION IN THE USA

Chart 8



Note: Expected inflation is based on the University of Michigan Inflation Expectation measure.

Source: Reuters EcoWin and Federal Reserve Bank of St. Louis.

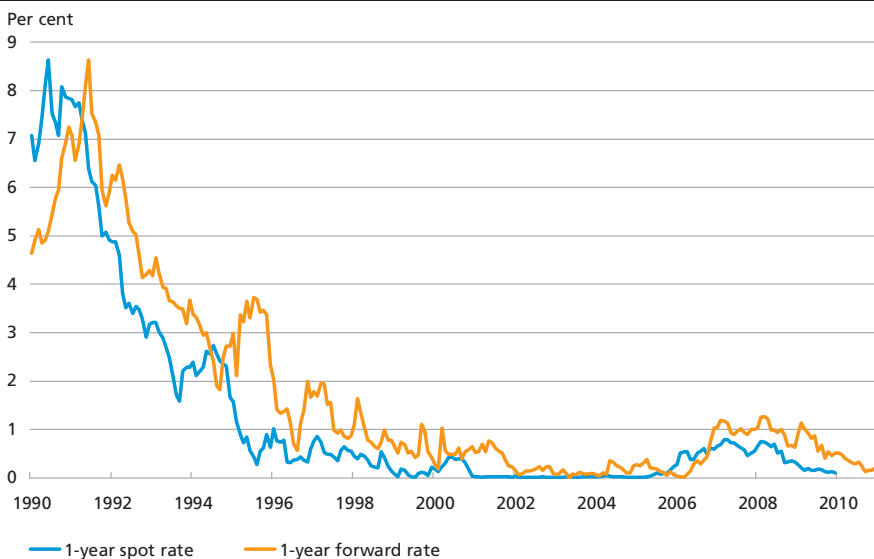
CONCLUDING REMARKS

Interest rates will rise – when and by how much remains uncertain. This could cause long-term bonds to yield a lower return than short-term bonds for a period. Developments in Japan show that it can be difficult to predict when and by how much interest rates will rise. In the past 15 years, assuming interest-rate risk has almost continuously resulted in an excess return in Japan, as forward rates have generally been higher than spot rates, cf. Chart 9.

Monetary policy is currently very accommodative amid low interest rates across most of the world. Bond purchases by central banks, historically low monetary-policy interest rates and extraordinary liquidity supply have had a strong impact on both the level of interest rates and the slope of the yield curve. Once monetary policy is normalised, the pace and pattern of adjustment in the level of interest rates and the slope of the yield curve may change unexpectedly, but the effect remains uncertain, cf. Kohn (2010). If the level of interest rates or the slope of the yield curve increases more than expected by the market, this could lead to price losses that may force investors to assume less interest-rate risk and close down positions. There is therefore a risk that interest-rate increases will be self-reinforcing, cf. BIS (2010). In such a situation, it is less important to the individual investor that there will be a gain on average over a long period, if the investor is not capable of absorbing potential losses on long-term bonds.

1-YEAR FORWARD RATE AND SPOT RATE ONE YEAR LATER IN JAPAN

Chart 9



Source: Bloomberg.

LITERATURE

Andersen, Allan Bødskov and Jacob Lage Hansen (2006), Risk and Return in the bond markets – past developments and future prospects, *Danmarks Nationalbank Working Papers*, No. 40.

Babcock, Guilford C. (1984), Duration as a Link Between Yield and Value: A summary, *The Journal of Portfolio Management*, Vol. 11, No. 1.

Berndsen, Jan (2003), Does Duration Extension Enhance Excess Returns?, *Danmarks Nationalbank Working Papers*, No. 10.

BIS (2010), International banking and financial market developments, Bank for International Settlements, *BIS Quarterly Review*, March.

Cook, Timothy and Thomas Hahn (1990), Interest Rate Expectations and the Slope of the Money Market Yield Curve, Federal Reserve Bank of Richmond, *Economic Review*, September/October.

Dimson, Elroy, Paul Marsh and Mike Staunton (2002), Triumph of the optimists – 101 Years of Global Investment Returns, Princeton University Press.

Froot, Kenneth A. (1989), New Hope for the Expectations Hypothesis of the Term Structure of Interest Rates, *The Journal of Finance*, Vol. XLIV, No. 2.

Gürkaynak, Refet S., Brian Sack and Eric Swanson (2006), Market-Based Measures of Monetary Policy Expectations, Federal Reserve Bank of San Francisco, *Working Paper*, No. 4.

Ilmanen, Antti (1995), Time-Varying Expected Returns in International Bond Markets, *The Journal of Finance*, Vol. L, No. 2.

Kohn, Donald L. (2010), Focusing on Bank Interest Rate Risk Exposure, speech at the Federal Deposit Insurance Corporations' Symposium on Interest Rate Risk Management, January 2010.

Poole, William, Robert H. Rasche and Daniel L. Thornton (2002), Market Anticipations of Monetary Policy Actions, Federal Reserve Bank of St. Louis, *Review*, July/August.

Pledging of Collateral to Danmarks Nationalbank

Astrid Henneberg Poffet, Payment Systems

INTRODUCTION AND SUMMARY

In the wake of the financial crisis attention has increasingly turned to the collateral framework for credit granted by central banks. This is because the demand for loans from central banks increases when the money markets are not functioning. Assets that are eligible as collateral for loans from central banks become more attractive and are traded at higher prices. This eligibility premium typically increases in periods of financial turbulence.

The increased focus on central banks' collateral frameworks entails a need to communicate Danmarks Nationalbank's underlying considerations when determining which assets monetary-policy counterparties may pledge as collateral for credit, i.e. the collateral basis.

Danmarks Nationalbank's collateral basis is large but comprises few asset types, given the large market for mortgage-credit bonds and covered bonds (SDOs), where the underlying legislation ensures a high credit quality.

This article explains why central banks require collateral in return for credit facilities, as well as the considerations and country-specific circumstances to be taken into account when determining the collateral basis. This is followed by an overview of Danmarks Nationalbank's rules for asset eligibility and the temporary credit facilities introduced during the financial crisis.

BACKGROUND TO PLEDGING OF COLLATERAL

It is common practice for central banks to require collateral when granting credit facilities to monetary-policy counterparties.¹ The primary reason is that the central bank wants to avoid credit losses. When collateral is pledged, two defaults must occur before the central bank incurs a credit loss, since both the counterparty and the issuer of the assets

¹ See e.g. Chailloux, Gray and McCaughring (2008) and ECB (2007).

pledged as collateral must default on their payment obligations.¹ By requiring collateral, the central bank also avoids having to assess the creditworthiness of its counterparties and lay down individual terms and conditions for credit. Differentiated terms and conditions for credit facilities would be a burden to administer, and changes in the central bank's credit assessments might send unintended signals to the markets. A uniform interest rate is also essential for effective implementation of monetary policy.

Considerations when determining the collateral basis

When determining the assets that are eligible as collateral for credit to monetary-policy counterparties, central banks basically have the option of a narrow or a wide collateral basis. A collateral basis mainly comprising domestic government securities and debt instruments issued by the central bank is said to be narrow. The central bank may widen the collateral basis by including other types of assets. The overall considerations traditionally taken into account when central banks determine the size and composition of the collateral basis are outlined in Box 1.²

Danmarks Nationalbank's primary concern when laying down the rules for pledging of collateral is to keep the krone stable vis-à-vis the euro. Prior to 1999, limiting the size of the collateral basis was deemed to be a stabilising factor in relation to the fixed-exchange-rate policy. With the introduction of the current-account limits in 1999, i.e. a ceiling on the counterparties' total current-account deposits at the close of the day, a quantitative limit was set to the monetary-policy counterparties' opportunities to accumulate current-account liquidity for speculation against the krone.³ Since then, limiting the collateral basis with the fixed-exchange-rate policy in mind has not been part of Danmarks Nationalbank's collateral framework for its credit facilities.

Moreover, Danmarks Nationalbank has traditionally taken access to sufficient amounts of eligible assets, risk mitigation, transparency and operational considerations into account when changing its collateral framework for credit facilities. In periods of financial turmoil, financial stability is also taken into consideration. Major changes to Danmarks Nationalbank's rules for asset eligibility since 1992 are listed in Box 2.

¹ See Andersen and Gürtler (2003) for a legal perspective on pledging of collateral to Danmarks Nationalbank.

² See e.g. Federal Reserve System (2002) as regards the Federal Reserve, ECB (2007) for the Eurosystem, Bank of England (2008) and Bakke, Sandal and Solberg (2008) for Norges Bank.

³ See Danmarks Nationalbank (1999) and Danmarks Nationalbank (2009a).

CONSIDERATIONS WHEN DEFINING THE COLLATERAL BASIS

Box 1

Considerations when central banks define their collateral bases typically include some of the following:

- *Sufficient amount of eligible assets*: supporting effective implementation of monetary policy and smooth settlement of payments by ensuring sufficient and relevant assets eligible as collateral.
- *Risk mitigation*: minimising the risk that the central bank will incur credit losses.
- *Operational efficiency*: minimising the operational risks and costs of handling the collateral for the monetary-policy counterparties and the central bank.
- *Transparency*: ensuring a transparent and simple collateral framework.
- *Financial markets*: preventing distortion of relative asset prices and market participants' behaviour.
- *Financial stability*: contributing to the stability of the financial system.
- *Equality*: equal treatment of e.g. issuers and counterparties (level playing field).

Source: Chailloux, Gray and McCaughrin (2008) and ECB (2007).

Defining the collateral basis

Due to country-specific circumstances, the same overall considerations often lead to different definitions of the collateral basis.

The size of the capital markets plays a role, including the outstanding volume of government securities. A large bond market, such as the Danish market for mortgage-credit bonds and SDOs, supports a narrow collateral basis. In some euro area member states, residential mortgages and borrowing by the corporate sector are mainly financed by bank loans rather than bond issuance, which is why the Eurosystem accepts credit claims as collateral.¹ Norway issues only few government securities and the bond market is small, which contributes to explaining why Norges Bank operates with a wide collateral basis.²

Payment patterns also affect the need for collateral. In Denmark, there is a relatively large liquidity requirement in payment systems on days when mortgages are paid or days with large central-government receipts of e.g. taxes. In Norway, the liquidity requirements of the counterparties increase on days when the special oil tax to the government falls due.

Furthermore, the payments infrastructure affects the need for collateral since e.g. participation in net settlement systems reduces the participants' current liquidity requirements³, but also requires liquidity to be available at certain times, which increases the need for intraday liquidity. An example is the multi-currency foreign-exchange clearing and settlement system CLS, which was the background to the establishment of

¹ ECB (2007) and Cheun, von Köppen-Mertes and Weller (2009).

² Bakke, Sandal and Solberg (2008).

³ See Danmarks Nationalbank (2005) for a description of the netting effect in payment and settlement systems.

MAJOR CHANGES TO DANMARKS NATIONALBANK'S RULES FOR ASSET ELIGIBILITY		Box 2
1989:	Danmarks Nationalbank requires pledging of collateral for interday credit.	
1992:	Danmarks Nationalbank's monetary-policy instruments are adjusted and credit is granted against T-bills and, to a limited extent, other Danish government securities as collateral.	
1993:	The limitation on other Danish government securities is abolished.	
1995-98:	Transition from uncollateralised to collateralised intraday credit.	
1998:	The automatic collateralisation arrangement, which represents a flexible approach to pledging of collateral for intraday credit in Danish kroner, is introduced for securities trading.	
1999:	The collateral basis is expanded to include mortgage-credit bonds. The procedures for pledging of collateral are adjusted from repos to collateralised lending, and a common collateral pool is introduced for all types of credit from Danmarks Nationalbank.	
2002:	The automatic collateralisation arrangement is expanded to include settlement of retail payments in the Sumclearing and settlement of FX transactions in the international clearing and settlement system CLS Bank International, CLS.	
2003:	Scandinavian Cash Pool, an automated system for pledging of cross-border collateral, is introduced for intraday credit in Danish kroner.	
2004:	The collateral basis is expanded to include euro-denominated bonds.	
2004:	Adjustment of risk-management instruments: liquidity categories are introduced, haircuts adjusted and initial margin requirements abolished.	
2007:	The collateral basis is expanded to include SDOs.	
2008:	Rating requirements are introduced for intraday credit in euro.	
2008-09:	Temporary expansion of the collateral basis, cf. Box 6.	
2010:	The collateral basis is expanded to include junior covered bonds.	

Note: See Danmarks Nationalbank (2005) for an elaboration on the automatic collateralisation arrangement, the Sumclearing, CLS and Scandinavian Cash Pool.

Scandinavian Cash Pool, an automated system for pledging of cross-border collateral for intraday credit in Danish and Norwegian kroner and Swedish kronor.¹

A group of counterparties with a fairly homogeneous composition of assets enables a narrowly defined collateral basis. That is the case for the Federal Reserve, whose counterparties are limited to a small group of primary dealers. Conversely, if the group of counterparties has a more heterogeneous composition of assets on their balance sheets, the collateral basis must not be too narrow. That is the case with the Eurosystem, which was made up of fragmented financial markets with a more diverse composition of assets on the balance sheets of the financial institutions. This entailed a need for a wide collateral basis in order to ensure

¹ Danmarks Nationalbank (2005).

COLLATERAL BASES								Table 1
	ECB	Federal Reserve (OMO) ¹	Federal Reserve (SF) ¹	Bank of England Standard ²	Bank of England Wider ²	Sveriges Riksbank ³	Norges Bank	Danmarks Nationalbank
Government securities, etc. ⁴	X	X	X	X	X	X	X	X
Covered bonds ⁵	X		X		X	X	X	X
Bank bonds	X		X		X	X	X	
Corporate bonds	X		X		X	X	X	
Asset-backed securities	X	X	X		X	X	X	
Bank loans	X		X					
Foreign bonds	X		X	X	X	X	X	
Bonds from multilateral institutions	X		X	X	X	X	X	
Other currencies (number)	0	0	8	1	7	6	9	1

Source: ECB (2008a), Sveriges Riksbank (2009) and central-bank websites.

¹ Federal Reserve: OMO = open market operations. SF = standing lending facility (Discount Window). Asset-backed securities (ABS) for open market operations include mortgage-backed securities guaranteed by federal agencies (Freddie Mac, Fannie Mae, Ginnie Mae).

² Bank of England: The standard collateral basis applies to open market operations, intraday credit and an operational standing lending facility. The wider collateral basis applies to extended-collateral long-term repos and a Discount Window Facility under which government securities are lent.

³ Sveriges Riksbank: for open market operations, the collateral basis comprises securities denominated in Swedish kronor only.

⁴ Also includes government-guaranteed securities and securities issued by regional and local authorities.

⁵ See Andersen and Johansen (2009) and ECB (2008b) for further information on covered bonds.

that counterparties throughout the euro area held or could be expected to hold eligible assets on their balance sheets.¹ The collateral bases of the ECB, the Federal Reserve, the Bank of England, Sveriges Riksbank, Norges Bank and Danmarks Nationalbank is listed in Table 1.

Collateral basis and risk management

In terms of risk mitigation, a narrow collateral basis solely comprising domestic government securities and debt instruments issued by the central bank would be preferable, as this minimises the risk of losses. As it is necessary to ensure a sufficient amount of eligible assets, however, this would often result in a collateral basis that is too small to ensure effective implementation of monetary policy and smooth settlement of payments. Typically, a wider collateral basis is therefore required. As the central bank widens the collateral basis, assets with relatively greater credit, market and liquidity risk become eligible, and – in the case of assets denominated in foreign currency – assets entailing exchange-rate risk. A wide range of instruments can be used to manage the central bank's risk in relation to collateralised credit facilities, cf. Box 3.

¹ ECB (2007) og Cheun, von Köppen-Mertes og Weller (2009).

COLLATERAL RISK MANAGEMENT

Box 3

- *Credit risk*, i.e. the risk that the counterparty defaults on its payment obligation, can be managed by means of an institutional and legislative limitation of eligible assets or by operating with rating requirements.
- *Liquidity risk*, i.e. the risk of a negative impact on the market value of an asset when it is realised, can be managed by means of valuation haircuts, i.e. percentage deductions in the collateral value; initial margins, i.e. requirements of excess cover when calculating the collateral value; requirements of regular quotation of bid and ask prices by market makers; and possibly minimum requirements as to outstanding volume.
- *Market risk*, i.e. the risk that the market value of the assets falls from the time of the most recent calculation of its collateral value to the time when it is realised, can be managed by means of daily market valuation, i.e. the most recent price quoted (mark-to-market), and theoretical pricing, i.e. a theoretical price if an asset has not been traded for some days; valuation haircuts; and use of a variation margin, i.e. a requirement of additional collateral if the collateral value falls below a certain level.
- *Exchange-rate risk* in connection with credit against assets denominated in foreign currency as collateral can be managed by means of exchange-rate haircuts.
- *Concentration risk* can be managed by setting limits to each counterparty's loans in terms of e.g. series, issuer, asset type, sector, etc.

Note: See e.g. Chailloux, Gray and McCaughrin (2008), Federal Reserve System (2002) and Bindseil and Papadia (2006) for a discussion of risk management and pledging of collateral, and Danmarks Nationalbank (2003) for a description of rating requirements.

When laying down its collateral framework, a central bank must bear in mind that counterparties naturally pledge the least liquid assets with the lowest credit quality among the eligible assets as collateral, reserving the most liquid assets with the highest credit quality for money-market loans. This is known as "Gresham's law of collateral".¹

DANMARKS NATIONALBANK'S RULES FOR ASSET ELIGIBILITY

Danmarks Nationalbank extends three types of credit to its monetary-policy counterparties (banks and mortgage-credit institutes): monetary-policy loans in kroner, intraday credit in kroner and euro, and loans for decentralised banknote holdings.

In the regular weekly open market operations, the monetary-policy counterparties have access to 7-day monetary-policy loans and may deposit liquidity at Danmarks Nationalbank for seven days by purchasing certificates of deposit.² Danmarks Nationalbank operates with an "open

¹ See Danmarks Nationalbank (2005) for Gresham's law and Chailloux, Gray and McCaughrin (2008) for Gresham's law of collateral.

² See Danmarks Nationalbank (2009a) for a description of the monetary-policy instruments.

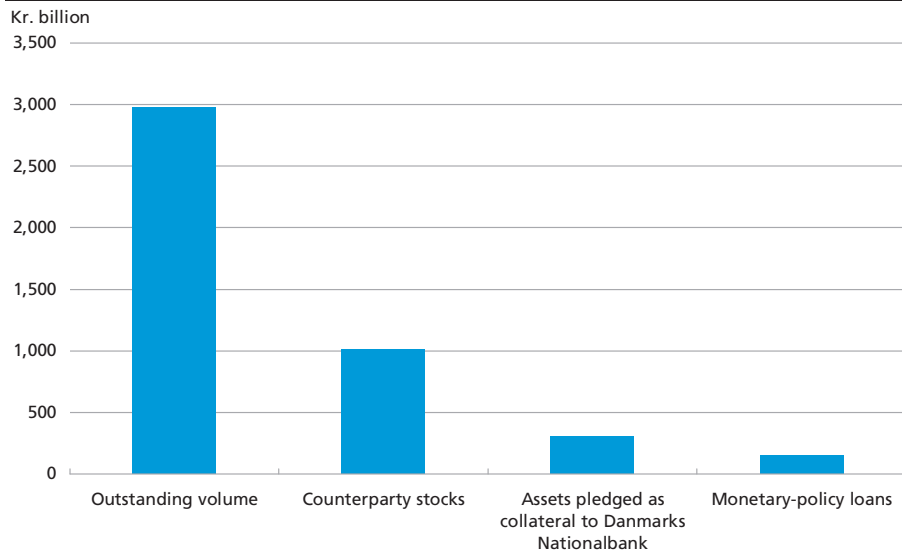
window", in which Danmarks Nationalbank determines the rate of interest on loans and deposits, after which the counterparties themselves – within the current-account limits – manage the size of their loans and deposits. Hence there is no quantitative limit to how much counterparties may borrow from Danmarks Nationalbank, provided that they are able to pledge eligible assets as required.

Danmarks Nationalbank's collateral basis predominantly comprises government securities, mortgage-credit bonds and SDOs, cf. Table 1. In spite of a relatively large number of monetary-policy counterparties, currently 112, Danmarks Nationalbank limits the collateral basis for credit in Danish kroner and euro to securities where underlying legislation ensures a high credit quality. Major reasons why Danmarks Nationalbank is able to operate with a narrow institutional and legislative definition of the collateral basis are the large market for mortgage-credit bonds and SDOs and familiarity with and confidence in the underlying legislation. Danmarks Nationalbank's collateral basis is described in Box 4.

From a requirements perspective, the collateral basis is deemed to be sufficient to cover the needs of the monetary-policy counterparties to pledge collateral vis-à-vis Danmarks Nationalbank. The counterparties' share of the total outstanding volume of eligible securities was 34 per cent in 2009. 30 per cent of these were pledged as collateral to Danmarks Nationalbank, cf. Chart 1. The counterparties mainly pledge mortgage-credit bonds and SDOs to Danmarks Nationalbank, cf. Chart 2.

COUNTERPARTIES' STOCKS AND USE OF ELIGIBLE ASSETS IN 2009

Chart 1

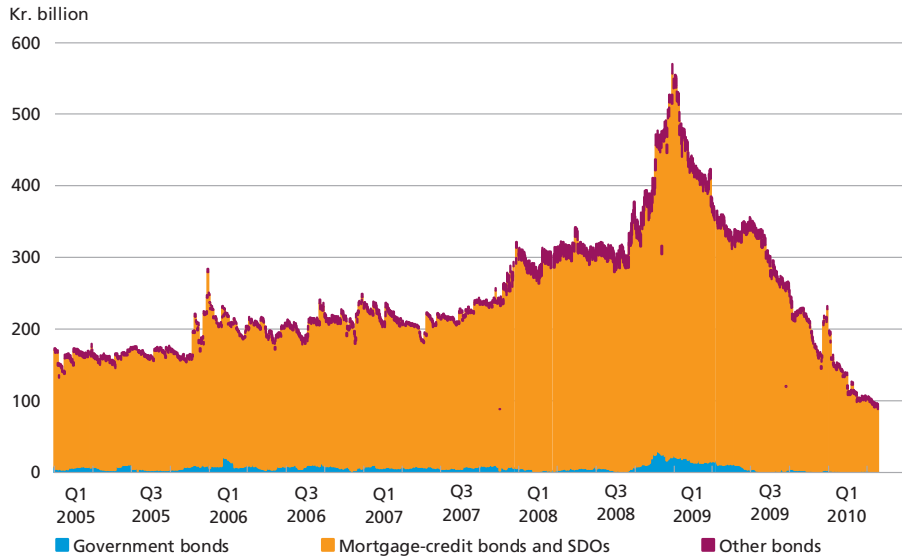


Note: Comprises government securities, mortgage-credit bonds and SDOs. Average at the end of all months in 2009.

Source: Danmarks Nationalbank.

PLEDGING OF ELIGIBLE ASSETS BY COUNTERPARTIES

Chart 2



Source: Danmarks Nationalbank.

Danmarks Nationalbank's risk management

Danmarks Nationalbank has an obligation to observe the ECB's guidelines for risk management in connection with intraday credit in euro and has chosen also to let these guidelines apply to credit in Danish kroner, except where special considerations require otherwise. The aim is to simplify the collateral framework, thus making it easier for foreign counterparties to understand, while complying with international standards.

The collateral value of a security pledged to Danmarks Nationalbank is found by taking its market value and subtracting a percentage, known as the valuation haircut, depending on the interest-rate sensitivity and liquidity of the security. Pledged securities are assigned to one of four liquidity categories, and the valuation haircut increases with the residual maturity, cf. Box 5. Floating-rate bonds are subject to the same valuation haircuts as securities with a residual maturity of up to 1 year. When securities denominated in euro are pledged as collateral for credit in kroner and vice versa, an exchange-rate haircut of 3 per cent is also deducted. The valuation haircuts and liquidity categories correspond to those applied by the ECB.¹

Daily market valuation of eligible assets is based on the preceding day's official price at OMX Nasdaq Copenhagen, including accrued interest. If a security has not been traded within the last five banking days,

¹ See ECB (2008a) and the ECB's website.

DANMARKS NATIONALBANK'S COLLATERAL BASIS

Box 4

Danmarks Nationalbank extends credit in kroner to its monetary-policy counterparties for monetary-policy loans, intraday credit and loans for decentralised banknote holdings against the following securities in kroner or euro as collateral:

- Securities issued by the Kingdom of Denmark.
- Debt securities guaranteed by the Kingdom of Denmark.
- Debt securities issued by KommuneKredit and Danish Ship Finance.
- Mortgage-credit bonds and covered bonds, SDOs, issued by institutes subject to the Danish Financial Business Act.
- Junior covered bonds issued pursuant to Section 33(e) of the Danish Mortgage-Credit Loans and Mortgage-Credit Bonds etc. Act or Section 152(b) of the Danish Financial Business Act.
- Debt securities issued by Føroya Landstýri, the Faroese government.

The securities must be traded at OMX Nasdaq Copenhagen and registered with VP Securities. In addition, junior covered bonds must comply with a rating requirement. The requirements concerning registration with VP Securities and trading at OMX Nasdaq Copenhagen reflect considerations such as minimising operational risk and administrative costs to Danmarks Nationalbank and its counterparties.

The counterparties also have access to intraday credit in euro. The collateral basis is the same as for credit in Danish kroner, except in the case of junior covered bonds and debt securities issued by the Faroese government. The securities must comply with a rating requirement laid down by the ECB. For mortgage-credit bonds, covered bonds and bonds issued by Danish Ship Finance, the rating requirement for intraday credit in euro applies only to bond series opened after 1 January 2008.

Furthermore, Danmarks Nationalbank's framework for credit operations stipulates that the securities may not be issued by the counterparty itself or by an entity with which the counterparty has close links. Mortgage-credit bonds and SDOs are exempt from this rule as they meet the UCITS 22(4) criteria, so that the investor has priority claim in respect of underlying payments from homeowners in the event that the issuer defaults on its payment obligations, cf. the UCITS Directive (Directive 88/220, amending Directive 85/611).

Certificates of deposit are included in the collateral basis when calculating the maximum access to intraday credit in kroner.

Source: Danmarks Nationalbank (2010).

a theoretical price is calculated. For securities denominated in euro, the collateral value in kroner is calculated on the basis of Danmarks Nationalbank's official exchange rate on the preceding day.

THE FINANCIAL CRISIS AND PLEDGING OF COLLATERAL

The financial crisis has increased focus on the central banks' collateral frameworks. The collateral premium for assets that are eligible as collateral vis-à-vis central banks has increased considerably, and central-bank

VALUATION HAIRCUTS

Box 5

Valuation haircuts are combined with daily market valuation in order to ensure that an asset pledged as collateral can be realised at a value that, as a minimum, matches the loan amount in the event of a counterparty's default on its payment obligation. Therefore valuation haircuts do not serve to minimise credit risk, but to minimise liquidity and market risk.

Valuation haircuts are asset-specific and depend on the liquidity and interest-rate sensitivity of the individual securities. Liquidity is usually measured on the basis of asset type, issuer and outstanding volume and determines the liquidity category in which an asset is placed. Interest-rate sensitivity is based on coupon type and residual maturity.

HAIRCUTS FOR VP-REGISTERED ASSETS WITH FIXED COUPON RATES

Table 2

Residual maturity	Category 1	Category 2	Category 3	Category 4
0-1 year	0.5	1.0	1.5	6.5
1-3 years	1.5	2.5	3.0	8.0
3-5 years	2.5	3.5	4.5	9.5
5-7 years	3.0	4.5	5.5	10.5
7-10 years	4.0	5.5	6.5	11.5
> 10 years	5.5	7.5	9.0	14.0

Note: Per cent of market value. For eligible securities with a zero coupon rate, floating coupon rate or inverse floating rate, the haircuts are listed in ECB (2008a). The valuation haircuts of the securities are the same, irrespective of whether the assets are pledged as collateral for credit in kroner or euro.

Source: ECB (2008a) and www.nationalbanken.dk.

eligibility has become an important factor when issuing new securities. This is emphasised by the increasing tendency for issuers to "tailor" their issues to the central banks' collateral frameworks.

In periods with financial turmoil and high collateral premiums, a narrower collateral basis at Danmarks Nationalbank than at the Eurosystem could put krone-denominated issues at a disadvantage relative to euro-denominated issues, which could impede the functioning of the Danish financial markets. Moreover, it could trigger a shift from krone loans to euro loans among Danish banks.

The financial crisis has put even more spotlight on financial stability. During the crisis, central banks worldwide introduced a number of temporary credit measures to ease the tight liquidity situation. Like other central banks, Danmarks Nationalbank temporarily expanded its credit facilities, cf. Box 6.

Danmarks Nationalbank receives many enquiries about amendments to its rules for asset eligibility, notably about the expansion of the collateral basis to include new types of securities. Danmarks Nationalbank regularly assesses the collateral basis in relation to market conditions

TEMPORARY CREDIT FACILITIES AT DANMARKS NATIONALBANK

Box 6

During the financial crisis Danmarks Nationalbank temporarily extended the credit facilities available to monetary-policy counterparties. The collateral basis was extended to include:

- Loan bills.
- Quoted and unquoted shares.
- Quoted investment fund shares.
- Quoted and unquoted junior covered bonds with individual government guarantees, cf. the Act to Amend the Financial Stability Act, and quoted junior covered bonds without a government guarantee.
- Quoted and unquoted unsecured debt issued by banks and mortgage-credit institutes with a general government guarantee, cf. the Financial Stability Act, or with individual government guarantees, cf. the Act to Amend the Financial Stability Act.
- SPV bonds (Special Purpose Vehicle) issued on the basis of loans with individual government guarantees to banks and mortgage-credit institutes, cf. the Act to Amend the Financial Stability Act.

Danmarks Nationalbank also introduced a new temporary credit facility giving banks and mortgage-credit institutes access to borrow on the basis of their excess capital adequacy, calculated as the difference between their base capital and their capital need.

The temporary credit facilities expire on 26 February 2011, except for the extension of the collateral basis to include securities comprised by individual government guarantees: unsecured debt issued by banks and mortgage-credit institutes, junior covered bonds and SPV bonds, which will apply until 30 December 2013.

Source: See Danmarks Nationalbank (2009b) and www.nationalbanken.dk under Rules/Temporary credit facilities for a further description of the temporary credit facilities.

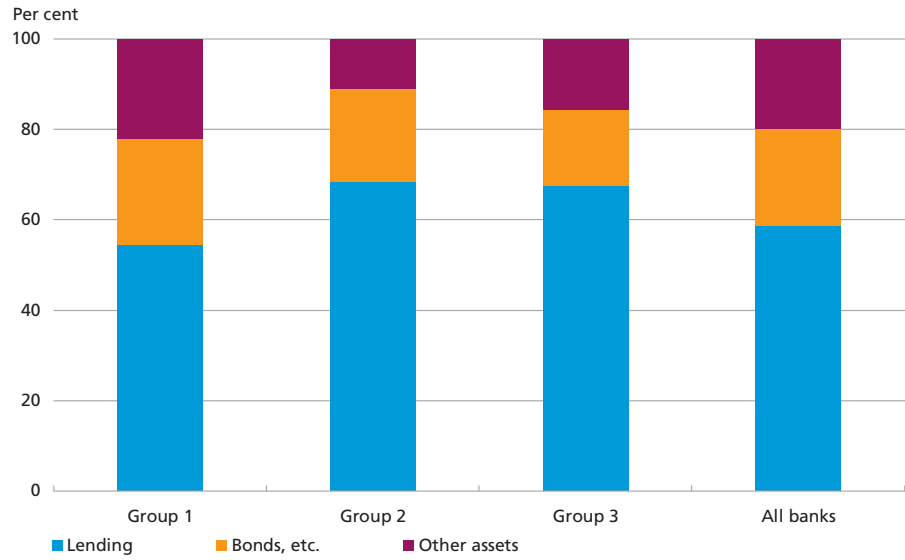
and makes the necessary adjustments. A case in point was the inclusion of junior covered bonds in February 2010, cf. Box 2.

If the need for temporary adjustments in connection with future turmoil in the financial markets is to be reduced, this can be achieved by expanding the collateral basis – provided that the new assets included are assets held by the counterparties on their balance sheets.

As Chart 3 illustrates, lending is by far the largest item on the counterparty balance sheets. Other assets than lending and assets already eligible as collateral vis-à-vis Danmarks Nationalbank constitute only a small share of the balance sheets. From a legal and administrative point of view, loans are difficult to pledge as collateral. Under loan agreements, the banks have often made a commitment not to pledge their assets, but with a few exceptions such as standard pledging of collateral to the central bank. Moreover, rules may stipulate that a bank can dispose of its assets only as part of its normal operations, for example. Finally, if a loan is pledged as collateral, each individual debtor must be notified,

THE BANKS' ASSETS BROKEN DOWN BY ASSET CLASSES, MARCH 2010

Chart 3



Note: The Danish Financial Supervisory Authority's grouping of banks by working capital has been applied.
 Source: Danmarks Nationalbank.

which could be administratively cumbersome. During the financial crisis the possibility of accepting loans as collateral on a temporary basis was considered, but due to the above factors, among others, loans were not included in the temporary expansion of the collateral basis.

LITERATURE

Andersen, Carsten and Claus Johansen (2009), Danish Mortgage-Credit Bonds during the Financial Turmoil, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter.

Andersen, Niels C. and Kirsten Gürtler (2003), The Provision of Collateral to Danmarks Nationalbank in a Legal Perspective, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter.

Bakke, Bjørn, Knut Sandal and Ingrid Solberg (2008), Collateral for loans from Norges Bank – consequences of changes in the rules, Norges Bank, *Economic Bulletin*, No. 1.

Bank of England (2008), The development of the Bank of England's market operations. A consultative paper, *Bank of England*, October.

Bindseil, Ulrich and Francesco Papadia (2006), Credit risk mitigation in central bank operations and its effects on financial markets: the case of the Eurosystem, ECB, *Occasional paper series*, No. 49, August.

Chailloux, Alexandre, Simon Gray and Rebecca McCaughrin (2008), Central bank collateral frameworks: principles and policies, IMF, *Working Paper*, No. 222, September.

Cheun, Samuel, Isabel von Köppen-Mertes and Benedict Weller (2009), The collateral frameworks of the Eurosystem, the Federal Reserve System and the Bank of England and the financial market turmoil, ECB, *Occasional paper series*, No. 107, December.

Danmarks Nationalbank (1999), *Monetary Review*, 2nd Quarter.

Danmarks Nationalbank (2004), *Financial Management at Danmarks Nationalbank*, January.

Danmarks Nationalbank (2005), *Payment Systems in Denmark*, September.

Danmarks Nationalbank (2009a), *Monetary Policy in Denmark*, September.

Danmarks Nationalbank (2009b), *Financial stability 1st half*, June.

Danmarks Nationalbank (2010), Documentation for monetary-policy instruments and settlement of payments in DKK, EUR, SEK and ISK, February.

ECB (2007), The collateral frameworks of the Federal Reserve System, the Bank of Japan and the Eurosystem, *Monthly Bulletin*, October.

ECB (2008a), The implementation of monetary policy in the euro area: General Documentation on Eurosystem monetary policy instruments and procedures, November.

ECB (2008b), Covered bonds in the EU Financial System, December.

Federal Reserve System (2002), Alternative instruments for open market and discount window operations, December.

Federal Reserve System (2010), Credit and liquidity programs and the balance sheet, *Monthly Report*, February.

Sveriges Riksbank (2009), Terms and Conditions for RIX and monetary policy instruments. Annex H4. Collateral Instructions, September.

Non-Callable Loans for Cooperative Housing Societies

Ib Hansen and Hans Henrik Knudsen, Market Operations

INTRODUCTION AND SUMMARY

The Danish mortgage-credit model is based on flexibility and transparency. It has won worldwide acclaim for offering homeowners a simple, well-functioning financing system. In recent years, the range of products has been developed substantially and in some cases the consequences of the financing structures are not easy to understand. Therefore, the new products make increasing demands on lenders and borrowers.

Mortgage loans are largely granted with the option to repay the loan at par or at a price close to par. This protects the borrower against substantial price losses in the event of falling interest rates.

When interest rates decline, the price of a bond loan rises. Loans that cannot be redeemed at par – non-callable loans – can be highly price-sensitive to interest-rate declines. This means that it can be very burdensome to redeem long-term, non-callable loans, for instance when the homeowner sells his house. Therefore, these loans are not suitable for home financing.

Some, especially new, cooperative housing societies have taken out quite risky non-callable loans with rising interest payments. The structure of these loans makes it difficult to understand the financial consequences, such as potential price losses if interest rates decline and the impact of rising debt service payments. The reason is that the loans are typically designed as a combination of a loan and a financial agreement – an interest-rate swap. The complexity of the products therefore requires that both lenders and borrowers truly understand the risks associated with this type of loan.

HOMEOWNERS RISK BEING LOCKED IN BY NON-CALLABLE LOANS

The mortgage-credit system in Denmark is based on issuance of bonds against real property as collateral. A pivotal point is that the mortgage-credit institute does not assume risk as a consequence of fluctuations in interest rates, or when homeowners refinance their loans.

Non-callable loans impose a significant risk on the borrower

If the borrower wishes a standard fixed-rate mortgage loan, it is taken out in the form of a callable loan. The *call option* implies that the borrower is protected against a sharp rise in the outstanding debt beyond par if interest rates decline. The borrower's option to redeem the loan at par is offset by the mortgage-credit institute issuing bonds which can also be redeemed at par. If the borrower redeems the loan at par, the bond will be prepaid at par. This means that the bond investor must reinvest the funds at a lower interest rate. In other words, the *bond investor* is subject to a prepayment risk.

The bond investor must obviously be compensated for taking this risk, and this will be in the form of a higher interest rate. Callable loans thus bear a higher interest rate than non-callable loans with the same maturity. Or put differently, callable loans are more expensive than non-callable loans, but are associated with lower risk of large price rises.

Unlike *callable* bonds, *non-callable* bonds have no embedded call option. This means that the mortgage payments on the loan are lower, but the borrower is not protected against price rises above par.

Price rises are not necessarily of major significance if the loan is held to maturity. If the home is to be sold, however, it may pose a serious problem if the price of the loan has risen markedly. Then the borrower will have to *realise* the price loss, which could make repaying long-term loans very burdensome.

Broad support for protection of borrowers

Due to the risk of prices rising above par, it has been a general rule that mortgages should be granted on conditions that allow the borrowers to repay their loans without being locked in by unexpectedly large remaining debt. Therefore, fixed-rate mortgages are granted as callable loans. In other words, the borrower can meet his obligations by repaying the remaining debt.

In connection with the Act on Covered Bonds (SDOs), it was generally agreed that borrowers should still be able to meet their obligations by repaying the loan at par. This is called the par rule, and it enjoys broad support.

In the report on the statutory basis for SDO loans, the parties involved in the political accord specified that they expect SDO loans to be redeemable through purchase of the underlying bonds or at a price that does not deviate significantly from par. If there are no underlying bonds, the loan is to be redeemable at par. At the 2010 annual meeting of the Danish Mortgage Banks' Federation the *Minister of Economic and Business Affairs* stated that this rule will be preserved.

The Association of Danish Mortgage Banks attaches great importance to the par rule, which is also reflected in the Association's consultation response regarding SDO legislation from 28 January 2010:

"It is essential to preserve the par rule – also after an evaluation in 2012. The political support behind the par rule means that borrowers should also in future be protected against significant price increases, and that they should neither need to make requests nor negotiate the price with the mortgage-credit institute regarding prepayment of the loan. Moreover, it is crucial to stability in the Danish economy that borrowers can always, at reasonable costs, refinance into the loans that are best and least expensive in view of their financial position and obtain the refinancing gains arising from time to time."

Danmarks Nationalbank has, most recently in its consultation response from 23 November 2009 to the evaluation of the legislation on covered bonds, emphasised that the bond investor and not the borrower should be exposed to the current financial risks:

"Ahead of the evaluation and at the meeting mentioned above, Danmarks Nationalbank has expressed its wish that the so-called par rule be preserved. The long-standing stability of the Danish mortgage-credit system is based on the bond investor and not the borrower being exposed to the current financial risks. The borrower obviously has to pay for this security via higher current interest payments. Historical evidence shows that if borrowers do not have the option to redeem loans at par, they could subsequently find themselves in an unfavourable situation. Danmarks Nationalbank therefore attaches importance to the par rule being preserved."

Teaser loans

In recent years, product development for home financing has resulted in a new loan type. Initially the borrower's interest payments are low, but subsequently they rise in steps until the loan matures. This type of loan has been nicknamed teaser loans, because the borrower is tempted by the initial low interest rate. Such loans are offered in the USA, where they were a contributory factor behind the subprime crisis.

Thus, many US homeowners took out loans with teaser interest rates in the years leading up to the subprime crisis. It turned out that neither homeowners nor mortgage-credit institutes were capable of assessing the homeowners' financial positions relative to this loan type. In many cases the homeowners could not pay the rising mortgage instalments.

When house prices began to fall, they could not refinance their teaser loans into new loans, and the subprime crisis erupted.

In Denmark, this type of loan is, as far as can be determined, not offered to individual homeowners. However, if more homeowners form a cooperative housing society, they can take out a teaser loan.

Compared with a fixed-rate loan, the essence of the loan is that the borrower postpones interest payment until a later date. If a teaser loan is combined with deferred amortisation, quite substantial payments are postponed.

Of course, certain business considerations can make teaser loans a suitable choice. But the consequences should be analysed and assessed very carefully.

EXAMPLE: PRICE SENSITIVITY OF TEASER LOANS

Box 1

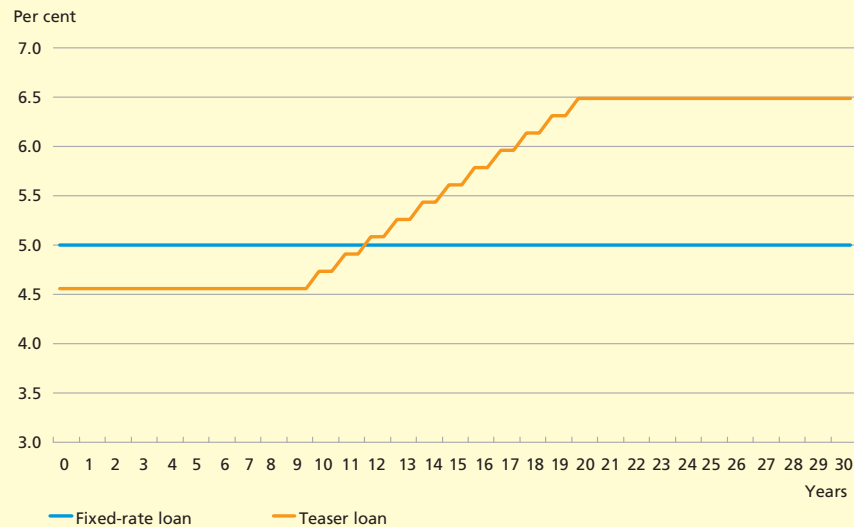
The following is an example of a teaser loan granted to a cooperative housing society. The total loan amount is kr. 288 million. The interest-rate sensitivity appears from the lender's material: if interest rates decline by 1 per cent, the borrower will suffer a price loss of 19 per cent of the principal, totalling almost kr. 55 million.

In comparison, the interest-rate sensitivity of a 30-year 5-per-cent callable loan is much lower. If interest rates decline by 1 per cent, the resulting price loss is 2.5 per cent or just over kr. 7 million.

Chart 1 shows the interest profile of the teaser loan compared with a 5-per-cent fixed-rate loan.

TEASER LOAN COMPARED WITH A FIXED-RATE LOAN

Chart 1



Teaser loans are non-callable loans with a high risk

When non-callable loans are granted as teaser loans, and possibly combined with deferred amortisation for a great number of years, the price sensitivity of the loan becomes very high. This means that falling interest rates lead to substantial price rises, implying price losses for the borrower, cf. Box 1.

Teaser loans are a combination of non-callable loans, which are not suitable for home financing, and loans with rising interest rates, which may tempt the borrower to take out excessive loans. The structure of the loan makes it difficult to understand the *financial consequences*, such as potential price losses if interest rates decline and the effect of rising debt service payments in future.

The risk on the loan lies in the interest-rate swap

It is not possible to take out the non-callable loans described above directly. Non-callable bonds are not issued at such long maturities. Therefore, the loans are designed by combining two products: an adjustable-rate *mortgage loan* and an *interest-rate swap*, cf. Box 2. While the mortgage-credit loan is taken out with a mortgage-credit institute, the interest-rate swap is entered into with a commercial bank, typically from the same financial group.

Falling interest rates may have a strong negative effect

As mentioned above, the market value of long-term, non-callable loans may rise and fall sharply. When a loan is designed as a combination of an adjustable-rate mortgage loan and a swap, the price fluctuations will stem predominantly from the swap. The price of the *mortgage loan* is typically quite stable. The reason is that it is an adjustable-rate loan, and the interest rate is therefore reset at relatively frequent intervals. The market value of the *interest-rate swap*, however, may become very negative for the borrower when interest rates decline and very positive when interest rates rise.

The commercial bank determines the price of the interest-rate swap

Ordinary mortgage-credit loans can always be redeemed at a known market price. This increases transparency. However, if a borrower wishes to redeem a teaser loan, it is not possible to find the market value in an official price list. The redemption price of an interest-rate swap depends entirely on the commercial bank's valuation.

An interest-rate swap agreement is, like any other financial contract, redeemable against payment. The price can turn out to be quite high.

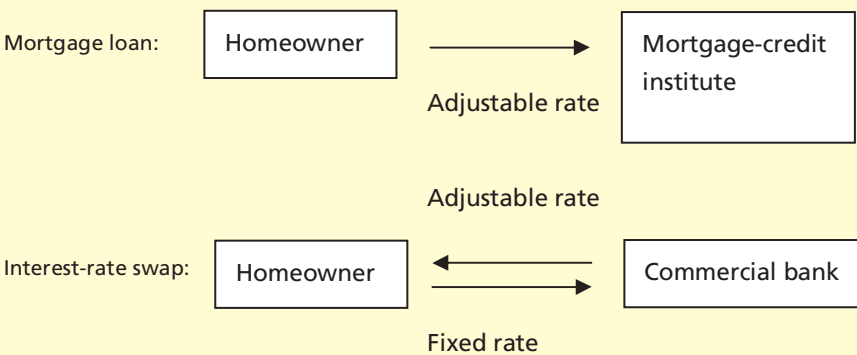
INTEREST-RATE SWAP IN TEASER LOANS

Box 2

An interest-rate swap is an agreement between two parties to exchange interest payments. In a teaser loan, the borrower has taken out an adjustable-rate mortgage loan with a mortgage-credit institute, cf. Chart 2. Subsequently, the borrower agrees with a commercial bank, typically from the same financial group, that the bank pays the borrower an adjustable rate in return for which the borrower pays the bank a fixed rate that increases in steps. The borrower will then pass on the adjustable rate to the mortgage-credit institute and has thus restructured his adjustable-rate loan into a non-callable loan.

ILLUSTRATION OF INTEREST PAYMENTS ON TEASER LOANS

Chart 2



The fixed rate in an interest-rate swap is determined so that the present value of the adjustable rate and the fixed interest payment are identical. When the contract is concluded, the market value is therefore zero.

If market rates decline, the market value of the swap will rise, reflecting a price loss for the borrower. When interest rates fluctuate strongly, the market value of the swap agreement will change significantly.

CONCLUDING REMARKS

Loans that cannot be redeemed at par – non-callable loans – can be highly price-sensitive to interest rate declines. For long-term, non-callable loans, this can make it very burdensome to redeem the loan, for instance when the homeowner sells his house. Therefore, long-term, non-callable loans are not suitable for home financing.

Some, especially new, cooperative housing societies have taken out quite risky non-callable loans with rising interest payments. The structure of these loans makes it difficult to understand the financial consequences, such as potential price losses if interest rates decline and the

impact of rising debt service payments. The reason is that the loans are typically designed as a combination of a loan and a financial agreement – an interest-rate swap. The complexity of the products therefore requires that both lenders and borrowers truly understand the risks associated with this type of loan.

LITERATURE

Danmarks Nationalbank (2009), Evaluation of covered bonds – Analysis of consumers' home financing options and competitive conditions, consultation response to the Ministry of Economic and Business Affairs, 23 November (in Danish only)

Trade and Industry Committee of the Danish Parliament (2007), Report on proposals for the Act to Amend the Financial Business Act and various other legislation (covered bonds), Report, 22 May (in Danish only).

Association of Danish Mortgage Banks (2010), The Association of Danish Mortgage Banks comments on a report on evaluation of the Act on Covered Bonds, press release, 28 January (in Danish only).

Ministry of Economic and Business Affairs (2010), Basis for speech by Brian Mikkelsen, Minister of Economic and Business Affairs, at the annual meeting of the Danish Mortgage Banks' Federation, 24 March (in Danish only).

New Calculation of Danmarks Nationalbank's Effective Krone-Rate Index

Erik Haller Pedersen and Mikkel Plagborg-Møller, Economics

Introduction

Danmarks Nationalbank regularly publishes an index of the development in the strength of the krone, the effective krone-rate index, and an index of the competitiveness of the Danish manufacturing sector, the real effective krone-rate index. Changing trade patterns make it necessary to revise the weights of the currencies in the index from time to time. The 2009 weights are presented below. The most recent revision of the weights is documented in Pedersen (2004).

2009 weights

Compared with the 2002 set of weights, the most important changes are that the weight of the Chinese currency, the yuan, has been doubled, making it the fourth most important currency in the effective krone-rate index, cf. Table 1. Trade with China has increased in terms of both exports and imports. Conversely, the weight of the pound sterling has been reduced substantially, also on both the import and export sides. In the new set of weights, the UK is only Denmark's fifth largest trading partner. Previously it ranked second.

The other adjustments to the weights are small. Generally, the weights of eastern European countries have increased, while those of many euro area member states, including Germany, have been reduced. In the new set of weights, trade with the euro area is weighted at 48 per cent as opposed to the previous 51 per cent. Over a long-term horizon the weight of the euro area has also declined. Nevertheless, the greater part of Denmark's trade is with countries that are geographically close to Denmark, but as globalisation increases trade becomes still more diversified.

About the revision of the weights

No methodological changes were made in connection with the revision of the weights. The number of countries included remains unchanged at 27. The krone-rate index is linked to the former index as of 8 April 2010 and will apply from that date onwards. Previously published figures have not been revised.

WEIGHTS FOR DANMARKS NATIONALBANK'S EFFECTIVE KRONE RATE

Table 1

	Double-weighted export weights	Bilateral import weights	2009 weights	2002 weights	1995 weights	1989 weights
	65,4	34,6	100			
Germany (DEM)	16.4	26.0	19.8	21.0	27.4	25.6
Sweden (SEK)	5.9	16.3	9.5	9.0	9.4	11.7
USA (USD)	12.2	3.3	9.1	8.6	7.5	8.7
China (CNY)	6.9	9.2	7.7	3.6	-	-
UK (GBP)	7.1	6.2	6.8	10.4	8.6	9.8
France (FRF)	6.1	4.1	5.4	6.4	7.0	6.8
Netherlands (NLG)	3.8	7.6	5.1	5.3	5.5	4.6
Italy (ITL)	5.2	4.0	4.8	5.1	5.4	5.3
Belgium (BEF)	3.7	4.7	4.1	4.1	3.8	3.5
Japan (JPY)	5.4	0.7	3.8	3.9	5.9	6.7
Norway (NOK)	4.2	2.4	3.6	3.7	3.7	3.9
Poland (PLN)	2.4	3.2	2.6	1.9	1.5	-
Spain (ESP)	3.2	1.4	2.6	2.5	1.8	1.8
Finland (FIM)	2.3	2.2	2.2	2.5	3.1	3.6
South Korea (KRW)	2.5	0.5	1.8	1.4	1.4	-
Switzerland (CHF)	1.8	1.4	1.6	1.9	2.4	2.7
Austria (ATS)	1.7	1.4	1.6	1.7	1.6	1.7
Czech Republic (CZK)	1.5	1.5	1.5	0.8	0.4	-
Hong Kong (HKD)	1.8	0.4	1.3	1.2	-	-
Ireland (IEP)	1.3	1.4	1.3	1.7	0.9	0.7
Hungary (HUF)	1.0	1.0	1.0	0.8	0.3	-
Canada (CAD)	1.3	0.2	0.9	0.7	0.5	0.7
Australia (AUD)	0.9	0.1	0.6	0.5	0.5	0.5
Portugal (PTE)	0.5	0.6	0.6	0.7	0.9	1.0
Greece (GRD)	0.4	0.2	0.4	0.3	0.3	0.4
Iceland (ISK)	0.2	0.1	0.2	0.2	0.1	0.2
New Zealand (NZD)	0.2	0.1	0.1	0.1	0.1	0.1
Euro area (EUR)	44.7	53.6	47.8	51.3	57.7	55.0

Note: The overall set of weights, the 2009 weights, is calculated as a weighted average of the double-weighted export weight and the bilateral import weight. Exports are weighted at 65.4 per cent, calculated as manufactured exports as a share of the value of total manufactured output. The total set of weights, comprising both export and import weights, has more decimals than shown in this Table. The rows have been sorted by the 2009 weights.

Source: OECD, Statistics Denmark and own calculations.

The calculations are based on trade in manufactured goods. The total weight is arrived at by weighing a set of weights for imports, bilateral import weights, with a set of weights for exports, double-weighted export weights, cf. below. In the new set, exports have been given a greater weight than imports, so that exports are now weighted at 2/3 and imports 1/3, since 2/3 of industrial output is now exported.

The term "double-weighted" in relation to export weights indicates that they take into account the fact that Danish exporters compete with a given country not only in its domestic market but also in third markets. The methodology applied is described in more detail in Pedersen (1998).

In order to calculate the double-weighted export weights, a trade matrix is set up, showing trade in manufactured goods between the 27 countries included. The matrix is based on 2006 figures, as these are the most recent OECD figures. The bilateral import and export weights are from 2009. The impact of this discrepancy is assessed to be limited. Firstly, international trade patterns change only slowly, and secondly changes are to a large extent captured by the bilateral weights. Nevertheless, the weight of especially China is presumably a bit on the low side, as the importance of China is growing rapidly in all markets these years.

For countries that are geographically far from Denmark, the double-weighted export weight is typically greater than the bilateral weight, cf. Table 2. This is true of e.g. Asian countries such as China, Japan, Korea and Hong Kong. This reflects the fact that these countries export heavily to all countries and thus compete with Danish manufacturers in many third markets. Direct bilateral trade, on the other hand, is typically of

BILATERAL AND DOUBLE-WEIGHTED EXPORT WEIGHTS

Table 2

	Bilateral	Double-weighted
Germany (DEM)	18.6	16.4
USA (USD)	9.7	12.2
UK (GBP)	7.8	7.1
China (CNY)	3.3	6.9
France (FRF)	5.8	6.1
Sweden (SEK)	12.3	5.9
Japan (JPY)	2.0	5.4
Italy (ITL)	3.3	5.2
Norway (NOK)	8.8	4.2
Netherlands (NLG)	5.1	3.8
Belgium (BEF)	2.3	3.7
Spain (ESP)	3.4	3.2
South Korea (KRW)	0.9	2.5
Poland (PLN)	2.8	2.4
Finland (FIM)	2.9	2.3
Hong Kong (HKD)	0.4	1.8
Switzerland (CHF)	1.4	1.8
Austria (ATS)	1.1	1.7
Czech Republic (CZK)	1.4	1.5
Canada (CAD)	0.9	1.3
Ireland (IEP)	1.9	1.3
Hungary (HUF)	0.9	1.0
Australia (AUD)	1.2	0.9
Portugal (PTE)	0.5	0.5
Greece (GRD)	0.7	0.4
Iceland (ISK)	0.5	0.2
New Zealand (NZD)	0.3	0.2
Euro area (EUR)	45.6	44.7

Note: The rows have been sorted by the double-weighted weights.

Source: OECD, Statistics Denmark and own calculations.

minor significance, especially in the case of Hong Kong, where the double-weighted export weight is more than four times as large as the bilateral weight.

The opposite applies to the near markets. Here direct exports prevail, and the bilateral export weights exceed the double-weighted ones. This applies to e.g. Sweden and Norway. The same pattern was seen in previous sets of weights.

WEIGHTS FOR CALCULATING REAL EFFECTIVE EXCHANGE RATES

A real effective exchange rate shows relative wages or prices in the same currency and is thus a measure of competitiveness. The real effective krone rates published by Danmarks Nationalbank are described in more detail in Pedersen (1996).

The calculations of weights include trade in manufactured goods, SITC 5-9, only. Manufactured exports account for 70 per cent of total Danish

WEIGHTS FOR DANMARKS NATIONALBANK'S REAL EFFECTIVE KRONE RATES Table 3

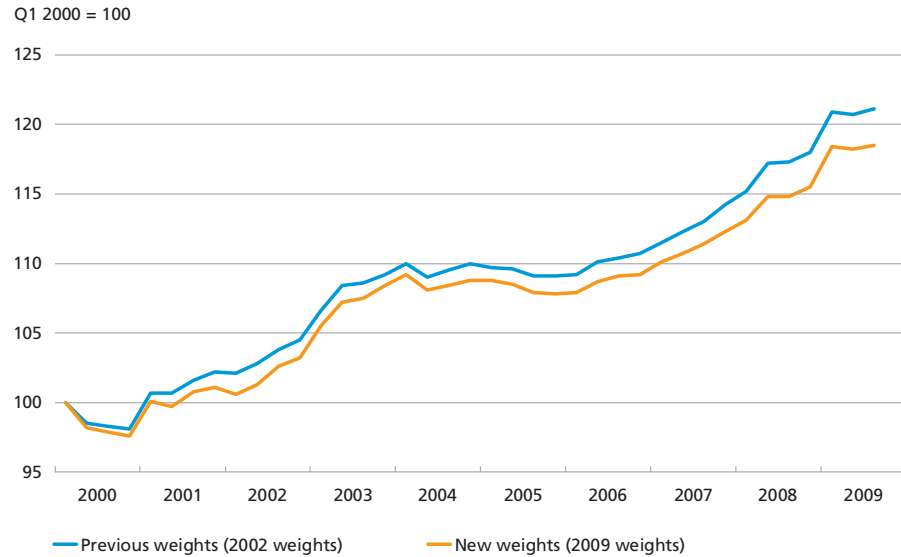
	2009 weights	2002 weights	1995 weights	1989 weights
Germany (DEM)	21.5	22.3	27.4	25.6
Sweden (SEK)	10.4	9.4	9.4	11.7
USA (USD)	10.1	9.0	7.5	8.7
UK (GBP)	7.5	10.9	8.6	9.8
France (FRF)	5.9	6.7	7.0	6.8
Netherlands (NLG)	5.7	5.6	5.5	4.6
Italy (ITL)	5.3	5.4	5.4	5.3
Belgium (BEF)	4.5	4.3	3.8	3.5
Japan (JPY)	4.2	4.1	5.9	6.7
Norway (NOK)	4.0	3.9	3.7	3.9
Poland (PLN)	2.9	2.0	1.5	-
Spain (ESP)	2.8	2.6	1.8	1.8
Finland (FIM)	2.5	2.6	3.1	3.6
South Korea (KRW)	2.0	1.5	1.4	-
Switzerland (CHF)	1.8	2.0	2.4	2.7
Austria (ATS)	1.7	1.8	1.6	1.7
Czech Republic (CZK)	1.6	0.8	0.4	-
Ireland (IEP)	1.4	1.8	0.9	0.7
Hungary (HUF)	1.1	0.8	0.3	-
Canada (CAD)	1.0	0.7	0.5	0.7
Australia (AUD)	0.7	0.5	0.5	0.5
Portugal (PTE)	0.6	0.7	0.9	1.0
Greece (GRD)	0.4	0.3	0.3	0.4
Iceland (ISK)	0.2	0.2	0.1	0.2
New Zealand (NZD)	0.2	0.1	0.1	0.1
China (CNY)	-	-	-	-
Hong Kong (HKD)	-	-	-	-
Euro area (EUR)	52.3	54.1	57.7	55.0

Note: The rows have been sorted by the 2009 weights.

Source: OECD, Statistics Denmark and own calculations.

DEVELOPMENT IN WAGE COMPETITIVENESS

Chart 1



Note: Real effective exchange rates of the krone, i.e. relative wages in the same currency. An increase in the index indicates weakening of Denmark's competitiveness. The 2009 weights have been applied to calculate the real effective krone rate with wages as the deflator back in time. In the data publications, the indices are linked, and historical data (blue curve) are not revised.

Source: OECD, Danmarks Nationalbank and own calculations.

exports of goods and 45 per cent of total exports, which also include services. See Pedersen (2007) for a calculation of a set of weights that includes trade in services.

The calculation of the real effective krone rate is based on the same set of weights as the calculation of the effective krone rate, except that China and Hong Kong are omitted, cf. Table 3. The set of weights is re-normed so that the weights still add up to 100. The reason why China and Hong Kong are omitted is that no immediately comparable wage statistics are available for these countries.

The weights used to calculate the real effective exchange rates have been revised only to a lesser extent. Notably, the weight of the UK has declined somewhat.

The view of developments in wage competitiveness over the past decade does not change if a backward calculation is performed using the new set of weights, cf. Chart 1. In practice, the indices are linked, and the historical figures are not revised.

A rising index indicates weakening of Denmark's competitiveness. The slightly lower increase in the alternative calculation based on the new weights is primarily attributable to the increased weight of the eastern European countries, where wage increases have been substantially stronger than in Denmark in the period in question.

LITERATURE

Pedersen, Erik Haller (1996), Real Effective Exchange Rates, Danmarks Nationalbank, *Monetary Review*, May.

Pedersen, Erik Haller (1998), Revision of the Weights for Calculation of the Nationalbank's Effective Krone Rate Index, Danmarks Nationalbank, *Monetary Review*, 2nd Quarter.

Pedersen, Erik Haller (2004), Revision of the Weights for Calculation of Danmarks Nationalbank's Effective Krone-Rate Index, Danmarks Nationalbank, *Monetary Review*, 4th Quarter.

Pedersen, Erik Haller (2007), The Effective Krone Rate and Trade in Services, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter.

Speech by Nils Bernstein at the Annual Meeting of the Danish Mortgage Banks' Federation 24 March 2010

The global economy is on the mend. The upswing is fragile, and though the direction of economic indicators is not clear, the recovery seems slightly stronger than expected in the autumn. The recovery is strongest in the emerging and developing economies, while it remains slightly more subdued in Europe. The overall picture is that the economic setback has been most pronounced in regions where the financial sector has been particularly exposed to inflated asset values.

The development has not yet led to a reversal in labour markets in the USA and Europe.

The rebound in the international economy is primarily the result of many countries' still very expansionary fiscal and monetary policies. The extraordinary monetary policy measures are slowly being phased out. But few central banks have begun to raise interest rates.

Public finances have deteriorated across industrial countries. And most EU member states are expected to run budget deficits exceeding 3 per cent of GDP this year. This means that they hold prospects of being included in the excessive deficit procedure that focuses on consolidation and leaves little room for manoeuvre in supporting the economic upswing further, if it turns out not to be self-sustaining.

The situation in Greece is in a category of its own. Lack of confidence in Greece's ability to get its public finances on track unaided has boosted the premium on loans to the Greek government. Ireland and Latvia are examples that illustrate the scale of the measures needed to restore confidence.

The recovery of the Danish economy is also expected to be slow and hesitant. The road ahead is likely to be bumpy. This year's growth will be insufficient to halt the increase in unemployment. The corporate sector has considerable spare capacity, and unemployment is expected to rise for yet another year.

Denmark is a small open economy, and about one job in four is related to exports, directly or indirectly. Wage competitiveness therefore plays an important role in the Danish economy, and the crisis has resulted in weak export markets and hence weak selling opportunities.

Erosion of wage competitiveness has led to loss of market shares. The loss has been quite substantial relative to those of many comparable countries. There is a clear tendency that countries whose competitiveness has deteriorated the worst also fare worst in export markets.

Collective bargaining has been finalised in a climate of rising unemployment and considerable uncertainty about the economic development. There are prospects of lower wage inflation than in previous years. Which we welcome. But there are hardly prospects of a change in the competitive environment. Changing real wage expectations after a period with a strong labour market is an uphill struggle. And it also clearly highlights the problems arising when demand reaches unsustainably high levels.

Financial conditions are very expansionary amid historically low short-term interest rates. Adjusted for tax and inflation, the real interest rate on an adjustable-rate mortgage is currently very low. This supports the housing market. In our judgement, the housing market is slowly recovering, and price adjustments are done at the current low interest rate level. Budding optimism is seen among potential buyers.

I usually refrain from official predictions of interest-rate developments. But today, I will make an exception. I am quite sure that rates on 1-year adjustable rate mortgages cannot be sustained at the current low level. I will not try to predict when it will rise. But I advise homeowners and others against stretching their budgets so tight that they can only make ends meet at the current very low interest rate level.

Normalisation of interest rates and rising unemployment may present a certain risk to the development. If the low growth continues in the euro area in the coming period, the normalisation of interest rates will be postponed. By contrast, stronger economic growth could cause interest rates to rise, but in that case, unemployment will stabilise and perhaps begin to fall.

Housing market developments and rising equity prices have caused household wealth to rise again. Combined with continued handsome growth in disposable incomes and more upbeat consumer expectations, this means that we take a more positive view on the outlook for private consumption.

The decline in consumption during the crisis has been sharper in Denmark than in most other countries. Despite a fairly good rise in incomes. The consumption ratio has thus dipped and now stands at a very low level. This, together with general stabilisation of the economic development and the slightly positive sentiment, paves the way for the return of confidence and for households to spend the increase in disposable incomes on consumption and residential investments.

However, indications for the first months of the year do not suggest a strong reversal.

The low interest rates will gradually stimulate the economy over a number of years. Therefore, interest rates will have an underlying expansionary effect on the economy in the years ahead. This also applies to fiscal policy as the expansionary stance of the past years has not yet fully shown through. Initial fiscal consolidation is thus unlikely to change the picture of an economy on a slow recovery path.

The fiscal challenges are now so daunting that consolidation is necessary in the coming years if we are to avoid an untenable increase in government debt. There is no avoiding it – even if there is still a great deal of spare capacity in the economy.

Add to this the erosion of wage competitiveness, strong pressures on expenditure, a heavy tax burden, low productivity increases and a limited job supply. The Danish economy is facing serious challenges far beyond cyclical factors.

And now over to mortgage credit.

The international financial crisis has demonstrated that there is a need for financial institutions having bigger capital buffers and larger and more stable liquidity reserves. Events deemed very unlikely by risk management models did actually occur.

International work is going on in order to formulate and agree on new rules addressing the problems unveiled by the crisis.

It is important to reach agreement across national borders and continents, so that the conditions for financial business are largely the same irrespective of the location.

For Denmark, it seems that our unique mortgage credit system can be facing challenges that we will have to deal with more or less on our own. It is therefore important that we carefully consider where to concentrate our efforts to have the new rules adjusted to our special conditions.

Here I will focus on the most essential aspects as we see them today.

The liquidity regulation proposals include a classification of assets based on how liquid they are. Government bonds and claims on central banks, international organisations etc. are considered fully liquid, while corporate bonds and mortgage-credit bonds can only be included up to a maximum of 50 per cent. Finally, there are some assets that cannot be included.

Denmark will seek to have mortgage-credit bonds included in the stock of fully liquid assets, provided their liquidity is comparable with that of government bonds. Liquidity – also in stressful situations – should be the crucial point.

We believe that we can prove that Danish mortgage-credit bonds are highly comparable with government bonds. And that's what we intend to do.

Another aspect concerns adjustable-rate mortgages specifically. During the financial crisis, financial institutions generally saw their funding sources in the market drying up. This was the reason why many governments found it necessary to issue state guarantees to financial institutions.

The rules now on the drawing board therefore pose requirements on stable funding. The definition of stable funding implies that Danish mortgage-credit bonds with a remaining term to maturity of less than one year cannot be included. Moreover, lending with a maturity of more than one year must be covered by stable funding.

Such a rule highlights the risk associated with Danish adjustable-rate mortgages. These are 30-year loans funded via short-term bonds, primarily with maturities of one year. Every year the issuing institute will have to refinance the loan.

At first, the risk can be passed on to borrowers, if they can bear it. If not, it will invariably return to the lender. We cannot ignore that there is a real risk inherent in the design of the Danish adjustable-rate mortgages. A design that implies that loans worth more than kr. 500 billion must be refinanced every year to finance 30-year loans.

I will not today try to guess whether the final formulation of the Basel rules will make it impossible to maintain the adjustable-rate mortgages as we know them today.

In such a situation, I find that it will be constructive if the sector itself seeks other solutions more in line with traditional mortgage-credit lending.

Finally, I will make a few remarks on the Danish discussions.

I understand that work is going on to ease the requirements for Danish covered bonds, if the loan exceeds 80 per cent of the property value due to declines in property prices. The so-called LTV rule. Today, the rule is that if the value of the property declines, and the covered bond loan then exceeds 80 per cent of the property value, the issuing mortgage-credit institute has to find additional collateral for the mortgage. I see little likelihood that it will be possible to requirement. And I doubt that it would benefit Danish mortgage credit in the longer run.

We should not introduce the slightest doubt about the quality of Danish covered bonds.

The legislation on covered bonds has provided the banks with the possibility of allowing investors in covered bonds to be secured creditors in respect of a number of assets in the banks' balance sheets. This arrange-

ment makes covered bonds a much safer asset than senior debt issued by a bank. The banks can therefore use covered bonds for long-term funding without this becoming prohibitively expensive. The banks can use covered bonds as a tool for better matching maturities on the asset and the liability side and thus reduce their liquidity risk. Covered bonds are therefore a funding tool, which can for example help banks comply with future liquidity regulation. Against this background, Danmarks Nationalbank does not support the idea of abolishing this possibility.

On behalf of Danmarks Nationalbank, I hereby thank the Danish Mortgage Banks' Federation for our successful cooperation during the past year.

Thank you for your attention.

Speech by Nils Bernstein at the Annual Meeting of the Association of Danish Mortgage Banks on 22 April 2010

The global economy is on the mend. The latest indicators point to a faster recovery than previously expected. There is considerable regional variation, and it is likely to be a bumpy ride.

The emerging and developing economies show the strongest growth. Countries like China, India and Brazil are now less affected by the economic crisis, while growth is more subdued in the old OECD countries, especially Europe.

Global GDP contracted by 0.6 per cent in 2009, the strongest fall in output since World War II. For comparison, global growth peaked at more than 5 per cent before the slowdown set in.

The crisis originated in the USA, but Europe experienced the most severe setback. Indeed, the recovery now seems to be stronger in the USA than in Europe. The US business sector has once again demonstrated its adaptability.

However, the main driver of the global economic recovery is the very accommodative economic policy. Many countries have historically low monetary-policy interest rates and very high budget deficits. Budget deficits of such magnitude may only exist for a relatively short period of a few years. Most countries are facing a consolidation challenge in the coming years, and some have to start already this year. Optimism about the global economy is only moderate because it is still uncertain whether the recovery will be self-sustaining. This means whether private demand will be able to take over when fiscal policies are tightened again.

The global recovery is illustrated by the rebound in world trade after the strong drop. Before the crisis, the limelight was on international imbalances, especially the large US current-account deficit and China's equally large surplus. The crisis has not eliminated these imbalances, and the discussion of the exchange rate of the Chinese currency should be viewed against that backdrop.

The market focus has shifted to fiscal imbalances - sovereign risk has taken centre stage. The IMF expects the government debt of the old OECD countries taken as one to reach 110 per cent of GDP by 2014. This is an alarming figure, but it covers considerable variation across coun-

tries. Greece is an example of how slippery the slope can be if a country is too complacent for too long. But Greece's tribulations have also highlighted the Eurosystem's limited scope for remedying an escalating situation when a member state is struggling to get through.

Most EU member states now have budget deficits exceeding the limit of 3 per cent of GDP under the Stability and Growth Pact. As a result, the Commission has ordered or will order these member states to reduce their deficits to below 3 per cent of GDP within a short span of years. The Stability and Growth Pact is at the heart of the EU's fiscal surveillance. It is no exaggeration to say that this surveillance has not been satisfactory when it comes to Greece. The outcome remains to be seen.

It is encouraging to see that the normalisation of the international financial markets has made great headway. Since the autumn, the spread between collateralised and uncollateralised yields, reflecting uncertainty in the money markets, has been back at pre-crisis levels. US long-term yields have risen since the beginning of 2009 in the light of improved growth prospects – and so have leading international stock indices.

The euro has weakened against the dollar due to the widening yield spread in favour of the USA, exacerbated from January this year by uncertainty about the Greek economy and concerns about a possible ripple effect in other euro area member states. But these fluctuations are still within the normal range. The current euro/dollar rate is close to the level before the onset of the financial crisis in the summer of 2007.

In Denmark, the crisis caused output to drop by more than 7 per cent. Since last summer, growth has been back in positive territory, albeit moderate. It will remain so in the coming years. We will probably have to wait until 2013 to see Danish output return to the level observed immediately before the crisis.

Private consumption in Denmark is recovering slowly. Disposable incomes are showing good growth this year, reflecting income-tax cuts and other factors. At the same time, household wealth is beginning to pick up again. The prospects for the housing market are also brightening, at least at the current level of interest rates. Moreover, consumer confidence has seen a marked increase over the past year. Nevertheless, the purse strings are still relatively tight, probably due to higher unemployment. But the overall finances of the household sector are quite robust. It is understandable that households are consolidating their finances. At the same time, there is scope for private consumption to contribute to the expected rebound in growth in the near term.

Denmark's export growth is lagging behind that of other countries. Industrial production remains low. The deterioration in Denmark's wage

competitiveness over a relatively long period gives cause for concern. This could prevent Danish companies from making the most of the budding international recovery.

The recently concluded collective agreements for the private sector entail a lower rate of wage increase than what has been observed for some time. But wage inflation is also declining in our competitor countries. Denmark's wage competitiveness has been eroded over a relatively long period by excessive wage increases and weak productivity development. It is a Herculean task to reverse this trend. And the results will, at best, be slow to emerge. But we have to make an extra effort in light of the increasing challenges in the international environment.

Employment has dived. The loss of 170,000 jobs since the peak in the 1st quarter of 2008 has almost swallowed up the entire increase in employment observed during the boom.

Many people have lost their jobs, but registered unemployment has "only" increased by 70,000.

The flattening of the unemployment curve in recent months is partly due to the seasonal adjustment methods.

What it boils down to is that the increase in unemployment is far smaller than the drop in employment. This pattern is different from previous periods of economic slowdowns, where around one third of the drop in employment was offset by a reduction in the labour force, while two thirds were offset by rising unemployment. This time, it is almost the other way around.

The question is whether the lower-than-expected increase in unemployment reflects stronger cyclical development than otherwise envisaged. Regrettably, I do not think that this is so. It is more likely to be the result of a stronger-than-expected reduction of the labour force and continued weak productivity development.

The private sector has borne the brunt of the fall in employment. In the public sector, some of the jobs that were difficult to fill during the boom have now been filled. Employment in the public sector taken as one has risen by 10,000 since the 1st quarter of 2008.

And the people who have left the labour force, where have they gone? The number of people receiving student grants or under adult education or educational activation has risen somewhat, reflecting that some people choose to embark on an education or finish their education later. On the other hand, the number of people receiving permanent benefits has not risen to any significant extent. This indicates that many of those who have left the labour force are self-supporting, such as unemployed who are not members of an unemployment fund and who do not receive cash benefits. Others have left the country, for instance some

of the migrant workers who came to Denmark from Eastern Europe during the boom. In addition, the number of commuters, especially from Germany and Sweden, has fallen.

On the positive side, there is a well-founded hope of spare capacity in the labour market to use when economic growth gains real momentum. Moreover, it is encouraging to see that the number of people on permanent benefits has not shown any significant increase.

There are indications that the supply of labour is now reacting more strongly than previously to economic developments. This is a positive feature in so far as it reflects greater flexibility in the labour market. It is important that the current cyclical reduction in the labour force does not lead to a rise in the number of people on benefit schemes. This could produce a knock-on effect in the form of a more permanent increase in the number of people on transfer payments, and Denmark is already at the upper end of that scale.

This development could mean that it may take longer before registered unemployment is reduced to any significant degree. Companies have not yet adapted fully to the drop in output. This means that they can increase production without hiring more people. And there are more to be hired outside the registered unemployment category.

It is interesting to observe how much these unemployed people outside the registered unemployment category will contribute to dampening wage inflation. If the contribution is substantial, our previous estimate of registered structural unemployment may be on the high side, but it is still too early to draw any conclusions.

Normally, consumer issues are outside the scope of Danmarks Nationalbank's tasks, important and interesting as they may be. Today, however, I would like to comment on the latest development in the market for financing of cooperative housing. Some cooperative housing associations seem to have resorted to very risky sources of finance in recent years. I'm thinking of uncallable fixed-rate loans subject to rising interest rates during the term of the loan. Technically, these loans are structured as adjustable-rate loans combined with an interest-rate swap.

These loans do not accord with Danmarks Nationalbank's opinion on the par rule that provides for redemption of a loan at a price close to 100. In addition, the loans seem to be a far cry from the mortgage sector's declared objective of protecting the borrower. So far, it has been good practice to provide housing loans on terms that give the borrowers a chance to get rid of their loans without being tied down by increasing debt. This is ensured by the right to redeem at par, and it was also a key aspect of the rules on covered bonds adopted almost three years ago. Adjustable-interest loans cannot be redeemed at par, but these loans

are typically financed by short-term bonds, limiting the risk on the outstanding debt.

Several institutes offer cooperative housing associations loans at a low initial interest rate, which then increases over the term of the loan. In Denmark, these are known as "stepped loans", but they are the same as the teaser loans that dominated the US subprime market just before the financial crisis.

This combination of long-term uncallable loans at a rising interest rate over the term of the loan is not suitable for housing financing. Stepped loans may entice borrowers to raise larger loans than they would otherwise have done, reinforcing the negative effects of non-redemption at par.

And now over to mortgage credit and its legal basis. The proposals from the Basel Committee and the European Commission are well-known in this forum. I mentioned them at the annual meeting of the Danish Mortgage Banks' Federation a few weeks ago, and I have nothing to add. The Danish Financial Supervisory Authority and Danmarks Nationalbank have jointly sent letters to Basel and Brussels pointing out a number of problems in relation to the Danish mortgage-credit sector. One particular problem is that liquid mortgage-credit securities are not fully included as liquid assets. The proposals will impact on the adjustable-rate loans currently offered by the mortgage-credit institutes, but it must be admitted that the current structure has inherent risks.

Mortgage-credit institutes have recently held auctions of fixed bullets. I am pleased to see a more even distribution of the auctions over the year. I welcome this, while encouraging you to continue the process.

In Denmark, both the authorities and financial enterprises are tuned in to 1 October 2010. This date marks the end of the general government guarantee of deposits and other unsecured claims in banks. It will be an important milestone in the process that will bring the financial sector back on its feet.

In order to smooth the transition, Danmarks Nationalbank has prolonged the credit facilities for banks and mortgage-credit institutes until 26 February 2011. The temporary extension of the collateral base has also been prolonged.

In Denmark, the most important initiative on the drawing board is the government's bill on a windingup solution for banks, which is to replace the general government guarantee. Experience from the financial crisis and the management of ailing banks has shown that it is necessary to establish a permanent scheme to provide for controlled winding up of a bank's activities. Danmarks Nationalbank has previously emphasised that the key issue is not the survival of the individual bank, but smooth continuation of its healthy activities.

The bill will establish a winding-up scheme. The Financial Stability Company will be able to take over ailing banks. The guaranteed cover for unsecured creditors does not exceed the statutory deposit guarantee of kr. 750,000. Unsecured creditors can suffer losses on exposures with banks as is the case for creditors in other business enterprises.

This will give unsecured creditors an incentive to get out quickly if a bank shows signs of trouble. Firstly, this entails a potential pressure that can contribute to the smooth functioning of the financial system of its own accord without excessive risk. It will also entail market pressure on the individual banks to have sufficient buffers.

Secondly, it will require the authorities to react sooner and more consistently when a bank is on a slippery slope. The financial system and financial stability should not be left in doubt for prolonged periods of a bank's ability to continue in business.

If we want quicker action, we have to accept that the basis for the action will not be 100 per cent certain. It is not conducive to fast decision-making if the FSA is constantly at risk of being subject to retrospective investigations of its decisions. The FSA must have a certain margin for action.

The bill requires each bank to provide the necessary information on account structures, etc. within 24 hours to pave the way for quick crisis management. A quick solution ensuring continuity in payment systems also requires a well-planned process for changing account structures, etc. Danmarks Nationalbank will engage in close dialogue with other authorities and owners of settlement systems to ensure this once the bill has been adopted.

Controlled winding up using the proposed model increases the certainty of the assets maintaining their value, compared with a traditional winding-up procedure. And the bank's customers will not suddenly discover that their Dankort is not working or that deposits in a salary account have been swallowed up by a car loan. There is no obligation for the individual bank to use this model. I understand that such obligation would require further legislation so as not to contravene the Constitutional requirement that expropriation shall be subject to statutory provisions.

The financial crisis has taught us that no bank can turn a blind eye on the issue and say that this could never happen to it. All institutions have to accept that it could happen to them. And they must have an emergency action plan. That will enable the customers to navigate safely! Consequently, we find it important that the institutions be obliged, by a prior general meeting, to decide whether to join the scheme now. I hereby welcome the Minister's consent.

Furthermore, it would be appropriate for the Danish Bankers Association to encourage its members to join the scheme.

I hereby thank the Association of Danish Mortgage Banks for our successful cooperation during the past year.

Thank you for your attention.

Press Releases

15 MARCH 2010: COMMEMORATIVE COIN TO MARK THE 70TH BIRTHDAY OF HER MAJESTY QUEEN MARGRETHE II ON 16 APRIL 2010

There is a longstanding tradition in Denmark to issue commemorative coins to mark special events in the Royal Family. The Queen's 70th birthday on 16 April 2010 will therefore be marked with the issue of a commemorative coin in three different versions.

A 1,000 krone gold coin is minted in 900 o/oo gold (Au) with a diameter of 22 mm and a weight of 8.65 g. A 500-krone silver coin in 999 0/00 fine silver (Ag) with a diameter of 38 mm and a weight of 31.1 g. The 20-krone ordinary circulation coin in aluminium bronze will be issued in an edition of 1.2 million. Furthermore a 20-krone coin will be minted in a very fine proof quality.

The motif of the obverse of the coin is a new portrait of the Queen made by the sculptor Lis Nogel. The new portrait is also to be used on the ordinary 10- and 20-krone coins from 2011 onwards. The reverse is designed by Ronny Andersen, Royal Armorer, and shows the royal coat of arms set against a background of daisies.

As from 17 March the coins can be purchased from the Royal Danish Mint, www.royalmint.dk, Danmarks Nationalbank and some banks and coin dealers. The recommended retail price for the gold coin is DKK 3,000 incl. VAT. The silver coin is sold at its nominal value. The proof version of the 20-krone coin will be sold by the Royal Danish Mint only. The price for a proof coin, delivered in a box, is DKK 125 incl. VAT. The 1.2 million ordinary circulation coins will be sold in rolls of 20 coins each at its nominal value.

25. MARCH 2010: INTEREST RATE REDUCTION

Effective from 26 March 2010, Danmarks Nationalbank's rate of interest on certificates of deposit is reduced by 0.10 percentage point to 0.70 per cent, the current-account rate is reduced by 0.10 percentage point to 0.60 per cent. The lending rate is maintained at 1.05 per cent, and the discount rate is maintained at 0.75 per cent.

The interest-rate reduction is a consequence of purchases of foreign exchange in the market. The money-market rates in euro are continu-

ously very low and the spread to the equivalent Danish rates tends to strengthen the Danish krone.

Effective from the above date, Danmarks Nationalbank's interest rates are:

Lending rate: 1.05 per cent

Rate of interest on certificates of deposit: 0.70 per cent

Current-account rate: 0.60 per cent

Discount rate: 0.75 per cent.

19 MAY 2010: INTEREST RATE REDUCTION

Effective from 20 May 2010, Danmarks Nationalbank's rate of interest on certificates of deposit is reduced by 0.10 percentage point to 0.60 per cent, the current-account rate is reduced by 0.10 percentage point to 0.50 per cent. The lending rate is maintained at 1.05 per cent, and the discount rate is maintained at 0.75 per cent.

The interest rate reduction is a consequence of purchases of foreign exchange in the market.

Effective from the above date, Danmarks Nationalbank's interest rates are:

Lending rate: 1.05 per cent

Rate of interest on certificates of deposit: 0.60 per cent

Current-account rate: 0.50 per cent

Discount rate: 0.75 per cent.

26 MAY 2010: INTEREST RATE REDUCTION

Effective from 27 May 2010, Danmarks Nationalbank's rate of interest on certificates of deposit is reduced by 0.10 percentage point to 0.50 per cent, the current-account rate is reduced by 0.10 percentage point to 0.40 per cent. The lending rate is maintained at 1.05 per cent, and the discount rate is maintained at 0.75 per cent.

The interest rate reduction is a consequence of purchases of foreign exchange in the market.

Effective from the above date, Danmarks Nationalbank's interest rates are:

Lending rate: 1.05 per cent

Rate of interest on certificates of deposit: 0.50 per cent

Current-account rate: 0.40 per cent

Discount rate: 0.75 per cent

Tables

Interest rates and share-price index	1
Selected items from Danmarks Nationalbank's balance sheet	2
Factors affecting the banks' and the mortgage-credit institutes' net position with Danmarks Nationalbank	3
Selected items from the consolidated balance sheet of the MFI sector	4
Money stock	5
Selected items from the balance sheet of the banks	6
Selected items from the balance sheet of the mortgage-credit institutes	7
Lending to residents by the banks and the mortgage-credit institutes .	8
The mortgage-credit institutes' lending broken down by type	9
The banks' effective interest rates	10
Selected items from the balance sheet of the investment associations .	11
Securities issued by residents by owner's home country	12
Households' financial assets and liabilities	13
Companies' financial assets and liabilities	14
Current account of the balance of payments	15
Financial account of the balance of payments	16
Portfolio investments of the balance of payments	17
Denmark's external assets and liabilities	18
GDP by type of expenditure	19
EU-harmonized index of consumer prices (HICP) and underlying inflation (IMI)	20
Selected monthly economic indicators	21
Selected quarterly economic indicators	22
Exchange rates	23
Effective krone rate	24
Danmarks Nationalbank's Statistical Publications	

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 19 July 2010 and thus based on more recent information than the equivalent section of the Danish edition.

Danmarks Nationalbank is the source for Tables 1-14, 16-18 and 23-24, 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 15 and 19-22. The calculations in Tables 20 and 24 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 uncollateralized	Bond yields		Share-price index OMXC20 (prev.KFX)
	Discount rate	Lending	Certificates of deposit	Main refinancing operations, fixed rate ¹			10-year central-government bond	30-year mortgage-credit bond	
	Per cent per annum				End of period	Per cent per annum		3.7.89 =100	
2005	2.25	2.40	2.40	2.25	2005	2.46	3.30	4.39	393.52
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 15 Jan	0.75	1.05	0.80	1.00	Dec 09	0.85	3.62	5.19	336.69
26 Mar	0.75	1.05	0.70	1.00	Jan 10	0.80	3.54	5.10	354.85
20 May	0.75	1.05	0.60	1.00	Feb 10	0.85	3.42	5.03	354.77
27 May	0.75	1.05	0.50	1.00	Mar 10	0.70	3.37	5.01	383.04
	|	|	|	|	Apr 10	0.70	3.21	4.98	411.50
	|	|	|	|	May 10	0.50	2.69	4.81	388.69
19 Jul ...	0.75	1.05	0.50	1.00	Jun 10	0.50	2.68	4.80	393.02

¹ Until 7 October 2008 minimum bid rate.

SELECTED ITEMS FROM DANMARKS NATIONALBANK'S BALANCE SHEET Table 2

End of period	The foreign-exchange reserve (net)	Notes and coin in circulation	The central government's account with Danmarks Nationalbank	The banks' and the mortgage-credit institutes' net position with Danmarks Nationalbank			
				Certificates of deposit	Deposits (current account)	Loans	Total net position
	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
Jan 10	415.4	58.1	196.0	131.2	11.3	26.4	116.2
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	438.3	61.4	220.7	142.1	23.5	47.2	118.4

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			Net purchase of bonds by Danmarks Nationalbank	Other factors	The banks' and the mortgage-credit institutes' net position with Danmarks Nationalbank	
	Do-mestic gross financing requirement	Sales of do-mestic central-government securities, etc.	Liquid-ity effect	Interven-tions to purchase foreign exchange, net	Other	Total			Change in net position	End of period
2005	39.5	30.9	8.6	-18.4	3.0	-15.4	-2.2	-0.5	-9.5	85.1
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
Jan 10	27.2	13.5	13.7	18.7	3.5	22.2	-3.7	-0.2	32.1	116.2
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	4.7	-18.1	118.4

SELECTED ITEMS FROM THE CONSOLIDATED
 BALANCE SHEET OF THE MFI SECTOR

Table 4

End of period	Total balance	Assets				Liabilities		Foreign assets, net ¹
		Domestic lending		Domestic securities		Domestic deposits	Bonds, etc. issued	
		Public sector	Private sector	Bonds, etc.	Shares, etc.			
		Kr. billion						
2005	4,228.2	107.8	2,584.2	75.9	53.5	971.3	1,318.2	-172.9
2006	4,672.7	116.8	2,953.6	51.8	60.3	1,077.0	1,433.4	-224.2
2007	5,497.4	117.5	3,356.1	43.3	63.5	1,219.7	1,505.2	-304.5
2008	6,286.4	131.6	3,721.8	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	1,427.6	1,651.2	-417.6
Dec 09	5,970.1	135.9	3,647.9	78.2	65.5	1,427.6	1,651.2	-417.6
Jan 10	6,091.2	133.7	3,660.0	80.1	68.0	1,430.1	1,704.1	-399.5
Feb 10	6,150.8	132.1	3,652.2	72.2	68.6	1,421.6	1,717.2	-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	6,133.6	136.1	3,651.7	70.9	69.5	1,421.8	1,681.5	-396.3
May 10	6,440.2	136.8	3,679.3	66.3	70.3	1,428.2	1,718.9	-389.5
		Change compared with previous year, per cent						
2005 .....	...	10.6	15.0	-24.7	15.4	14.4	7.9	...
2006 .....	...	8.3	14.3	-31.8	12.8	10.9	8.7	...
2007 .....	...	0.6	13.6	-16.4	5.2	13.3	5.0	...
2008 .....	...	12.0	10.9	-6.2	-10.7	22.0	0.2	...
2009 .....	...	3.3	-2.0	92.4	15.5	-4.0	9.5	...
Dec 09 .....	...	3.3	-2.0	92.4	15.5	-4.0	9.5	...
Jan 10 .....	...	1.5	-1.7	111.1	19.0	-3.3	13.4	...
Feb 10 .....	...	1.9	-1.4	60.7	22.5	-2.8	13.7	...
Mar 10 .....	...	3.6	-1.7	54.3	26.1	-0.7	9.7	...
Apr 10 .....	...	3.4	-1.5	26.5	23.2	-1.2	7.1	...
May 10 .....	...	4.7	0.2	11.1	21.6	-0.3	8.8	...

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 circulation 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								
2005	47.3	596.3	643.5	114.1	18.4	776.0	14.2	8.4	798.7
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	771.8	820.3	183.2	19.5	1,023.1	10.9	143.0	1,177.1
Dec 09	48.5	771.8	820.3	183.2	19.5	1,023.1	10.9	143.0	1,177.1
Jan 10	47.4	792.7	840.2	185.4	17.2	1,042.8	6.9	191.5	1,241.3
Feb 10	47.5	791.1	838.6	174.6	17.3	1,030.5	6.5	188.9	1,225.9
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	806.9	857.9	157.6	16.2	1,031.7	17.3	173.0	1,222.2
May 10	51.3	812.4	863.7	161.6	16.6	1,042.0	4.4	201.1	1,247.7
Change compared with previous year, per cent									
2005 .....	...	...	19.9	...	...	14.7	...	...	14.3
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
Dec 09 .....	...	...	8.6	...	...	-3.5	...	...	5.0
Jan 10 .....	...	...	9.0	...	...	-3.8	...	...	4.5
Feb 10 .....	...	...	7.8	...	...	-4.4	...	...	2.6
Mar 10 .....	...	...	9.1	...	...	-4.0	...	...	3.1
Apr 10 .....	...	...	9.1	...	...	-2.4	...	...	2.7
May 10 .....	...	...	8.0	...	...	-2.7	...	...	3.0

¹ Notes and coin in circulation, excluding the banks' holdings.

SELECTED ITEMS FROM THE BALANCE SHEET OF THE BANKS

Table 6

End of period	Total balance	Assets					Liabilities	
		Lending to MFIs	Domestic lending			Holdings of securities	Loans from MFIs	Deposits
			Total	of which:				
				Households, etc.	Non-financial companies			
Kr. billion								
2005	2,867.3	652.0	920.1	396.6	370.0	862.1	975.7	1,065.6
2006	3,242.0	715.0	1,124.3	475.0	458.0	889.6	1,133.8	1,148.3
2007	3,991.1	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	1,178.7	1,417.3
Dec 09	4,147.6	876.1	1,359.1	575.7	529.7	1,203.5	1,178.7	1,417.3
Jan 10	4,244.1	950.4	1,361.4	565.4	523.6	1,181.3	1,233.6	1,431.3
Feb 10	4,261.4	969.2	1,344.9	560.9	534.6	1,154.1	1,228.7	1,418.7
Mar 10	4,293.0	949.6	1,347.2	566.5	532.3	1,241.8	1,258.4	1,423.4
Apr 10	4,226.3	916.4	1,333.6	560.0	528.0	1,189.8	1,143.4	1,446.0
May 10	4,485.0	958.3	1,352.7	558.9	527.0	1,216.5	1,182.4	1,453.8
Change compared with previous year, per cent								
2005 .....	...	31.7	21.9	22.1	19.5	10.5	18.5	17.3
2006 .....	...	9.7	22.2	19.8	23.8	3.2	16.2	7.8
2007 .....	...	29.9	18.9	17.4	21.0	20.1	27.8	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	-18.4	-0.5
Dec 09 .....	...	-10.1	-12.1	-1.9	-12.2	10.2	-18.4	-0.5
Jan 10 .....	...	0.8	-11.3	-2.3	-10.6	2.0	-13.6	-1.9
Feb 10 .....	...	6.9	-10.2	-2.0	-7.2	-2.2	-11.0	-0.7
Mar 10 .....	...	0.8	-10.6	-2.0	-7.2	4.7	-11.1	1.1
Apr 10 .....	...	-5.5	-9.5	-1.6	-7.0	-2.1	-21.0	1.7
May 10 .....	...	9.2	-5.4	-0.8	-4.3	-8.6	-13.9	0.4

Note: Excluding Danish banks' units abroad.

SELECTED ITEMS FROM THE BALANCE SHEET OF
 THE MORTGAGE-CREDIT INSTITUTES

Table 7

End of period	Assets						Liabilities	
	Total balance	Lending to MFIs	Domestic lending			Holdings of securities	Loans from MFIs	Bonds, etc. issued
			Total	of which:				
				Households, etc.	Non-financial companies			
Kr. billion								
2005	2,519.9	101.4	1,664.4	1,281.5	334.2	645.0	151.7	2,237.0
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	467.4	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
Dec 09	3,827.1	512.2	2,278.8	1,712.2	501.0	927.6	539.3	3,048.3
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
Change compared with previous year, per cent								
2005 .....	...	11.1	11.7	12.3	8.5	34.0	481.5	14.6
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	15.7	-2.4	37.8	3.5
2009 .....	...	19.5	5.3	5.1	7.2	46.4	13.7	18.0
Dec 09 .....	...	19.5	5.3	5.1	7.2	46.4	13.7	18.0
Jan 10 .....	...	27.4	4.9	4.7	7.7	-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

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								
2005	2,614.5	1,678.0	852.2	950.2	396.6	510.4	1,664.4	1,281.5	341.7
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	1,457.1	1,622.9	586.8	978.3	2,164.6	1,629.6	478.8
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
Dec 09	3,682.4	2,287.9	1,283.8	1,403.6	575.7	770.0	2,278.8	1,712.2	513.8
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	3,671.8	2,278.0	1,287.1	1,373.5	560.0	762.2	2,298.2	1,718.0	524.9
May 10	3,698.1	2,282.3	1,310.5	1,392.6	558.9	781.5	2,305.5	1,723.4	529.0
Change compared with previous year, per cent									
2005	14.9	14.5	15.0	20.9	22.1	19.6	11.7	12.3	8.8
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	16.1
2009	-2.8	3.2	-11.9	-13.5	-1.9	-21.3	5.3	5.1	7.3
Dec 09	-2.8	3.2	-11.9	-13.5	-1.9	-21.3	5.3	5.1	7.3
Jan 10	-2.1	2.9	-9.0	-11.6	-2.3	-17.6	4.9	4.7	8.0
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	-2.0	2.1	-8.4	-10.3	-1.6	-15.8	3.7	3.4	5.1
May 10	-0.4	2.2	-4.3	-6.3	-0.8	-10.0	3.6	3.2	5.6

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		Total	of which:		
			Total	of which =<1 year		Total	Lending in foreign currency	Instalment-free lending ¹
2005	88.6	720.3	853.9	616.0	1,662.8	80.5	315.5	
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	
Dec 09	68.3	740.2	1,472.7	1,106.6	2,281.2	211.4	695.1	
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	

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	Households, etc.	Non-financial companies	Financial companies	All sectors	Households, etc.	Non-financial companies	Financial companies
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
Dec 09	3.9	5.6	4.5	1.5	1.3	1.5	1.1	1.4
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

SECURITIES ISSUED BY RESIDENTS BY OWNER'S HOME COUNTRY

Table 12

End of period	Bonds, etc.						Shares	
	Total		of which:					
			Central-government securities		Mortgage-credit bonds			
	Denmark	Abroad	Denmark	Abroad	Denmark	Abroad	Denmark	Abroad
	Market value, kr. billion							
2005	2,559.7	461.2	434.9	205.1	2,002.9	252.5	845.2	300.5
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	3,410.7	435.8	392.9	160.0	2,799.3	255.4	639.8	348.7
Dec 09	3,410.7	435.8	392.9	160.0	2,799.3	255.4	639.8	348.7
Jan 10	2,742.5	457.6	414.0	156.5	2,122.0	282.0	676.3	368.3
Feb 10	2,762.1	479.2	413.5	173.3	2,143.1	285.5	671.5	375.8
Mar 10	2,892.3	467.3	432.8	170.6	2,250.1	276.2	703.6	409.7
Apr 10	2,764.9	509.7	439.8	181.5	2,115.9	308.6	737.4	437.6
May 10	2,847.0	507.8	473.6	178.1	2,158.0	310.4	702.6	408.6

Note: Comprise quoted and unquoted securities registered with the VP Securities Services (VP).

HOUSEHOLDS' FINANCIAL ASSETS AND LIABILITIES

Table 13

End of period	Assets					Liabilities		
	Currency and bank deposits, etc.	Bonds, etc.	Shares and certificates issued by investment associations, etc.	Life-insurance and pension-scheme savings, etc.	Total	Loans, etc.	Net financial assets	Total
2005	785	173	1,121	1,617	3,696	1,892	1,805	3,696
2006	836	181	1,559	1,681	4,256	2,072	2,183	4,256
2007	902	188	1,433	1,723	4,245	2,272	1,973	4,245
2008	900	178	763	1,784	3,625	2,436	1,189	3,625
2009	917	171	879	1,927	3,893	2,552	1,341	3,893
Q1 09	912	169	670	1,779	3,531	2,469	1,062	3,531
Q2 09	913	175	793	1,794	3,675	2,495	1,180	3,675
Q3 09	906	172	861	1,882	3,820	2,522	1,298	3,820
Q4 09	917	171	879	1,927	3,893	2,552	1,341	3,893
Q1 10	936	167	942	1,998	4,044	2,621	1,423	4,044

COMPANIES' FINANCIAL ASSETS AND LIABILITIES

Table 14

End of period	Assets				Liabilities				
	Currency, bank deposits and granted credits, etc.	Bonds, etc.	Shares and certificates issued by investment associations, etc.	Total	Debt			Net financial assets	Total
					Loans, etc.	Bonds, etc. issued	Shares, etc. issued		
Kr. billion									
2005	792	162	2,198	3,152	1,344	143	3,219	-1,553	3,152
2006	818	148	3,083	4,048	1,578	139	4,427	-2,095	4,048
2007	898	134	2,889	3,922	1,714	118	4,233	-2,143	3,922
2008	1,040	129	1,716	2,887	1,922	109	2,423	-1,566	2,887
2009	1,049	126	1,911	3,086	1,871	138	2,573	-1,495	3,086
Q1 09	1,041	127	1,549	2,717	1,941	107	2,131	-1,462	2,717
Q2 09	1,036	138	1,800	2,974	1,926	118	2,434	-1,503	2,974
Q3 09	991	140	1,868	2,999	1,890	122	2,511	-1,524	2,999
Q4 09	1,049	126	1,911	3,086	1,871	138	2,573	-1,495	3,086
Q1 10	1,080	132	2,062	3,275	1,937	139	2,776	-1,578	3,275

Note: Companies are defined as non-financial companies.

CURRENT ACCOUNT OF THE BALANCE OF PAYMENTS (NET REVENUES)						Table 15
	Goods (fob)	Services	Goods and services	Wages and property income	Current transfers	Total current account
Kr. billion						
2005	43.9	38.3	82.2	9.9	-25.0	67.1
2006	18.2	42.0	60.2	16.8	-28.4	48.6
2007	2.0	43.0	45.0	9.2	-29.3	25.0
2008	-3.7	51.0	47.3	15.8	-27.9	35.2
2009	35.8	21.3	57.1	38.0	-30.6	64.5
Jun 08 - May 09	3.9	44.3	48.2	24.7	-31.8	41.0
Jun 09 - May 10	49.4	27.1	76.5	30.5	-30.3	76.7
Dec 09	2.9	1.8	4.7	4.0	-2.0	6.6
Jan 10	0.6	0.8	1.4	1.9	-4.0	-0.8
Feb 10	4.5	1.9	6.4	1.8	-3.7	4.4
Mar 10	8.8	2.5	11.3	-0.7	-3.1	7.5
Apr 10	4.1	5.9	10.0	1.3	-2.2	9.0
May 10	2.8	4.4	7.2	1.8	-2.4	6.7

**FINANCIAL ACCOUNT OF THE BALANCE OF PAYMENTS
(NET PAYMENTS FROM ABROAD)**

Table 16

	Current account and capital account, etc., total	Capital import				Other ²	Denmarks Nationalbank's transactions with abroad ³
		Direct investments		Portfolio investments ¹	Other capital import		
		Danish abroad	Foreign in Denmark				
Kr. billion							
2005	70.0	-97.1	77.2	-68.8	23.2	-16.2	-11.8
2006	48.6	-50.2	16.1	-103.3	83.4	-33.0	-38.3
2007	25.2	-112.3	64.3	-32.2	56.5	-2.7	-1.2
2008	35.6	-70.9	13.9	60.9	-64.3	-46.5	-71.4
2009	64.1	-84.7	42.5	107.8	191.9	-33.5	288.0
Jun 08 - May 09	40.9	-24.8	5.7	112.4	35.9	-40.5	129.6
Jun 09 - May 10	76.8	-76.3	29.0	48.4	88.3	-34.4	131.8
Dec 09	6.7	15.3	-12.4	-30.0	14.0	11.9	5.4
Jan 10	-0.8	-10.4	9.0	-21.0	54.4	-11.1	20.0
Feb 10	4.5	-13.4	-10.3	25.4	8.2	-14.1	0.3
Mar 10	7.5	0.3	0.3	-41.4	28.3	5.4	0.4
Apr 10	9.1	-9.7	7.9	38.8	-54.5	-5.4	-13.8
May 10	6.7	-1.2	-1.5	18.8	7.4	4.6	34.7

¹ This item may differ from the total of the below Table 17, 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 17

	Danish securities			Foreign securities		Total ¹
	Krone-denominated bonds, etc.	Foreign currency denominated bonds, etc.	Shares	Bonds, etc.	Shares	
Kr. billion						
2005	20.8	122.5	-18.9	-108.2	-85.0	-68.8
2006	16.3	70.0	-34.4	-21.5	-133.8	-103.3
2007	26.2	73.4	15.0	-96.7	-50.0	-32.2
2008	-59.1	141.2	11.4	-86.7	54.1	60.9
2009	-0.1	163.3	46.3	-75.2	-26.5	107.8
Dec 09	-9.1	-10.5	3.7	-19.4	5.4	-30.0
Jan 10	0.0	17.0	0.6	-31.8	-6.8	-21.0
Feb 10	14.8	-8.6	7.2	2.8	9.3	25.4
Mar 10	-6.8	5.3	5.5	-41.0	-4.5	-41.4
Apr 10	28.0	16.4	1.7	0.8	-8.0	38.8
May 10	-13.2	9.7	-2.1	23.3	1.2	18.8

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 the above Table 16, as the rest of the balance of payments is published 1-2 weeks later.

DENMARK'S EXTERNAL ASSETS AND LIABILITIES

Table 18

End of period	Direct investments		Portfolio investments		Financial derivatives, net	Other investments			Danmarks Nationalbank	Total
	Equity	Inter-company debt, etc.	Shares, etc.	Bonds, etc.		Trade credits	Loans and deposits	Other		
	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	639	287	796	733	0	47	1,035	32	176	3,745
2008	629	380	449	783	85	45	1,097	37	226	3,731
2009	767	375	602	931	34	40	927	32	400	4,107
Q1 09	674	400	435	842	55	47	1,088	36	269	3,846
Q2 09	746	367	484	878	42	44	992	36	336	3,926
Q3 09	754	369	574	896	40	42	955	33	400	4,063
Q4 09	767	375	602	931	34	40	927	32	400	4,107
Q1 10	808	387	659	1,020	52	45	988	35	423	4,416
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	539	275	422	1,123	...	36	1,405	37	5	3,843
2008	495	291	242	1,198	...	43	1,405	41	121	3,836
2009	504	300	350	1,366	...	36	1,407	37	5	4,006
Q1 09	501	304	229	1,313	...	39	1,479	39	46	3,951
Q2 09	501	292	292	1,355	...	41	1,431	37	38	3,988
Q3 09	499	304	337	1,435	...	35	1,370	38	8	4,026
Q4 09	504	300	350	1,366	...	36	1,407	37	5	4,006
Q1 10	507	298	414	1,412	...	30	1,573	42	2	4,278
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	100	13	373	-390	0	11	-371	-5	171	-98
2008	134	89	207	-415	85	3	-308	-4	105	-106
2009	262	75	252	-435	34	3	-480	-5	395	101
Q1 09	173	95	206	-471	55	7	-391	-3	223	-105
Q2 09	245	75	192	-477	42	3	-439	-1	298	-62
Q3 09	255	65	236	-539	40	7	-414	-5	392	37
Q4 09	262	75	252	-435	34	3	-480	-5	395	101
Q1 10	302	88	245	-392	52	14	-585	-7	421	138

Note: As a key principle, the market value has been used for the compilation.

GDP BY TYPE OF EXPENDITURE

Table 19

	Final domestic demand						Exports of goods and services	Imports of goods and services
	GDP	Private consumption	General-government consumption	Gross fixed capital formation	Change in inventories	Total		
		Kr. billion						
2005	1,545.3	745.1	402.5	303.9	17.9	1,469.5	757.0	681.2
2006	1,631.7	786.6	422.6	356.0	14.6	1,579.8	849.6	797.7
2007	1,691.5	821.7	439.1	379.6	9.8	1,650.2	886.4	845.1
2008	1,737.4	845.5	463.8	365.7	15.7	1,690.7	955.9	909.2
2009	1,662.4	817.6	496.4	308.5	-18.8	1,603.7	785.2	726.5
Q1 09	405.7	199.4	119.3	81.6	-3.4	396.8	194.1	185.2
Q2 09	411.3	203.9	123.3	76.5	-5.8	397.8	191.6	178.1
Q3 09	414.5	200.4	124.6	73.4	-4.2	394.3	198.2	177.9
Q4 09	430.9	213.9	129.3	77.0	-6.3	414.8	201.4	185.3
Q1 10	418.8	210.4	126.2	67.0	-2.4	401.2	198.1	180.5
Real growth compared with previous year, per cent								
2005	2.4	3.8	1.3	4.7	...	3.4	8.0	11.1
2006	3.4	3.6	2.8	14.2	...	5.2	9.0	13.4
2007	1.7	2.4	1.3	2.9	...	1.9	2.2	2.6
2008	-0.9	-0.2	1.6	-4.7	...	-0.5	2.4	3.3
2009	-4.7	-4.6	3.4	-13.0	...	-6.2	-10.2	-13.2
Q1 09	-3.8	-6.0	3.7	-4.9	...	-5.5	-7.7	-11.1
Q2 09	-7.0	-7.0	3.2	-17.3	...	-8.6	-13.5	-16.8
Q3 09	-5.1	-4.4	3.6	-15.0	...	-6.2	-11.2	-13.6
Q4 09	-3.1	-1.0	3.0	-14.3	...	-4.5	-8.3	-11.3
Q1 10	-0.4	3.2	2.5	-18.7	...	-1.0	-2.0	-3.2
Real growth compared with previous quarter (seasonally adjusted), per cent								
Q1 09	-1.8	-1.7	0.9	2.0	...	-3.1	-5.3	-8.0
Q2 09	-1.8	-0.3	0.7	-13.2	...	-2.0	-3.8	-4.3
Q3 09	0.6	0.5	1.0	-0.4	...	1.0	0.5	1.3
Q4 09	0.2	0.7	0.3	-3.0	...	-0.2	0.1	-0.7
Q1 10	0.5	1.7	0.5	-3.3	...	0.2	1.3	0.8

EU-HARMONIZED INDEX OF CONSUMER PRICES (HICP) AND UNDERLYING INFLATION (IMI)

Table 20

	HICP							Index of net retail prices ¹		
	Subcomponents:									
	Total	Energy	Food	Core inflation ²	Administered prices		HICP excl. energy, food and administered prices ³	Index of net retail prices excl. energy, food and administered prices ³	Split into ⁴ :	
					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										
2005	1.7	7.6	1.0	1.0	2.4	3.2	0.6	0.7	3.4	-0.6
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
Q1 07	1.9	1.1	4.1	1.3	2.0	0.3	1.3	1.3	1.7	1.1
Q2 07	1.5	-1.7	3.6	1.5	2.1	0.2	1.5	1.4	0.9	1.7
Q3 07	1.0	-1.4	2.0	1.2	2.2	0.8	1.0	1.2	0.9	1.4
Q4 07	2.2	3.3	5.2	1.2	2.0	1.0	1.2	1.6	2.0	1.4
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

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 21

	Unemployment Per cent of labour force	Quantity index		Forced sales of real property	New passen- ger car registra- tions	Con- sumer confi- dence indicator	Composite cyclical indicator for		
		Manu- facturing industry 2005=100	Retail trade 2005=100				Manu- facturing industry	Building and construc- tion	Service
2005	5.1	100.0	100.2	1,874	148,578	9	0	7	20
2006	3.9	105.7	103.5	1,231	156,719	10	9	21	24
2007	2.8	107.0	104.9	1,392	162,481	7	5	9	20
2008	1.9	106.7	101.7	2,840	150,663	-8	-7	-16	3
2009	3.6	88.2	97.0	4,140	112,247	-5	-17	-44	-13
Seasonally adjusted									
Jan 10	4.3	85.3	96.3	473	13,205	-1	3	-42	-1
Feb 10	4.3	87.0	96.1	463	10,750	3	5	-46	4
Mar 10	4.3	88.6	98.4	497	12,665	1	7	-40	1
Apr 10	4.2	85.7	94.1	383	11,825	2	6	-33	1
May 10	4.1	89.5	97.5	455	12,527	2	8	-32	6
Jun 10 .....	...	...	...	457	11,752	-1	5	-34	8

¹ Excluding shipbuilding.

SELECTED QUARTERLY ECONOMIC INDICATORS

Table 22

	Employment		Hourly earnings			Property prices (purchase sum, one-family dwellings) As a percentage of property value 2006
	Total	Private	All sectors in Denmark, total	Manufacturing industry in Denmark	Manufacturing industry abroad	
	1,000 persons		1996=100			
2005	2,767	1,924	141.4	141.7	130.7	82.3
2006	2,825	1,980	145.7	146.1	134.2	100.0
2007	2,908	2,066	151.3	152.1	138.4	104.9
2008	2,964	2,126	158.0	158.4	143.0	101.1
2009	2,864	2,015	162.9	163.2	145.5	87.1
Seasonally adjusted						
Q1 09	2,924	2,080	161.7	162.1	144.5	87.3
Q2 09	2,886	2,036	162.3	162.7	145.0	86.8
Q3 09	2,842	1,991	163.4	163.9	145.9	87.5
Q4 09	2,804	1,953	164.1	164.9	146.7	86.8
Q1 10	2,791	1,934	165.8	166.1	148.6	...
Change compared with previous year, per cent						
2005	1.0	1.4	2.9	2.7	2.5	17.4
2006	2.1	2.9	3.1	3.1	2.7	21.5
2007	2.9	4.4	3.8	4.0	3.2	4.9
2008	1.9	2.9	4.4	4.2	3.3	-3.6
2009	-3.4	-5.2	3.1	3.0	1.8	-13.8
Q1 09	-1.1	-1.8	4.1	3.9	1.8	-15.1
Q2 09	-2.4	-4.0	3.0	2.7	1.7	-16.3
Q3 09	-4.3	-6.7	2.8	2.6	1.7	-13.3
Q4 09	-5.5	-8.2	2.3	2.5	1.9	-6.7
Q1 10	-4.5	-7.0	2.5	2.5	2.8	...

EXCHANGE RATES

Table 23

	EUR	USD	GBP	SEK	NOK	CHF	JPY
	Kroner per 100 units						
	Average						
2005	745.19	600.34	1,090.02	80.29	93.11	481.30	5.4473
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
Jan 10	744.24	521.55	842.99	73.01	90.97	504.06	5.7128
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

EFFECTIVE KRONE RATE Table 24

	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
2005	101.6	241.7	228.5	107.5	109.6	100.0
2006	101.6	246.2	233.4	107.3	110.2	102.2
2007	103.2	250.5	238.7	108.3	112.7	104.4
2008	105.8	259.0	246.9	111.1	116.7	107.8
2009	107.8	262.4	247.3	114.9	120.7	108.1
Jan 10	107.0	263.6	248.5	113.8	...	108.1
Feb 10	105.7	266.6	249.5	113.4	...	108.4
Mar 10	105.4	268.2	250.7	113.3	118.2	109.4
Apr 10	104.8	268.6	251.4	112.5	...	109.9
May 10	103.3	268.6	...	...	...	110.0
Jun 10	102.2	268.2	...	...	...	110.0
Change compared with previous year, per cent						
2005	-0.6	1.8	2.0	-0.7	-0.2	2.2
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	0.2	3.4	3.4	0.3
Jan 10	-0.3	2.0	1.3	0.0	...	1.0
Feb 10	-1.0	1.9	1.3	-0.7	...	0.9
Mar 10	-2.4	2.2	1.7	-2.2	-1.9	1.4
Apr 10	-2.4	2.4	1.8	-2.1	...	1.5
May 10	-3.9	2.2	...	...	...	1.6
Jun 10	-5.4	1.7	...	...	...	1.4

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 - 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:
nationalbanken.statbank.dk

Special Reports

Special Reports deal with statistics of a thematic character and are not prepared on a regular basis.

Release calendar

A release calendar for the statistical publications, covering the current month and the following quarter, is available on:
www.nationalbanken.dk (see Statistics > Release calendar).