BANK OF FINLAND
BULLETIN
EUROJÄRJESTELMÄ
EUROSYSTEMET

1 · 2013

Monetary policy and the global economy

Contents

Bank of Finland Bulletin 1 • 2013
Vol. 87
Published 18 April 2013
The Bank of Finland Bulletin is published five times a year.

The Monetary policy and the global economy article was prepared in the Monetary Policy and Research Department under the supervision of Samu Kurri.

Authors
Hanna Freystätter
Juhana Hukkinen
Pasi Ikonen
Kristiina Karjanlahti
Mika Kortelainen
Kimmo Koskinen
Märten Ross
Heidi Schauman
Katja Taipalus
Lauri Vilmi

Assistants
Heli Honkaharju
Sami Oinonen

Translated and edited
by the Bank of Finland Language and Publication Services

Subscriptions
email: BoFpublications@edita.fi

Printed
Edita Prima Oy, Helsinki 2013

ISSN 0784-6509 (print)
ISSN 1456-5870 (online)

Bank of Finland
PO Box 160
FI-00101 HELSINKI
Phone: National 010 8311,
International +358 10 8311
Fax: +358 9 174 872
www.bof.fi

The cover picture depicts the national motif on the Irish 50 cent coin: The Celtic harp, a traditional symbol of Ireland.

Monetary policy and the global economy

9 March 2013

Executive summary

The deepening of the debt crisis in the euro area increased uncertainty and disrupted the financial markets in late spring 2012. The uncertainty and more difficult financing conditions weakened household and business confidence in many key countries in summer and early autumn. The most significant drop in confidence indicators was in the euro area, where there was a substantial decline in GDP in the second half of 2012.

Despite the weak trend in the real economy, uncertainty on the financial markets eased towards the end of the year. Share prices climbed and there were positive developments on the sovereign bond markets. The programme of Outright Monetary Transactions (OMT) announced by the ECB Governing Council in September 2012, conditional on uptake of an appropriate EFSF/ESM programme, has played an important role in calming the situation.

According to the Bank of Finland's spring 2013 international economic forecast, world economic growth in the current year will still be just over 3%. The forecast has been revised downwards, particularly for the EU 20 area, where unemployment will remain substantial and the economy contract in the current year at around the same pace as in 2012, by approximately ½%. Overall, GDP in the EU 20 is forecast not to reach its pre-crisis level until 2015. Due to the fragility of the situation, the risks to the growth forecast are still mainly on the downside. Euro area inflation dropped below 2% in February, with the accelerator effect from energy and food prices fading and the prolonged recession beginning to make itself felt in domestic inflationary pressures. It can be assumed that the current change will turn out to be long term. The Bank of Finland forecast envisages EU 20 inflation remaining around 1½% for almost the whole forecast period.

Public and private sector balance sheet adjustment and tight financing conditions, particularly in the crisis countries, will weigh on euro area growth in the immediate years ahead and moderate the outlook for inflation. The euro area economy will gain strength only gradually as the decline in housing prices in the crisis countries peters out, the health of the banking sector is restored and the level of private debt is reduced. Balance sheet adjustment is, however, a slow process. For example, in the United States signs of an end to the process of household debt adjustment have only recently gained strength, more than 5 years after the onset of the crisis.

The growth in public debt is not limited to the euro area, a similar trend being discernible in the advanced economies more broadly. A typical feature is that the debt ratio has barely fallen during economic upswings, while continuing to grow at other times. Debt accumulation accelerated as a consequence of the financial crisis. From the point of view of the economic policies pursued in the advanced economies in recent decades, reducing the ratio of public debt presents a new challenge that will have to be met one way or another.

The ECB Governing Council has responded to the challenges facing the euro area and the expected slowdown in inflation with an accommodative monetary policy alongside non-standard monetary policy measures to secure stability in the euro area. Since July 2012, the Eurosystem's key policy rate has been 0.75%, and continuation of the fixed-rate, full-allotment policy in central bank refinancing operations ensures the availability of funding for the banking sector. As the financial market tensions recede, the impact of the low policy rate will feed through better into the real economy. The accommodative monetary policy gives time for a controlled reduction in debt.

There is fairly widespread unanimity that the rapid cut in interest rates and non-standard monetary policy measures have prevented a repeat of an uncontrolled deflationary spiral like that of the 1930s. The crisis cannot, however, be resolved by monetary policy means alone. The problems in the real economy will require real economy solutions.

I Cyclical conditions and outlook for the global economy

The deepening of the euro area debt crisis in 2012 increased uncertainty worldwide and impaired the operation of the financial markets from late spring. The uncertainty and more difficult funding conditions eroded household and business confidence in many key countries during the summer and early autumn.

Chart 1.

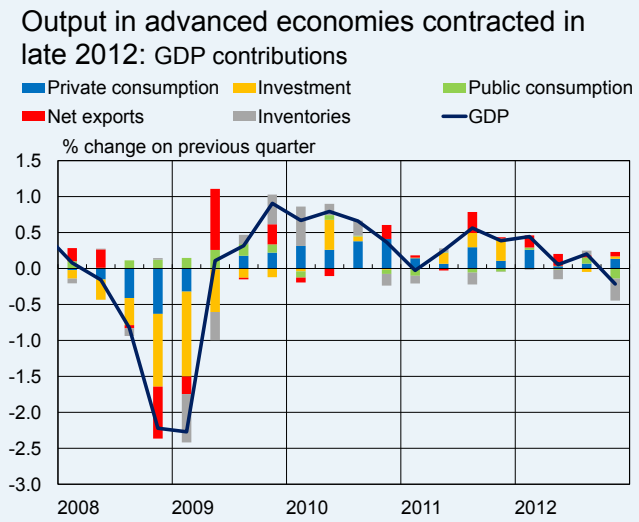


Chart 2.

The strongest declines in confidence indicators were experienced in the euro area, where purchasing managers' indices for manufacturing and services pointed to a contraction of economic activity during the autumn. Although the financial markets calmed and the climate of confidence improved slightly towards the end of the year, GDP declined strongly in the fourth quarter of 2012 (-0.6% on the previous quarter) (Chart 1). Consequently, the basis for the current year was fragile.

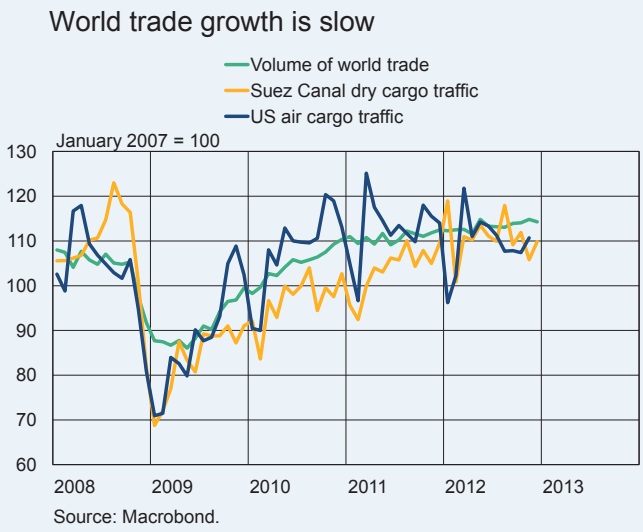
Despite weak performance in the real economy, uncertainty in the financial markets receded towards the end of the year. Stock prices rose and related uncertainty diminished, while sovereign debt markets witnessed declining yield curves for eg Spanish and Italian government bonds (Chart 2). In addition, bank deposits in euro area crisis countries were grew mildly, and TARGET balances reflecting an uneven country-specific distribution of banks' borrowing from the central bank contracted to some extent.

In the latter half of 2012, private consumption and investment growth in the United States was depressed by uncertainty over the stance of fiscal policy. In addition, subdued growth in inventories and lower defence expenditure led to sluggish GDP growth in the fourth quarter. The Japanese economy performed very poorly in the second half of 2012. In the third

quarter, GDP dropped by almost 1% on the previous quarter and continued contracting slightly in the last quarter. By contrast, economic growth in China picked up as expected towards the end of 2012, with whole-year growth reaching nearly 8%.

Viewed globally, the deteriorating economic situation was reflected especially in world trade indicators. The development of indicators for cargo traffic in international trade was very poor at the end of 2012. The volume of imports and exports in advanced economies remained almost unchanged in the second half of the year (Chart 3).

Chart 3.

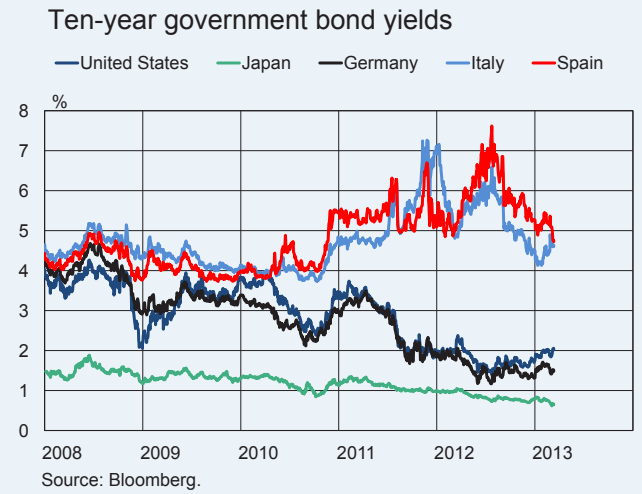


Bank of Finland's spring 2013 forecast assumptions for the international economy

The Bank of Finland's spring 2013 forecast for the international economy is based on the assumption that policy measures sufficient for managing the euro area confidence crisis can be successfully implemented and the crisis will be brought permanently under control. The forecast assumes euro area countries will honour their commitments concerning fiscal adjustment and structural reforms.

As countries seek to fulfil general government deficit targets in accordance with their stability programmes, fiscal policy will remain fairly tight. Such fiscal tightening, which governments need to implement in order to improve confidence and safeguard the operation of sovereign debt markets, will impair growth prospects over the short term. But higher fiscal policy credibility will enable a reduction in the financially stressed countries' overall interest rate levels (Chart 4). This reduction is a prerequisite for an improvement in the position of the private sector. Substantial debt levels in the crisis

Chart 4.



countries can, however, be corrected only slowly and gradually.

The other forecast assumptions are based on market information. In regard to monetary policy, the new forecast for short-term interest rates is based on market expectations derived from 3-month interest rate futures on 27 February 2013. These were also used, along with uncovered interest rate parity, to derive the exchange rate expectations in the forecast. The largest changes in expectations are related to the Japanese yen, whose external value has depreciated by 14% during the last six months, as measured by the trade-weighted index. Market expectations suggest that the yen will stabilise at its new lower level. Market expectations regarding interest rates in the euro area have been revised just a little upward relative to expectations at the time of the September 2012 forecast. The assumptions regarding crude oil and other commodity prices are based on the futures prices prevailing on 27 February (Chart 5).

Chart 5.

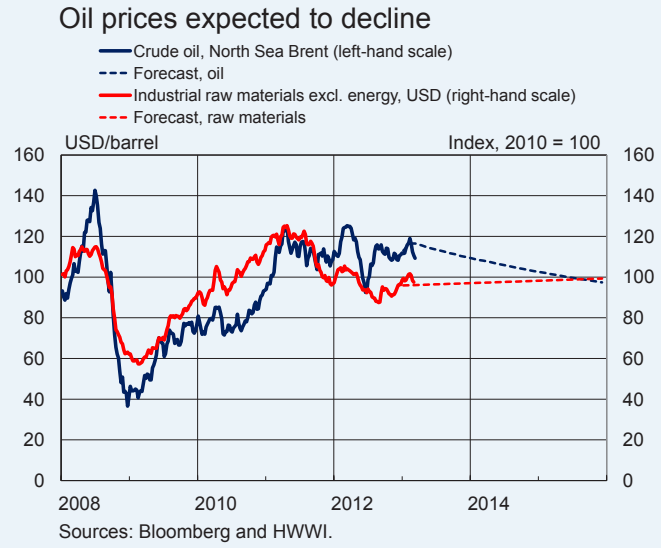
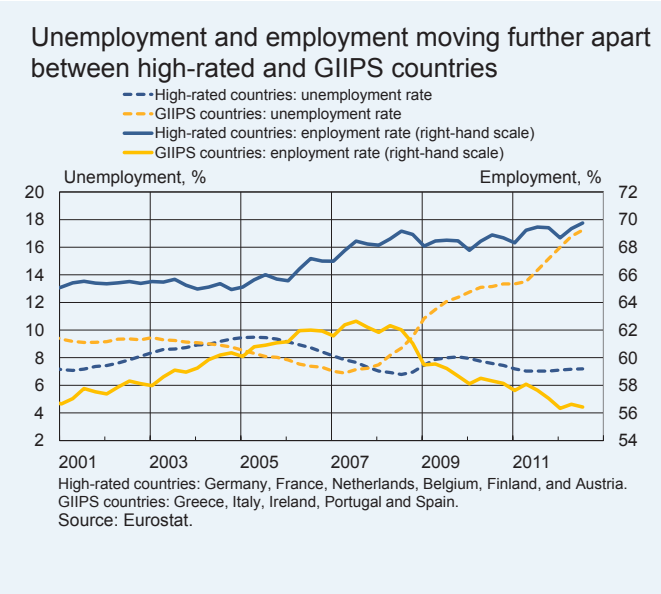


Chart 6.



Euro area faces the challenge of breaking the spiral of weak economic activity and tight funding conditions

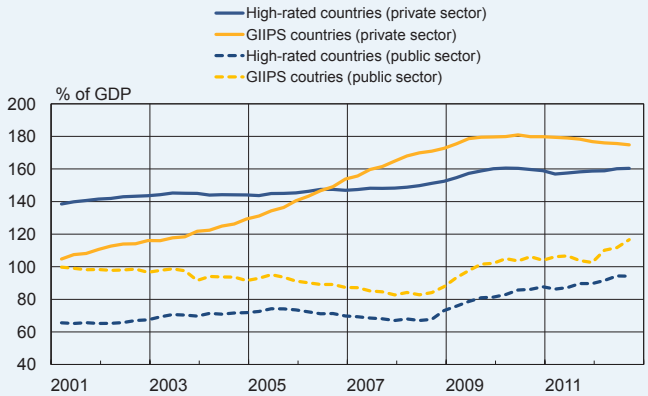
Despite accommodative euro area monetary policy and subdued financial market tensions, the easing of funding conditions for governments and banks has filtered slowly and unevenly through to the private sector's funding costs across countries. This is due to a high degree of indebtedness and an already long-sustained period of subdued economic performance in many countries, which further hampers the loan-servicing capacity of non-financial corporations and households as well as the state of the banking sector and banks' ability to lend. The euro area faces the challenge of breaking the spiral of weak economic activity and tight funding conditions.

High unemployment, tight funding conditions and huge debt burdens are particularly dampening domestic demand in the GIIPS countries (Greece, Italy, Ireland, Portugal and Spain) (Charts 6 and 7). On one hand, reductions in these countries' current account deficits reflect lower imports. On the other hand, however, this is also a reflection of export growth, which has exceeded its pre-crisis level in euro terms, except for Greece. Price competitiveness has continued to improve, and the real exchange rate, measured in terms of unit labour costs, has depreciated in most GIIPS countries.

Lower levels of current account deficit help create conditions for the resumption of growth in the euro area. A return of the current account to balance means that a country's external debt accumulation is halted, which reduces funding problems and the threat of a balance of payments crisis. However, although there would be no further increase in the country's external indebtedness, considerably high levels of private and public debt could still lead to uncontrollable capital movements and a resultant aggravation of funding problems. According to statistics up to late 2012, however, private capital would appear to have returned to the GIIPS countries, which has eased funding for their governments and banks. Even so, increased market nervousness since the end of January 2013 may slow favourable developments.

Reducing the huge debt burdens will subdue euro area growth in the immediate years ahead and maintain the risk of a balance sheet recession (Chart 7). Private sector deleveraging in the euro area has only just begun, and tools to speed up the process are few. Public indebtedness will continue to grow, despite already alarmingly high levels of debt in most countries. Going forward, public debt accumulation can no longer be a driver of growth in the euro area.

Chart 7.



High-rated countries: Germany, France, Netherlands, Belgium, Finland and Austria.
GIIPS countries: Greece, Italy, Ireland, Portugal and Spain.
Source: European Central Bank.

Balance sheet adjustment undermines growth prospects in many EU countries

According to the Bank of Finland's spring 2013 forecast for the global economy, the EU20 countries[1] will see their economies contract by about ½% in the current year, ie at about the same pace as in 2012. The forecast for 2013 has been revised downwards due, above all, to weaker developments in the latter half of 2012 than forecast in September, but growth in early 2013 is also proving lower than previously predicted (Chart 8).

[1] Euro area, United Kingdom, Sweden and Denmark.

Chart 8.

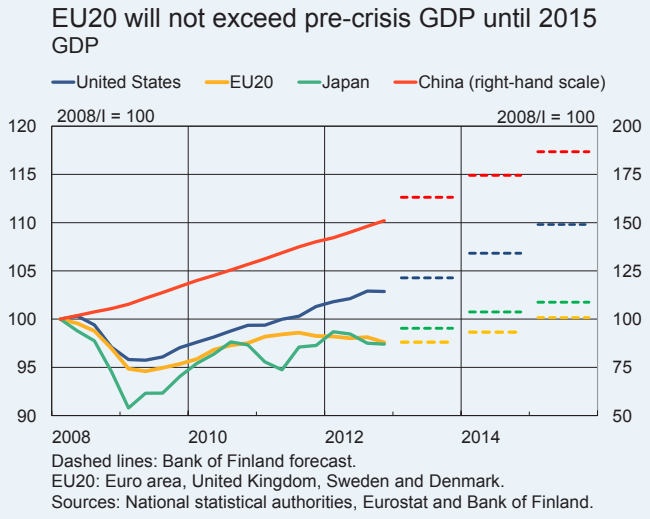
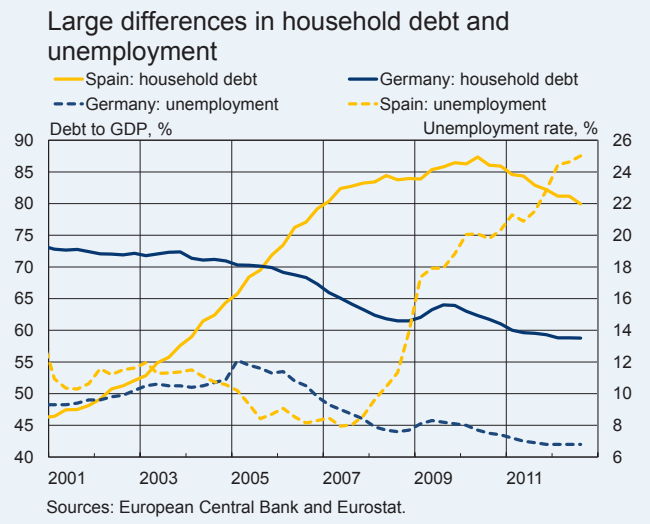


Chart 9.



Differences across EU countries are significant. In **Germany**, economic growth slowed in the latter half of 2012. Exports were depressed by low growth in euro area countries important for external demand and particularly exports. Growth in demand for capital goods produced by German industry also decelerated in the home market in the wake of higher uncertainty. The German economy is, however, in good shape in terms of economic fundamentals: the current account is in surplus, reflecting good competitiveness, household debt accumulation has declined, the unemployment rate has been halved during the past seven years and industrial expectations have improved considerably in recent months. The low level of interest rates and rising house prices are sustaining construction activity. Moreover, preliminary estimates suggest that federal public finances achieved structural balance as defined in the debt brake laws as early as 2012.

In **Spain**, for its part, the situation is difficult in respect of both economic growth and economic fundamentals. Spanish GDP continues to contract, the current account is only now returning to balance, corporate and household indebtedness is significant, the banking sector's restructuring is still partly ongoing, house prices are falling and the already record unemployment is continuing to grow. Public sector spending cuts and tax increases will reduce public consumption and investment demand as well as household purchasing power, eroding economic growth in the short term. Over the longer term, however, fiscal tightening will support the government's debt-sustainability, which will enable a reduction in interest rates on the country's sovereign debt. However, both public and private sector debt has reached such dimensions that it will require a long period of adjustment

(Chart 9). The strongly increased unemployment has curbed labour cost increases, which has begun to improve the price-competitiveness of exports. Growth in exports to regions outside Europe in particular has been significant, which has helped reduce the current account deficit.

The 2013 growth outlook for **France** is subdued. High unemployment, weak business confidence and fiscal consolidation will subdue growth in domestic demand. With exports recovering, domestic demand will begin to improve in 2014–2015. The impact of structural reforms boosting competitiveness and labour market functioning may start to be reflected in growth towards the end of the forecast horizon.

The **Italian** economy declined by approximately 2% in 2012, with GDP contraction also continuing in annual terms in the current year. Growth is, however, forecast to recover gradually from the latter half of 2013. Owing to predicted growth and fiscal tightening measures already decided, the general government debt ratio is expected to stabilise towards the end of the forecast horizon. The outcome of the February general election put Italy in a deadlock situation, where there is no obvious basis for a government. Heightened political uncertainty will increase the risks of more subdued economic activity than projected in both Italy and the euro area as a whole.

As regards **Greece**, **Ireland** and **Portugal**, the Bank of Finland forecast relies on EU/IMF programmes.

GDP growth in the **United Kingdom** remained at zero in 2012, but the outlook for the next few years is slightly brighter. Weak productivity performance, lacklustre domestic demand and tight fiscal policy have impaired economic activity in recent years. Even so, the employment situation has remained relatively good in view of the seriousness of the crisis. Accordingly, acceleration in economic growth during the forecast period will require an improvement in productivity. The outlook for the **Swedish** economy deteriorated rapidly in the autumn and winter. Growth in 2012 remained below 1%, despite being brisk at the beginning of the year. More modest developments than expected in the world economy have affected Sweden's economic prospects more than estimated earlier, with orders for the export industry also pointing to a weak opening to 2013. Nevertheless, the outlook for Sweden has remained better than for many other European countries. The euro area situation will also be reflected in the non-euro area **Central** and **Eastern European Countries**, which have close links with the euro area via both exports and the financial sector.

Signs of accelerating growth in the United States and China

In the **United States**, private consumption and investment growth in the latter half of 2012 was eroded by uncertainty about the stance of fiscal policy. On top of this, growth in the fourth quarter of the year was impaired by slow growth in inventories and cuts in defence expenditure. These effects will be temporary, however. Household

The United States is running a large federal budget deficit.

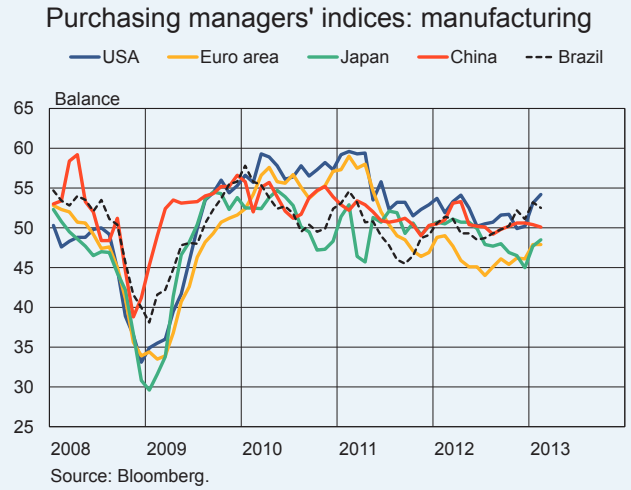
Table 1.

Growth in GDP and world trade

GDP	*2011*	*2012f*	*2013f*	*2014f*	*2015f*
United States	*1.8*	*2.2 (2.2)*	*1.8 (2.2)*	*2.4 (2.6)*	*2.8*
EU (20)	*1.5*	*–0.4 (–0.4)*	*–0.4 (0.4)*	*1.1 (1.4)*	*1.5*
Japan	*–0.5*	*1.9 (2.5)*	*1.1 (0.6)*	*1.7 (1.1)*	*1.0*
China	*9.2*	*7.8 (8.0)*	*8.0 (8.0)*	*7.0 (7.0)*	*7.0*
Russia	*4.3*	*3.5 (3.7)*	*3.4 (3.7)*	*3.4 (3.4)*	*3.0*
World	***3.8***	***3.1*** *(3.2)*	***3.2*** *(3.5)*	***3.6*** *(3.7)*	***3.8***
World trade	*6.2*	*3.4 (3.1)*	*4.0 (4.8)*	*5.7 (6.0)*	*6.3*

f = forecast
% change on previous year (previous forecast in brackets)
Source: Bank of Finland.

Chart 10.



debt has declined to the same level as 2004, while wealth has begun to increase in response to a strong recovery in asset prices and a high savings ratio. At the same time, corporate profits are record high. By contrast, the federal budget deficit is large. Consequently, private consumption growth in the early part of the year is assumed to be sluggish, because of tax increases and spending cuts, but to accelerate towards the end of the year against the backdrop of stronger household balance sheets. Fiscal consolidation is estimated to be strongest in 2013, when the federal budget deficit is likely to contract by some 2% of GDP (Table 1).

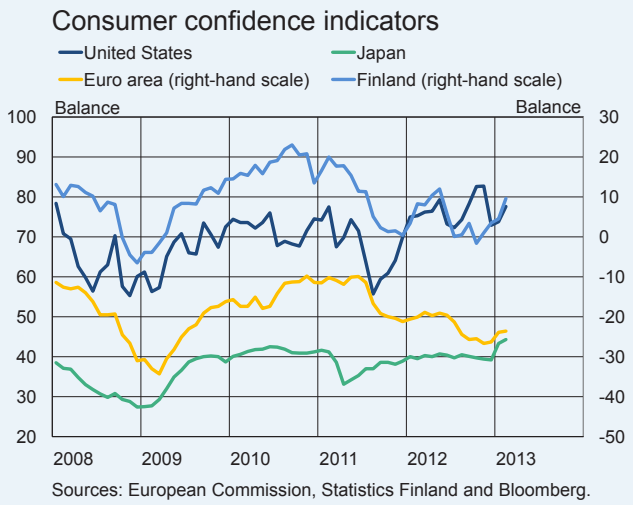
The **Japanese** economy declined in the second half of 2012. The country's new government has increased stimulus measures as promised in the election campaign, focusing especially on investment and reconstruction. Moreover, the central bank of Japan raised its inflation target to 2% and announced more quantitative easing of monetary policy. The aim of these measures is to take a grip on the deflation that has already plagued the country for a decade and a half. The value of the yen has depreciated by about 14% since late September 2012, as measured in terms of the broad trade-weighted nominal exchange rate index.

In Japan, repeated stimulus packages have led to continuous budget deficits and the swelling of public debt to record levels. According to the forecast, the country's public debt will grow to about 240% of GDP in 2013. The large public debt is offset by Japan being a very rich national economy. The bulk of the public debt is held domestically and the private sector also has substantial claims on non-residents. The forecast for Japanese economic growth

in 2013 and 2014 has been revised upwards on what was predicted last autumn, on account of the new government's stimulus package. Fiscal and monetary stimulus is expected to encourage domestic consumption. Moreover, yen devaluation will boost net exports.

Economic growth in **China** picked up as expected towards the end of 2012, with whole-year growth reaching nearly 8%. Early this year, annual growth may still accelerate just a little, aided by the poor starting level at the beginning of 2012, but GDP for the whole of 2013 is predicted to grow by approximately 8%, as before. In the future, China will seek to amend its investment-driven growth model based on goods production towards a more consumption-driven and services-oriented approach, which will cause the country's pace of growth to decline to around 7% in 2014–2015. Slowing growth may be a sign of sound changes in economic structures and of a move towards a more sustainable growth model. In terms of goods exchange, China is already a trading power comparable to the United States, and sizeable surpluses in its foreign trade and financial accounts have provoked problems relating to trade policy. However, following the global economic crisis, China's surpluses have declined. The forecast assumes no aggravation of China's problems with the United States, Japan or the EU. Although Chinese economic growth is projected to slow slightly, the country's import volumes will grow faster than world trade, thereby underpinning world economic growth.

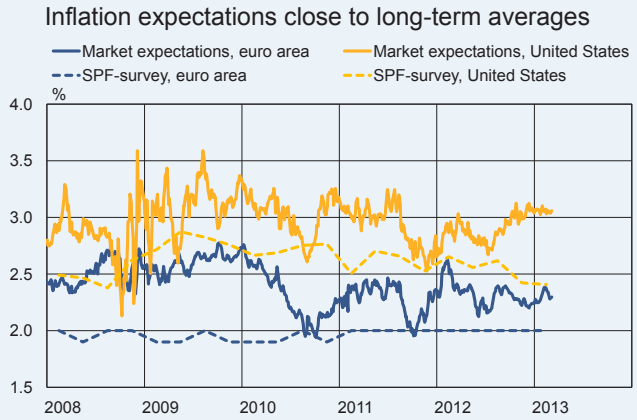
Chart 11.



Russian GDP grew by about 3% in the second half of last year. Private consumption growth slowed, albeit remaining fairly rapid until the end of the year. Exports grew sluggishly and investment growth receded strongly during the year. The assumed gradual fall in oil prices will weigh on economic growth. Growth in private consumption is, however, estimated to continue at a fairly brisk pace. The reduction of unemployment to unprecedented lows will buttress payroll growth in the private sector, but lower corporate profitability will curb real pay increases. Pay increases in the public sector are likely to slow, and efforts will be made to keep real increases in pensions at the pace of economic growth. These and other government expenditure will be limited by a new budget rule, under which spending is tied to previous years' oil prices.

Overall, the **world economy** will only see growth in the range of a good 3% in the current year, too. Growth will recover towards the end of the year, as the recession in the EU20 recedes and the effects of US fiscal tightening wane. Growth in 2014 and 2015 is forecast to accelerate to just under 4%. World trade growth will continue at a very slow pace over the next few quarters. In advanced economies, deleveraging in the private and public sector will be reflected in weak demand for consumer durables and capital goods. In contrast, world trade will be driven by import growth in China. Towards the end of the forecast horizon, world trade is projected to achieve its average long-term (1990–2008) growth rate. Global imbalances will be corrected to some extent, as Chinese net exports, among other factors, are expected to be slightly lower than earlier.

Chart 12.



Inflation expectations are based on 5-year inflation swaps. 3-day moving averages.
SPF-survey 5 years ahead.
Sources: Bloomberg, ECB, Federal Reserve Bank of Philadelphia and calculations by Bank of Finland.

Inflation outlook stable

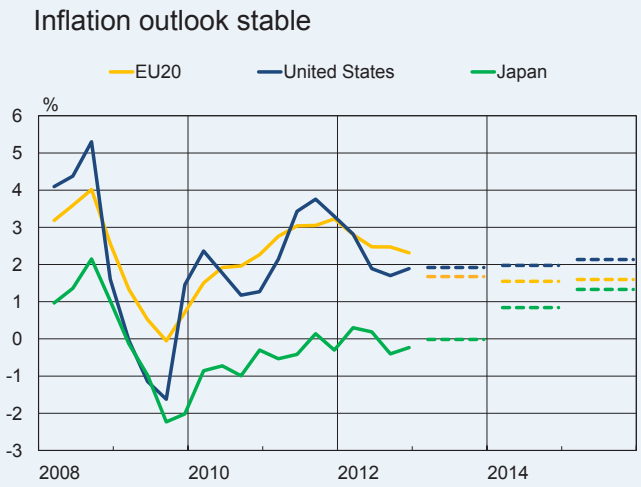
Price developments in the main economic regions were rather steady at the end of 2012. In January, consumer price inflation was 2.0% in the euro area, 1.6% in the United States and 2.0% in China. In contrast, deflation still prevailed in Japan. Factors underlying stable inflation performance include the levelling off of commodity prices since the summer and the maintenance of firmly anchored inflation expectations. According to oil futures prices, the markets expect the price of oil to continue declining moderately throughout the forecast period. Other industrial raw materials have also witnessed moderate price changes due, in part, to the muted growth outlook for the economies. World market prices for food have declined modestly from the elevated levels to which they were brought by the drought in summer 2012. Long-term inflation expectations derived from market information (5-year inflation expectations 5 years hence) in both the euro area and the United States have remained anchored close to their averages over the last five years (Chart 12).

In the last two years, euro area inflation has exceeded its 2% reference value. At the same time, forecasts have pointed to inflation falling below 2% over the policy relevant medium-term horizon, and market inflation expectations have remained stable. The faster inflation rate than the reference value has been due, in particular, to higher energy and food prices. This effect is now petering out. Another driver of

inflation has been indirect tax and payment increases effected with a view to improving the public finances. These effects are assumed to be strongest in 2012 and 2013. The appreciation of the euro has also helped reduce inflation pressures.

Euro area inflation fell below 2% in February (preliminary information 1.8%). If developments in the real economy are to materialise as estimated in the Bank of Finland's spring 2013 forecast for the global economy, inflation is likely to remain well below its reference value throughout the forecast horizon, as weak domestic demand and ongoing high unemployment keep domestic inflation pressures in check. The forecast therefore **envisages inflation in the EU20 countries** decelerating to around 1.5% during the forecast period (Chart 13). The **United States** is also estimated to see inflation staying close to the current 2% level throughout the forecast period. Price pressures stemming from US domestic demand are predicted to remain fairly neutral, and changes in monetary policy communication will only have a slight impact on the inflation outlook for the remainder of the forecast period. According to the Bank of Finland forecast, inflation in **Japan** will accelerate discernibly. The country's inflation is expected to turn positive at the beginning of 2014 and to pick up moderately to around 1%. The forecast is affected by both the strong depreciation in the yen's exchange rate towards the end of the year and higher inflation expectations on account of the Bank of Japan's new objectives.

Chart 13.



Risks to the forecast

The forecast is based on the assumption that the improvement in confidence that began in euro area financial markets in the latter half of 2012 will continue. There are many factors underlying the perceived stabilisation of the situation. Of these, the most prominent is the Outright Monetary Transactions (OMT) programme announced by the ECB, which significantly reduced nervousness in the crisis countries' sovereign debt markets during the autumn. However, the OMT programme is in itself no solution to the problems of sovereign debt sustainability and competitiveness. Its purpose is to safeguard adequate market functioning with a view to enabling the countries to carry out their fiscal and structural programmes. If the countries' ability to take, or commitment to taking, remedial action proves insuffi-

Table 2.

Effects of lower risk appetite in euro area

	Deviations from baseline		
	2013	*2014*	*2015*
Real GDP, %	*–0.9*	*–1.2*	*–1.0*
Investment, %	*–4.3*	*–5.4*	*–5.0*
Core inflation, % points	*–0.2*	*–0.3*	*–0.3*

Source: Calculations by the Bank of Finland.

cient, favourable progress may be rapidly reversed and the ECB will then have no room for preventing market reactions.

Consequently, it is a clear risk to the forecast that the adjustment programmes will not move ahead as planned. This would have an obvious negative impact on euro area growth.

A faster-than-expected recovery in US private sector consumption and investment can be considered a positive risk to the forecast for growth.

The forecast analyses the implications of this type of situation via a scenario calculation (Table 2). The scenario assumes that lower risk appetite will temporarily increase sovereign debt risk premia in the euro area by an average of 0.5–0.75 of a percentage point and corporate bond risk premia by 2 percentage points. In practice, this means a strong rise in interest rates in the crisis countries and a mild decline in the financially stronger countries. Higher interest rates will quickly cut domestic demand and reduce GDP by about 1% relative to the baseline. Inflation will decelerate by less than ½ of a percentage point over the medium term. The real exchange rate of the euro will depreciate mildly in the short term. The scenario and the model employed for its construction are described in more detail in the article 'A model of the international monetary and fiscal economy' (below).

Heightening exchange rate volatility may also disturb improvements in the euro area situation. Appreciation of the euro's trade-weighted exchange rate during the last six months is not problematic as such, and it has reflected an improvement in market assessments of the euro area. However, continued euro appreciation could slow problem countries' adoption of more export-driven economic structures and thus worsen the growth outlook for the euro area. A considerable further strengthening of the euro could also dampen the euro area inflation rate by much more than anticipated, possibly even to the extent of deflation.

A faster-than-expected recovery in US private sector consumption and investment can be considered a positive risk to the forecast for global economic growth. Balance sheet adjustment by US households and non-financial corporations has already advanced relatively far, which may also result in a more rapid resumption of economic activity than currently projected. This would support recovery in world trade as a whole, and via this channel also growth in Asia and Europe. On the other hand, commodity prices would then probably rise faster than foreseen in the current forecast, inflation would accelerate and the justifications for continuing non-standard monetary policy measures would be reduced.

Another possibility is that the structural reforms undertaken in recent years could have a larger-than-forecast

Box 1.

Economic developments in sub-Saharan Africa

Sub-Saharan Africa has become one of the fastest-growing economic regions in the world. Factors behind this development include rapid population growth, an abundance of natural resources and an improved policy environment. On the other hand, the challenges relating to poverty, weak governance, unemployment and political instability are still considerable.

The economic catch-up phase of sub-Saharan African (SSA) economies appears to have finally commenced. During the first post-millennium decade, the economy of the region grew by an average of 4.7% a year. Excluding South Africa, which accounts for a third of the region's economy, growth was as much as 6%. In the two preceding decades, average annual GDP growth in the region was 2%, meaning that real GDP per capita contracted by almost 15%.[1] It was not until the end of the 1990s that the longer-term pace of GDP growth exceeded population growth (Chart A). Despite strong growth, sub-Saharan Africa still lags considerably behind the rest of the world. The region's 875 million people account for 12.5% of the global population, but its GDP contribution remains at 2% of the global economy. According to the World Bank definition, 26 of the world's 36 low-income countries (LICs)[2] and 18 of the world's 33 fragile states are located in the region.

Strengthened macro economy has softened shocks

Despite the global financial and economic crisis, the economy of sub-Saharan Africa grew by 4.8% in 2012, with growth expected to accelerate to almost 6% in 2013 and 2014. This would take the region into the group of the world's fastest-growing areas.[3] Strong domestic consumption and high commodity prices have supported growth, although the slowing of the global economy has at the same time weakened export demand. Growth has been particularly rapid in the region's countries with low income levels, whereas growth in the middle-income countries (MICs)[4] has more closely followed the trend in the global economy. However, sub-Saharan Africa is not immune to developments in the global economy. The realisation of downside risks to world economic growth would also significantly slow growth in the region's economies.

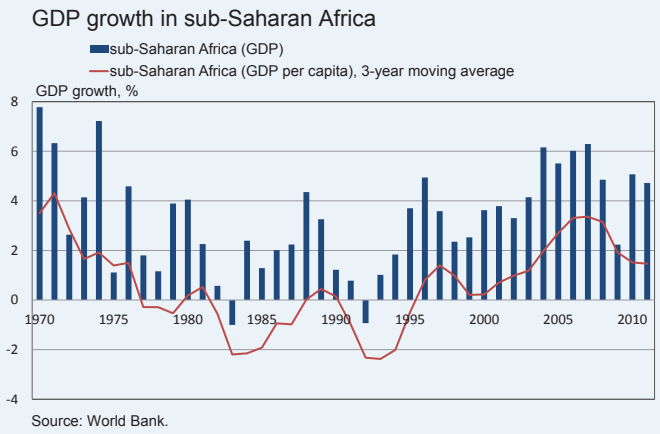
[1] *World Bank (2012) World Development Indicators.*

[2] *According to the World Bank definition: GDI per capita is below USD 1,025.*

[3] *IMF (2013) World Economic Outlook, update 1/2013.*

[4] *According to the World Bank definition: GDI per capital is USD 1,026–4,035.*

Chart A.



Source: World Bank.

More stable macroeconomic developments in the 2000s, such as decelerating inflation and declining public-sector debt levels, have helped the region's economies adjust to external shocks. In the first post-millennium decade, the inflation rate mainly remained below 10%, but upward pressures especially on food and oil prices led to price spikes in 2008 and 2011. In 2012, the inflation rate decelerated to 8%. In East Africa, in particular, the response to the 2011 price spikes was to tighten monetary policy. Falling goods prices and favourable weather conditions have also contributed to a moderation in price developments.

Thanks to debt relief programmes launched at the end of the 1990s, the general government debt-to-GDP ratio of the countries in the region contracted from more than 70% to less than 30% in 2008. The improved state of public finances enabled a fiscal policy response to the financial crisis. Nevertheless, despite a post-2008 return to growth, several countries in the region have been slow in adjusting growing public deficits. This has weakened the ability of certain countries, such as Mozambique or Guinea, to respond to potential new external shocks. Overall, however, the trend in debt levels is expected to remain stable.

Capital flows have supported growth

External resources available to sub-Saharan African countries have multiplied during the last decade. In particular, direct investment and development aid to the region have increased in the 2000s, constituting the largest external sources of finance. In addition, the amount of migrants' remittances has more than quadrupled. The global crisis was also reflected in a contraction of capital flows to the region's countries, particularly in direct investment, which declined in 2008 and 2012 (Chart B).

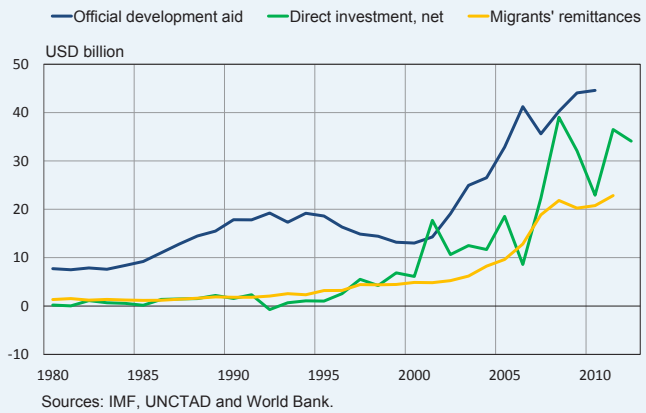
About 40%[5] of the region's direct investment still comes from the OECD countries, but the importance of emerging economies, and notably China, has increased. China's share of direct investment has expanded from approximately USD 70 million in 2002 to nearly USD 3 billion in 2011.[6] The bulk of investments from emerging economies have been concentrated on the natural resource sector, but the investments are becoming increasingly diversified, focusing on agricultural, productive and service sectors. In 2011, the main recipient countries for direct investment were the largest economies within the country group – Nigeria and South Africa – which together accounted for almost 40% of direct investment in the region.

Strong growth reflected in poverty statistics

About half of the sub-Saharan African population continues to

Chart B.

Development of capital flows in sub-Saharan Africa



Sources: IMF, UNCTAD and World Bank.

[5] *Data from 2010.*

[6] *Ministry of Commerce, People's Republic of China.*

live below the poverty line.[7] This is almost 10 percentage points less than in 1999, when the poverty rate in the region fell for the first time since the 1970s. Even so, not all countries have seen poverty declining at the same pace as growth has improved. Human development indicators particularly for many oil-exporting countries (eg Angola, Gabon and Nigeria) provide a picture that is among the weakest in the world, despite sizeable oil receipts. On the other hand, other countries, such as Tanzania, Mozambique or Burkina Faso, have also witnessed strong growth, but the poverty rate has not declined at the same pace as economic growth.

Is Africa's rise sustainable?

Abundant natural resources, favourable population developments, diversified export markets and an improved policy environment have opened up development opportunities for sub-Saharan African countries. So is the region undergoing a structural change similar to the change that resulted in a long phase of strong growth in many Asian countries?

A structural change is typically triggered by productivity growth in the agricultural sector, which releases workers for more productive sectors. In Asia, labour released from agriculture largely migrated to low-paid manufacturing, which became the driver of economic growth in the region.

In spite of rapid growth, structural change in sub-Saharan Africa has moved ahead slowly. Productivity in the region's agricultural sector is still poor. The sector accounts for 20% of the region's GDP, but employs more than half of the workforce. Even so, in most of the countries in the region, labour productivity of either the whole labour force or at least in the agricultural sector improved in 1995–2010. An overall review reveals that more labour has moved from agriculture to the service sector than to industrial production. There are, however, significant differences between developments across countries. Accordingly, structural change in sub-Saharan African economies appears to differ from that in Asia, focusing, in part, more on the service sector than on manufacturing. This is explained by a greater abundance of natural resources in the countries of the region than in Asia and by the increased competition due to existing cheap production.

Opportunities do exist for sustainable growth in sub-Saharan Africa. Old challenges need to be addressed, however. Poverty, substantial unemployment, weak infrastructures and human capital restrict people's chances of participating in development. Moreover, fragile institutions and political instability may distort effective allocation of increased resources.

Sources

IMF (October 2012) Regional Economic Outlook. SSA – Maintaining Growth in an Uncertain World.

IMF (2013) World Economic Outlook, update 1/2013.

World Bank (October 2012) Africa's Pulse.

ADB, OECD, UNDP (2012) African Economic Outlook 2012.

Devarajan – Fengler (2012) Is Africa's Recent Economic Growth Sustainable? Ifri.

[7] *This is based on the World Bank definition, according to which people with daily incomes of less than USD 1.25 (PPP) are below the poverty line; data from 2008.*

long-term impact on productivity improvement and hence on potential growth in the euro area as a whole. This would be reflected in a brisker-than-expected recovery in growth in subsequent forecast years.

II Monetary policy and its transmission

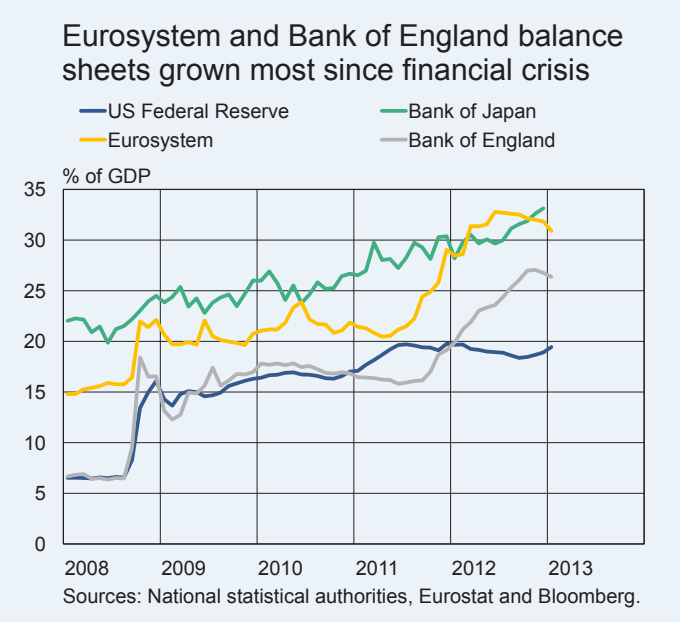
Monetary policy focus on non-standard measures

In response to the financial crisis, the ECB, the US Federal Reserve and the Bank of England all lowered their key policy rates to or close to the zero bound as early as the first half of 2009. The Bank of Japan's key policy rate was already close to zero before the global financial crisis broke out. The zero bound having been reached, these central banks then focused their monetary policy on non-standard measures.

The broadly based asset purchase programmes pursued by the Fed, the Bank of Japan and the Bank of England, focused primarily on government securities, have swollen these central banks' balance sheets relative to GDP. Since the financial crisis, the largest growth has been in the balance sheets of the Bank of England (21 percentage points) and the Eurosystem (approx. 17 percentage points) (Chart 14). The growth in the Eurosystem balance sheet is due to central bank credit operations employed to support banking liquidity and lending to the private sector. The balance sheets of the Fed and the Bank of Japan have grown more moderately. The central banks have planned and proportioned their non-standard measures taking into account the special features of their countries' financial market structures and financial intermediation as well as other special features.

Among economists, there is relatively broad agreement that the monetary policy pursued by central banks has prevented an uncontrolled deflationary spiral, which could have been a consequence of the financial crisis. Thus, the central banks have, in accordance with their primary responsibility, succeeded in maintaining price stability. The zero interest rate bound, non-standard monetary policy and growth in central bank balance sheets have, however, taken monetary policy into territory of which there is very little previous experience.

Chart 14.



Central banks intensify their non-standard measures

With the crisis becoming prolonged and the post-crisis economy stuck in a slow growth phase, many central banks have recently sought to intensify the impact of their non-standard monetary policies. In December 2012, the Fed changed its forward guidance, indicating that it expected to be able to hold its key policy rate exceptionally low until unemployment had fallen below 6.5%, on condition that forecast inflation would not exceed 2.5% during the next two years and inflation expectations remained anchored. By linking its interest rate steering more precisely to the condition of the economy, the Fed believes it will increase the transparency and predictability of its monetary policy, thereby supporting economic activity.

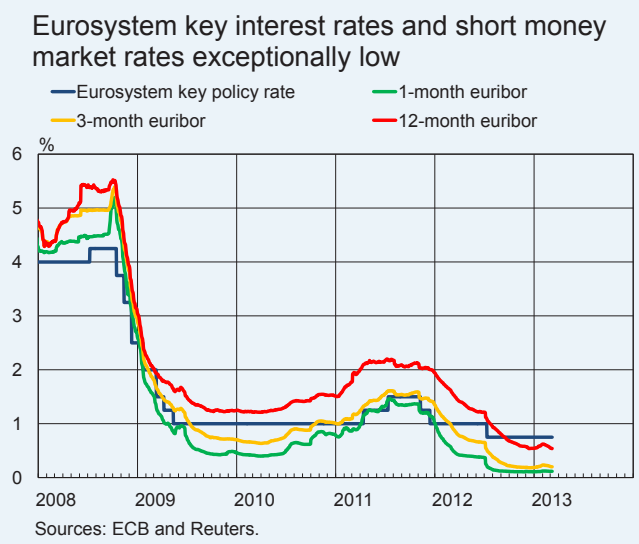
Also in December, the Fed additionally announced it would be supplementing its open-ended asset purchasing programme with monthly purchases of USD 45 billion in Treasury securities in addition to the monthly purchases of USD 40 billion in mortgage-backed securities (MBS) already agreed in September 2012. As new information on the effectiveness of the new purchase programme and any possible unwelcome effects is coming in all the time, decisions on the programme do not have precise quantitative criteria: the programme will be continued until the labour market outlook has clearly improved. The purchase programme is aimed at achieving more relaxed financial conditions to support the economy, while the forward guidance provides information as to the circumstances in which the Fed will consider raising interest rates.

In January 2013, the Bank of Japan took some important monetary policy decisions. It abandoned its previous 1% intermediate inflation target, instead aiming directly for 2% inflation. In pursuit of this target, it announced an open-ended securities purchasing programme: after the end of its current purchase programme in January 2014, it will purchase JPY 13,000 billion in government securities every month until it achieves its inflation target. The Bank of England has also been active in developing new measures, and in July 2012 it launched a 'funding for lending' scheme designed to lower the funding costs of participating banks and encourage them to increase their lending to businesses and households.[2]

Central banks' recent announcements of new measures have attracted a lot of attention and also some concern. The impact of non-standard monetary policy measures on the real economy is uncertain and they could have significant harmful effects. They could, for instance, obscure the balance sheet problems of weak banks, slow the essential adjustment of debt to a lower level, delay structural reforms required to accelerate the pace of growth and disturb pricing on the markets. The concern has also been expressed that they could make it harder to retighten

[2] The Bank of Japan, too, is supporting bank lending to the private sector through its 'Stimulating Bank Lending Facility'.

Chart 15.



monetary policy as the economy recovers.

Accommodative monetary policy relative to other countries and expectations this will continue weaken the external value of a currency. The monetary policy measures taken by the US Federal Reserve and the Bank of Japan have, in fact, weakened these countries' currencies and strengthened others, including the euro. Measured according to trade-weighted exchange rates the changes are not exceptionally strong, but the depreciation of the yen since the upward trend came to an end has been clear. After all, the main currencies float freely and their exchange rates follow developments in the real economy and the current account. Although the euro system does not have an exchange rate target, currency appreciation serves to moderate inflationary pressures, and in this way also influences the monetary policy decisions of the ECB Governing Council.

Eurosystem monetary policy remains accommodative

At the turn of the year 2012–2013, the Eurosystem's monetary policy appeared to the markets to be tighter than those of eg the Federal Reserve or the Bank of Japan. This was one of the reasons for the rise in euro area short money market rates and the appreciation of the euro at the very beginning of the present year. At its meetings in February and March, the Governing Council of the ECB nevertheless stressed that monetary policy would continue to be accommodative. Since July 2012, the Eurosystem's key policy rate has been 0.75%, and continuation of the fixed-rate, full-allotment policy in central bank refinancing operations ensures the availability of funding for the banking sector (Chart 15). On top of this, the Governing Council's announcement in September 2012 on the creation of a policy of Outright Monetary Transactions (OMT) has helped reduce the probability of destructive trends in the euro area, although so far there has actually been no need to activate the programme. The yields on Spanish and Italian government bonds, in particular, are still well below the levels of last summer. As the financial market tensions have eased, the impact of the low policy rate is being felt more clearly in the real economy.

In addition to the monetary policy decisions of the ECB Governing Council, other factors contributing to a

more stable trend on the financial markets have included agreement on banking union and progress in preparing the Single Supervisory Mechanism (SSM), commencement of the recapitalisation of Spanish banks, the entry into effect of the fiscal compact in January 2013 and the commencement of operations by the permanent European Stability Mechanism (ESM) in October 2012. However, the situation remains fragile and the growth outlook for the euro area is subdued, which means inflation is also expected to slow in the coming years.

Improvement in funding position of banks reduces Eurosystem balance sheet

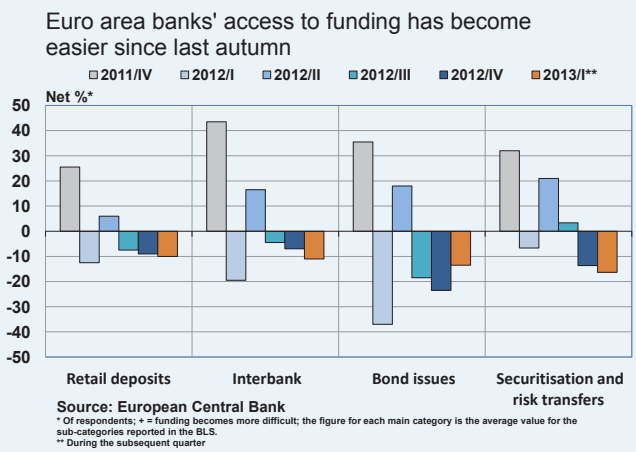
The Eurosystem balance sheet contracted somewhat towards the end of 2012, when banks reduced their shortest central bank loans. The balance sheet reduction continued through the early months of 2013, as some banks repaid in advance central bank loans they had taken out in the 3-year refinancing operations conducted in December 2011 and February 2012. By 6 March around EUR 225 billion had been repaid. Banks have the option of repaying these loans every week until their maturity in approximately 2 years' time.

Repayment of the 3-year refinancing operation loans indicates an improvement in the financial position of the banks. However, market assessments suggest it has mainly been banks in countries with a high credit rating that have been making the repayments, and hence there is as yet no clear sign of a reduction in the polarisation of the banking sector. The repayments are not expected to reduce liquidity to such an extent as to cause a rise in short-term market interest rates. The contraction in the Eurosystem balance sheet is a mark of improvement in banks' financial situation, not a sign of monetary policy tightening. If banks' financial situation improves, this will boost interbank confidence and reduce banks' dependence on central bank funding. At the same time, the margins they ask of businesses and households can come down and financing conditions become more relaxed.

Polarisation of euro area banking sector

The strength of banks' balance sheets is a key factor for the provision of adequate credit in the economy and the normalisation of all channels of finance. From the perspective of monetary policy transmission, it is vital that the uncertainty surrounding the durability of banks' balance sheets be dispersed. At the aggregate level, banks' balance sheets in the euro area have become stronger and their operational capacity has therefore improved. This process has been assisted by the European Banking Authority's (EBA) capitalisation exercise for large European banks that came to an end in June 2012. All in all, the banks involved strengthened their capital positions by over EUR 200 billion between December 2011 and June 2012. However, the aggregate figures hide significant differences that will affect the operational capacity of the banking sector in the future. Uncertainty over the position of the

Chart 16.



banks is caused by the incomplete picture of the amount of bonds that have lost their value currently held by banks, the application of forbearance and the amount of collateral available for use in acquiring funding.

The operating capacity of the banking sector has been improved by transferring poor quality assets off banks' balance sheets and into asset management companies.

The operating capacity of the banking sector has been improved by transferring (under various programmes) poor quality assets – such as corporate loans to real estate companies – off banks' balance sheets and into asset management companies set up for this specific purpose, and also winding down or restructuring poor-quality banks (Spain, Ireland, Greece)[3]. At the same time, banks have also adjusted their balance sheets for their own strategic reasons. They have reduced their lending on account of the weak state of the economy. Additionally, banks have reduced their most high-risk investments in response to tightening capital requirements and market pressures.

The general restoration of functioning and stability on the financial markets in recent months has eased access to funding for banks in the GIIPS countries, too. Banks' funding costs have come down and the availability of funding improved (Chart 16). Notwithstanding the gradual improvement, banks' access to wholesale market funding is still polarised. For many banks in the crisis countries the price of market funding is still high and the markets have opened only to large banks in better condition. In addition to the price of funding, refinancing needs in many countries have been reduced by the ongoing consolidation of bank balance sheets and various restructuring programmes. The volume of bond emissions by banks in 2012 was well below the level of 2011. The stabilising of banks' funding acquisition in recent months is also indicated by the positive turn in retail deposits, particularly in the GIIPS countries. The renewed positive flow of household deposits also contributes to the picture of a gradual restoration of confidence.

Regulation shapes the banking sector

Regulatory updates will secure the stability of banking operations in the future, thereby helping to prevent widespread financial crises like the one

[3] The most significant restructurings over the past year have been in Greece and Spain. In Greece, approximately EUR 50 billion has been set aside for the recapitalisation of core banks, relating to losses on government bonds and other credits. In Spain, in December 2012, 'group 1' banks transferred almost EUR 40 billion in poor quality corporate loans to the asset management company SAREB, receiving in compensation around EUR 44 billion in new capital via the ESM. The recapitalisation of Spanish 'group 2' banks continued in the first half of 2013, but the capital required is estimated to be much less than in the first phase, at around EUR 2 billion.

we have just gone through. The tightening of regulation will boost confidence, enhance the functioning of the interbank market and lower risk premia, thereby improving the efficiency of monetary policy transmission.

Updated, tighter regulation will, in the short term, increase banks' expenses and reshape their business models. The biggest impact of the regulatory reform on traditional banking will come via the tightening of capital adequacy and liquidity requirements. Although there will be lengthy transition periods, the markets could require banks to comply with the new criteria in advance, accelerating the process of adjustment. In the wake of the recent crisis, it is by no means certain that the new regulatory requirements will be fundamentally tighter than the demands from the market. The regulations will, however, ensure the tighter capital and liquidity buffers will be maintained even after the acute crisis has eased.

The debt-driven operating model witnessed before the crisis will not return to the banking sector; instead, banking business models will change. The change in business models could, for its part, significantly alter the mechanisms of financial mediation in Europe; a move away from financial mediation through the banking sector towards market funding could be one possible alternative in the future.

Accommodative monetary policy feeds through slowly and unevenly into corporate financing conditions

The Eurosystem's non-standard monetary policies together with other policy measures applied within the euro area significantly eased the funding climate for both banks and governments in the second half of 2012. This easing is, however, feeding through only slowly and unevenly into private sector funding costs. Interest rates on new bank loans paid by businesses in the GIIPS countries rose from 3.6% in August to 3.8% in January 2013, against a simultaneous fall in comparable interest rates from 2.0% to 1.9% in countries with a high credit rating (Chart 17).[4]

On the basis of the bank lending survey of euro area banks, the terms of both corporate and housing loans are expected to tighten further and demand for credit decline in the euro area. The

[4] The interest rate differential between new corporate loans in the GIIPS countries and the 3-month Euribor was around 3.6 percentage points in December 2012. The corresponding differential in high-rated countries was 1.7 percentage points.

Chart 17.

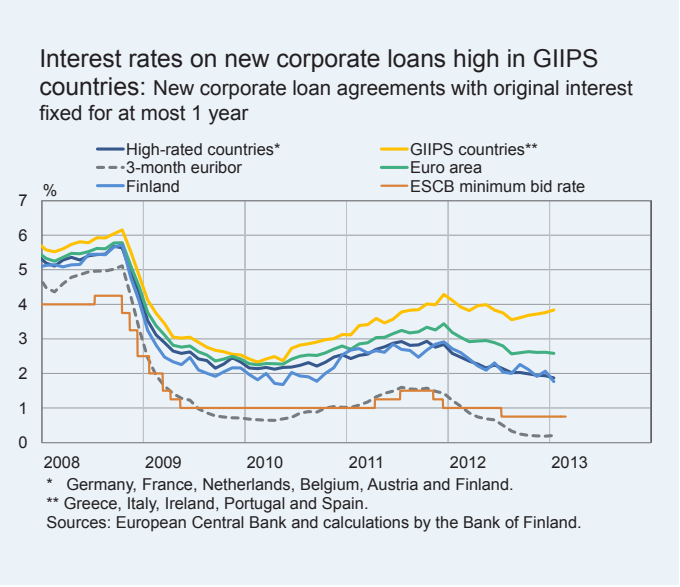
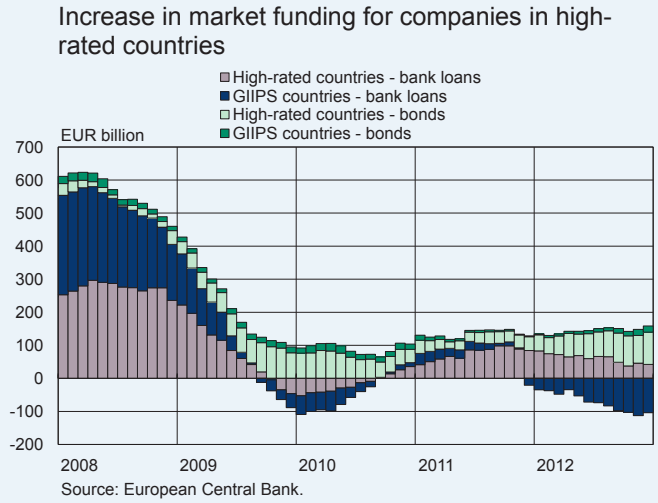


Chart 18.



tightening of funding conditions is most marked in the GIIPS countries, and particularly in regard to small and medium-sized enterprises, which depend on bank funding.

Larger corporations have increased their market funding (Chart 18). Corporate bond issues have already been growing for several years since the financial crisis burst in 2008, and the bonds of companies with a high credit rating have been purchased at low yields. Although corporate bond issues have been concentrated in high-rated countries, high-rated companies in the crisis countries have also increased their market funding.

Several factors behind tight financial conditions in GIIPS countries

The still continuing polarisation of corporate funding conditions between the GIIPS countries, on one hand, and high-rated countries, on the other, has two important causes.

In the first place, the sovereign debt crisis and financial market tensions have weakened the position of banks, particularly in the GIIPS countries, and increased their funding costs. The countries with EU/IMF programmes (Greece, Ireland and Portugal) and Spain have been forced to turn to outside support to recapitalise their banks, but the process is still partly incomplete. The still weak state of several banks is subduing lending and sustaining high interest rates on corporate loans.

Secondly, the economic situation is continuing to deteriorate in most of the GIIPS countries and at the same time the loan-servicing capacity of businesses and households is declining. Banks are avoiding risky loans and require higher interest to compensate the risk of default.

From the perspective of economic recovery and stronger lending, it is important that corporate readiness to invest and credit demand both become more robust. However, in many of the GIIPS countries corporate demand for credit is unlikely to recover quickly, as the corporate sector has to wind down its own debt. This is particularly important in those countries in which the global financial crisis was preceded by economic overheating and strong accumulation of debt in, for example, the construction sector. In many countries of the euro area, reduction of the level of corporate debt is an essential process that will depress euro area growth in the immediate years ahead.

Although these factors are tightening funding conditions and subduing growth in the stock of loans even in some high-rated countries, the situation there is not as challenging as in the GIIPS countries (Chart 19).

Housing loan interest down slightly

Country differences in the transmission of monetary policy to housing loan interest rates are smaller than those for corporate loans. Over the past half year, housing loan interest rates have come down on average for both the GIIPS countries and high-rated countries taken together, and are only slightly higher in the GIIPS countries considered on their own (Chart 20).

The process of unwinding the indebtedness of the euro area household sector has, however, only just begun, and it will be a slow process. In the United States, bringing the level of household debt back down to the level of 2003 took around 5 years from the heights of 2007. In Spain, household indebtedness has declined slightly, while in Estonia and Ireland the level of household debt has come down substantially since 2009, reflecting the flexibility of these countries' economies.

Household sector indebtedness is also substantial in many countries with a high credit rating. In these countries, the rapid accumulation of further debt has come to a halt, but no real reduction is discernible. The exception is Germany, where household indebtedness has developed in the opposite direction to many euro area countries. While the GDP ratio of German household debt was over 72% at the turn of the millennium, which at that time was a high level internationally, it is now below 59%. This is a relatively moderate level in the current circumstances, but not at all low compared with the turn of the millennium.

Chart 19.

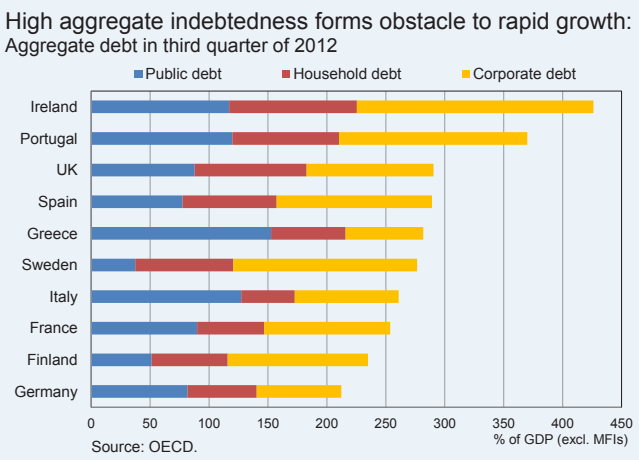
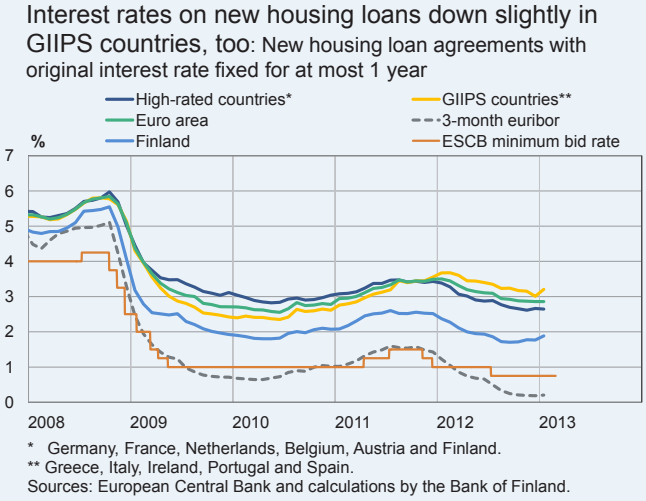


Chart 20.



Housing market a key factor in households' financial equations

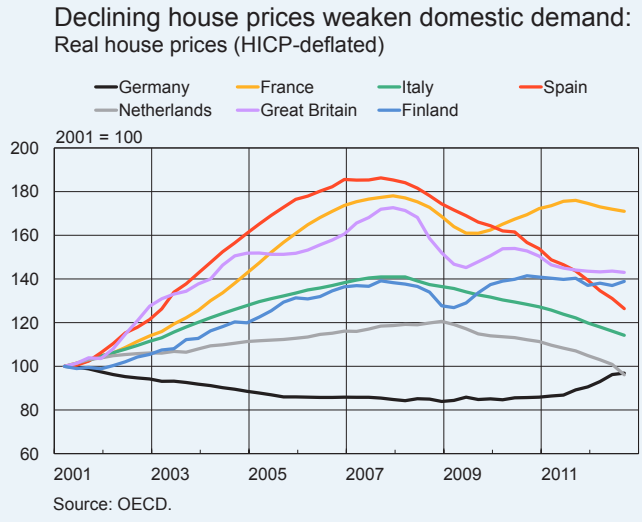
Housing market trends are a key factor in respect of the position of households and developments in the macro economy as a whole. Most household debt is actually housing debt, for which the collateral is the household's home.

Since the peak in 2007, real house prices[5] have declined almost 49% in Ireland, a good 33% in Spain and Greece and around 19% in Italy (Chart 21). In Ireland, there are already signs the decline is coming to an end, but in many other euro area countries prices are expected to keep declining, thereby sustaining the contraction in domestic demand. Growing unemployment means a deteriorating capacity to service loans. If the value of a house falls below the value of the loan taken out on it, selling will not resolve the debtor's situation. In the immediate years ahead, domestic demand will remain weak until there is an upturn in the housing market cycle and unemployment begins to gradually fall.

Of the high-rated countries, in France and particularly the Netherlands, real house prices have recently been declining. In France, the price level is still assessed to be relatively expensive. The turndown in house prices allied to strong household indebtedness presents a noteworthy risk to the balance of the economy. Following several years of almost static prices, house prices in Germany have begun to rise again in recent years.

[5] Relative to the HICP.

Chart 21.



Monetary policy cannot be used to reduce structural unemployment

Unemployment rates in the GIIPS countries have in recent years risen exceptionally high, to over 17% on average. In many high-rated countries, the unemployment rate has also risen during the crisis, but the average rate is just 7%, due to the positive employment picture in Germany. In France, the unemployment rate is almost 11%. In many countries, both the duration of unemployment periods and especially the incidence of youth unemployment have increased. The risk of labour market exclusion is extremely worrying, as this is a case of young people just starting out in working life.

Besides undermining the growth potential of the economy, extended periods of unemployment can in the worst case lead to marginalisation and permanent exclusion from the labour

market. Combined with a large burden of debt, at the level of the individual this can have disastrous consequences.

In the euro area, both cyclical unemployment and structural unemployment have increased. A change in the structure of the economy leads to structural unemployment, which in itself is a more intractable problem than cyclical unemployment. Structural change channels labour demand into new fields, and if labour supply does not adjust quickly enough, the result is structural unemployment. A rising phase of the business cycle does not reduce structural unemployment, and monetary policy certainly cannot ameliorate it.

According to the latest OECD estimates, the euro area structural unemployment rate is 9.1% (total unemployment rate 11.9% in January 2013). According to the OECD, structural unemployment in the GIIPS countries (excl. Italy)[6] has increased by an average of around 3 percentage points since 2006. Thus, of the approximately 10 percentage point rise in total unemployment in the GIIPS countries, some can be attributed to an increase in structural unemployment. Over the same period, the average structural unemployment rate in the euro area has only risen by around 0.5 of a percentage point.

The OECD estimated structural unemployment to be 16.5% in Spain and 12.5% in Greece.[7] The total unemployment rate in both countries is around 26%. Particularly in Spain, a large part of unemployment is therefore, according to these estimates, structural, not cyclical in nature. This partly reflects the collapse of the country's inflated construction sector. The large significance of structural unemployment in Spain further weakens the outlook for households and increases the probability of personal tragedies.

In its forward guidance in December 2012, the US Federal Reserve decided to give a threshold value for the unemployment rate (6.5%), which reflects the Fed's estimate of the level of structural unemployment. The Fed will support the reduction of the unemployment rate towards the threshold through a low policy rate on condition that this does not threaten price stability. The Fed has a dual mandate: in addition to price stability, its objectives also include maximising employment. Pursuit of maximal employment means seeking to reduce cyclical unemployment.

The primary objective of Eurosystem monetary policy is to maintain price stability. The unemployment trend affects the inflation outlook, and is therefore not without significance for monetary policy. Eurosystem monetary policy can also be used to further other economic policy objectives, provided price stability is not endangered. The increase in structural unemployment in many of the crisis countries in the euro area means that, even were the economy to embark on an upswing, this would not on its own be

[6] Contrary to the other GIIPS countries, in Italy, according to the OECD estimate, structural unemployment has not increased since 2006.

[7] Economic Outlook 92 (2012).

enough to return unemployment rates to their pre-crisis level. One challenge for the euro area is the large regional differences in structural unemployment that are obscured by the average unemployment rate. Moreover, there is in fact a lot of uncertainty regarding estimates of structural unemployment.

Reducing the public debt ratio is a challenge for the advanced economies

The crisis has brought many countries close to their debt limit.

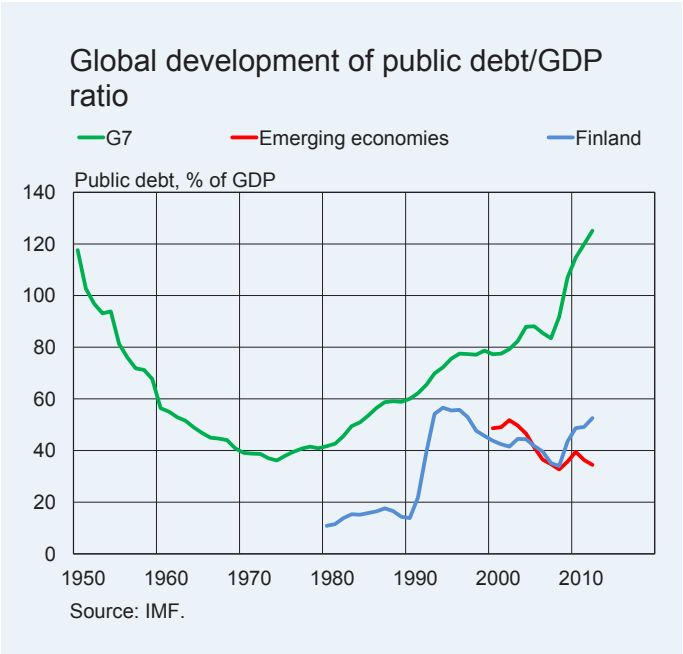
Growth in the GDP ratio of public debt is not limited solely to the euro area; a similar trend is visible across the advanced economies more broadly. In the G7 countries, the debt ratio has been growing since the 1970s (Chart 22). A typical feature has been that while the debt ratio has barely declined during economic upswings, at other times it has risen. Thus, the accumulation of debt may be viewed as one of the motors of growth, which cannot be a permanent state of affairs. Debt growth accelerated as a consequence of the financial crisis. At present, the GDP ratio of public debt in the advanced economies already exceeds the level it rose to in the wake of the Second World War. In emerging economies, the GDP ratio of public debt has recently been declining.

In light of the economic policies pursued in recent decades, reducing the public debt ratio in the advanced economies presents a new challenge that must be met one way or another. The crisis has brought many countries close to their debt limit, ie the maximum amount of debt their government is able to manage. Markets concerned about debt-sustainability sooner or later lose confidence in the fiscal policy of an indebted country, triggering a debt crisis.

Foreign capital, in particular, is sensitive to problems with debt-sustainability. The large domestic ownership of sovereign bonds partly explains why Japanese markets have not become restless despite the country's public debt/GDP ratio reaching as much as 240%. The Japanese economy as a whole has been in surplus, and private sector savings have largely gone into domestic sovereign bonds. Japan's public debt has, however, already grown so large that the risk of an uncontrolled unravelling cannot be excluded.

A high debt ratio has also been shown to slow economic growth. Reinhart, Reinhart and Rogoff[8] have

Chart 22.



[8] Reinhart, C M – Reinhart, V R – Rogoff, K S (2012) Debt overhangs: past and present. NBER working paper 18015.

examined periods in the economic history of advanced economies when the public debt ratio was over 90% of GDP for an unbroken period of at least 5 years. Average economic growth in such periods was revealed by the study to be 1 percentage point weaker than in those years when the debt ratio was under 90% of GDP. According to Cecchetti et al.,[9] a high public debt ratio begins to erode economic growth at around 85% of GDP in such a way that, from there on, 10 percentage points more debt relative to GDP reduces growth by 10–15 basis points. The brake on growth is due to the fact that the uncertainty caused by the level of public debt displaces private investment. It also leads to a higher public debt risk premium, which pushes up real interest rates.

Compliance with fiscal policy rules increases room for manoeuvre in monetary policy

One tool for restricting growth in public debt is the use of fiscal policy rules. In the aftermath of the crisis, fiscal policy rules have been reinforced, particularly in the euro area, to ensure future discipline in government finances and prevent a sovereign debt crisis like the present one from jeopardising stability in the euro area. Fiscal policy rules can reduce uncertainty and infuse fiscal and monetary policy with long-term credibility, thereby reducing interest rates in the crisis countries.

The fiscal policy rules in the euro area are rooted in the EU-level Stability and Growth Pact (SGP) and related national legislation. In response to experience gained during the crisis, a new version of the SGP has just been completed, in which the earlier version has been supplemented with a package of measures known as the 'six pack'. This is to be further supplemented with a new package of two additional measures, the 'two pack'. The SGP has also been reinforced with an intergovernmental agreement on fiscal policy (the 'fiscal compact'), which came into effect at the beginning of 2013.

The fiscal compact obliges signatory governments to embed fiscal rules in their national legislation. Germany has been the trailblazer, with the länder each having their own rules. In Spain, too, the rules entered in national legislation in 2011–2012 have been extended to the level of regional administrations, with compliance with the rules supervised at national level. Experience has shown that, in these countries, regional levels of government otherwise find it hard to commit to the objectives of the public sector as a whole.

The first version of the Stability and Growth Pact, which came into effect in 1997, already defined the debt threshold for triggering the excessive deficit procedure (EDP), placing it at 60%, and the (headline) deficit threshold at 3% of GDP. In the new version of the SGP, the deficit threshold is tightened by 1/20 of the amount exceeding the debt threshold, if the debt ratio exceeds the 60% threshold. Thus, in Italy, for example, the deficit threshold after the transition period

[9] Cecchetti, S G – Mohanty, M S – Zampolli, F (2011) The real effects of debt. BIS working paper No 352.

According to the European Commission's February 2013 forecast, it would appear the minimum performance of corrective measures will not be achieved in all EDP countries in 2014.

would be around zero, as Italy's public debt is approximately 120% of GDP. If the thresholds are exceeded, the country concerned is subject to an EDP and must take corrective action. The minimum scale of corrective measures is ½ a percentage point improvement per annum in the structural deficit ratio. If corrective action is not taken, the country could, in the worst cases, face a fine.

In addition, signatories to the fiscal compact are committed to a medium-term objective of a structural deficit/GDP ratio of ½%. If a country's debt is well below the debt threshold and the risk of exceeding it is small, the country can be granted a deficit margin of 1% of GDP. The medium-term deficit objective is presented as structural: the impact of cyclical and other temporary factors has been removed, meaning that in a normal recession it would be possible to provide a fiscal stimulus without exceeding the 3% (headline) deficit objective. The level of potential output needed for calculating the structural deficit is, however, hard to define, particularly in current circumstances.

The stability programmes for euro area countries present an adjustment path for achieving the medium-term objective (MTO) for their structural deficit ratio. As a general rule, the GDP ratio of expenditure in the adjustment path may not grow, and the structural deficit ratio should improve by at least ½ a percentage point per annum, which corresponds to the minimum performance under an EDP. Progress with the stability programmes will be assessed against European Commission forecasts.

According to the European Commission's February 2013 forecast, it would appear the minimum performance of corrective measures will not be achieved in all EDP countries in 2014. Of the large euro area countries, this applies clearly to Spain, but also to some extent to France as well. The fiscal policy rules could thus require these countries to make additional adjustments to consolidate their finances. In the current situation this is not entirely clear, as it is permissible to depart from the rules in exceptional circumstances. Thus the rules do not prevent governments from pursuing economic policies to suit the situation prevailing at any time. The significance of the rules will probably be greater in future. For the credibility of the rules, and hence the likelihood of their success, it is vital that governments hold to them. In the final analysis, this will depend on a shared political will.

Keywords: inflation, monetary policy, economic situation

Box 2.

Fiscal multipliers and economic policy

The past half year has seen vigorous debate on the short-term economic impacts of fiscal policy. There has been disagreement over the scale of fiscal multipliers and their influence on the economic policy that should be pursued. Essential factors that need to be taken into account in deciding on fiscal policy are debt-sustainability, financial market confidence and the planned duration of measures.

The financial crisis has brought the concept of 'fiscal multipliers' to centre stage in economic policy debates. Fiscal multipliers measure the impact fiscal policy measures will have on GDP. According to current economic theory, the impact of fiscal policy on economic growth is primarily a short-term phenomenon and depends on the instruments used, the duration of the policy measures and several factors that affect the economy. Hence there is not just a single fiscal policy multiplier. The scale of the multipliers has been estimated using statistical methods rooted in historical data and simulations based on macroeconomic models. Fiscal multipliers can be calculated using different time durations according to the length of period for which the multipliers take account of the impacts on growth. The results will be influenced by what type of statistical or macroeconomic model is used and what values are selected for the macro-economic models' parameters.

Recent debate on the multipliers

The International monetary Fund (IMF) stimulated debate on fiscal multipliers when it published, in connection with its October 2012 forecast, results that showed that, since the financial crisis, short-term multipliers have been in the range 0.9–1.7, ie larger than normal by a clear margin.[1] The results produced by the IMF's Blanchard and Leigh suggest the growth-inhibiting impacts of the general government fiscal consolidation currently underway in many countries are more extensive than previously imagined. Hence, balancing the public finances through savings measures would be much harder than previously thought, and the economic costs of consolidation larger.

The IMF results were based on a simple statistical model in which GDP growth forecast errors in the years 2010–2011 were explained with the help of the fiscal policy forecast for 2010. The study also took account of the effects of many other factors (incl. the prices of credit default swaps). These results are consistent with research evidence that fiscal multipliers can be larger in circumstances like the present, where the resources of the economy are underused, monetary policy interest rates are close to the zero bound, access to credit is hard and the terms of credit strict, there are more consumers than normally with liquidity constraints and synchronous consolidation measures are being pursued in different countries. It has also been suggested that one consequence of the financial crisis is a larger discount factor, ie economic agents would place a higher value on present income relative to future income than at other times, which would inflate the multipliers.

There has been a lot of criticism directed at the results presented in the IMF article. For example, the European Commission commented on the results in connection with its November forecast[2] based on a corresponding statistical model relating to the euro area; the Commission's model was supplemented by taking into account sovereign debt yields. The ECB contributed to the debate by presenting in the December

[1] *Blanchard & Leigh (October 2012). Are we underestimating short-term fiscal multipliers? IMF WEO.*

[2] *European Commission (November 2012) Forecast errors and multiplier uncertainty. European Economic Forecast.*

edition of its Monthly Bulletin[3] results for the euro area based on simulations with its own macroeconomic model, according to which credible consolidation measures and structural reforms reduce the short-term fiscal multipliers by improving confidence. Finally, in January 2013, the IMF's Blanchard and Leigh published a working paper[4] in which they responded to the criticism of their original article. In their paper, they demonstrated credibly that the results do not depend fundamentally on the choice of the set of advanced economies, the institution behind the forecasts used in the statistical model or whether the model employs forecast or actual fiscal policy. They also assert that the results do not apply to emerging economies.

What sort of results has the debate generated?

It is generally agreed that in conditions like those of a financial crisis fiscal policy measures will probably have a greater-than-usual impact in the short term. The IMF's results on the scale of fiscal multipliers are not, however, unproblematical. According to later results by Blanchard and Leigh (2013), the large multipliers refer only to the fiscal policy forecast for 2010. The fiscal multipliers estimated using the data for 2011 do not differ from the norm, and the multipliers estimated for 2009 and 2012 are also much smaller than those for 2010.[5]

According to a study by the European Commission, the results for 2010 also change when the influence of sovereign debt yields is taken into account. In the Commission's calculations, inclusion in the model of the actual change in sovereign debt yields in 2010–2011 completely eliminates the impact of fiscal policy on the GDP forecast error. Thus the weaker-than-forecast GDP growth could be a consequence of the rise in market interest rates rather than fiscal policy.

The direction of causality between fiscal policy, GDP and sovereign debt yields is, when all is said and done, not entirely unambiguous. One interpretation is that after 2010 there was a tightening in the general attitude on the financial markets towards the risks attaching to sovereign debt in the euro area. This pushed up interest rates, particularly in those euro area countries with the greatest need for fiscal consolidation, weakening GDP growth in these countries. If this interpretation is correct, the correlation between fiscal policy tightening and weaker GDP growth is not causal in nature. On the other hand, Blanchard and Leigh (2013) proposed an alternative interpretation, according to which the rise in sovereign debt yields was a consequence of weak economic performance (caused by the fiscal policy tightening) rather than the cause of it. It is also possible that both factors have operated simultaneously.

Other factors that may have contributed to the forecast errors could be, for example, a deterioration in monetary conditions in some countries, balance sheet adjustment or a variety of financial market factors. Bringing the current account into the equation reduces the multipliers in the analysis by Blanchard and Leigh (2013), too.

All parties to the debate have agreed that the confidence effects of consolidation measures in countries struggling with fiscal policy credibility problems and weak public finances can lead to lower interest rates, and hence smaller short-term fiscal multipliers. There has also been unanimity that short-term multipliers are just one of the factors that should be taken into account when deciding fiscal policy. Even when the short-term fiscal multipliers are substantial, it does not follow that consolidation measures can be avoided, especially in advanced economies with a large burden of government debt and threats to

[3] *European Central Bank (December 2012) Monthly Bulletin, Box 6. The role of fiscal multipliers in the current consolidation debate.*

[4] *Blanchard & Leigh (2013) Growth forecast errors and fiscal multipliers. IMF working paper 13/1.*

[5] *One interesting observation is that, according to the European Commission, the large forecast errors in relation to 2010 can be attributed to underestimating growth in the economies with fiscal stimulus, not overestimating growth in the economies that had been consolidating.*

the sustainability of this debt. Fiscal consolidation will improve long-term debt sustainability even if the short-term multipliers are substantial.

The ECB's simulations based on the euro area macro-economic model would suggest the long-term multipliers of general government fiscal consolidation could be positive, particularly if the consolidation measures, over the long term, put an emphasis on cutting expenditure and some of the savings are used to reduce the burden of taxation, for example labour taxes. On the other hand, expenditure cuts may inflate the short-term negative multipliers of fiscal consolidation more than tax increases. Another factor is that a large debt/GDP ratio, of itself, can hamper economic growth. This is because it displaces private investment, increases uncertainty and leads to large sovereign debt risk premia, which in turn push up real interest rates.

The impact of fiscal policy measures depends on the economic situation

Recent debate has focused attention on the fact that the impact of fiscal policy on the real economy varies according to the economic situation. Particularly in the crisis countries of the euro area, the availability of finance is weak and the resources of the economy underutilised, and hence the fiscal multiplier can be considerably larger than in countries where finance is still readily available and there is relatively little unemployment.

In the debate, less attention has been given to the fact that even a large GDP impact from fiscal policy cannot on its own make fiscal stimulus feasible, as this always requires funding. It is actually a paradox of a sort that specifically in those countries where the impact of fiscal policy could be great (the crisis countries), there is simply no money to fund fiscal expansion. In more stable countries, where fiscal expansion would be possible, the real impacts of it could be rather uninspiring.

An expansionary fiscal policy could under present conditions be a sensible alternative in some countries. In others there is no realistic alternative to fiscal austerity. The recent debate on the scale of fiscal multipliers gives little help in choosing between these alternatives.

Financial crisis and monetary policy targets

5 March 2013

The prolonged financial market and sovereign debt crisis has stimulated increased research into economic policy measures and their effectiveness. In monetary policy, the zero lower bound has brought about new non-standard measures as well as forward-looking communication on future accommodation. The aim of such forward guidance is to generate expectations that policy is going to remain accommodative for some time. With the financial crisis, there is also fresh interest in price level and nominal income targeting as alternatives to inflation targeting.

Introduction

The financial market and sovereign debt crisis has touched all countries in the major currency areas. It began in 2007 with the US housing market crash and spread quickly after the collapse of Lehman Brothers. Banks ran into funding problems, the world economy dipped into recession and, in 2010, the crisis evolved into a sovereign debt crisis in several European countries. The crisis is now in its sixth year.

As the crisis spread, central banks swiftly lowered their interest rates. Governments pursued accommodative fiscal policies. The crisis continued, and monetary policy was approaching the zero lower bound. In many countries, fiscal policy was constrained by over-indebtedness and the resulting higher loan costs and greater difficulties in obtaining new loans. At the same time, households and non-financial corporations began to deleverage and banks started to repair their weakened balance sheets, further limiting their lending to the private sector.

The protracted crisis has given new impetus to the analysis of economic policy measures and their impact. Both fiscal policy and monetary policy have come under scrutiny. As banks have played a key role both in the lead up to the crisis and during the crisis, one strain of the discussion has focused on financial market and banking regulation, supervision and crisis management. It has become obvious that changes in the regulatory and supervisory environment are going to have a major impact on the functioning and methodology of central banks.

With the real economy not recovering regardless of accommodative interest rates, monetary policy has become the subject of increasingly lively and topical discussion. The focus of interest is on the zero lower bound and the non-standard monetary policy measures introduced by central banks. Such measures cause expansion in the central bank's balance sheet while providing liquidity support to the banking system and ideally bringing down long-term interest rates.

A number of contradictory assessments have been presented regarding the effectiveness and long-term impact of non-standard measures. There is, however, rather broad consensus that, together with the swift lowering of interest rates, the non-standard measures have helped avoid a deflationary spiral as in the 1930s. The international community has also been able, at least for the time being,

Juha Kilponen
Adviser
Monetary Policy and Research

Jarmo Kontulainen
Principal Adviser
Monetary Policy and Research

Antti Suvanto
Adviser to the Board
Monetary Policy and Research

to prevent a large-scale trade and currency war that might lead to competitive devaluations and a proliferation of trade barriers. In longer perspective, a key concern is the fear that monetary policy easing might have an inflationary effect in the long term.

Price stability established itself as the primary objective of monetary policy in the 1990s.

Recent discussion has examined the objectives of monetary policy. In the 1990s, price stability established itself as the primary objective of monetary policy for all major central banks. Many adopted an inflation target. They were aiming for low and stable inflation expectations and building a new approach that would enable market participants and the public to assess the success of their monetary policy. Stable inflation expectations were seen to support economic growth and promote financial market stability.

During the financial crisis, it has been proposed that one-sided targeting of price stability or low inflation could perhaps have contributed to the development of the crisis. Monetary policy might have been too loose and contributed to over-indebtedness and excessive house prices in the run-up to the crisis. According to this way of thinking, monetary policy decision-makers should have given greater consideration to asset prices and rapid lending growth, not just inflation.

In their search for alternatives to inflation targeting, several authors have brought up price level targeting and nominal income targeting. The former means setting a target path for the level of prices. Nominal income targeting is similar, except that the central banks seek to keep nominal GDP – rather than the price level – around its target path.

This article describes the proposed alternatives to inflation targeting and reviews monetary policy strategy in the light of recent discussion. Monetary and exchange rate targets, which dominated discussion in earlier days, are not considered here. Monetary targeting has not been seriously proposed in current discourse. Exchange rate targeting could be a relevant monetary policy strategy for a small open economy country that wants to use a major currency as an anchor for the external value of its currency to gain credibility for its monetary policy. For countries with a major currency, such as the euro area countries, the United States, Japan or Great Britain, this is not an option.

General principles of monetary policy

In the pre-crisis days, the dominant theory of macroeconomics was the new neoclassical synthesis.[1] The literature on this suggests the following nine principles are suggested for monetary policy:[2]

1. Inflation is a monetary phenomenon.
2. Price stability brings about important benefits.
3. There is no long-run trade-off between unemployment and inflation.

[1] The *new neoclassical synthesis* combines key elements of new classical macroeconomic theory and new Keynesian theory. The former is concerned with dynamic (intertemporal) general equilibrium, rational expectations and technological changes as a driver of cyclical fluctuations. The latter stresses the importance of nominal rigidities, such as sticky prices, in determining the resilience of an economy. These nominal rigidities are the reason why monetary policy has a short-term impact on production and employment rates. See Goodfriend and King (1997), Woodford (2009) and Gali (2008).

[2] Mishkin (2011).

4. Expectations play a crucial role in the determination of inflation and the transmission of monetary policy to the economy.
5. Real interest rates need to rise with higher inflation.
6. Monetary policy is subject to a time-inconsistency problem.
7. Central bank independence improves the credibility of monetary policy.
8. Commitment to a nominal anchor for monetary policy is essential.
9. Financial frictions play an important role in the business cycle.

These principles are more or less formally acknowledged in all central banks striving to maintain price stability or low inflation. One solution to the time-inconsistency problem in the sixth principle has been central bank independence coupled with a clear and unequivocal objective, such as price stability.[3]

The last principle emphasises the imperfections of the financial markets, but it was long neglected in the new neoclassical synthesis and the models used by central banks.[4] In fact, it has only been given importance recently in policy analysis and in projections of future developments as a result of the financial crisis. Macroeconomic general equilibrium models have proven to be flexible, and many have been extended to take into account frictions in financial intermediation.

Since the onset of the financial crisis, financial market imperfections have begun to receive greater attention.

Price stability as a monetary policy objective

The European Central Bank has published a book entitled 'The Monetary Policy of the ECB' which includes the following statement: 'The objective of price stability refers to the general level of prices in the economy and implies avoiding both prolonged inflation and deflation. There are several ways in which price stability contributes to achieving high levels of economic activity and employment.'[5] Price stability makes it easier to compare relative prices, reduces inflation risk premia in interest rates as well as the need to hedge against unexpected price fluctuations, diminishes distortionary impacts of tax and social security systems, makes it more advantageous to hold cash and other liquid assets and helps to prevent arbitrary redistribution of wealth and income. Price stability is also considered to contribute to the achievement of broader economic goals and to the longer-term stability of the financial system.

A price stability objective can take the form of either a price level target or an inflation target. Setting a price stability objective involves selecting a suitable price index and a numerical value. The

[3] A time-inconsistency problem arises when decision-makers have conflicting objectives in the short and longer term. In the context of monetary policy, this typically happens when a central bank would have incentives to keep monetary policy excessively loose over the short term. In such a situation, the time-inconsistency problem can result in high inflation without positive employment effects. Principle three states that there is no long-run trade-off between unemployment and inflation.

[4] This has been a recurring theme in literature since Irving Fisher (1933). Theoretical literature has reviewed frictions between lenders and borrowers (Bernanke & Gertler 1989 and Kyotaki & Moore 1997) as well as the cyclical impact of financial intermediaries and their balance sheets (Bernanke et al. 1999, Gertler & Kiyotaki 2010 and Holmström &Tirole 1997). Blanchard et al. (2010) examines the wider impact of the financial crisis on macroeconomic policies.

[5] European Central Bank (2011), p. 56.

A price stability objective generally implies keeping inflation low and steady.

target could be, for example, an unchanged price level as measured by the CPI or zero inflation. Generally, though, central banks aim to keep inflation low and steady. The target can be expressed either as a point value or as a range.

Flexible inflation targeting

The principles of the new neoclassical synthesis are the basis for the most widely accepted strategy in present-day monetary policy, known as flexible inflation targeting. No central bank disregards real economic developments and conducts monetary policy solely from the point of view of achieving its price stability objective, regardless of whether its legal basis dictates a strict inflation target and makes the Governor accountable for achieving it.

When a central bank conducts monetary policy with flexible inflation targeting, it sets the policy rates to bring the forecast for inflation and production in line with a target path. The financial market situation (credit growth, asset prices, indebtedness etc.) is only taken into account insofar as it is expected to have relevance for the targeted variables.

Central banks with a flexible inflation target will allow inflation to deviate from the target in the short term. They rarely react to a temporary impetus from eg oil prices. Instead, they use inflation expectations to gain information for selecting the proper monetary policy stance. Central banks aim to keep inflation expectations steady and in line with their inflation target.

For central banks with an inflation target, bygones are bygones, ie deviations in price level caused by unexpected inflation shocks are not smoothed out later by pushing inflation above or below target. There is no target for future price levels. In other words, reducing uncertainty about inflation does not entirely remove uncertainty about future price levels, as the impact of unavoidable inflation shocks on future price levels is permanent.

The Statute of the European Central Bank makes price stability the primary objective of the ECB. The ECB pursues its objective with a strategy not unlike flexible inflation targeting. The price stability objective has been defined operationally as an inflation rate below but close to 2%. Risks to price stability are assessed with two analyses: the economic analysis (of real economic developments) and the monetary analysis (of money and credit growth). The US Federal Reserve System (Fed) has adopted a numerical inflation target of 2% only recently, in early 2012. The Bank of England, the Bank of Canada, Norges Bank, Sveriges Riksbank and the Reserve Bank of New Zealand are examples of central banks that have very explicitly based their monetary policy strategy on flexible inflation targeting.[6]

Pre-crisis monetary policies in the major economic areas can be characterised as gradualist. Inflation expectations remained stable and in line with targets, and interest rates were consequently changed in small steps. Assessments of future economic developments usually considered tail risk scenarios highly

[6] For further information on flexible inflation targeting in practice, see Gjeldrem (2004), Bollard & Karagefikli (2005), Svensson (2009), Ingves (2011) and Carney (2012a).

unlikely. In hindsight, it has been easy to point to loose monetary policy around the middle of the first decade of the 21st century, and yet it is highly uncertain whether more active monetary policy could have prevented the financial crisis. A number of important reasons for the crisis are linked to the functioning of the financial markets and banks.

One lesson we can draw from the financial crisis is that low inflation and stable inflation expectations alone cannot guarantee financial market stability. Before the crisis, there was a clear demarcation between monetary policy and financial market supervision. Financial supervision had the task of preventing excessive risk-taking on the markets. Ex post it is clear that neither central banks nor supervisors were believed to have the tools to effectively address excesses on the financial markets. The lessons of the crisis have now led to such tools being developed around the globe.

Price level targeting

There has been extensive debate about price level targeting as a monetary policy objective and a number of articles have been published on the topic.[7] However, no central bank has thus far adopted a price level target.

A price level target is set by defining a target path for a price index. A price level target of 2% differs from a 2% inflation target in that the central bank commits to correcting any deviation resulting from inflation shocks.

In theory, reducing uncertainty about the price level should foster economic welfare in the long term and stable macroeconomic conditions in the short term. Monetary policy that seeks to correct earlier deviations from its price level target becomes an automatic stabiliser for the real economy, provided that the short-term link between the output gap and inflation (the short-term Phillips curve) is sufficiently strong and predictable. A supply shock, however, would increase production volatility. In a recession, if the price index were to fall below its target path, the price level target would lead to a stronger easing of monetary policy than would be seen with an inflation target.

One lesson from the financial crisis is that low inflation and stable inflation expectations are no guarantee of financial stability.

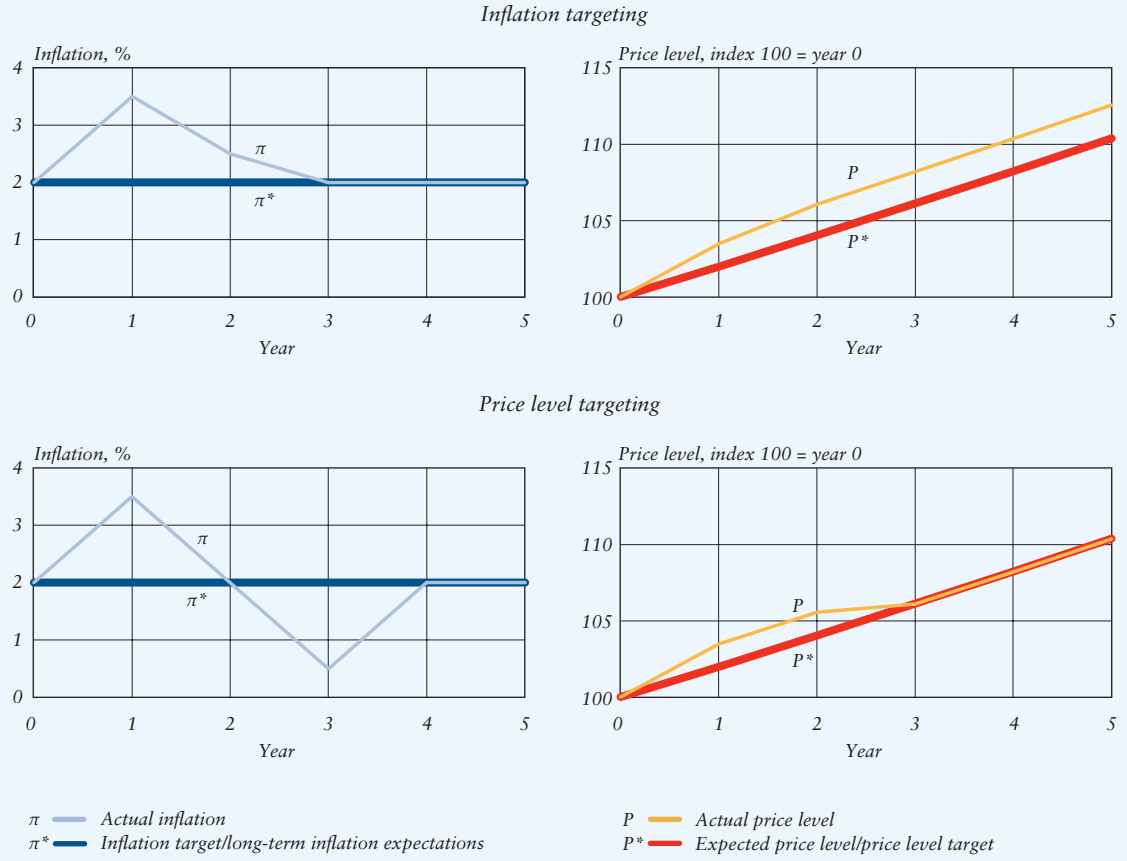
Differences between price level targeting and inflation targeting are illustrated in Chart 1.[8] The target path for each is implied by a constant annual rate of inflation of 2%. In the first period, inflation is 1.5 percentage points above target. The price level target necessitates tighter monetary policy to bring inflation below trend for the next periods and the price level back on its target path. Correspondingly, if the price index falls below its target path, the central bank eases its onetary policy stance and permits faster inflation to bring the price level back on target. The inflation target does not require such tightening or easing of monetary policy and inflation shocks thus have a lasting impact on the price level. Several inflation shocks in succession can take the price level very far from its 2% trend.

[7] The academic discussion has been summarised by eg Mayes (2008) and Ambler (2009).

[8] Kahn (2009), p. 39.

Chart 1.

A comparison of inflation targeting and price level targeting



Source: Kahn (2009).

Comparisons between the two strategies need to take into account 1) whether monetary policy is credible and 2) to what extent expectations are forward-looking. If economic policy-makers can rely on the central bank to always bring the price level back to its target path, this will stabilise medium-term inflation expectations and reduce short-term volatility in both inflation and the real economy. If, however, confidence in the central bank's ability to stabilise the price level on its target path is lacking, inflation expectations do not stabilise, deviations from the target path can grow large and the central bank's attempts to bring the price level back to its target path can have significant economic costs.

A common conclusion in the theoretical literature on monetary policy is that the benefits of price level targeting, as opposed to flexible inflation targeting, are the greatest

when inflation dynamics in an economy reflect economic policymakers' expectations of future cost developments and past inflation has a very limited impact on expectations. If the price level target acts as a stable nominal anchor for policymakers' inflation expectations, in an environment where monetary policy is based on the central bank's commitment to the stated target, price level targeting produces better results than inflation targeting. Conversely, if inflation expectations are a mix of forward-looking and backward-looking expectations, price level targeting does not necessarily produce superior results.

Recent literature also suggests an alternative that combines price level and inflation targeting as objectives of monetary policy.[9] When minimising fluctuations in the price level is important for the central bank and inflation expectations reflect both past and future economic developments, optimal interest rate policy can be derived as the weighted average of appropriate monetary policy stances with price level targeting and inflation targeting.[10]

Price level targeting may have advantages over inflation targeting, but there is minimal evidence on the magnitude of the benefits. The Bank of Canada has had a dedicated research programme for some years now, but the results do not indicate significant benefits.

The financial crisis has also revived the argument that price level targeting would be practical when short-term interest rates are close to zero. This is based on the demand-stabilising properties of price level targeting, where real interest rates rise and fall with the price level moving above and below its target path. Confidence in the price level target would thus allow negative real interest rate expectations with nominal policy rates at the zero lower bound.[11] Communicating the monetary policy stance would be a major challenge, as such a strategy would be new to both central banks and economic policymakers.

Nominal income targeting

The idea of a nominal income target for monetary policy was introduced into the discussion on monetary policy in late 2012 by the Governor of the Bank of England, Mark Carney, then Governor of the Bank of Canada. He has proposed a number of ways to improve the effectiveness of monetary policy in a zero interest rate environment. Carney also brought up nominal income targeting in this context.[12] Nominal income targeting means that, instead of stable inflation, the central bank is aiming at stable nominal GDP growth over the long term.

Nominal income targeting implies keeping nominal GDP growth stable over the long term.

Nominal income targeting is not a novel idea. There has been extensive academic discussion on monetary policy rules and objectives, and several well-known economists have proposed giving monetary policy a nominal income target. One of the first was a British economist James Meade, who was awarded the Nobel prize in

[9] Cecchetti & Kim (2004).
[10] Côté (2007).
[11] Fischer (1994) and Mishkin (2011).
[12] Carney (2012b).

economics in 1977.[13] He advocated nominal income targeting because it would allow inflation to be temporarily above target level in an environment of slow real GDP growth. It would thus allow greater flexibility than pure inflation targeting.

There is one important difference between Carney's thinking and the earlier academic literature. Meade and other academic authors typically considered a stable growth rate of nominal income to be the objective of monetary policy, whereas Carney was proposing that the objective should be derived from a target path for nominal income.[14] The differences are similar to those between inflation targeting and price level targeting. Carney suggested setting a target path for the level of nominal income and smoothing any deviations afterwards to keep nominal income around its target path over the long term.

At its best, monetary policy should be effective irrespective of the economic situation or uncertainties about the functioning of the economy. A key problem would seem to be the uncertainty relating to measurement of the output gap.[15] Nominal income targeting would not require data on price and output dynamics nor on the output gap. Nonetheless, model simulations have shown that monetary policy rules aiming at stabilising nominal output growth do not function very well under model uncertainty and measurement bias.[16]

However, such criticism is not fully applicable, if the selected nominal income target is a level and not a growth rate. As price level targeting differs from inflation targeting, so nominal income level targeting differs from growth targeting. A level target makes monetary policy dependent on past developments. Past deviations from the target level need to be corrected afterwards by deviating from the target path in the opposite direction.

A central bank with a nominal income level target will seek a monetary policy stance that will keep the level of nominal GDP close to a predefined path. If, for example, the desired inflation rate were 2% and potential output growth were estimated at 2–3%, the central bank should set a nominal income level target path with a growth rate of 4–5%. If the nominal income level is expected to be high (above the target path), the central bank should tighten its policy stance. If nominal income is low (below the target path), the central bank eases its monetary policy to bring nominal income back on the target path over the coming years. Stable nominal income may also contribute to the debt sustainability of economic agents (incl. sovereigns) by limiting the increase in the real debt burden in the recessions. During the sovereign debt crisis, this has been one of the main arguments for nominal income targeting.

[13] Other early proponents of nominal income targeting include Tobin (1980) and Britten (1981). Research results backing nominal income targeting have also been published by Bean (1983), Gordon (1985), McCallum (1997,1998), Hall & Mankiw (1994), Feldstein & Stock (1994) and Trehan (1999).

[14] Hall & Mankiw (1994) also mentions a nominal income level target.

[15] The issues are prominently flagged by McCallum (1998), Orphanides (1999) and Trehan (1999).

[16] Rudebusch (2002).

In practice, inflation could temporarily deviate greatly from the desired average rate of 2%. It is feared, though, that this could impair the central bank's commitment to the nominal income target and, in a worst-case scenario, lead to a situation where long-term inflation expectations are no longer anchored in line with the objective. Nominal income targeting would also require data on long term trend economic growth. It, too, is therefore prone to uncertainty.

Several economists have pointed out further problems with nominal income targeting. For example, some suggest that the public would not be able to understand the difference between nominal and real output. In addition, national income statistics are quarterly and only become available with a time-lag.

Zero lower bound and non-standard monetary policy measures

In the current prolonged financial crisis, the euro area, the United States and the United Kingdom have all reached a point where policy rates and the lowest market rates are both close to zero. Inflation is low and expected to remain so. At the same time, total output is less than potential output. Under these conditions, a central bank with an inflation target should, in principle, continue with easing. According to the Taylor rule, interest rates should be negative. With traditional monetary policy, this is impossible. This is known as the zero lower bound problem.

Economic policy, again in principle, has various options open to it in this situation, too. The most obvious course of action is fiscal policy easing, but even that may not produce higher economic activity under all circumstances. Moreover, fiscal policy easing leads to higher budgetary deficits and rising public debt. If indebtedness is already high, confidence in the sovereign's solvency may suffer, rendering fiscal policy easing ineffective.

Conventional monetary policy is generally understood to mean interest rate policy. With policy rates close to zero, central banks have had to resort to non-standard monetary policy measures. Japan already had experience of quantitative easing of monetary policy in the late 1990s. In Japan, quantitative easing meant large-scale asset purchases by the central bank. Most of these assets were sovereign bonds. In recent years, the Fed and the Bank of England have also resorted to similar quantitative easing. Asset purchases have caused an expansion of the central banks' balance sheets, and the amount of excess liquidity (central bank money) in the banking system has also grown (see Chart 2).[17]

In the case of the European Central Bank, non-standard monetary policy measures have meant increased lending to the banking system. The Eurosystem balance sheet has expanded, banks are holding more excess liquidity and the shortest money-market rates have even fallen below the policy rate, close to zero.

[17] Other non-standard monetary policy measures include credit easing and operation twist. In credit easing, the focus is on key borrower groups, with the central bank eg selling sovereign bonds and buying corporate debt instruments. Operation twist impacts on the yield curve, with the central bank selling short-term sovereign bonds and buying long-term sovereign bonds.

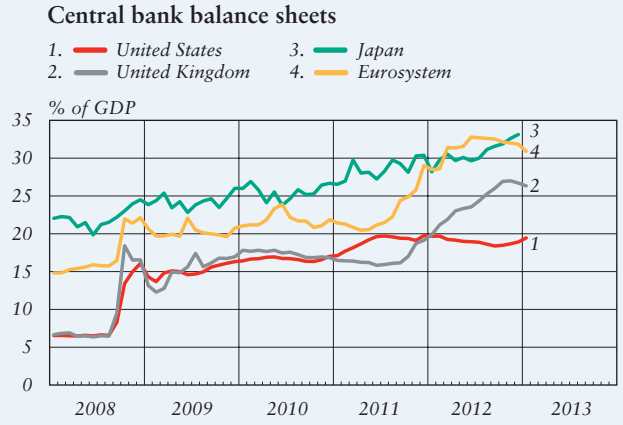
Non-standard monetary policy measures, together with the zero lower bound, and the expansion of central bank balance sheets have created a new situation from a monetary policy point of view. There is little empirical evidence on the impact of such measures, and the results have been equivocal.[18] Central bank actions, monetary policy strategies and changes in tactics have therefore been the subject of much attention and also concern.

Forward guidance can help calm market expectations of monetary policy tightening.

It is clear that non-standard monetary policy has adverse side-effects and significant costs. Zero interest rates can mask the need to repair banks' balance sheets, and they can delay structural adjustment. They can distort pricing in the market and make it increasingly difficult to tighten monetary policy in the future.

[18] Woodford (2012).

Chart 2.



Sources: National statistical authorities, Eurostat and Bloomberg.

The macroeconomic effects of quantitative easing are uncertain and coincidental. The impact of credit easing is negligible without a simultaneous quickening of loan demand from non-financial corporations and households.

Forward guidance

Communication has become a key field in monetary policy.[19] Simply committing to a certain objective and following clear rules is not enough. A central bank needs to be credible, and to be credible, it must be transparent. By taking care how it makes the background to its decisions public, the central bank can guide market expectations and enhance the effectiveness of its monetary policy decisions. By explaining its aims, it can have a direct impact on market rates and reduce uncertainty about future monetary policy.

It is important to differentiate between communication and commitment. When members of the Governing Council of the European Central Bank are asked about future monetary policy, they repeatedly emphasise that they never pre-commit with regard to future decisions. The message is that in its decision-making, the Governing Council takes into account all the latest information on economic developments and the outlook for inflation. The Governing Council has consistently sought to keep the public informed about the analyses underlying its decisions. This style of

[19] Blinder et al. (2008), Garney (2012b).

communication speaks of future monetary policy depending on a changing economic outlook.

When a central bank is transparent and gives information about its future policy, it is making a conditional commitment. The central bank can, for example, make public its economic forecast anticipating higher inflation. This acts as a message that monetary policy will eventually be tightened. Some central banks, like Sveriges Riksbank and Norges Bank, publish a projected path of the policy rate together with their forecast to show how the anticipated inflation rate can be brought in line with their objective.[20] The published interest rate path is optimised for achieving the central bank's objectives, in the light of available information. If new shocks to the economy have an impact on the outlook for inflation or monetary policy transmission, the central bank publishes a new policy assessment.

The financial crisis and the emergence of the zero lower bound as a serious concern have paved the way for a new kind of forward-looking communication, known as forward guidance. Forward guidance has been used to calm recurrent market expectations about monetary policy tightening.[21] It can also be used to communicate that the central bank is prepared to tolerate higher inflation (above target) in the short term. Such a message can bring about a change in market sentiment as regards monetary policy and bring down real interest rate expectations. This is one possible way to ease monetary policy under the zero lower bound without quantitative measures that would cause an expansion of central bank balance sheets.

The zero lower bound introduced forward guidance into monetary policy frameworks.

In December 2012, the Fed clarified its forward guidance on monetary policy. Where it earlier announced that interest rates would remain low for a considerable period of time, provided that economic developments remained in line with expectations, the Fed now made interest rate policy more explicitly conditional on the state of the national economy. More specifically, the Fed announced that it expected to keep its policy rates close to zero at least as long as the unemployment rate remained above 6.5% and inflation was projected to be no more than half a percentage point above its 2% target rate. As a third condition, longer-term inflation expectations had to continue to be well anchored in line with the 2% inflation target. With its announcement, the Fed gave forward guidance that policy rates would not be changed as long as these conditions prevailed. The Fed's communication reflects willingness to commit more strongly to a highly accommodative stance as well as the hope that communicating this will reduce uncertainty with regard to future interest rate developments. The clarification is tactical and does not imply a change to the Fed's longer-term inflation target of 2%.

[20] Rosenberg (2007), Ingves (2011) and Bernhardsen & Kloster (2002).

[21] The United States resorted to this measure already in the early 2000s. Starting in August 2003, the Fed repeatedly announced that its monetary policy would continue to provide support for demand for a 'considerable period' (see Bernanke, 2010).

Discussion on monetary policy objectives will continue

This article describes monetary policy during the financial crisis and the recent discussion on monetary policy objectives, where new directions have been sought by critically reviewing policy principles and the measures taken. Price stability is going to remain the primary objective of monetary policy, but in the future monetary policy needs to watch the developments in the rest of the economy more closely.

Communication has become a key activity in conducting monetary policy. By explaining its aims, a central bank can have a direct impact on market interest rates and reduce uncertainty about future monetary policy. In particular, the zero lower bound has made forward guidance a part of monetary policy frameworks, allowing central banks to create expectations about monetary policy remaining accommodative. Forward guidance can also be used to signal that the central bank is prepared to temporarily accept inflation rates above its target rate.

Recently it has been proposed to define target paths for either the price level or nominal GDP as an alternative to flexible inflation targeting. In both cases, monetary policy would seek to correct past deviations from the target path. With an inflation target, there is no intention to correct for past inflation or nominal income shocks, which makes future price levels less predictable. However, both alternatives present significant practical problems, which makes it unlikely that flexible inflation targeting will be sidelined as a monetary policy strategy in the foreseeable future.

The current interest in price level and nominal income targeting is partly due to the financial crisis. A lively discussion on monetary policy objectives is ongoing, and there is a lot of research into the topic. This is a discussion where active participation by central banks is desirable.

Keywords: monetary policy, financial crisis, inflation targeting, price level targeting, nominal income targeting

Bibliography

Ambler, S (2009) 'Price-Level Targeting and Stabilization Policy: A Survey'. Journal of Economic Surveys 23, p. 974–997.

Bean, C (1983) 'Targeting Nominal Income: An Appraisal'. The Economic Journal 93, p. 806–819.

Bernanke, B (2010) Monetary Policy and the Housing Bubble. Annual Meeting of the American Economic Association. Atlanta, Georgia (3 January 2010).

Bernanke, B & Gertler, M (1989) 'Agency Costs, Net Worth, and Business Fluctuations'. American Economic Review 79(1), p. 14–31.

Bernanke, B, Gertler, M & Gilchrist, S (1999) 'The Financial Accelerator in a Quantitative Business Cycle Framework'. In Taylor, J & Woodford, M (eds) Handbook of Macroeconomics. Volume 1, p. 1341–1393.

Bernhardsen, T & Kloster, A (2002) 'Transparency and predictability in monetary policy'. Economic Bulletin 2/2002. Volume LXXIII, p. 45–57. Bank of Norway.

Blanchard, O, Dell'Ariccia, G & Mauro, P (2010) 'Rethinking Macroeconomic Policy'. Journal of Money Credit and Banking 42, p. 199–225.

Blinder, A S, Ehrmann, M, Fratzscher, M, De Haan, J & Jansen, D-J (2008) 'Central Bank Communication and Monetary Policy: A Survey of Theory and Evidence'. NBER Working Paper No. 13932, p. 1–73. April 2008.

Bollard, A & Karagedikli, Ö (2005) Inflation Targeting: The New Zealand Experience and Some Lessons. Paper prepared for the Inflation Targeting Performance and Challenges Conference by the Central Bank of the Republic of Turkey. Istanbul 19–20 January 2005.

Brittan, S (1981) How to end the monetarist controversy. Hobart Paper no. 90. London: Institute of Economic Affairs.

Carney, M (2012a) Monetary Policy Framework for All Seasons. Remarks by Mark Carney, Governor of the Bank of Canada, Presented to U.S. Monetary Policy Forum New York. New York 24 February 2012.

Carney, M. (2012b) 'Guidance'. Remarks by Mark Carney, Governor of the Bank of Canada. CFA Society Toronto, 11 December 2012.

Cecchetti, G & Kim, J (2004) 'Inflation Targeting, Price-Path Targeting, and Output Variability'. In Bernanke, B & Woodford, M (eds) The Inflation-Targeting Debate. National Bureau of Economic Research, p. 173–200.

Côté, A. (2007) Price-Level Targeting. Bank of Canada Discussion Paper / Document d'analyse 2007–8.

European Central Bank (2011) The Monetary Policy of the ECB. Frankfurt am Main.

Feldstein, M & Stock, J (1994) 'The Use of a Monetary Aggregate to Target Nominal GDP'. In Mankiw, G, Monetary Policy, p. 7–70. National Bureau of Economic Research. University of Chicago Press.

Fisher, I (1933) 'The Debt-Deflation Theory of Great Depressions'. Econometrica 1(4), p. 337–357.

Fischer, S (1994) 'Modern Central Banking'. In Forrest, C (ed.) The Future of Central Banking. Cambridge: Cambridge University Press.

Gali, J (2008). Monetary Policy, Inflation and the Business Cycle: An Introduction to the New Keynesian Framework. Princeton University Press.

Gertler, M & Kiyotaki, N (2010) 'Financial Intermediation and Credit Policy in Business Cycle Analysis'. In Friedman, B & Woodford, M (eds) Handbook of Monetary Economics. Volume 3, p. 547–599.

Gjedrem, S (2004) Flexible inflation targeting. Speech on 29 March 2004. Norwegian School of Management.

Goodfriend, M & King, R (1997) 'The New Neoclassical Synthesis and the Role of Monetary Policy'. National Bureau of Economic Research Macroeconomics Annual, p. 231–283.

Gordon, R (1985) 'The Conduct of Domestic Monetary Policy'. In Ando, A, Eguchi, H, Farmer, R & Suzuki, Y (eds) Monetary Policy in Our Times, p. 45–81. Cambridge: MIT Press.

Hall, R & Mankiw, G (1994) 'Nominal Income Targeting'. In Mankiw, G (ed.) Monetary Policy, p. 71–93. Chicago: Chicago University Press.

Holmström, B & Tirole, J (1997) 'Financial Intermediation, Loanable Funds, and the Real Sector'. The Quarterly Journal of Economics, 112 (3), p. 663–691.

Ingves, S (2011) Flexible inflation targeting in theory and practice. Speech on 12 May 2011. Swedish Economics Association, Stockholm.

Kahn, G A (2009) 'Beyond Inflation Targeting: Should Central Banks Target Price Level?' Economic Review, Federal Reserve Bank of Kansas City. Third Quarter 2009, p. 35–64.

Kiyotaki, N & Moore, J (1997) 'Credit Cycles'. Journal of Political Economy, 105(2), p. 211–248.

Mayes, D (2008) A new look at price level targeting. BoF Online 11/2008. Bank of Finland.

McCallum, B (1997) The Alleged Instability of Nominal Income Targeting. NBER Working Paper No. 6291.

McCallum, B. (1998) 'Issues in the Design of Monetary Policy Rules'. In Taylor, J & Woodford, M (eds) Handbook of Macroeconomics, p. 1483–1530. New York: North-Holland.

Mishkin, F S (2011) 'Monetary Policy Strategy: Lessons From the Crisis'. In Jarocinski, M, Smets, F & Thimann, C. (eds) Sixth ECB Central Banking Conference (European Central Bank: Frankfurt), p. 67–118.

Orphanides, A (1999) The Quest for Prosperity without Inflation. Federal Reserve Board (unpublished manuscript).

Rosenberg, I (2007) Riksbank to introduce own path for the repo rate. Speech on 17 January 2007. Danske Bank, Stockholm.

Rudebusch, G D (2002) 'Assessing Nominal Income Rules for Monetary Policy with Model and Data Uncertainty'. The Economic Journal, 112(479), p. 402–432.

Svensson, L (2009) Flexible Inflation Targeting – Lessons from the Financial Crisis. Speech in the seminar 'Towards a new framework for monetary policy? Lessons from the crises'. De Nederlandsche Bank, Amsterdam, 21 September.

Tobin, J (1980) 'Stabilization Policy Ten Years After'. Brookings Papers on Economic Activity, no. 1, p. 19–72.

Trehan, B (1999) 'Supply Shocks and the Conduct of Monetary Policy'. Economic Letter, p. 99–121. Federal Reserve Bank of San Francisco.

Woodford, M (2009) 'Convergence in Macroeconomics: Elements of the New Synthesis'. American Economic Journal: Macroeconomics 1, p. 267–279.

Woodford, M (2012) Methods of Policy Accommodation at the Interest-Rate Lower Bound. Columbia University.

Global integrated monetary and fiscal model

22 February 2013

The Bank of Finland has adopted a new model of the international monetary and financial economy developed at the International Monetary Fund (IMF) for the analysis of political changes and shocks to the global economy. This article provides an introduction to the structure and key assumptions of the model and illustrates its properties through a more detailed presentation of the risk scenario discussed in the article 'Monetary policy and the global economy' (above).

Mika Kortelainen
Economist
Monetary Policy and Research

The new global integrated monetary and fiscal (GIMF) model adopted at the Bank of Finland is a dynamic stochastic general equilibrium (DSGE) model developed for the purposes of global economic analysis.[1] The model covers the entire global economy but views it as distinct economic areas linked by trade flows and relative prices, such as exchange rates. The calculations in this article are based on a six-area model covering the United States, the euro area, Japan, China, Asia and the rest of the world.

In the GIMF model, households and non-financial corporations optimize their economic behaviour. Stock-flow accounting over the long term allows eg investment flows to be accumulated as capital stocks. As a result of built-in frictions in wage and price setting, wages and prices adjust to political changes and varying shocks in the global economy with a delay.

The model also takes into account a number of real adjustment costs, some households are liquidity-constrained, and all households have a finite planning horizon. Both monetary and fiscal policies thus play an important part in fiscal consolidation.

The assumption of finite planning horizons sets this model apart from traditional general equilibrium models. In the long-term steady state, each country has a uniquely defined net external asset balance. This gives fiscal policy and private sector saving a major role in both dynamic adjustment and defining long-term steady states.

The model is particularly useful in the analysis of fiscal policy issues, as it has properties that render both spending-based and revenue-based fiscal variables non-neutral. Fiscal policy can have a short-term impact on economic activity, but persistent general government deficits tend to crowd out private investment and net external financial assets in the long term.[2] Persistent general government deficits in larger economies can also lead to higher real interest rates at the global level and thus constrain global economic developments.

Asset markets in this model are incomplete. Sovereign debt is held domestically by private investors in the form of domestic-currency-denominated nominal government bonds with a maturity of one period. All non-financial corporations are domestically owned and their equity is not traded on domestic financial markets. Households receive dividends from the corporate sector.

[1] Kumhof et al. (2010).

[2] As in eg Coenen et al. (2010), GIMF fiscal multipliers in an environment of temporary fiscal shocks are close to those of more traditional monetary models.

Household sector

There are two types of households in the model, both of which consume goods and supply labour. Overlapping-generations households (OLG) optimise their borrowing and saving over a planning horizon of 20 years.[3] Liquidity-constrained households' (LIQ) consumption equals their net income, ie they do not save and have no access to financial markets in the model. Both types of household pay income tax on labour income, value-added tax on consumption and a lump-sum tax. OLG households invest their savings in domestic sovereign bonds and US dollar-denominated international bonds as well as fixed-term deposits. They maximise their consumption and leisure within their dynamic budgetary constraints, and their aggregate consumption is thus a function of their financial wealth and the discounted current value of their labour and investment income after taxes. For LIQ households, consumption equals net income, putting their marginal propensity to consume at one. A large share of LIQ households in a population implies considerable fiscal multiplier effects from temporary changes in taxes and transfer payments.

The planning horizon of OLG households being finite, tax cuts have a positive impact on their consumption in the short term. These households discount future taxes at an above-market interest rate. Higher sovereign debt will thus increase their wealth – future taxes resulting from the debt will, at least in part, only be imposed beyond their planning horizon. If sovereign debt continues to grow, and taxes are assumed to rise accordingly to service the debt and keep the debt ratio stable over the long term, this will lead to higher real interest rates and a crowding out of private capital.[4]

Higher real interest rates have a negative impact on consumption, mainly through wealth effects. In the model, the intertemporal substitution effects of interest rate changes are small and calibrated to be consistent with empirical findings.

Productive sector

Non-financial corporations that produce intermediate inputs for production in both the tradables sector and the non-tradables sector are managed in accordance with the preferences of OLG households (their owners) and thus also have a finite planning horizon in the model.

These corporations face nominal rigidities in price setting and real adjustment costs in labour costs and investment. They pay capital income tax to the government and wages and dividends to households.

Their investments are financed by bank loans. When a corporation is financed with borrowed capital and its earnings fall below the threshold specified in its rate agreement, banks take control of its capital stock (less any auditing/insolvency costs) and reallocate it to OLG households (their depositors).

[3] With the stochastic life time assumption, derived in continuous time by Blanchard (1985), discount factors differ for households and the public sector and there is no Ricardian equivalence.

[4] For fiscal policy implications of the GIMF see eg Kumhof & Laxton (2007, 2009a and 2009b).

In a monopolistic market, corporations set the price of their goods at marginal cost plus a fixed profit margin. Export prices depend on the destination market, and import prices include quantity adjustment costs. Prices are sticky, as corporations also have to take into account nominal adjustment costs.

In addition to intermediate inputs, corporations also use public infrastructure inputs (public sector capital stock) in their production. Public capital thus promotes productivity in the economy.

Financial sector

The GIMF incorporates a compact set of financial assets. Sovereign debt consists of domestic-currency-denominated bonds with a maturity of one period.

The financial sector is modelled as in Bernanke et al.[5] and the external funding cost of a corporation depends on its indebtedness. Banks pay market interest rate on deposits and charge a risk premium on debt. The risk premium in their lending rates is directly linked to a borrower's leverage ratio to compensate for the risk of insolvency costs. The dynamics are non-linear, and a large net worth shock will cause much larger increases in risk premia.

Uncovered interest rate parity does not hold entirely; country-specific risk premia cause deviations between interest rates in different economic areas both in the short and in the long term, even though they are adjusted for expected changes in exchange rates.

[5] Bernanke et al. (1999).

Global implications and economic interdependencies

The GIMF model is structured around several distinct economic areas and, as a whole, covers the entire global economy.

As a multi-region model covering the entire world economy, the GIMF models bilateral trade flows and relative prices (also exchange rates) between the regions explicitly. Trade flows include import and export of intermediate and final goods. In this model, international trade linkages are based on global saving and investment decisions, building on households' finite planning horizon. Current account balance as a share of GDP and the net foreign asset position are uniquely defined for each economic area. With an incomplete market in financial assets, net foreign asset positions are expressed in nominal US-dollar-denominated bonds with a maturity of one period.

Other major factors determining the economic impact of shocks between economic areas are uncovered interest rate parity and long-term changes in the real international interest rate.

Monetary and fiscal policy

Fiscal policy in the model encompasses various expenditure and taxation instruments. Public expenditure can consist of public consumption or investment, or lump-sum income transfers either to all households or specifically to LIQ households. Income tax on labour and capital income, taxes on consumption and lump-sum taxes generate public revenue. It is also possible to set customs duties on imported goods to augment public revenue. Public investment demand is used to replenish public infrastructure, which depreciates at a constant rate over time.

The fiscal policy rule is selected to guarantee the long-term sustainability of public debt while allowing counter-cyclical policies in the short term. In general, the rule is implemented through changes in income taxes, but for some economic areas other instruments may be more realistic.

With the fiscal rule in place, the long-term sovereign debt ratio and, by extension, the deficit ratio in each country and economic area remain stable, which eliminates the possibility of default. The rule also allows automatic stabilisers to operate (counter-cyclical fiscal policy).

In the model, central banks use an interest rate rule responding to inflation forecasts: they adjust the difference between their policy rate and a long-term equilibrium rate to keep inflation stable over the long term.

Scenario calculation: growing risk aversion

To illustrate the properties of the GIMF, this article presents a simulation examining the economic impacts of a sudden rise in euro area risk premia. In the scenario, the risk appetite of euro area investors diminishes, leading to a steeper yield curve for sovereign bonds and an increase in corporate bond risk premia. Risk premia in the euro area return to levels last seen in the early summer of 2012 before the gradual calming of the markets.

The following assumptions are made. The one-year risk premium on sovereign bonds suddenly increases by ½ of a percentage point and then begins a slow return to the starting level. The increase is halved after approximately two years. The three-year and ten-year risk premia increase by 0.75 of a percentage point each. The risk premium on euro area corporate bonds suddenly increases by 2 percentage points, but the increase is temporary and will be halved after approximately two years. Monetary policy in both the euro area and the United States is assumed to be accommodative (close to the zero lower bound) for the next two years. In Japan, monetary policy is assumed to be at the zero lower bound for the next four years. In addition, the ECB is assumed to communicate that monetary policy should remain accommodative for a number of years to come. Interest rate cuts are possible after two years, but any easing of monetary policy in this scenario is gradual. Policy rates will fall slightly with respect to the baseline after two years. With the rising yield curve affecting the baseline, this means that policy rates will remain close to the zero lower bound for quite some time. Forward guidance is assumed to have full credibility.

Changes in risk appetite can be highly non-linear. Reductions are often swift, whereas recovery can be a very slow process under current conditions. Hence, once risk appetite wanes, investors may require an extra exchange rate premium on euro-denominated financial assets. In the scenario, this possibility is accounted for by including an immediate temporary exchange rate premium that will be halved after two years and will alone reduce the nominal exchange rate by an

approximate ½% with respect to the baseline.

The main result of this scenario (Chart 1) is a reduction in euro area GDP with respect to the baseline of just over 1% over two years. Prices fall, and in the most extreme case, inflation slows down by ¼ of a percentage point over the second, third and fourth years.

A steeper yield curve and higher corporate risk premia lead to lower domestic consumption in the euro area. In the first two years, monetary policy easing is not possible using conventional measures because of the zero lower bound.

Higher corporate risk premia and real interest rates result in higher capital utilisation costs and thereby lower investment demand. Waning domestic demand causes a contraction in output, which in turn weakens labour demand. As a consequence, wage levels fall. This drives down marginal costs for non-financial corporations, and they begin to let the reduction be transmitted into their price setting. For all these reasons, inflation will slow down slightly over the medium term.

Household labour income will contract because of lower labour demand and lower wages. The weakening financial position of non-financial corporations will adversely affect corporate profits and the flow of dividends to households. The public sector will allow automatic stabilisers to operate, providing additional income to households. In the short term, higher real interest rates will also reduce consumption through substitution effects. All in all, these factors will reduce private consumption by 1% over the medium term.

The scenario considers a situation in which the risk appetite of euro area investors diminishes.

The zero lower bound, on one hand, and forward guidance signalling accommodation, on the other, contribute to keeping nominal interest rates stable in the long term. Although, in this way, the central bank is effectively keeping the real interest rate as low as possible, the real interest rate does rise in this calculation over the short and medium term.

Fiscal policy supports consumption by letting automatic stabilisers operate. Counter-cyclical fiscal policy leads to rising deficits, and the sovereign debt ratio grows by nearly 2% in the short term.

Central banks in emerging economies still have room for manoeuvre: they lower their policy rates and use conventional monetary policy measures to alleviate the adverse effects of the shock. The real effective exchange rate of the euro weakens as increasingly risk-averse euro area investors begin to shun euro-denominated assets.

Import prices rise as the euro depreciates against other currencies, helping to curb deflationary pressures. As import prices rise and domestic demand shrinks, imports contract. A depreciating exchange rate leads to an increase in foreign demand. Overall, the current account turns positive mainly on account of weaker imports.

Diminished risk appetite in the euro area is felt in the global economy via cross exchange rates, trade flows and the real international interest rate. The assumed zero lower bound in the

Risk appetite in the euro area

Chart 1a.

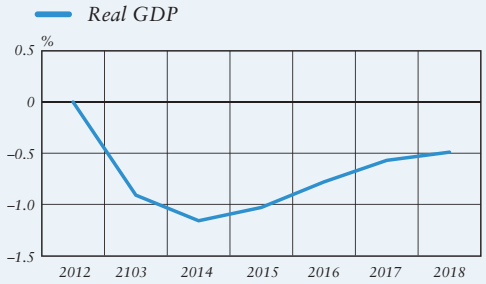


Chart 1b.

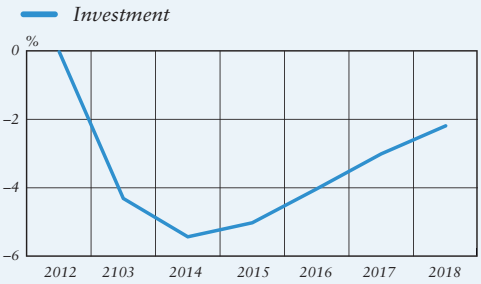


Chart 1c.

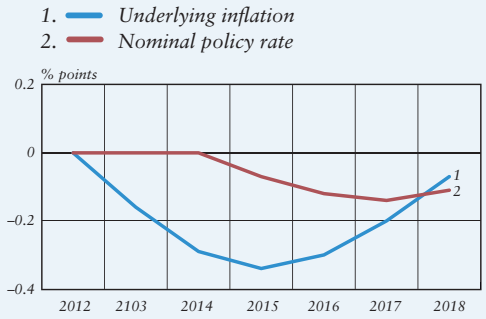
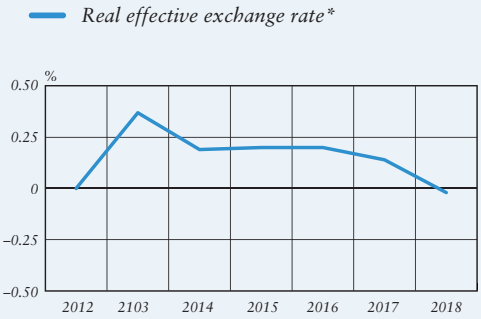


Chart 1d.



**A positive value of the real exchange rate index implies depreciation.*

Source: Bank of Finland calculations.

United States and Japan is also relevant for the international transmission of the shock. In the United States, for example, growth falls 0.1% with respect to the baseline and inflation remains near baseline. Overall, the euro area shock has a relatively minor impact on the global economy.

Conclusion

A new global integrated monetary and fiscal (GIMF) model has been adopted at the Bank of Finland. The model covers the entire global economy – viewing it as composed of economic areas – to arrive at a broad analysis of the impact of different shocks and policy changes in the different areas. In particular, the model provides a valuable angle for assessing the domestic and international impacts of monetary and fiscal policy measures.

Keywords: monetary policy, fiscal policy, GIMF

Sources:

Bernanke, B S, Gertler, M & Gilchrist, S (1999) 'The Financial Accelerator in a Quantitative Business Cycle Framework'. In Taylor, J B & Woodford, M (eds) Handbook of Macroeconomics. Volume 1C. Amsterdam: Elsevier.

Blanchard, O (1985) 'Debt, Deficits, and Finite Horizons'. Journal of Political Economy. Vol. 93, p. 223–247.

Coenen, G, Erceg, C, Freedman, C, Furceri, D, Kumhof, M, Lalonde, R, Laxton, D, Lindé, J, Mourougane, A, Muir, D, Mursula, S, Roberts, J, Roeger, W, de Resende, C, Snudden, S, Trabandt, M & in't Veld, J (2010) Effects of Fiscal Stimulus in Structural Models. IMF Working Paper Series. WP/10/73. See http://www.imf.org/external/pubs/cat/longres.cfm?sk=23671.0.

Kumhof, M & Laxton, D (2007) A Party Without a Hangover? On the Effects of U.S. Fiscal Deficits. IMF Working Paper Series. WP/07/202. See http://www.imf.org/external/pubs/ft/wp/2007/wp07202.pdf.

Kumhof, M & Laxton, D (2009a) Simple, Implementable Fiscal Policy Rules. IMF Working Paper Series. WP/09/76 (April 2009). See http://www.imf.org/external/pubs/ft/wp/2009/wp0976.pdf.

Kumhof, M & Laxton, D (2009b) Fiscal Deficits and Current Account Deficits. IMF Working Paper Series. WP/09/237. See http://www.imf.org/external/pubs/ft/wp/2009/wp09237.pdf.

Kumhof, M, Laxton, D, Muir, D & Mursula, S (2010) The Global Integrated Monetary Fiscal Model (GIMF) – Theoretical Structure. IMF Working Paper Series. WP/10/34. See http://www.imf.org/external/pubs/cat/longres.cfm?sk=23615.0.

The transformation of global energy markets

26 February 2013

Two major shifts in global energy markets have occurred over the past ten years. First, emerging economies now drive growth in global energy consumption and use more than half of all energy produced globally. The growth emphasis has clearly shifted to emerging economies. Second, traditional energy markets have been challenged by the arrival of unconventional hydrocarbons and plentiful liquefied natural gas. Renewable energy sources continue to meet an increasing share of consumption, yet even a few decades from now they will account for less than 20% of overall production. At the same time, access to unconventional oil and gas deposits has driven down production costs, especially in the United States and Canada. This has led to a dramatic drop in natural gas prices in North America even as energy prices have remained high in Europe.

Laura Solanko
Adviser
Monetary Policy and Research

Lauri Vilmi
Economist
Monetary Policy and Research

Asia consumes an ever-increasing share of the world's energy

Although energy consumption in emerging economies has been increasing rapidly for over a decade, the OECD member countries still accounted for over half of the world's energy consumption up to 2007. Today the picture has changed and almost all growth in global energy consumption – as well as increases in fossil fuel use and greenhouse gas emissions – comes from these emerging economies. China's energy consumption doubled from 2002 to 2009, making it the world's biggest energy consumer and number-one source of carbon dioxide emissions.[1] The growth in energy consumption in Asia's emerging economies is supported by urbanisation and rising personal wealth. In addition to the creation of massive infrastructure, rising energy demand is driven by the manufacturing and use of consumer electronics and home appliances. According to the 2012 forecast of the International Energy Agency (IEA), the OECD countries will account for just 35% of global energy consumption in 2035 (Chart 1).

Global energy efficiency has constantly increased. The IEA predicts that energy intensity (energy consumption in relation to global GDP) will decline about 2% a year.[2] Despite gains in energy efficiency, global energy consumption in 2035 will be about 40% higher than in 2010. Renewable energy sources (biomass, hydropower, wind, solar, etc.) are expected to play a much larger role, especially in electrical power generation, but their overall contribution to satisfying energy demand will remain small. The share of fossil fuels in world primary energy consumption will fall from around 80% at present to about 75% in 2035, while the share of renewables in the primary energy mix will increase from 13% to 18% in 2035. Nuclear power will account for most of the remainder.

Oil is currently the world's top energy source, satisfying about a third of the world's energy demand. Although reliance on petroleum products by industry and in electrical power generation should diminish, their use in

[1] BP (2012).

[2] The greatest reductions in energy intensity will occur in China, India and Russia; the world's first, third and fourth largest energy consumers, respectively.

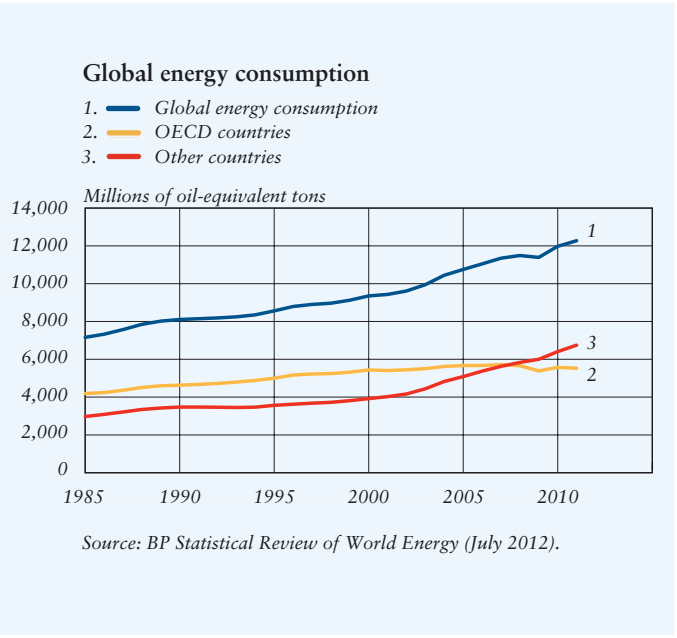
Rapid growth in emerging economies will demand renewable energy sources and increasing amounts of fossil fuels.

transportation will increase demand overall. Demand for oil and coal in particular, may even decline in the OECD countries as they shift to increased use of natural gas and renewable energy sources. The high growth in emerging economies, however, will demand both increased use of renewable energy sources and increased use of fossil fuels (oil, coal and natural gas).

International trade flows have shifted rapidly. China became a net importer of oil as recently as 1993, yet it was the world's second-largest oil importer and the largest importer of petroleum products by 2010. China and India together account for over half of the world's coal production, and yet both are important buyers of coal on the world market. India, in particular, is expected to step up its coal imports in coming years. By international standards, India's domestic coal production is extremely inefficient and unable to keep pace with rising domestic demand.[3] The share of natural gas in energy consumption outside the OECD countries and countries of the former Soviet Union has been small, but gas consumption could grow rapidly in the coming years.

Europe and North America will continue to be major markets in the future, but the growth of Asian energy consumption will shift the bulk of energy trade flows from the Atlantic to the Pacific Ocean, and will increase the importance of the South China Sea in global energy trade. Currently, about a third of the world's crude oil supplies, and about half of the world's liquefied natural gas (LNG) supplies, move through the Strait of Malacca and the South China Sea.[4] Energy companies owned by the Chinese, Koreans and Indians are increasingly influential operators in producer countries of the Mideast, Africa and Central Asia, as well as in international trade. Rising demand in China and other emerging economies also bears a direct impact on world prices of energy commodities.[5]

Chart 1.



Source: BP Statistical Review of World Energy (July 2012).

Deposits once thought intractable now drive boom in US oil and gas production

The explosion in global demand in the past decade coincided with peaking of production in mature production areas developed in the 1970s (eg Russia, the

[3] IEA Coal (2012).
[4] EIA (2012).
[5] Simola (2012).

US and Europe). The new potential oil and gas fields were known to be in increasingly challenging locations, but the relatively low oil prices in the 1980s and 1990s did not encourage large and uncertain investments. It was only when global demand took off and prices of crude oil and natural gas shot up that companies got serious about exploring production possibilities in extreme conditions such as the Arctic continental shelf (Russia, Alaska) and in the deep Atlantic (Brazil). Interest also turned to unconventional gas and oil reserves, especially in North America. Exploiting these less accessible hydrocarbons was understood to require patience, deep pockets and an ability to take on risk.

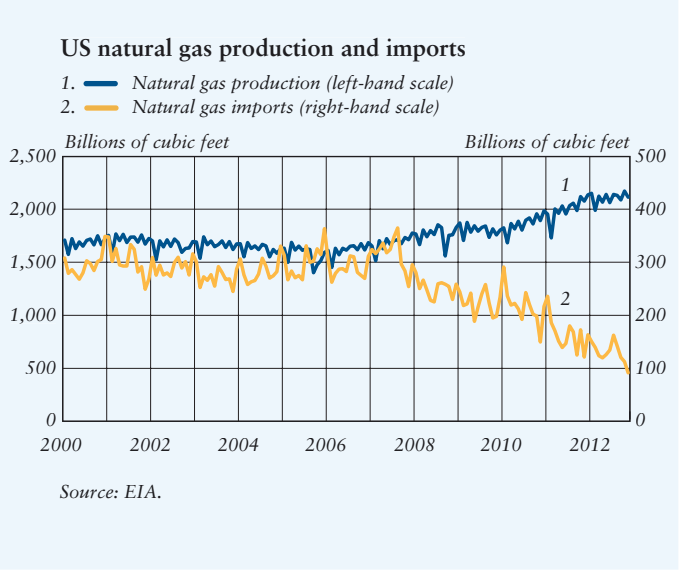
The technology, new skill sets and support services needed to extract unconventional oil and gas (see Box 1, p. 62) have evolved far faster than predicted. Lower production costs have made it attractive to develop many unconventional hydrocarbon deposits and has led to an oil and gas boom in the United States. Using new methods, substantial amounts of natural gas are now beginning to be extracted from vast shale formations. After 2006, US natural gas production began to rise – and rise much faster than earlier imagined. During 2007–2012, US gas production increased over 25% and caused a noticeable decline in gas imports (Chart 2). Just ten years ago, US gas imports were expected to continue to rise rapidly, so gas producers in eg Qatar and Russia were planning gas export terminals specifically to serve a growing US gas market. Now suddenly the US is self-sufficient in natural gas and it may become a net gas exporter. Over the last five years, natural gas originally destined for the North American market has had to be diverted to the European and Japanese markets.

The United States could soon become a net exporter of natural gas.

The technology developed to extract shale gas has been repurposed for use in oil production, and production from unconventional oil deposits once considered unprofitable has increased. The result is an impressive rise in domestic production in the US that reversed decades of decline in the US crude oil production in 2008. US production of oil and petroleum products exceeded 1993 levels in 2012 (Chart 3).[6] The latest IEA forecast sees US oil production climbing 40% a year through 2017, which

[6] EIA figures available up to November 2012.

Chart 2.



Box 1.

What are unconventional hydrocarbons?

The world's oil and gas reserves are a legacy of plant and animal life buried under layers of sediment hundreds of millions of years ago. Over time, heat and pressure converted this matter into a rich soup of hydrocarbons. Some of the liquid and gas was trapped in underground formations and some mineralised. Traditional or conventional oil and gas deposits are associated with special geological formations that include caverns in which the gas and oil collect. Oil exploration in the old days involved finding one of these underground hydrocarbon pools, drilling and casing a borehole, and pumping the oil and gas to the surface.

Unconventional hydrocarbons, in contrast, reside in a much wider variety of geological features and typically embedded in porous mineralisations. Such formations are common, but extracting these intractable hydrocarbons was traditionally quite challenging and expensive. Sources of unconventional crude oil include tar sands and oil (kerogen) shale. Sources of unconventional natural gas include tight gas, coal bed methane (CBM), shale gas, and clathrate (methane) hydrates. Over the past ten years, the techniques for extracting shale gas (eg horizontal drilling and fracking) have developed rapidly, reducing production costs and setting off a major oil and gas boom in the US. As the technology has evolved and the service sector supporting unconventional extraction have developed, the possibilities of shale gas production have begun to be examined in eg Poland, Ukraine and China. At the moment, the environmental risks associated with fracking have limited its use Europe, but in coming decades production methods now classed as unconventional are likely to be in increasing use.

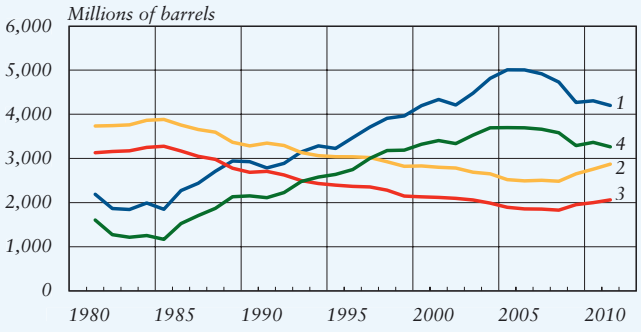
would make the US one of the world's biggest oil producers.[7] At the same time, US reliance on imported oil has fallen both due to the recent financial downturn and increased domestic production. US dependence on imports is likely to keep falling, so the domestic production in the near future could be sufficient to cover about half of total US oil consumption. The US Energy Information Administration (EIA) expects net fuel imports to the US to fall by about 20% by 2025.[8] This, together with net gas exports, should reduce the US trade deficit over the next ten years by about 0.5 percentage points of GDP.

Because the United States still is one of the world's largest crude oil and natural gas consumers, growth in its domestic gas and oil production has significant global impacts. Growth in gas production has driven gas prices in the US to record lows, which, in turn, has boosted the use of gas, especially in electrical power generation. Many US power plants have shifted from coal to cleaner natural gas, leading to a sharp decline in coal consumption in 2011–2012. This, in turn, has led coal producers to seek out export markets, which has driven down market prices especially in Europe. Unlike the US, gas prices have remained high in Europe, making coal, the environmentally less friendly fuel, an attractive option for power plants. The collapse in coal prices has in some cases made running gas-fired power plants unprofitable.

Chart 3.

US oil production and imports

1. *Imports of crude oil and petroleum products*
2. *Production of crude oil and petroleum products*
3. *Crude oil production*
4. *Crude oil imports*



Source: EIA.

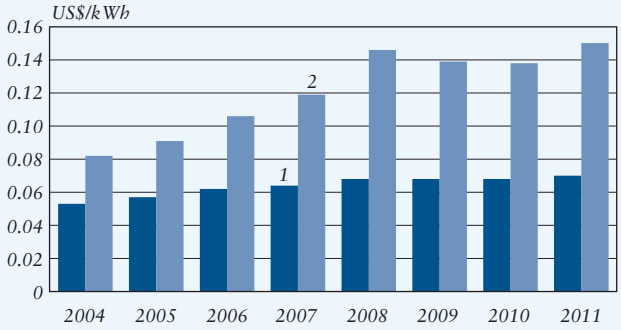
The low price of natural gas in the US has also helped keep the price of electricity fairly stable, even as electrical power rates in Europe have soared over the past decade. In 2011, the price for gas paid by industrial users in the US was about a third of that paid by their European counterparts; US electricity rates were about half of the European average (Charts 4 and 5).[9] This situation has created increased challenges for Europe's industrial competitiveness, especially in energy-intensive industries such as metals refining and chemicals. In Germany, in particular, many companies have publicly stated that they are considering transferring production to the US to take advantage of cheaper energy supplies.

At the same time, the gas and oil boom in the US is anticipated to create

[7] IEA Oil (2012).
[8] EIA (2013).
[9] Comparable figures are not yet available for 2012, but the difference is unlikely to have changed much.

Chart 4.

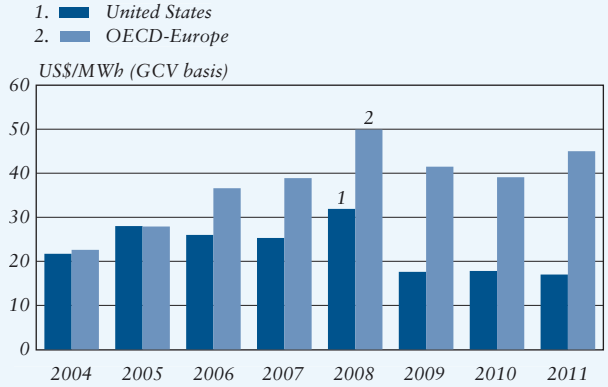
Electricity prices for industry in the United States and Europe



Source: IEA, Energy Prices and Taxes (2012).

Chart 5.

Natural gas prices for industry in the United States and Europe



Source: IEA, Energy Prices and Taxes (2012).

thousands of new jobs in the energy sector and other industries. While cheap energy may have helped revive American industry and encouraged new capital investment, the impact should not be exaggerated. The rebirth of the energy sector largely affects closely related branches such as chemicals and metals, and the employment effects are limited. The American Chemistry Council estimated in 2012 that only about 10% of the then 12 million unemployed persons in the US would benefit from the energy boom and that the impacts on industrial competitiveness would increase level of the US GDP by slightly more than 1% over the long term.[10]

How these changes affect Europe and Finland

United States natural gas imports contracted during 2006–2011, while global production capacity for liquefied natural gas doubled. As significant amounts of LNG became available, spot trade volumes increased and prices fell in several trading hubs.[11] LNG represented less than 10% of the global gas trade in 2003 and over 25% in 2011.[12] At the same time, oil prices on the world market rebounded rapidly to pre-crisis levels last seen in 2008, which, in turn, caused European and Asian oil-indexed gas prices to go up. LNG, which was once considered the expensive alternative form of gas, began to look quite attractive to many European energy companies. In 2005, there were nine LNG import terminals in Europe. There are 19 today in eight EU countries and more are planned.[13] In 2000, about 5% of gas imports to

[10] American Chemistry Council (2012).

[11] Spot and short-term LNG trade is defined as LNG traded under contracts with a duration of 4 years or less.

[12] IGU (2012).

[13] GIIGNL (2012).

the EU zone were supplied as LNG. That share rose to about 15% in 2005 and about 25% in 2011.

The increased availability of LNG and short-term supply contracts increased demands from European customers for modification of the terms of their traditional long-term supply contracts. (See Box 2 for an explanation on gas pricing arrangements in Europe, p. 67.) So far, Norway's Statoil has been much more accommodating about new pricing principles than Russia's Gazprom or Algeria's Sonatrach. Gazprom's inflexibility on modifying terms of its gas supply contracts has be widely criticised and even contributed to Gazprom's loss of market share in recent years. Even with these problems, Gazprom remains the top supplier of natural gas to the EU countries.[14]

LNG has yet to appear on the Finnish market for the simple reason that Finland does not have a LNG import terminal. At the moment, all of Finland's natural gas supplies come from Russia, as does 90% of its crude oil and 80% of its coal. Gasum, the company that manages Finland's gas market, is planning an LNG regasification terminal to be built in Inkoo or Porvoo. Environmental impact assessment studies have been initiated for both sites.

In autumn 2009, the European Commission and the EU parliament approved the Third Energy Package aimed at reforming and opening up the gas and electricity sectors in the EU. The goal of this package of legislative proposals is to increase competition and trade across national borders, separate (unbundle) energy distribution from energy production, as well as improve energy security of EU member states through the construction of trunk transmission pipelines and grids. To support these goals, EU's Baltic Energy Market Interconnector Plan (BEMIP) project may co-finance construction of an LNG import terminal in Lithuania, Latvia, Estonia or Finland, along with construction of trunk pipelines connecting all the BEMIP countries. Given that the EU support will be available only for one large project, the member countries must first agree on the best location for the LNG terminal. The Finnish market by itself is too small to support a very large terminal.

The EU's BEMIP project could co-finance construction of a large LNG receiving terminal in Lithuania, Latvia, Estonia or Finland.

The availability of LNG on the Finnish market would increase security of supply and introduce gas pricing that more closely tracks price formation in European trading hubs. In the future natural gas may travel under the Baltic seabed from east to west via the Nord Stream gas pipeline, while on the surface of the Baltic Sea LNG tankers will sail from west to east to deliver their cargoes.

The reduction in the production costs of unconventional oil and gas has opened new opportunities to increase energy production elsewhere than in the traditional oil and gas producing countries. Given that domestic production will meet a larger share of US oil demand than previously thought, the significance of emerging Asian economies as export destinations will increase. Natural gas is increasingly

[14] Simola, Solanko and Korhonen (2013).

becoming a globally traded commodity that can be readily shipped to distant destinations in liquid form. This implies that, gas pricing on European regional markets is moving towards market-based pricing. At the same time, the shift in focus to growing energy demand in Asia's rising economies will alter global trade flows and erase the relative dominance of the OECD member countries. Shifts in global supply and demand will become more apparent in European energy prices in the future.

Keywords: energy markets, shale gas, liquefied natural gas (LNG)

Box 2.

How is the price of natural gas set?

As natural gas is expensive to transport and difficult to store, there is no world market price for natural gas. Gas has traditionally been piped from production fields to end users. In some cases, transmission pipelines can stretch thousands of kilometres. Alternatively, natural gas (after liquefaction) can be transported by sea in special tanker vessels. Unloading an LNG cargo requires a special-built regasification terminal to offload the LNG and restore it to gas form. Natural caverns suited to natural gas storage are extremely rare, and none exist in Finland.

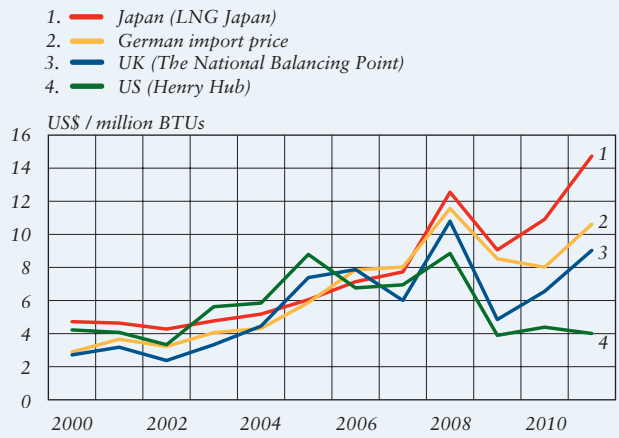
Due to the large investments needed for the transportation, gas markets have typically been oligopolistic. Before the mid-1990s, it was common for countries in Europe to have a single gas company with a monopoly on the domestic gas market. There were only a handful of gas producers from which to purchase gas. Even today, most of the gas producers are large state-owned companies (eg Gasterra, Statoil, Sonatrach, Gazprom).

For these reasons, natural gas trade has traditionally be based on long-term supply contracts that committed both buyer and seller to deals lasting as long as 25 years. Typically, these contracts define both the volumes supplied and the pricing mechanism. In Asia and Europe, this usually meant linking the gas price to the market price of crude oil or certain petroleum products.[1] The long-term nature of the supply contracts and the lack of cross-border transmission pipelines meant that a single gas price shaped by current supply and demand could not emerge in continental Europe. Instead, the market price of natural gas is typically quoted in terms of a regional or local price. At the moment, the only liquid marketplace for natural gas in the world is Henry Hub in the US, which shapes the gas price on the US regional market.

In recent years, changes in the gas sector in Europe have increased pressure to end the traditional oil-indexed pricing mechanism and to increase the role of marketplaces (hubs) where short-term gas contracts are traded. At the moment, the UK's virtual gas marketplace, the

Chart.

Average natural gas prices by regional market



Source: BP Statistical Review of World Energy (June 2012).

[1] *Precise data on price formation is scarce. Stern (2007) reports that the pricing of 90% of the gas supplied by Norway, Algeria and Russia in 2004 was tied to pricing of petroleum products with a lag of about 6 months. As long as the supply contract included a "final destination" clause that forbids the buyer from selling supplied gas to third parties, producers could discriminate on price among their customers. In addition to petroleum products, in some markets, the pricing formulas could incorporate prices of other energy carriers or trends in electricity prices. Oil indexation of the gas price is a legacy from the 1960s, when heavy fuel oil was also used extensively in electrical power generation in Western Europe.*

National Balancing Point (NBP), is Europe's most liquid market for gas. Norway's Statoil ties a significant share of its gas pricing to regional pricing set by traders on the NBP. Continental Europe boasts a number of smaller marketplaces that should have a growing impact on regional gas pricing in coming years. The creation of similar marketplaces in Asia has been slower, and trading is still almost exclusively conducted on the basis of oil-indexed long-term contracts.

References

American Chemistry Council (2012). Shale Gas, Competitiveness and New U.S. Investments: A Case Study of Eight Manufacturing Industries. May 2012.

BP (2012). BP Statistical Review of World Energy 2012. http://www.bp.com/statisticalreview.

GIIGNL (2012) The LNG Industry in 2011. http://www.giignl.org/fr/home-page/publications/.

IGU (2012) World LNG Report 2011. International Gas Union.

EIA (2012) World Oil Transit Chokepoints. U.S. Energy Information Administration. http://www.eia.gov/countries/regions-topics2.cfm?fips=WOTC. Cited 11 February 2013.

EIA (2013). Annual Energy Outlook 2013 Early Release Overview. U.S. Energy Information Administration.

IEA (2012). World Energy Outlook 2012. International Energy Agency. Paris.

IEA Coal (2012). Medium-Term Coal Market Report. International Energy Agency. Paris.

IEA Oil (2012). Medium-Term Oil Market Report. International Energy Agency. Paris.

IEA Prices (2012) Energy Prices and Taxes. 4th Quarter 2012. International Energy Agency. Paris.

Simola, H (2012). How have emerging economies changed global price trends? Bank of Finland Bulletin 4/2012.

Simola, H – Solanko, L – Korhonen, V (2013). Perspectives on the Russian Energy Sector. BOFIT Online 2/2013.

Stern, J (2007). Is There a Rationale for the Continuing Link to Oil Product Prices in Continental European Long Term Gas Contracts? OIES Working Paper. April 2007.

Organisation of the Bank of Finland

1 February 2013

PARLIAMENTARY SUPERVISORY COUNCIL

Ben Zyskowicz, *Chairman,* **Pirkko Ruohonen-Lerner,** *Vice Chairman,*
Jouni Backman, Timo Kalli, Mari Kiviniemi, Marjo Matikainen-Kallström,
Lea Mäkipää, Petteri Orpo, Pia Viitanen

Anton Mäkelä, Secretary to the Parliamentary Supervisory Council

BOARD

Erkki Liikanen Governor	**Pentti Hakkarainen** Deputy Governor	**Seppo Honkapohja** Member of the Board
Monetary policy preparation and implementation, domestic economic policy, membership of the Governing Council and General Council of the ECB.	***Financial stability issues, currency supply services, financial administration and procurement, risk control, Chairman of the Board of the Financial Supervisory Authority.***	***Research, investments of financial assets, administration.***
Member of the Board to whom the Heads of the General Secretariat, Banking Operations, and Internal Audit report.	*Member of the Board to whom the Heads of Financial Stability and Statistics, and Cash Department report.*	*Member of the Board to whom the Heads of Monetary Policy and Research, and Administration report.*

Mika Pösö, Secretary to the Board

DEPARTMENTS

Monetary Policy and Research *Tuomas Saarenheimo*	• Forecasting • International and Monetary Economy	**Institute for Economies in Transition (BOFIT)**	**Research**
Financial Stability and Statistics *Kimmo Virolainen*	• Macroprudential Analysis Division • Macroprudential Policy Division • Oversight of Market Infrastructure	**Statistics** • Balance of Payments • Financial Statistics	• Statistical Systems Management
Banking Operations *Harri Lahdenperä*	• Market operations	• Investments	• Payment and Settlement Division
Cash Department *Mauri Lehtinen*	• Currency	• Infrastucture and Systems	• Security
General Secretariat *Mika Pösö*	**Communications** **European and International Affairs** **Legal Affairs**	• Information Management	Senior Secretarial Staff Strategy and Organisation
Administration*Pirkko Pohjoisaho-Aarti*	• Financial Administration and Procurement • Language and Publication Services • In-House Services	• Personnel • Risk Control	**Information Technology**
Internal Audit *Pertti Ukkonen*			

The Financial Supervisory Authority, headed by Anneli Tuominen, operates in association with the Bank of Finland.

Publications

A complete list of publications is available on the Bank of Finland website (www.bof.fi > Publications).

The Bank of Finland has introduced a free electronic subscription service on its website, through which it is possible to order the Bank's publications in electronic form. Subscribers are sent an email alert whenever the publications subscribed to are newly released. Publications can be subscribed to at www.bof.fi > Publications > Order and subscribe to electrionic publications and reports.

Back copies of older printed publications still in stock can be ordered from the Bank of Finland (www.bof.fi > Publications > Orders and subscriptions, printed publications).

Suomen Pankki
Bank of Finland
PO Box 160
FI-00101 HELSINKI
FINLAND