

GLOBAL ECONOMIC OUTLOOK - JANUARY

Monetary and Statistics Department
External Economic Relations Division

2015

I. Summary	2
II. Economic outlook in advanced economies	3
II.1 Euro area	3
II.2 United States	4
II.3 Germany	5
II.4 Japan	5
III. Economic outlook in BRIC countries	6
III.1 China	6
III.2 India	6
III.3 Russia	7
III.4 Brazil	7
IV. Outlook of exchange rates vis-à-vis the US dollar	8
V. Commodity market developments	9
V.1 Oil and natural gas	9
V.2 Other commodities	10
VI. Focus	11
The effect of oil prices on inflation from a GVAR model perspective	11
A. Annexes	15
A1. Changes in GDP predictions for 2015	15
A2. Changes in inflation predictions for 2015	15
A3. List of abbreviations	16
A4. List of thematic articles published in the GEO	17

Cut-off date for data

12 - 16 January 2015

CF survey date

12 January 2015

GEO publication date

23 January 2015

Notes to charts

ECB and Fed: midpoint of the range of forecasts.

The arrows in the GDP and inflation outlooks indicate the direction of revisions compared to the last GEO. If no arrow is shown, no new forecast is available. Asterisks indicate first published forecasts for given year.

Forecasts for EURIBOR and LIBOR rates are based on implied rates from interbank market yield curve (FRA rates are used from 4M to 15M and adjusted IRS rates for longer horizons). Forecasts for German and US government bond yields (10Y Bund and 10Y Treasury) are taken from CF.

Authors

Luboš Komárek lubos.komarek@cnb.cz	Oxana Babecká Kucharčuková oxana.babecka-kucharukova@cnb.cz	Tomáš Adam tomas.adam@cnb.cz	Filip Novotný filip.novotny@cnb.cz	Milan Klíma milan.klima@cnb.cz
Editor-in-chief Summary	Editor	Editor II.1 Eurozone	II.2 United States	II.3 Germany
Soňa Benecká sona.benecka@cnb.cz	Lucie Matějková lucie.matejkova@cnb.cz	Jan Hošek jan2461.hosek@cnb.cz		
II.4 Japan Focus	III. Economic outlook in BRIC countries	V. Commodity market developments Focus		

The January issue of Global Economic Outlook presents its regular overview of recent and expected developments in selected territories focusing on key economic variables: inflation, GDP growth, leading indicators, interest rates, exchange rates and commodity prices. In this issue we focus on the biggest phenomenon of recent months – oil prices. Our analysis deals with the effect of oil prices on inflation from a GVAR (global vector autoregression) model perspective. This model framework shows that a fall in oil prices leads to an increase in anti-inflationary pressures, especially in the short run. If a country reaches the zero lower bound on monetary policy interest rates, a fall in oil prices can be expected to have a much greater impact on inflation according to this model.

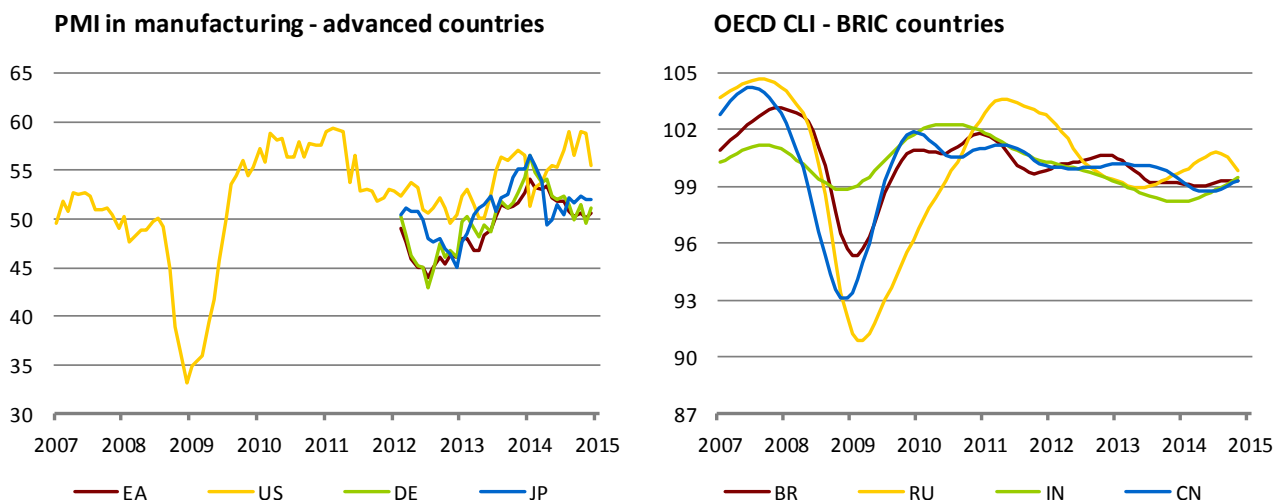
The global economic outlooks for 2015 and 2016 are more optimistic than last year. The global economy is expected to grow at a 3% pace, increasing slightly further in 2016. The impacts of the sharp decline in dollar prices of oil and appreciation of the dollar against most other currencies will play an important role. Price developments remain worrying in the euro area, where creeping deflation has not yet been averted. The outlooks for euro area economic powerhouses such as Germany, France and Italy are indicating relatively weak performance. Along with traditionally fast growing countries such as China and India, the US economy is expected to be the main driver of global economic growth over the next two years (see the chart below). Among the G7 countries, Canada and the UK should also maintain solid growth. The results of the Japanese economy should also gradually improve, albeit with inflation only just above 1%.

The outlooks for emerging economies, represented by the BRIC group, remain mixed until 2016. Despite slightly deteriorating results, the Chinese economy is best off, as it will maintain growth of just below 7% amid relatively low inflation. The accelerating Indian economy will be catching up with China, reaching almost the same rate of growth at the end of 2016. By contrast, the Russian economy is heading into recession amid higher inflation (and a weak rouble). Its situation primarily reflects the low dollar prices of oil and the sanctions imposed by the international community. The current adverse macroeconomic situation in Russia is expected to improve slightly over the next two years, with economic growth reaching 2% at the end of 2016 amid slightly falling inflation.

The outlooks for euro area interest rates remain very low and there is no sign of them rising before the end of 2016. Moreover, there are mounting expectations that the ECB will introduce further unconventional instruments. In the USA, interest rates might start to increase in a matter of months (roughly in the second half of 2015). According to CF, the dollar will appreciate slightly against all the monitored currencies at the one-year horizon, the only exceptions being the renminbi and the rouble, for which a slight correction is expected after a steep decline in its value.

Oil prices are expected to stand at around USD 60 a barrel at the end-2015 outlook horizon. Owing to a stronger dollar, however, the effects of cheaper oil will weaken for consumers who do not pay in dollars. However, such consumers might benefit from a possible economic recovery, which usually begins in periods of lower oil prices. The outlooks for natural gas prices, which normally lag behind oil prices, suggest a substantial decline to USD 140 per 1,000 m³; they will then start to grow again. The outlooks for prices on the agricultural commodities and industrial metals markets are stable around current levels.

Leading indicators for countries monitored in the GEO

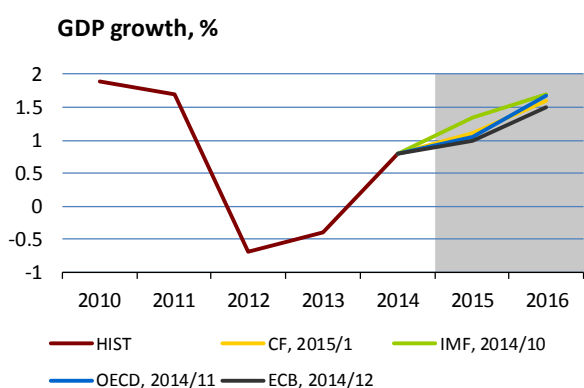


Source: Bloomberg, Datastream

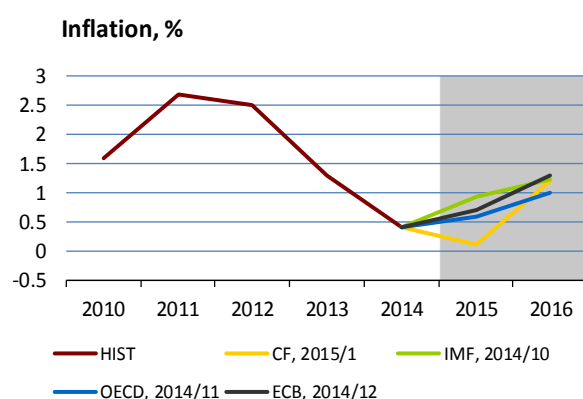
II.1 Euro area

Quarterly GDP growth in the euro area rose to 0.2% in 2014 Q3 (after recording growth of 0.1% in Q2). Continued modest economic growth, fostered among other things by lower oil prices, is expected at the end of the year. Industrial production showed higher-than-expected month-on-month growth in November (0.2%), with lower production in the energy sector counteracted by a sizeable increase in production of durable goods due partly to Christmas shopping. Retail sales grew at solid rates and leading indicators are also signalling slightly improved activity at the year-end. Although the PMI in manufacturing increased in December (to 50.6) and its new orders component is signalling an improvement, it is still only just above the stagnation level. Euro area GDP growth is expected at around 0.6% for 2014 as a whole. It is expected to pick up to around 1% this year and to rise further to 1.5% next year.

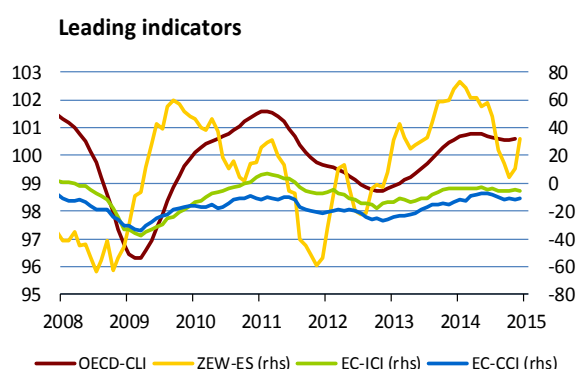
Inflation dropped by 0.5 pp to -0.2% in December. The decline to negative levels was due to a negative contribution of energy prices, while core inflation (0.8%) and services price inflation (1.2%) are roughly at the levels recorded in previous months. Average inflation declined by almost 1 pp to 0.4% in 2014. This year it will slow to 0.1% according to the January CF, while according to the December forecast of the ECB, which did not foresee the sharp fall in oil prices in December and January, it will drop to around 0.7%. Longer-term bond yields in most euro area countries also fell in January, with some turning negative. This decline reflects expectations of a possible launch of bond purchases by the ECB and also a decline in longer-term inflation expectations, as signalled, for example, by 5Y inflation swaps. By contrast, government bond yields in Greece increased on uncertainty regarding the snap election called for late January.



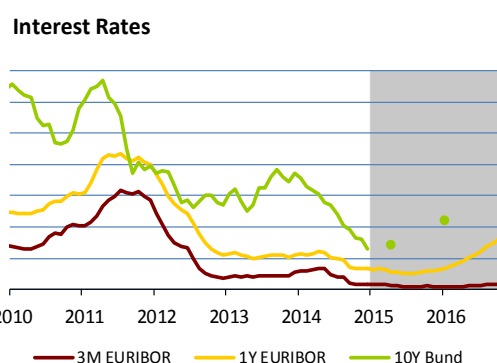
	CF	IMF	OECD	ECB
2015	1.1 →	1.3	1.1	1.0 ↘
2016	1.6 ★	1.7	1.7	1.5 ↘



	CF	IMF	OECD	ECB
2015	0.1 ↘	0.9	0.6	0.7 ↘
2016	1.2 ★	1.2	1.0	1.3 ↘



	OECD-CLI	EC-ICI	EC-CCI	ZEW-ES
10/14	100.6	-5.1	-11.1	4.1
11/14	100.6	-4.3	-11.5	11.0
12/14		-5.2	-10.9	31.8

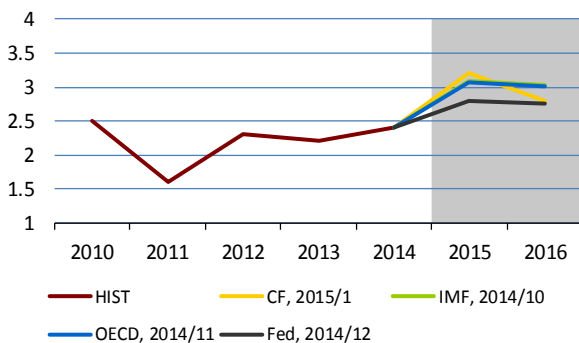


	12/14	01/15	06/15	12/15	06/16	12/16
3M EURIBOR	0.08	0.07	0.05	0.05	0.06	0.11
1Y EURIBOR	0.33	0.32	0.26	0.31	0.56	0.96
	11/14	04/15	01/16			
10Y Bund	0.80	0.70	1.10			

II.2 United States

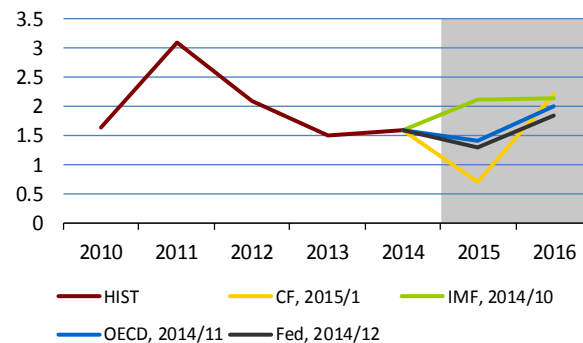
Economic growth in the USA will rise above 3% in 2015 according to most of the institutions monitored. Annual GDP growth increased to 2.7% in 2014 Q3, and GDP growth of 2.4% is expected for 2014 as a whole. Industrial production growth also rose significantly in November. On the other hand, although the PMI leading indicator weakened in December, it remains in the expansionary band, giving rise to positive expectations for future growth in industrial production. The consumer confidence index (Conference Board) went up in December, while the University of Michigan Consumer Sentiment Index increased significantly. This is good news for retail sales and consumer demand this year and is probably also associated with the oil price decline. According to the January CF, inflation expectations dropped substantially. Slower annual growth in consumer prices can also be observed in the actual November data, as headline inflation slowed to 1.3%. The oil price decline is expected to have a stronger effect in subsequent months. Implied outlooks for interest rates and the CF outlook for 10Y government bond yields responded by falling slightly. The date of the first increase in the Fed's key interest rates thus seems to have moved further beyond 2015 H1. Moreover, the US dollar continued to appreciate against the euro. In December 2014, it was more than 10% stronger year on year. A further appreciation of 2.2% is expected at the one-year horizon.

GDP growth, %



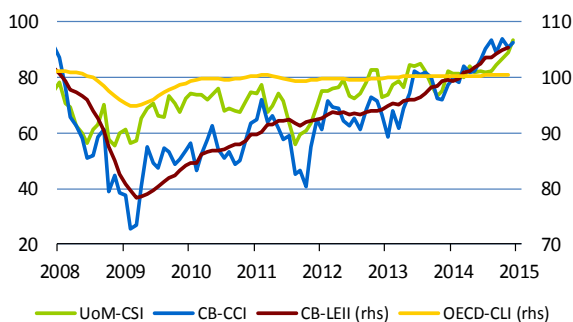
	CF	IMF	OECD	Fed
2015	3.2 ↗	3.1	3.1	2.8 ↘
2016	2.8 ★	3.0	3.0	2.8 ↘

Inflation, %



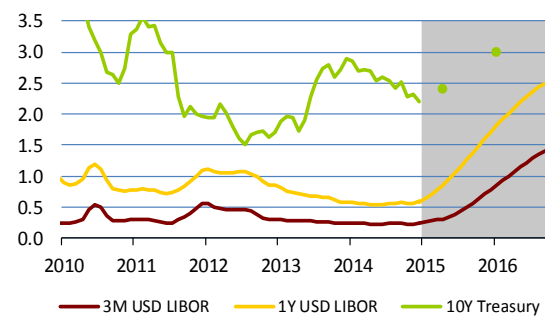
	CF	IMF	OECD	Fed
2015	0.7 ↘	2.1	1.4	1.3 ↘
2016	2.2 ★	2.1	2.0	1.9 ↘

Leading indicators



	CB-LEII	OECD-CLI	UoM-CSI	CB-CCI
10/14	104.9	100.4	86.9	94.1
11/14	105.5	100.4	88.8	91.0
12/14			93.6	92.6

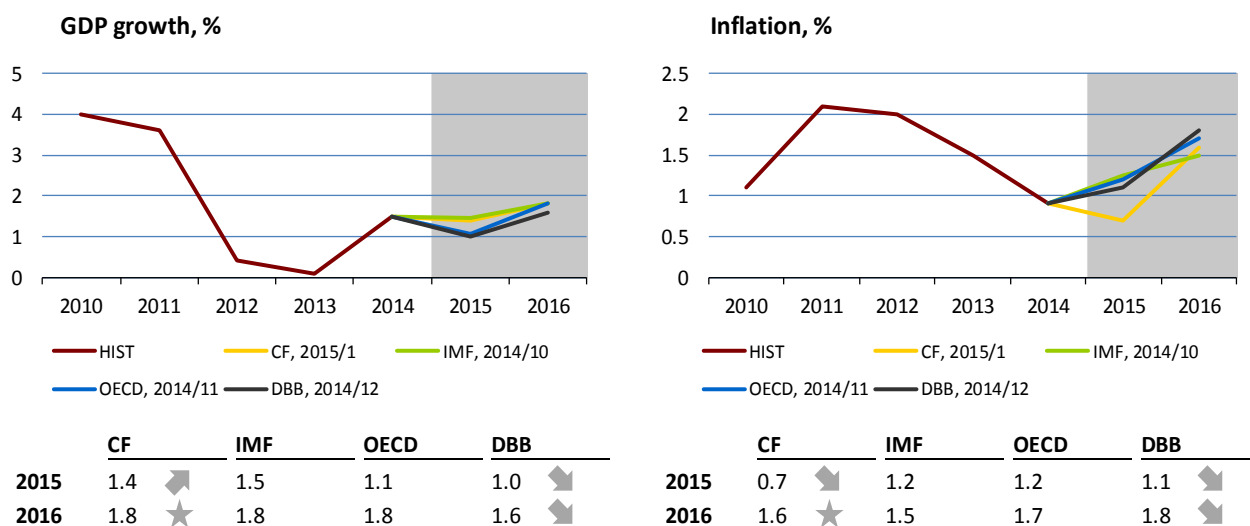
Interest Rates



	12/14	01/15	06/15	12/15	06/16	12/16
3M USD LIBOR	0.25	0.25	0.38	0.78	1.22	1.56
1Y USD LIBOR	0.60	0.63	1.05	1.71	2.28	2.69
10Y Treasury	2.21	2.40	3.00			

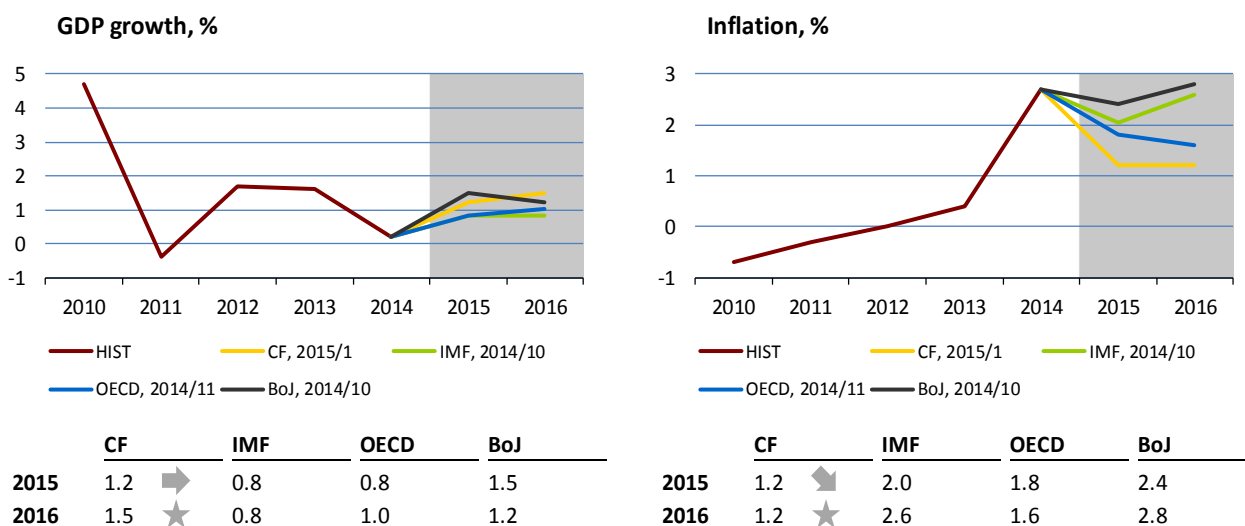
II.3 Germany

Quarterly economic growth in Germany increased slightly to 0.1% in 2014 Q3 after declining by the same amount in Q2. By contrast, annual GDP growth slowed by 0.2 pp to 1.2%. Quarterly growth probably increased somewhat in Q4 on the back of rising domestic demand. According to a flash estimate, GDP grew by 1.5% in 2014 as a whole. Economic growth is expected to remain at roughly the same level this year. Given the extremely low oil prices and the weakening euro, the growth might even be higher. This is also suggested by increasing values of leading indicators. As a result of the higher growth and low interest rates, the German government achieved a balanced federal budget last year. Inflation declined by 0.4 pp to 0.2% in December, mainly due to falling energy prices. Inflation amounted to 0.9% in 2014 as a whole. According to the January CF, it should drop to 0.7% this year.



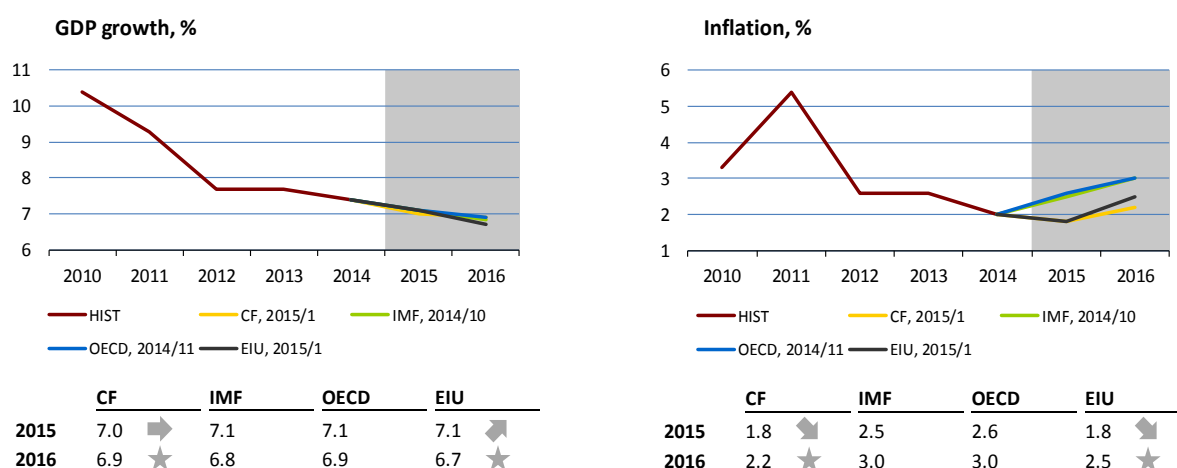
II.4 Japan

Headline inflation in Japan slowed further to 2.4% (or 2.7% excluding food prices) in November. The economy is facing recession and consumer price inflation also reflects the sharp fall in oil prices. With the exception of the labour market, the new data from the economy are not very encouraging either. In November, industrial production fell by 0.6% month on month and retail sales also lost momentum (declining to 0.4% year on year). Consumer confidence fell to the level observed in May 2014, when tax changes were introduced. Besides an extension of the central bank's stimuli, further government measures amounting to JPY 3.5 trillion were announced (to support underdeveloped regions, households on benefits, etc.). However, the new package should not induce higher debt, as it is to be financed using previous years' savings and higher tax receipts. The January CF only revised its inflation outlook for 2015 (down by 0.7 pp).



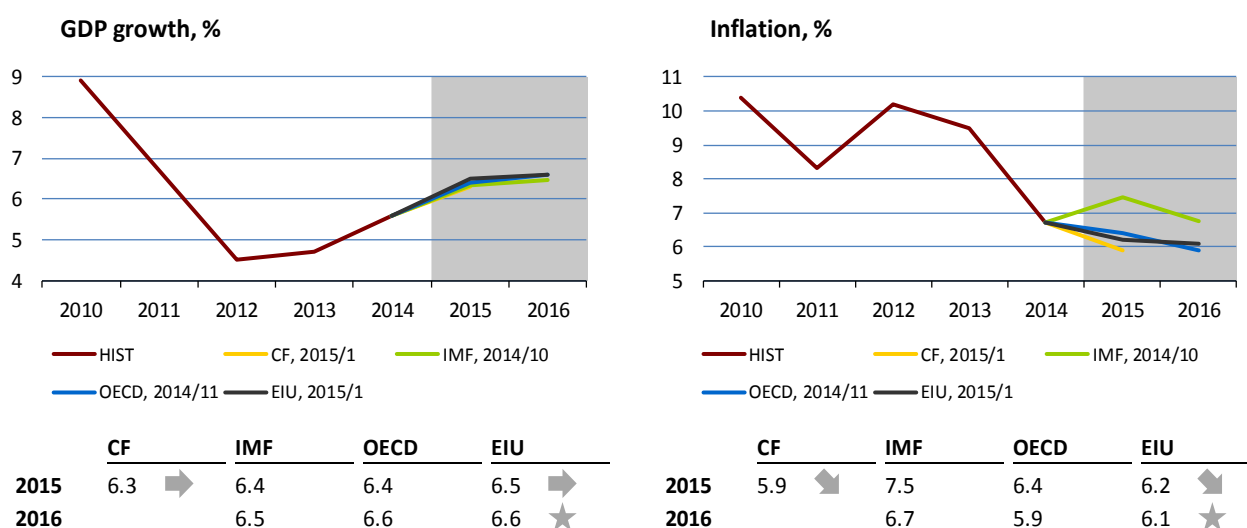
III.1 China

The December leading indicators in manufacturing suggest that growth in China continued to slow in the final months of 2014. The HSBC PMI dropped below 50 points, indicating a fall in this sector, and the official Chinese NBS PMI stayed only just above this level. The slower growth was also due to a slowdown in the property sector, which accounts for around 15% of the Chinese economy. The annual new property price index has been declining for 11 months now. Banks and local governments are introducing measures to boost demand on the property market. Demand has also been supported by the central bank, which lowered its policy rate for the first time in more than two years (by 0.4 pp to 5.6%). Consumer inflation edged up to 1.5% in December, mainly because of food prices. According to CF, the annual inflation rate was just 2% in 2014. In 2015, it is expected to decrease to 1.8% according to both CF and the EIU. CF estimates GDP growth in 2014 at 7.4%. The outlooks of international institutions for economic growth in 2015 are around 7%. In 2016, the growth is expected to slow slightly to about 6.8%.



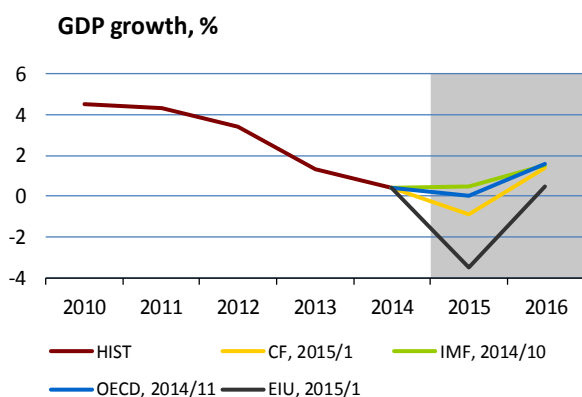
III.2 India

After a record drop to 4.4%, inflation in India rose to 5.0% in December, mainly due to rising food prices. This was still a lower-than-expected rise and the second lowest level in 2014. The central bank of India took advantage of the favourable inflation to lower its policy rate by 0.25 pp to 7.75% in January. According to CF, inflation is expected at 6.7% in 2014/2015 as a whole (the Indian fiscal year ends in March). Both CF and the EIU reduced their outlooks to 5.9%–6.2% next year. Further steps by the central bank will depend on the 2015/2016 budget, which will be submitted by the government in February. A recovery in industrial production, which rose by 3.8% year on year in November (after a 4.2% fall in October), and steady PMI growth in manufacturing, which rose to a two-year high in December, are good news for the economy. CF estimates GDP growth at 5.6% for 2014/2015 as a whole. The outlooks of international institutions for 2015/2016 remained unchanged, with growth of 6.3%–6.5% expected.

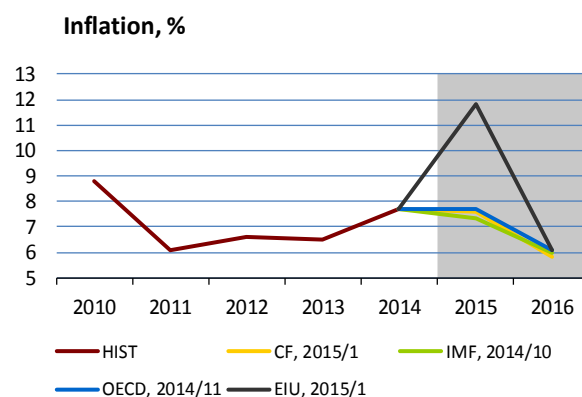


III.3 Russia

The Russian central bank unexpectedly hiked its key interest rate by 6.5 pp to 17% in mid-December to support the rouble. Despite this, the Russian currency dipped to RUB 80 to the dollar. Later, however, it appreciated back to RUB 60–65 to the dollar. Following the fall in the currency, the central bank also intervened in favour of the rouble on the foreign exchange market. The interventions ran to USD 11.9 billion in December. In order to stabilise the financial sector, the State Duma enacted state support for major banks in December. The first institutions have already started to benefit from this support. The weakened rouble also fed through to a rise in inflation, which reached 11.4% in December (food prices increased by as much as 15.4%). According to the EIU, inflation was 7.7% in 2014 as a whole. As for the economic growth in 2014, CF estimates it as very low at 0.4%. Both CF and the EIU sharply reduced their forecasts for Russian GDP growth in 2015 to a contraction of 0.9%–3.5% and increased their inflation outlooks to 7.6%–11.8%.



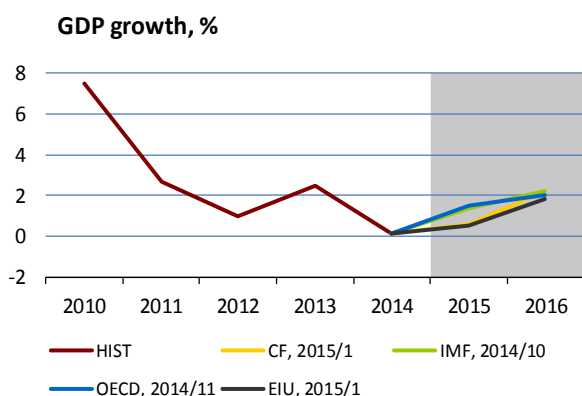
	CF	IMF	OECD	EIU
2015	-0.9	0.5	0.0	-3.5
2016	1.4	1.5	1.6	0.5



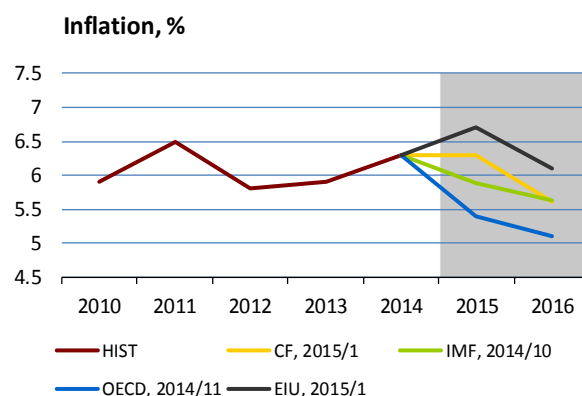
	CF	IMF	OECD	EIU
2015	7.6	7.3	7.7	11.8
2016	5.8	6.0	6.1	6.1

III.4 Brazil

Inflation in Brazil fell by 0.1 pp to 6.4% in annual terms in December, but is expected to increase in January, mainly due to a rise in some administered prices. According to the EIU, the annual inflation rate was 6.3% in 2014, thus remaining inside the central bank's tolerance band. However, together with the weak real (which weakened by 11% in 2014 and has been depreciating for four years now), a rise in inflation in January might spur the central bank into raising its rates slightly. A new Brazilian government economic team announced the first steps towards reducing the budget deficit by cutting government spending and increasing taxes. The new finance minister aims to achieve a primary budget surplus of 1.2% of GDP in 2015 and at least 2% of GDP in 2016 and 2017 (a deficit of 0.2% of GDP was achieved in the past 12 months). By CF's estimation, Brazil recorded growth of just 0.1% in 2014. Both CF and the EIU slightly lowered their growth outlooks for 2015 to 0.5%–0.6%.



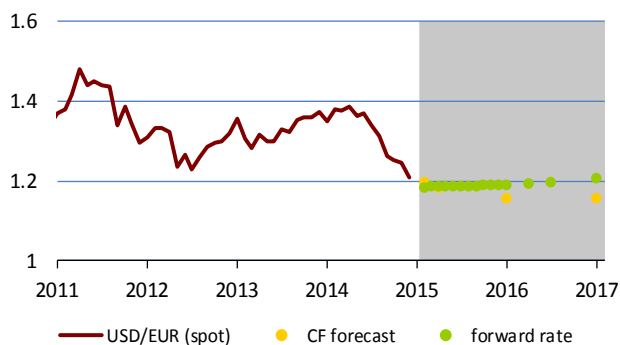
	CF	IMF	OECD	EIU
2015	0.6	1.4	1.5	0.5
2016	2.2	2.2	2.0	1.8



	CF	IMF	OECD	EIU
2015	6.3	5.9	5.4	6.7
2016	5.6	5.6	5.1	6.1

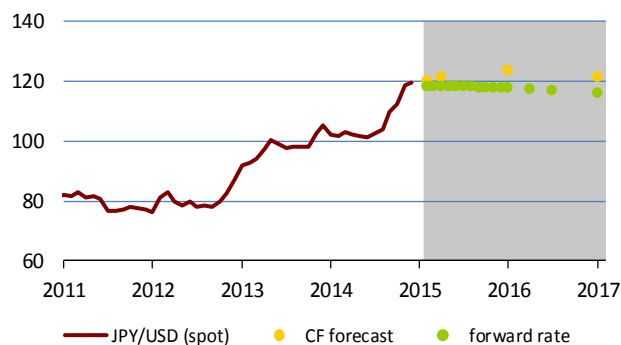
IV. Outlook of exchange rates vis-à-vis the US dollar

The euro



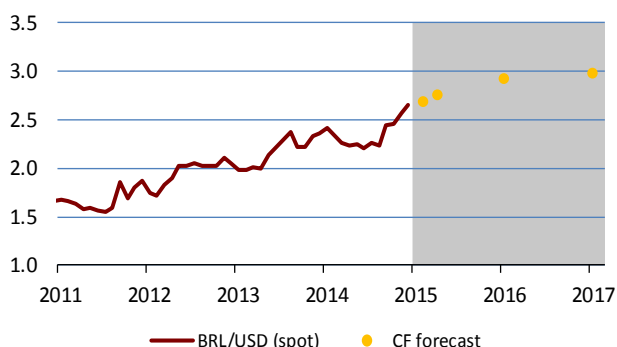
	12/1/15	02/15	04/15	01/16	01/17
spot rate	1.182				
CF forecast		1.195	1.183	1.156	1.154
forward rate		1.184	1.184	1.190	1.206

The Japanese yen



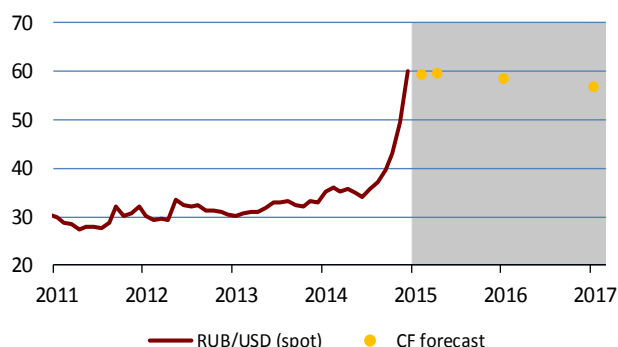
	12/1/15	02/15	04/15	01/16	01/17
spot rate	118.6				
CF forecast		120.1	121.4	123.5	121.6
forward rate		118.3	118.3	117.7	115.9

The Brazilian real



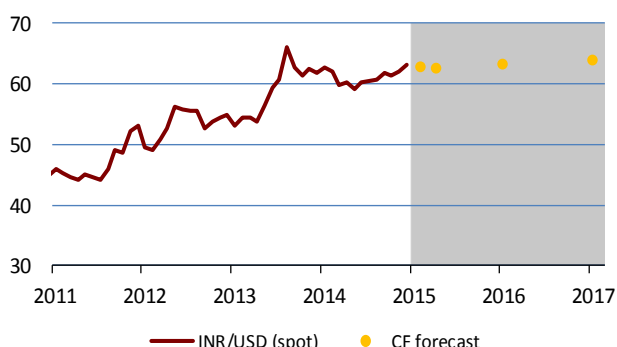
	12/1/15	02/15	04/15	01/16	01/17
spot rate	2.663				
CF forecast		2.680	2.745	2.912	2.973

The Russian rouble



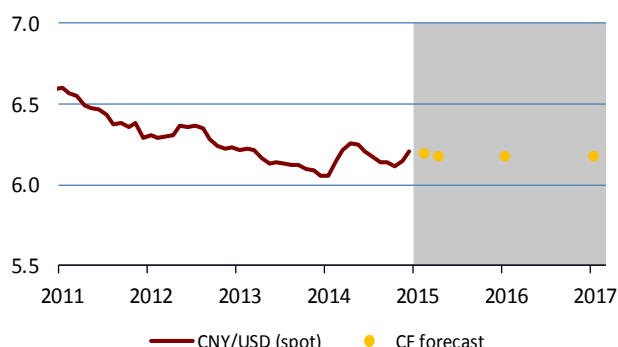
	12/1/15	02/15	04/15	01/16	01/17
spot rate	62.95				
CF forecast		59.16	59.48	58.46	56.75

The Indian rupee



	12/1/15	02/15	04/15	01/16	01/17
spot rate	62.24				
CF forecast		62.72	62.39	63.05	63.74

The Chinese renminbi



	12/1/15	02/15	04/15	01/16	01/17
spot rate	6.204				
CF forecast		6.186	6.177	6.173	6.173

Exchange rates as of last day of month. Forward rate does not represent outlook; it is based on covered interest parity, i.e. currency of country with higher interest rate is depreciating. Forward rate represents current (as of cut-off date) possibility of hedging future exchange rate.

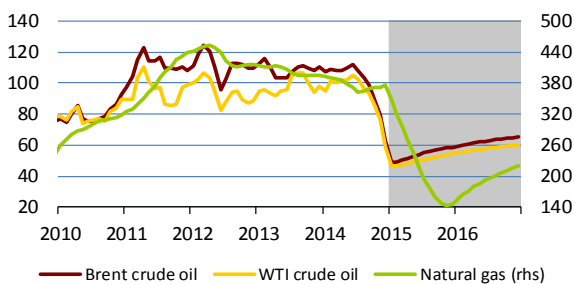
V.1 Oil and natural gas

The decline in oil prices picked up pace at the end of November after OPEC decided at its meeting to maintain the current extraction rate and to leave the oil market purely to market mechanisms. The price of Brent crude oil dropped below USD 46 a barrel (bbl) in the first half of January, the lowest level since March 2009. Oil prices are still being pushed down by the appreciating dollar and in particular by a fundamental excess supply of oil. According to OPEC statistics, global oil production rose by 2 million barrels a day in 2014, surging mainly at the year-end, while global consumption went up by less than 1 million barrels a day, its growth being dampened by the slowing Chinese economy and the economic problems in Russia. The futures price curves for both Brent and WTI are contango in shape. This means that there is now a physical surplus of oil in the market, which is reducing spot prices relative to prices of more distant contracts. This makes it advantageous to store oil, as evidenced by growing WTI oil stocks at Cushing in the USA and by Asian traders' increased demand for storing Arabian and Brent crude oil in giant tankers at sea.

Goldman Sachs (GS) reduced its 3-month oil price forecast to USD 42/bbl for Brent and USD 41/bbl for WTI. The 2015 forecast was lowered from around USD 84/bbl to USD 50/bbl and from USD 74/bbl to USD 47/bbl respectively. GS expects the market to remain in contango for about a year without hitting any significant storage constraints. Société Générale expects slightly higher oil prices. It, too, reduced its forecast for 2015 to USD 55/bbl (Brent) and USD 51/bbl (WTI) in line with the market outlook. The January CF expects the Brent price to rise to USD 57.1/bbl by the end of April and to USD 67.6/bbl at one year.

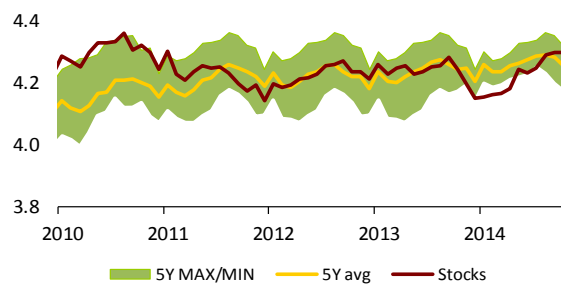
Spot market prices of natural gas have been declining in both the USA and Europe since November due to a more moderate winter and high stocks.

Outlook for prices of oil and natural gas (USD/1000m3)

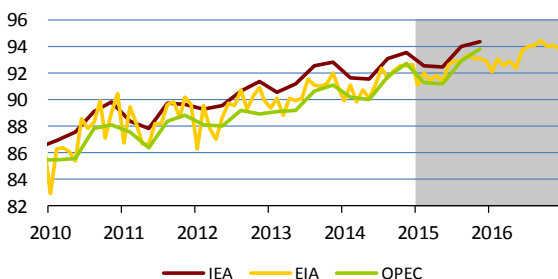


	Brent	WTI	Natural gas
2015	53.91	50.43	221.73
2016	62.51	57.63	191.67

Total stocks of oil and oil products in OECD (bil. barrel)

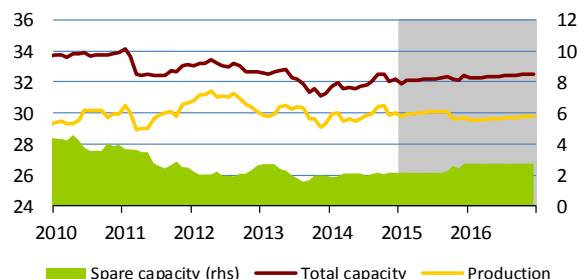


Global consumption of oil and oil products (mil. barrel / day)



	IEA	EIA	OPEC
2015	92.44	91.39	91.15
2016	93.34	92.39	92.30

Production, total and spare capacity in OPEC countries (mil. barrel / day)



	Production	Total capacity	Spare capacity
2015	29.87	31.92	2.05
2016	29.91	32.16	2.25

Note: Oil price in USD/barrel, price of Russian natural gas at German border in USD/1,000 m3 (IMF data, smoothed by the HP filter). Future oil prices (grey area) are derived from futures and future gas prices are derived from oil prices using model. Total oil stocks (commercial and strategic) in OECD countries including average, maximum and minimum in past five years in billions of barrels. Global consumption of oil and oil products in millions of barrels a day. Production and extraction capacity of OPEC in million barrels a day (EIA estimate).

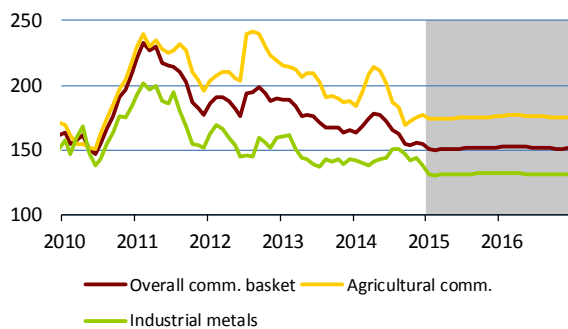
Source: Bloomberg, IEA, EIA, OPEC, CNB calculations

V.2 Other commodities

Following a short-lived rise in November, the non-energy commodity price index fell back slightly in December. The decline accelerated in the first half of January, mainly because of a similar decline in the industrial metals index. Prices of industrial metals fell in response to the appreciating dollar and to a worse outlook for industry, with the PMI in November declining in the USA and China (below 50 in the latter case), stagnating in Japan and rising only slightly in Europe. The decline was also fostered by low energy prices, which account for a large slice of extraction and processing costs. Copper prices fell in response to the cooling of demand in China. Aluminium prices dropped sharply due to the decline in oil prices. The price of iron ore fell to its lowest level since May 2009 as major producers continued to expand new capacities in an effort to squeeze more expensive competitors out of the market.

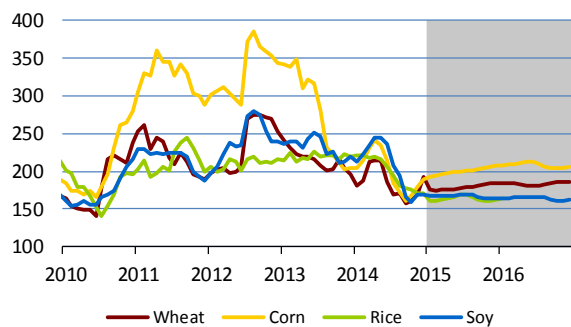
The average monthly food commodity price index edged up in 2014 Q4, but the data for the first half of January indicate a decline (due mainly to wheat prices) followed by stagnation. Wheat prices increased after the Russian government introduced export duties, which might reduce exports, but they have been falling again since mid-December because of high stocks in the USA. The price of soy has been almost flat since early November despite a higher estimate for the harvest in Brazil thanks to good weather. Corn prices rose in the first half of December and then stagnated. Low petrol prices in the USA are reducing demand for bio-ethanol, but increased demand for corn as an animal feed is expected from the EU. These expectations are pushing up corn prices over the forecast horizon. Prices of sugar and lean hogs fell last month. A decrease was also recorded by the volatile prices of live cattle, which are expected to continue moving away from the record high observed in November 2014. By contrast, the price of rubber rose relatively sharply.

Non-energy commodities price indices



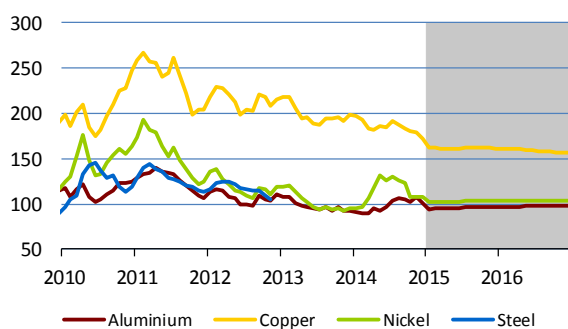
	Overall	Agricultural	Industrial
2015	164.8	189.8	143.1
2016	150.9	174.7	131.1

Food commodities



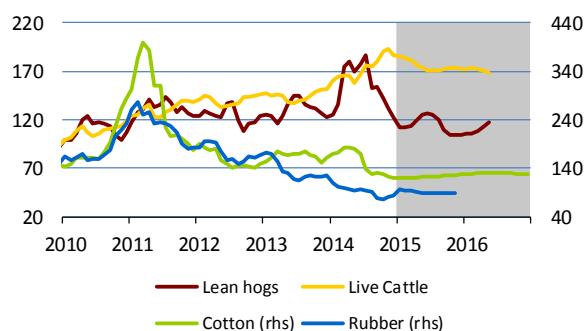
	Wheat	Corn	Rice	Soy
2015	184.6	199.3	197.9	205.2
2016	178.9	200.1	163.9	166.9

Metals



	Aluminium	Copper	Nickel
2015	98.5	184.9	114.7
2016	95.7	161.7	102.8

Meat, non-food agricultural commodities



	Lean hogs	Live Cattle	Cotton	Rubber
2015	154.3	173.4	151.8	92.1
2016	154.3	173.4	151.8	92.1

Note: Structure of non-energy commodity price indices corresponds to composition of The Economist commodity indices. All prices are given as indices, 2005 = 100 (charts) and percentage changes (tables).

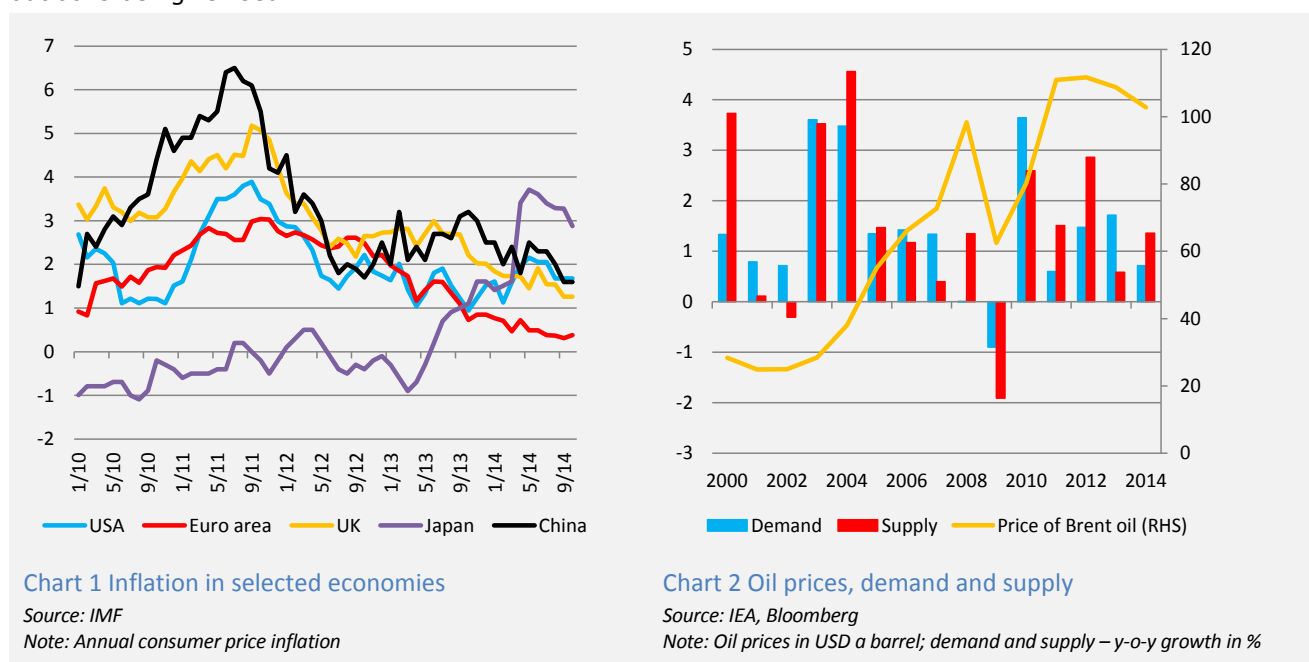
Source: Bloomberg, CNB calculations.

The effect of oil prices on inflation from a GVAR model perspective¹

Disinflationary pressures have been observed not only in the euro area, but in most advanced countries in recent months. With inflation expectations quite well-anchored, the inflation outlooks for next year have also been revised. This is due mainly to a sharply falling price of crude oil. In early January, Brent crude price dropped below USD 52 a barrel and WTI price below USD 49 a barrel. Besides trade and financial links, the global shock transmission channel includes the sharing of scarce resources (oil and other commodities). One way of modelling interactions and shock spillovers is to use the global vector autoregression (GVAR) model. Our estimates suggest that a fall in the oil price leads to an increase in anti-inflationary pressures, especially in the short run. Such a price shock has an inflationary effect only in some oil-exporting countries (Indonesia and Russia), where the effect of a weaker domestic currency prevails. Assuming a monetary policy response, the effect of the oil shock is modestly anti-inflationary in some advanced economies such as the euro area and the UK. For a country at the zero lower bound, however, a fall in oil prices can be expected to have a much greater impact on inflation. The GVAR model does not provide a detailed view of individual euro area member states. However, it is reasonable to assume that the effect of an oil shock will be stronger in countries where energy items have a larger weight in the consumer basket.

1 Subdued inflation pressures and the potential effect of a decline in oil prices

Slowing inflation is not a new phenomenon. Inflation is below the central bank target in some advanced economies (e.g. the euro area) due to a highly negative output gap, but a downward trend in consumer price inflation can also be seen in China and the UK (see Chart 1). Inflation in the USA has also been slowing in recent months, in an environment of robust recovery, and the Japanese scenario of constantly higher inflation is not materialising. The central banks in Japan and the euro area have already taken steps to avert disinflation, as the outlooks for 2015 suggest no major change in trend either. The current decline in oil prices, which is not necessarily just a short-term swing, is one of the factors that may lead to the outlooks being revised.



Following two years of relative stability with the average monthly price of oil showing no clear trend, a major change occurred in the second half of 2014 and the price of Brent oil dropped by more than 50% between mid-June and the year-end. This was due to weaker growth in global demand, mainly as a result of slower economic growth in Europe and China, and also to fast growth in oil extraction in North America. At the same time, there was an increase in extraction in some OPEC countries recovering from previous domestic conflicts. OPEC is showing no willingness to curb extraction, in fear of losing market share. The

¹ Written by Soňa Benecká (sona.benecka@cnb.cz) and Jan Hošek (jan2461.hosek@cnb.cz). The views expressed in this article are those of the authors and do not necessarily reflect the official position of the Czech National Bank.

excess supply in the market is thus reducing the risk premium which the market would otherwise add due to persisting geopolitical tensions, and is driving down the price of oil.

The falling oil prices are being reflected in lower energy and fuel prices, further slowing inflation. In the longer run, though, lower input costs of firms and rising real disposable income of households should boost global economic growth, unless they are adversely affected by second-round effects of the oil price decline in the form of slower nominal wage growth. However, the overall effect on inflation may differ across economies given their different energy intensities of consumption and production, price regulation policies and exchange rate regimes. Many studies have examined the impacts of oil shocks on consumer inflation. However, they have not taken into account second-round effects associated with greater global interconnectedness of economies. In the text below, we therefore use the GVAR model to assess the impacts of the current oil shock.

2 The impact of an oil shock in the GVAR model

The global vector autoregression (GVAR) model offers a relatively simple and effective way of modelling interactions between economies. Possible transmission channels include trade and financial relations and the sharing of scarce resources (oil and other commodities). Unlike other global macroeconomic models, the GVAR model is not built on structural assumptions, but structural links can be tested in it. Our model, which builds on Dees et al. (2007), contains 31 emerging and advanced economies. The euro area is modelled as a single country. The variables used in the model include real GDP, inflation, short-term and long-term interest rates, the real exchange rate and an equity index. The price of oil is a global variable which is affected by feedback effects from economies and also affects other commodity prices to some extent.² The quarterly data cover the period of 1995–2013, i.e. including the global financial crisis.

As indicated above, the GVAR model lets us consistently and efficiently study not only the direct effects of various shocks, but also second-round effects associated with greater global trade and financial interconnectedness of economies. Second-round effects can substantially alter the effect of the original shock. The following text explains how this happens in the case of a shock to oil prices within the GVAR modelling framework.

A shock to oil prices due to lower global **demand** is associated with a decline in inflation and lower economic growth regardless of whether the country is an oil importer or oil exporter. It is accompanied by a fall in oil production. The effect may be greater on countries which not only import oil, but also trade the most with oil exporters. Besides the direct cost channel, these economies will face a fall in external demand. However, if the shock is due to **supply** factors, for instance innovations in shale oil extraction technology, the decrease in oil prices is accompanied by lower inflation and higher economic growth in the case of oil-importing countries. Total oil production should increase, and in such case the impact on growth in oil-exporting countries will not be clear-cut. Similarly, the reaction of countries may differ depending on whether and to what extent they trade with oil exporters.

The currently observed drop in the price of oil is due not only to lower demand, but also to higher supply linked with growth in extraction in the USA. It is beyond the scope of this article to show the different reactions of economies depending on the type of shock, but it can be summed up that the decline in oil prices should be reflected in lower inflation, especially in oil-importing countries. This is confirmed by the results of our GVAR model estimates (see Charts 3–6), which show the impulse responses (GIRFs) in percentage points to a one standard deviation decrease in the price of oil. This is equivalent to a price decline of around 13% per quarter.³

A shock resulting from a decrease in oil prices has a sizeable anti-inflationary effect in advanced economies, especially in the first quarter after the shock. The permanent effect on inflation is 0.10–0.12 pp in the euro area and Japan and slightly larger in the USA. The different results for the USA compared to previous studies are due to different modelling of the oil price. In our version, the price of oil is not endogenous to the model of the USA but is modelled independently (as a dominant variable) and responds to global demand and inflation (in the form of feedback effects).

In other advanced economies, such as Canada and Australia, the effect of an oil shock is more pronounced in the first quarter after the shock but is limited overall. A larger anti-inflationary effect can be observed for Norway, whereas in the UK the effect is weak. The UK lost its net oil exporter status in 2004 and, given the selected period (1995–2013), the impact is therefore broadly similar to that in the euro area.

² For a more detailed analysis of the interactions between oil, macroeconomic variables and other commodity prices, see Hošek, Komárek and Motl (2011).

³ The generalised IR analysis in the GVAR model is based on data in levels, while the parameter estimates are performed in a VECM. The shocks will therefore tend to have a permanent effect.

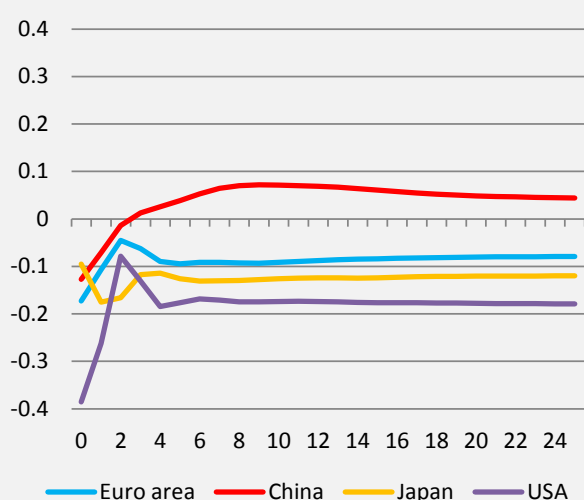


Chart 3 Impact of a decrease in the price of oil on inflation in selected oil-importing economies

Source: Authors' calculations

Note: Impulse responses in percentage points to a one standard deviation decrease in the price of oil; quarters on the horizontal axis

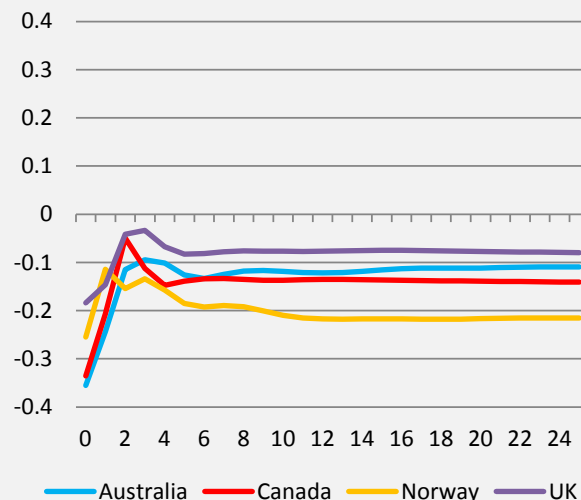


Chart 4 Impact of a decrease in the price of oil on inflation in selected OECD commodity exporters

Source: Authors' calculations

Note: Impulse responses in percentage points to a one standard deviation decrease in the price of oil; quarters on the horizontal axis

The results for China may seem surprising, but they do not differ much from previous literature (Cashin et al., 2012). A decrease in oil prices has an anti-inflationary first-round impact, but the effect of recovering demand and subsequent growth in inflation pressures may outweigh this over the next two years. Moreover, although China is the largest global oil importer (followed by the USA), coal covers more than 60% of its domestic consumption. Fluctuations in oil prices may thus not have such a great effect on this economy. China also has significant price regulation, which further limits the sensitivity of consumer prices to oil price movements.

A decrease in the price of oil is also observed to have an anti-inflationary effect in other emerging economies (see Chart 5). However, the reactions of oil-exporting countries are mixed. There is a visible anti-inflationary effect in Mexico, while in Saudi Arabia the impact on consumer prices is almost zero (see Chart 6). On the other hand, Indonesia and Russia record strong inflationary pressures, bolstered by depreciation of their currencies.

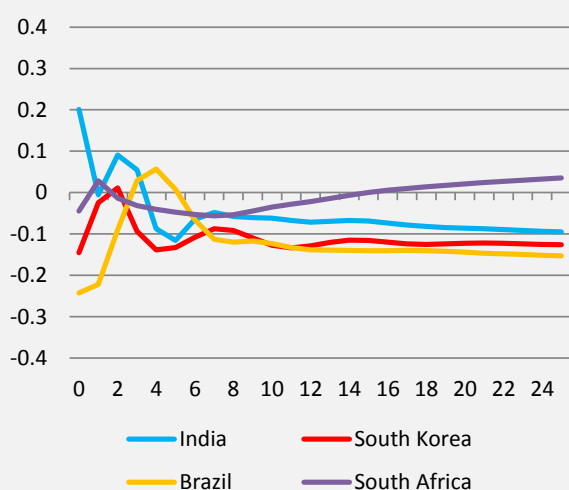


Chart 5 Impact of a decrease in the price of oil on inflation in selected oil-importing emerging economies

Source: Authors' calculations

Note: Impulse responses in percentage points to a one standard deviation decrease in the price of oil; quarters on the horizontal axis

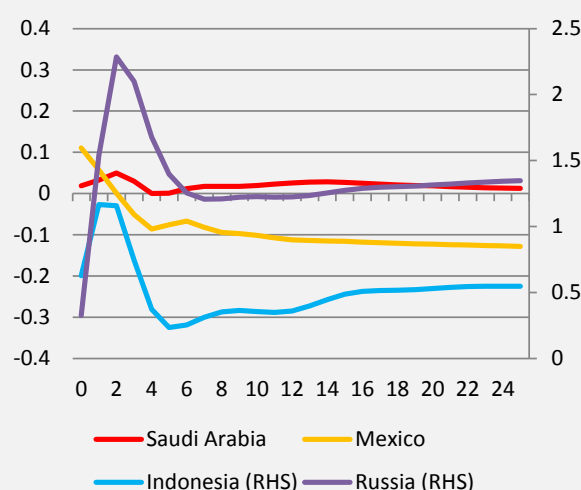


Chart 6 Impact of a decrease in the price of oil on inflation in selected oil-exporting economies

Source: Authors' calculations

Note: Impulse responses in percentage points to a one standard deviation decrease in the price of oil; quarters on the horizontal axis

To sum up, a fall in the price of crude oil leads to an increase in anti-inflationary pressures, especially in the short run. The overall effect depends on the level of development and size of the economy. Such a price

shock has an inflationary effect only in some oil-exporting countries (Indonesia and Russia), where the effect of a weaker domestic currency outweighs the loss in economic performance. Our results also suggest that monetary policy tends to respond to an oil shock. Further monetary policy easing can therefore be expected in the event of a decline in oil prices. However, in the current situation, with many countries at the zero lower bound, it is not realistic for central banks to take major steps, so the anti-inflationary impacts of a fall in oil prices may be more pronounced.

3 The effect of oil prices on the HICP of European countries

In the current setting, our GVAR provides information about the overall global effect of shocks, but it cannot be used to analyse the impacts on individual euro area member states. We will thus only briefly outline a comparison of the effect of oil prices using the weights of energy commodities and fuels in the consumer basket.

Generally speaking, euro area/EU countries are economically developed and energy commodities and fuels do not have a very big weight in their consumer baskets. Despite this, some countries are currently experiencing deflation or are dangerously close to zero consumer price inflation (see Chart 7), and the current decline in global oil prices is probably the main cause of this situation. According to Eurostat's flash estimate, annual euro area HICP inflation declined from +0.3% in November to -0.2% in December. Energy prices made the largest negative contribution, with inflation of -6.3% (-2.5% in November). Prices of food and non-energy industrial goods were flat year on year, so only prices of services (with inflation of 1.2%) made a positive contribution to overall inflation. As for energy items, the largest year-on-year declines in prices in November were recorded by liquid fuels for heating (-10.4%), fuels for motor vehicles (-4.2%), natural gas (-1.5%) and heat (-0.7%). The weight of these consumer basket items (directly affected by the price of oil) can be used to derive the strength with which a decline in oil prices is reflected in inflation in each country. Besides these items, however, the price of oil indirectly affects personal transport, where fuel prices are a major component of costs. A large part of the consumer basket is also affected to a lesser extent by freight transport costs, which also decline as oil prices drop.

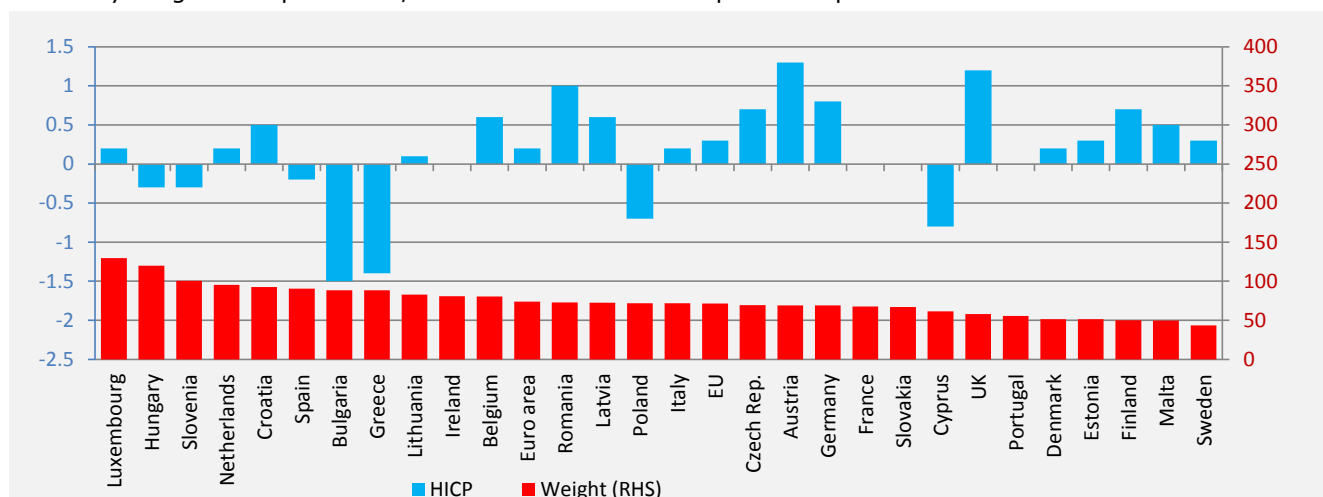


Chart 7 Inflation in EU countries and weights of energy items in their consumer baskets

Source: Eurostat

Note: HICP inflation adjusted for tax changes (November 2014; in % year on year); weights of energy items (natural gas, liquid fuels, vehicle fuels) in the basket in %

Chart 7 compares countries in terms of the weight of energy items in the consumer basket and for comparison also shows annual HICP inflation (in November 2014 adjusted for any tax changes). No obvious dependence can be observed here, as inflation is also affected by numerous country-specific factors, but when adjusted for these factors the dependence on oil prices should become clear.

References

Filippo di Mauro, L. Vanessa Smith, Stephane Dees and M. Hashem Pesaran, 2007. "Exploring the International Linkages of the Euro Area: A Global VAR Analysis," *Journal of Applied Econometrics* 22(1), pp. 1–38.

Paul Cashin, Kamiar Mohaddes, Mehdi Raissi and Maziar Raissi, 2012. "The Differential Effects of Oil Demand and Supply Shocks on the Global Economy," *IMF Working Papers* 12/253, International Monetary Fund.

Jan Hošek, Luboš Komárek and Martin Motl, 2011. "Měnová politika a cena ropy," *Politická ekonomie* 2011(1), pp. 22–46.

A1. Change in GDP predictions for 2015

	CF		IMF		OECD		CB / EIU	
EA	0	2015/1	-0.2	2014/10	0.0	2014/11	-0.6	2014/12
		2014/12				2014/7		
US	0.2	2015/1	0.1	2014/10	0.0	2014/11	0.0	2014/12
		2014/12				2014/7		
DE	0.1	2015/1	-0.2	2014/10	-0.4	2014/11	-1.0	2014/12
		2014/12				2014/7		
JP	0	2015/1	-0.3	2014/10	-0.3	2014/11	0.0	2014/10
		2014/12				2014/7		
BR	-0.2	2015/1	-0.6	2014/10	0.1	2014/11	-0.3	2015/1
		2014/12				2014/7		
RU	-1	2015/1	-0.5	2014/10	-1.8	2014/11	-3.5	2015/1
		2014/12				2014/7		
IN	0	2015/1	0.0	2014/10	0.5	2014/11	0.0	2015/1
		2014/12				2014/7		
CN	0	2015/1	0.0	2014/10	-0.2	2014/11	0.1	2015/1
		2014/12				2014/7		

A2. Change in inflation predictions for 2015

	CF		IMF		OECD		CB/EIU	
EA	-0.5	2015/1	-0.3	2014/10	-0.5	2014/11	-0.4	2014/12
		2014/12				2014/4		
US	-0.6	2015/1	0.5	2014/10	-0.3	2014/11	-0.5	2014/12
		2014/12				2014/4		
DE	-0.5	2015/1	-0.2	2014/10	-0.6	2014/11	-0.4	2014/12
		2014/12				2014/4		
JP	-0.2	2015/1	0.3	2014/10	-0.2	2014/11	-0.2	2014/10
		2014/12				2014/4		
BR	0	2015/1	0.4	2014/10	-0.1	2014/11	0.0	2015/1
		2014/12				2014/4		
RU	0.9	2015/1	2.0	2014/10	3.1	2014/11	4.5	2015/1
		2014/12				2014/4		
IN	-0.2	2015/1	0.0	2014/10	-0.3	2014/11	-1.0	2015/1
		2014/12				2014/4		
CN	-0.3	2015/1	-0.5	2014/10	-0.4	2014/11	-0.5	2015/1
		2014/12				2014/4		

A3. List of abbreviations

ABS	asset-backed securities	HICP	harmonised index of consumer prices
BoJ	Bank of Japan	CHF	Swiss franc
BR	Brazil	ICE	Intercontinental Exchange
BRIC	countries of Brazil, Russia, India and China	IFO	Institute for Economic Research
BRL	brazilian real	IFO-BE	IFO Business Expectations
CB-CCI	Conference Board Consumer Confidence Index	IMF	International Monetary Fund
CB-LEII	Conference Board Leading Economic Indicator Index	IN	India
CBOT	Chicago Board of Trade	INR	Indian rupee
CBR	Central Bank of Russia	IRS	Interest Rate swap
CF	Consensus Forecasts	JP	Japan
CN	China	JPY	Japanese yen
CNB	Czech National Bank	LI	leading indicators
CNY	Chinese renminbi	LIBOR	London Interbank Offered Rate
DBB	Deutsche Bundesbank	MER	Ministry of Economic Development (of Russia)
DE	Germany	OECD	Organisation for Economic Co-operation and Development
EA	euro area	OECD-CLI	OECD Composite Leading Indicator
EC	European Commission	PMI	Purchasing Managers' Index
ECB	European Central Bank	PPI	producer price index
EC-CCI	European Commission Consumer Confidence Indicator	RU	Russia
EC-ICI	European Commission Industrial Confidence Indicator	RUB	Russian rouble
EIA	Energy Information Administration	TLTRO	targeted longer-term refinancing operations
EIU	Economist Intelligence Unit	UoM	University of Michigan
EIU	The Economist Intelligence Unit database	UoM-CSI	University of Michigan Consumer Sentiment Index
EU	European Union	US	United States
EUR	the euro	USD	US dollar
EURIBOR	Euro Interbank Offered Rate	WEO	World Economic Outlook
Fed	Federal Reserve System (the US central bank)	WTI	West Texas Intermediate (crude oil used as a benchmark in oil pricing)
FRA	forward rate agreement	ZEW-ES	ZEW Economic Sentiment
GBP	pound sterling		
GDP	gross domestic product		

A4. List of thematic articles published in the GEO

2015

	Issue
The effect of oil prices on inflation from a GVAR model perspective (Soňa Benecká and Jan Hošek)	2015-1

2014

	Issue
Applicability of Okun's law to OECD countries and other economies (Oxana Babecká Kucharčuková and Luboš Komárek)	2014-12
Monetary policy normalisation in the USA (Soňa Benecká)	2014-11
Changes in FDI inflows and FDI returns in the Czech Republic and Central European countries (Vladimír Žďárský)	2014-10
Competitiveness and export growth in selected Central European countries (Oxana Babecká Kucharčuková)	2014-9
Developments and the structure of part-time employment by European comparison (Eva Hromádková)	2014-8
The future of natural gas (Jan Hošek)	2014-7
Annual assessment of the forecasts included in GEO (Filip Novotný)	2014-6
How far the V4 countries are from Austria: A detailed look using CPLs (Václav Žďárek)	2014-5
Heterogeneity of financial conditions in euro area countries (Tomáš Adam)	2014-4
The impacts of the financial crisis on price levels in Visegrad Group countries (Václav Žďárek)	2014-3
Is the threat of deflation real? (Soňa Benecká and Luboš Komárek)	2014-2
Forward guidance – another central bank instrument? (Milan Klíma and Luboš Komárek)	2014-1

2013

	Issue
Financialisation of commodities and the structure of participants on commodity futures markets (Martin Motl)	2013-12
The internationalisation of the renminbi (Soňa Benecká)	2013-11
Unemployment during the crisis (Oxana Babecká and Luboš Komárek)	2013-10
Drought and its impact on food prices and headline inflation (Viktor Zeisel)	2013-9
The effect of globalisation on deviations between GDP and GNP in selected countries over the last two decades (Vladimír Žďárský)	2013-8
Competitiveness and determinants of travel and tourism (Oxana Babecká)	2013-7
Annual assessment of the forecasts included in GEO (Filip Novotný)	2013-6
Apartment price trends in selected CESEE countries and cities (Michal Hlaváček and Luboš Komárek)	2013-5
Selected leading indicators for the euro area, Germany and the United States (Filip Novotný)	2013-4
Financial stress in advanced economies (Tomáš Adam and Soňa Benecká)	2013-3
Natural gas market developments (Jan Hošek)	2013-2
Economic potential of the BRIC countries (Luboš Komárek and Viktor Zeisel)	2013-1

2012

	Issue
Global trends in the services balance 2005–2011 (Ladislav Prokop)	2012-12
A look back at the 2012 IIF annual membership meeting (Luboš Komárek)	2012-11
The relationship between the oil price and key macroeconomic variables (Jan Hošek, Luboš Komárek and Martin Motl)	2012-10
US holdings of foreign securities versus foreign holdings of securities in the US: What is the trend? (Narcisa Kadlčáková)	2012-9
Changes in the Czech Republic's balance of payments caused by the global financial crisis (Vladimír Žďárský)	2012-8
Annual assessment of the forecasts included in the GEO (Filip Novotný)	2012-7
A look back at the IIF spring membership meeting (Filip Novotný)	2012-6
An overview of the world's most frequently used commodity indices (Jan Hošek)	2012-5
Property price misalignment around the world (Michal Hlaváček and Luboš Komárek)	2012-4
A macrofinancial view of asset price misalignment (Luboš Komárek)	2012-3
The euro area bond market during the debt crisis (Tomáš Adam and Soňa Benecká)	2012-2
Liquidity risk in the euro area money market and ECB operations (Soňa Benecká)	2012-1

2011

	Issue
An empirical analysis of monetary policy transmission in the Russian Federation (Oxana Babecká)	2011-12
The widening spread between prices of North Sea Brent crude oil and US WTI crude oil (Jan Hošek and Filip Novotný)	2011-11
A look back at the IIF annual membership meeting (Luboš Komárek)	2011-10
Where to look for a safe haven currency (Soňa Benecká)	2011-9
Monetary policy of the central bank of the Russian Federation (Oxana Babecká)	2011-9
Increased uncertainty in euro area financial markets (Tomáš Adam and Soňa Benecká)	2011-8
Eurodollar markets (Narcisa Kadlčáková)	2011-8
Assessment of the forecasts monitored in the GEO (Filip Novotný)	2011-7
How have global imbalances changed during the crisis? (Vladimír Žďárský)	2011-6
Winners and losers of the economic crisis in the eyes of European investors (Alexis Derviz)	2011-5
Monetary policy of the People's Bank of China (Soňa Benecká)	2011-4
A look back at the IIF spring membership meeting (Jan Hošek)	2011-3
The link between the Brent crude oil price and the US dollar exchange rate (Filip Novotný)	2011-2
International integration of the Chinese stock market (Jan Babecký, Luboš Komárek and Zlatuše Komárková)	2011-1