

# GLOBAL ECONOMIC OUTLOOK – APRIL

Monetary and Statistics Department  
External Economic Relations Division

2013

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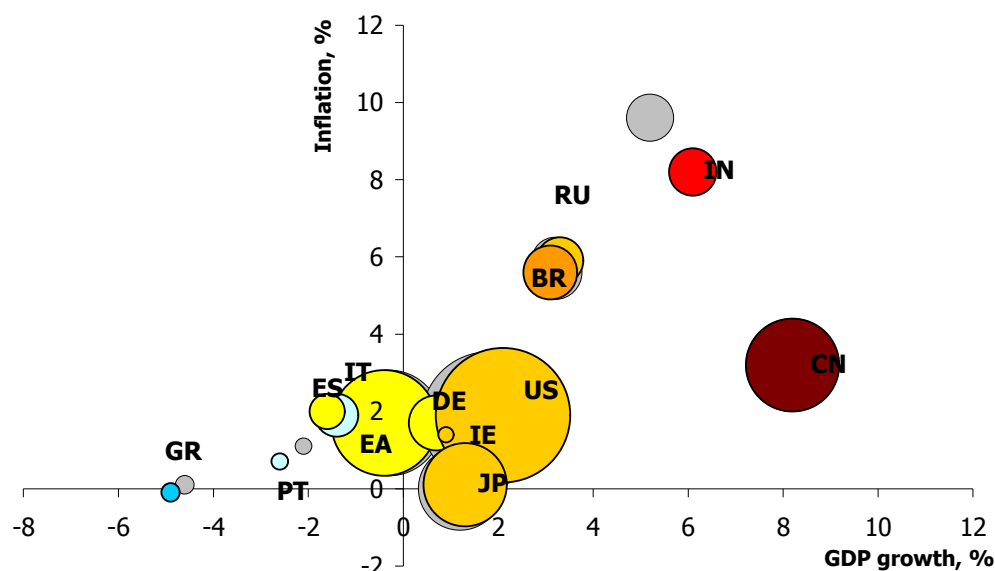
The April issue of Global Economic Outlook presents its regular overview of recent and expected developments in selected advanced and emerging economies, focusing on key economic variables such as GDP, inflation, leading indicators, interest rates, exchange rates and commodity prices. In this issue, we also present selected leading indicators for the euro area, Germany and the USA, especially those which yield the best estimates of their economic development.

The economic outlooks for the advanced economies were no better at the start of Q2 than they were last month. This is due to long-running uncertainty regarding future economic developments, even though this has now been partially calmed by the resolution of the situation in the Cypriot financial system. The economy of the euro area, and also most of its member economies, will remain in recession in 2013. The outlooks for 2014 are optimistic so far. Economic growth in the euro area continues to be driven by Germany. The economic performance of the USA is on the rise, aided by temporary stabilisation of its fiscal problems and mostly positive signals from individual sectors of the US economy. By contrast, the Japanese economy is gradually slowing and is attempting to extricate itself from the feared deflation – the Bank of Japan repeatedly emphasised that it would strive to hit the inflation target of 2%. Thus, inflation in advanced economies should remain below 2% until 2014.

Most emerging economies, including the BRIC countries, which we monitor in more detail, will maintain robust growth rates until the end of 2014. This will be reflected in higher expected inflation rates. China is still the best-performing BRIC country. It will record the highest growth rates and the lowest inflation until 2014.

The interest rate outlooks still indicate that rates in both the euro area and the USA will edge up steadily across maturities during 2014. The US dollar should depreciate slightly against the euro and the Brazilian and Russian currencies at the one-year horizon. By contrast, it is expected to strengthen against the yen and the Indian and Chinese currencies. Dollar prices of oil and natural gas still indicate a slight decline until the end of 2014. Food commodity prices are also expected to decrease in 2013, while prices of non-energy commodities will be in line with the current levels.

**Outlook for the global economy in 2013**



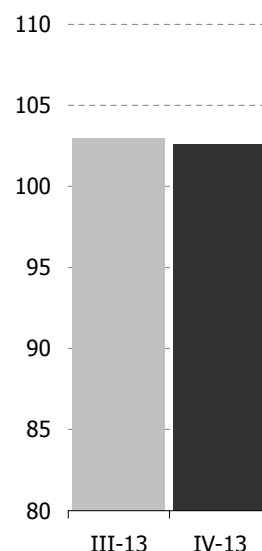
**OECD-CLI, y-o-y, %**



Note: The size of each point represents the size of the country/region according to nominal GDP in US dollars in 2011. The points are coloured according to OECD-CLI in 2012, y-o-y, %. The grey colour is the CF forecast (GDP, inflation) or Bloomberg survey (oil price) from the previous month. [Cut-off date for data: 11 April 2013]

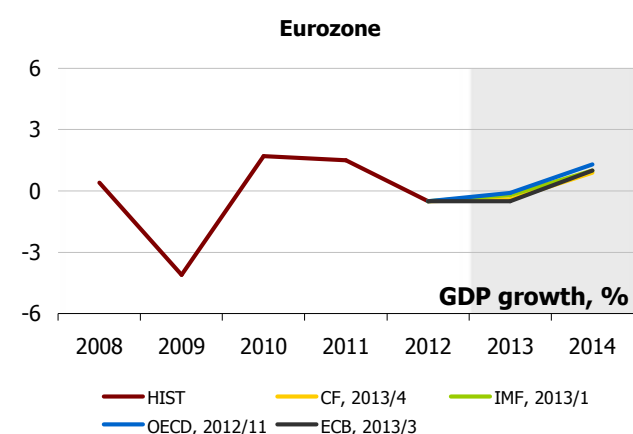
Source: Bloomberg, Consensus Economics, OECD, CNB calculations.

**Outlook for Brent crude oil prices in December 2013**

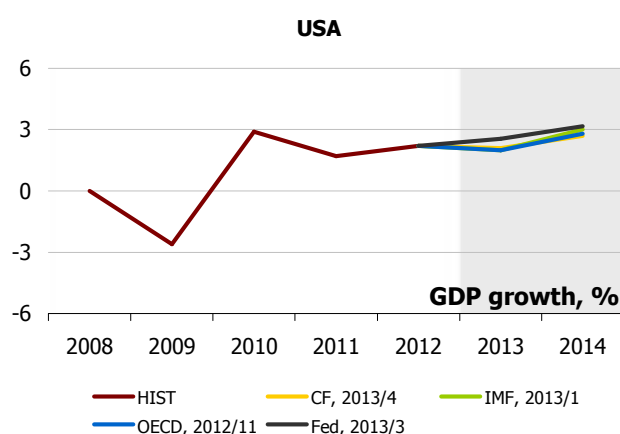


## II.1 GDP outlook in advanced countries

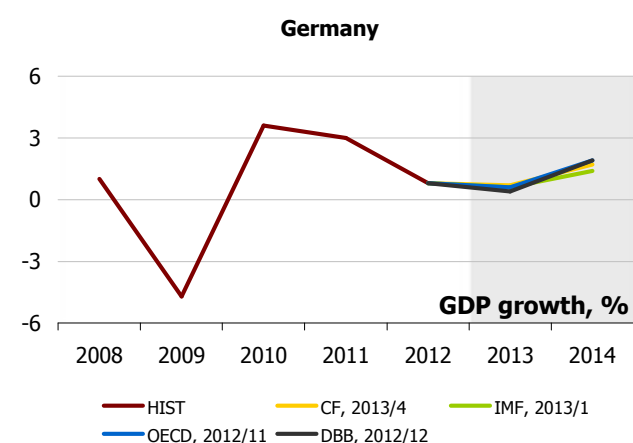
The return of the euro area economy to growth is gradually being postponed in the monitored outlooks. The April CF lowered its outlook by 0.1 pp from the previous month and now expects a decrease of 0.4% in the region's GDP this year. Future economic activity will be adversely affected not only by the current macroeconomic situation, especially in periphery countries, but also by persisting uncertainty, this time partly connected with the financial crisis in Cyprus. The CF outlook for Germany was unchanged at 0.7% in April. However, the probability of a future deterioration of the German economy is rising. The USA is performing much better than the euro area, as evidenced, for example, by an upward final revision of GDP for 2012 Q4, growth in private investment and a gradual recovery in the real estate sector, although labour market data are somewhat disappointing. CF raised its US GDP growth outlook for 2013 by 0.3 pp (to 2.1%). Although macroeconomic data from Japan are not very optimistic, CF raised its economic growth outlook for this year by 0.1 pp compared to the previous month. Next year the euro area will record positive but still very slow GDP growth (0.9%), while the USA will record the strongest growth (2.7%).



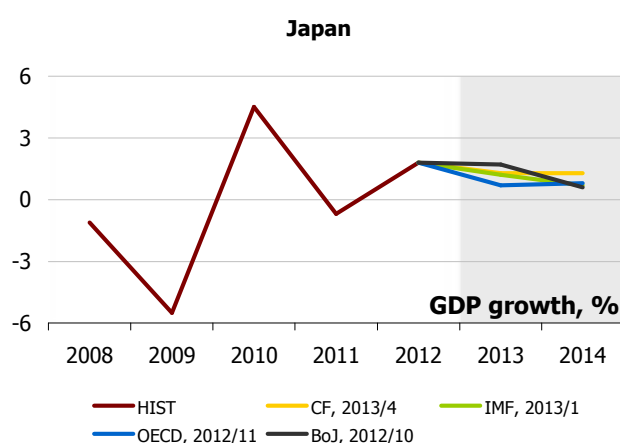
	CF	IMF	OECD	ECB
2013	-0.4 ↘	-0.2	-0.1	-0.5 ↘
2014	0.9 ↘	1.0	1.3	1.0 ↘



	CF	IMF	OECD	Fed
2013	2.1 ↗	2.0	2.0	2.6 ↘
2014	2.7 ↘	3.0	2.8	3.2 ↘



	CF	IMF	OECD	DBB
2013	0.7 →	0.6	0.6	0.4
2014	1.7 →	1.4	1.9	1.9



	CF	IMF	OECD	BoJ
2013	1.3 ↗	1.2	0.7	1.7
2014	1.3 ↗	0.7	0.8	0.6

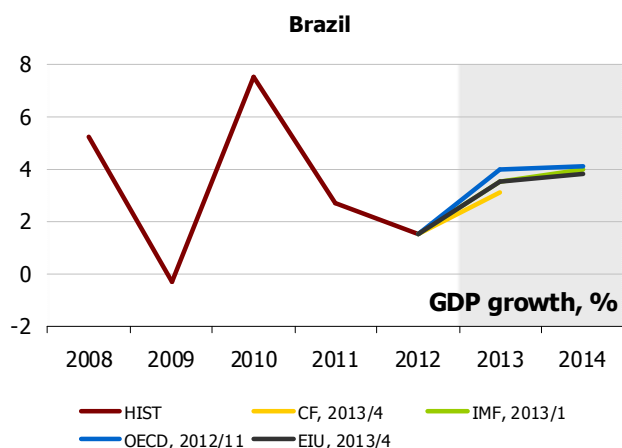
Note: Legend shows latest forecast data in format "Source, year/month" of forecast publication. HIST: historical values. ECB and Fed: midpoint of range. Arrow indicates direction of revision of newly published forecast. If no arrow is shown, no new forecast was available in previous month or by cut-off date in current month. Asterisk indicates first published forecast for given year.

[Cut-off date for data: 11 April 2013]

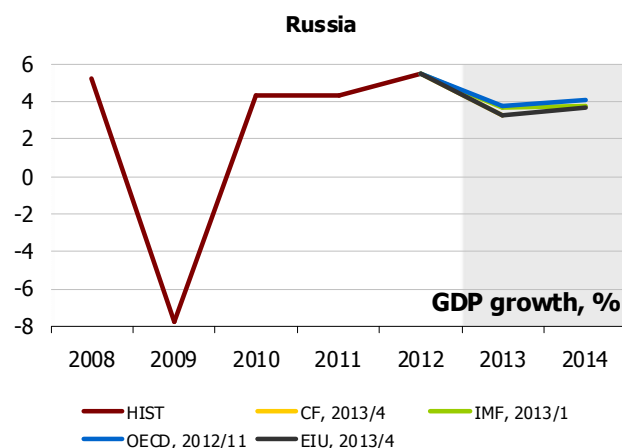
Source: CF, IMF, OECD, ECB, Fed, DBB, BoJ, CNB calculations.

## II.2 GDP outlook in BRIC countries

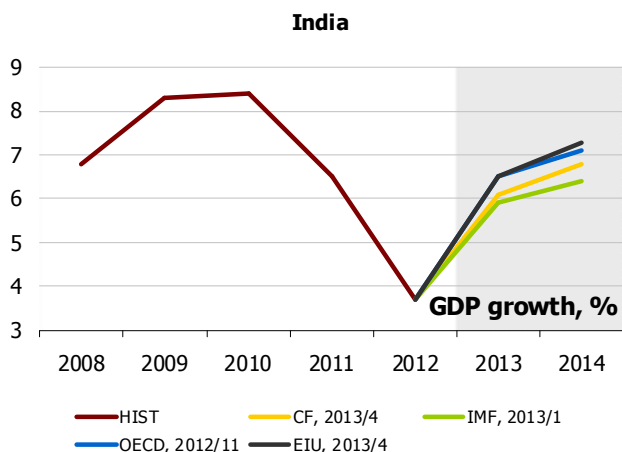
Following downward corrections in previous months, the GDP growth outlook for the largest emerging economies remained broadly unchanged. Brazil's economic outlook declined by 0.1 pp for both 2013 and 2014. The outlook for India's GDP for the fiscal year 2013/2014 recorded the same decrease. The economy is facing an outflow of investment, which is slowing its growth. With the exception of China, the BRIC countries have a relatively limited ability to support growth by means of monetary policy, as they are facing strong inflation pressures (see section II.4). China is in the best position among the monitored emerging economies despite the fact that its net exports are rising more slowly than expected by the markets owing to weakening global demand and its industrial production data have also disappointed the markets.



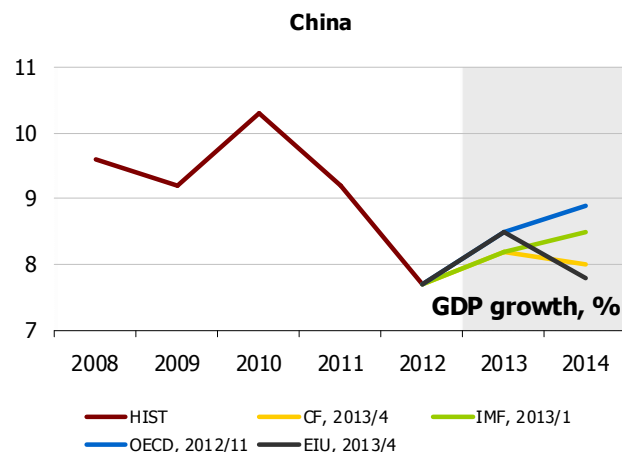
	CF		IMF		OECD		EIU
<b>2013</b>	3.1	↘	3.5		4.0		3.5
<b>2014</b>	3.7	↘	4.0		4.1		3.8



	CF		IMF		OECD		EIU
<b>2013</b>	3.3	↗	3.7		3.8		3.3
<b>2014</b>	3.8	↗	3.8		4.1		3.7



	CF		IMF		OECD		EIU
<b>2013</b>	6.1	↘	5.9		6.5		6.5
<b>2014</b>	6.8	✱	6.4		7.1		7.3



	CF		IMF		OECD		EIU
<b>2013</b>	8.2	↗	8.2		8.5		8.5
<b>2014</b>	8.0	↗	8.5		8.9		7.8

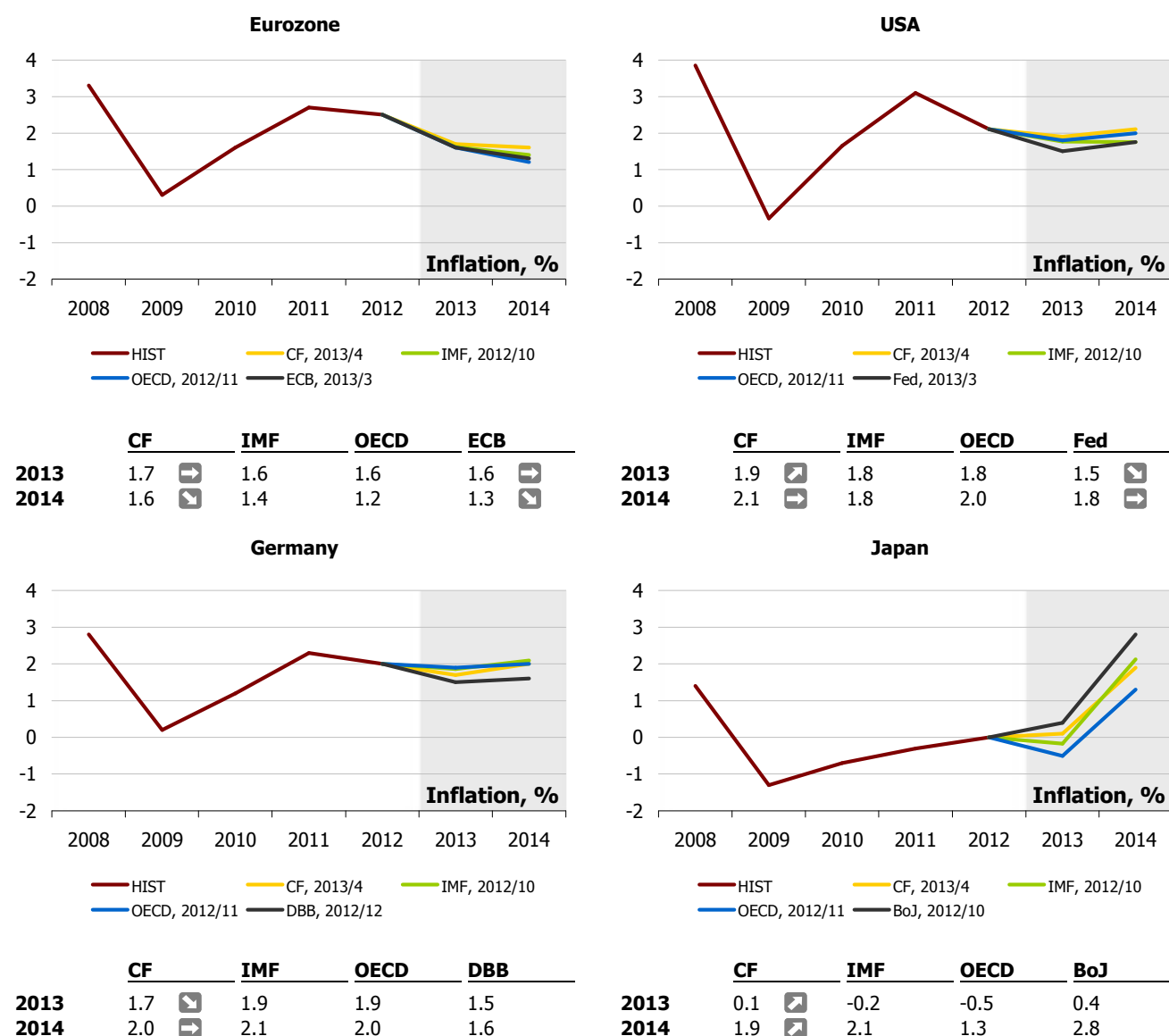
Note: Legend shows latest forecast data in format "Source, year/month" of forecast publication. HIST: historical values. Arrow indicates direction of revision of newly published forecast. If no arrow is shown, no new forecast was available in previous month or by cut-off date in current month. Asterisk indicates first published forecast for given year.

[Cut-off date for data: 11 April 2013]

Source: CF, IMF, OECD, EIU, CNB calculations.

### II.3 Inflation outlook in advanced countries

According to CF, euro area inflation will reach 1.7% this year amid significant differences in inflation rates across the individual countries of the monetary union. This year the largest increase in the price level will be recorded in Austria (2.3%). By contrast, deflation of 0.1% is expected in Greece. In Germany, consumer prices will rise in line with the euro area average; their growth outlook is unchanged from the previous month. Inflation in the USA will stand at 1.9%, up by 0.1 pp compared to the March CF outlook. At the Bank of Japan meeting in early April, the new governor confirmed the intention to hit the inflation target of 2%. The April CF increased its inflation outlook for Japan by 0.1 pp for both 2013 and 2014 and expects consumer price inflation to approach the target of 2% in 2014. Next year inflation will also pick up pace in the euro area, but the acceleration will be only modest and inflation will remain below the ECB's target. However, this is not the case for some national economies in the region, especially Germany, where CF expects consumer prices to rise by 2%. US consumer prices will increase by 2.1%.



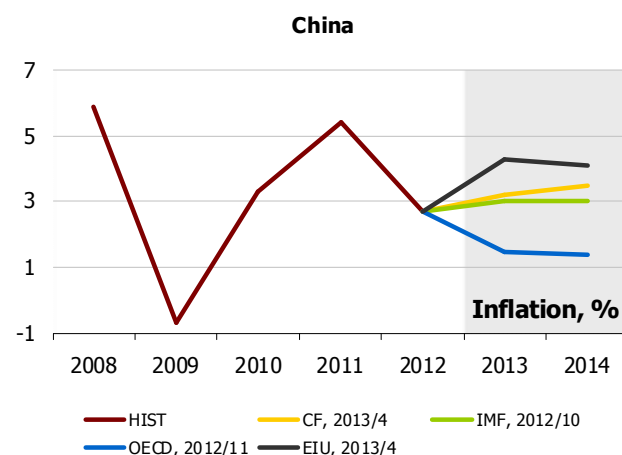
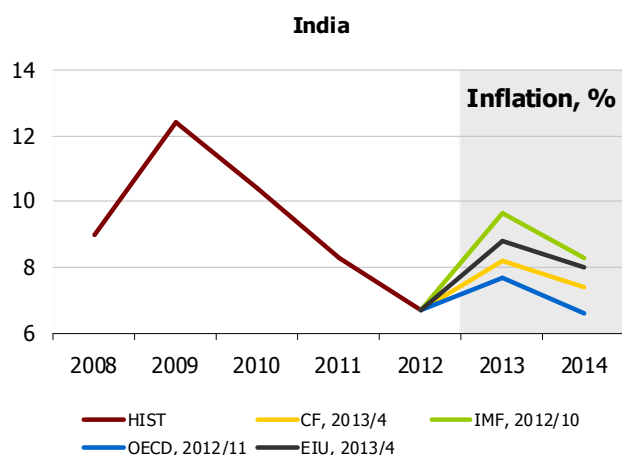
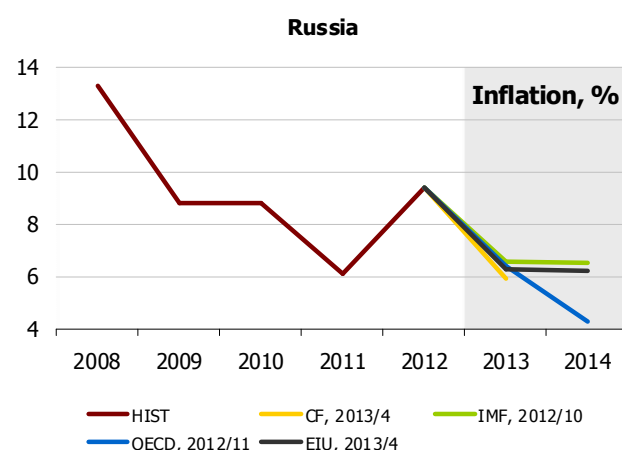
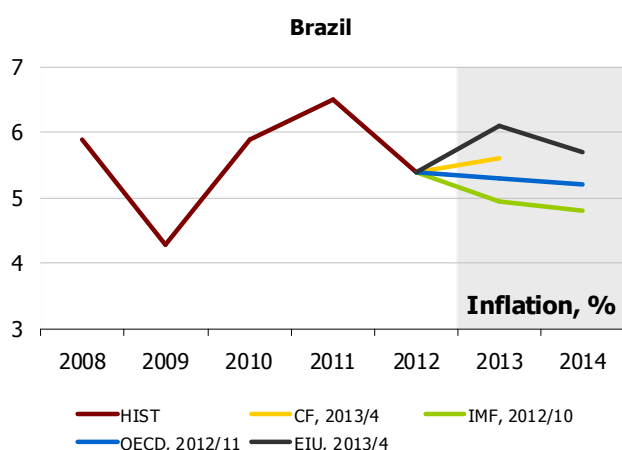
Note: Legend shows latest forecast data in format "Source, year/month" of forecast publication. HIST: historical values. ECB and Fed: midpoint of range. Arrow indicates direction of revision of newly published forecast. If no arrow is shown, no new forecast was available in previous month or by cut-off date in current month. Asterisk indicates first published forecast for given year.

[Cut-off date for data: 11 April 2013]

Source: CF, IMF, OECD, ECB, Fed, DBB, BoJ, CNB calculations.

### II.4 Inflation outlook in BRIC countries

Inflation remains a noticeable problem in the BRIC countries. China is the exception, surprising analysts by recording a marked deceleration in prices. In all other BRIC countries, however, inflation remains elevated. Prices in Brazil rose faster than expected by analysts and prices in Russia remain close to an 18-month high. In 2013 inflation should also stay high in India, reaching 8.2% according to the new CF; nevertheless, the Indian central bank decided to cut its interest rate in March. A cut is also being discussed in Russia; however, inflation deviated significantly from the central bank's target in February, preventing monetary policy stimulation of the economy.



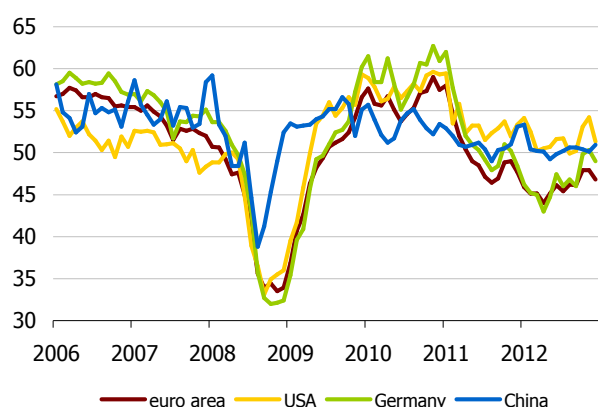
Note: Legend shows latest forecast data in format "Source, year/month" of forecast publication. HIST: historical values. Arrow indicates direction of revision of newly published forecast. If no arrow is shown, no new forecast was available in previous month or by cut-off date in current month. Asterisk indicates first published forecast for given year.

[Cut-off date for data: 11 April 2013]

Source: CF, IMF, OECD, EIU, CNB calculations.

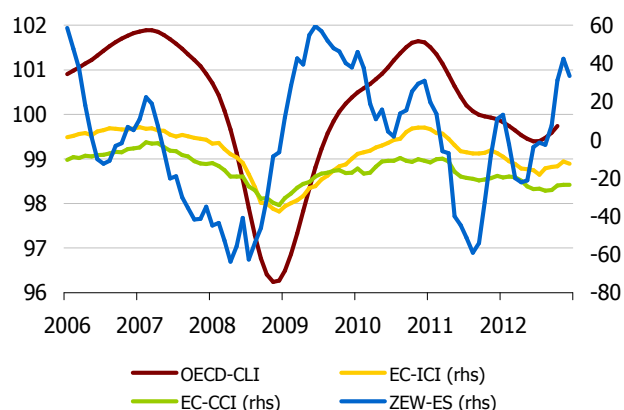
Compared to the previous month, the outlook for the US economy deteriorated somewhat in April. The PMI (Purchasing Managers' Index) in industry decreased significantly, as did one of the monitored consumer sentiment indicators. Another consumer sentiment indicator and the Conference Board leading indicator increased slightly. Expectations for the euro area also worsened. The PMI declined further to below 50 points, and the industrial confidence indicator and the ZEW economic sentiment indicator also fell. The outlook for Germany remains virtually unchanged. The PMI and the Ifo consumer expectations edged down, whereas the EC consumer confidence indicators and the ZEW consumer sentiment indicator rose slightly. Overall, the outlook for Germany remains significantly above that for the euro area as a whole.

PMI IN MANUFACTURING



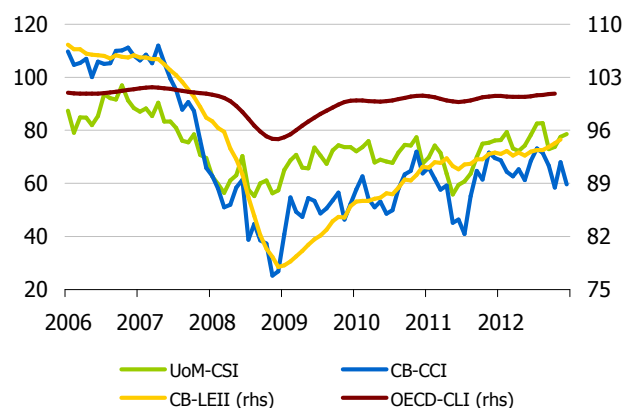
	EA	US	DE	CN
1/13	47.9	53.1	49.8	50.4
2/13	47.9	54.2	50.3	50.1
3/13	46.8	51.3	49.0	50.9

EURO AREA



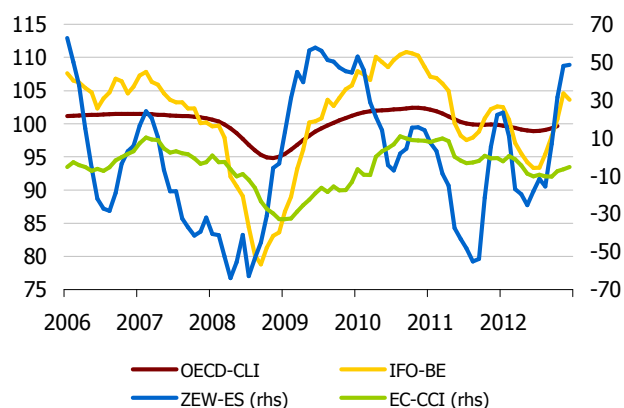
	OECD-CLI	EC-ICI	EC-CCI	ZEW-ES
1/13	99.7	-13.8	-23.9	31.2
2/13		-11.3	-23.6	42.40
3/13		-12.5	-23.5	33.40

USA



	CB-LEII	OECD-CLI	UoM-CSI	CB-CCI
1/13	94.3	100.8	73.8	58.4
2/13	94.8		77.6	68.0
3/13			78.6	59.7

GERMANY



	OECD-CLI	IFO-BE	ZEW-ES	EC-CCI
1/13	99.6	100.7	31.5	-7.6
2/13		104.6	48.2	-6.4
3/13		103.6	48.5	-5.4

Note: **PMI** = Purchasing Manager Index (50); **OECD-CLI** = OECD Composite Leading Indicator (100); **EC-ICI** = European Commission Industrial Confidence Indicator (0); **EC-CCI** = European Commission Consumer Confidence Indicator (0); **ZEW-ES** = ZEW Economic Sentiment (0); **CB-LEII** = Conference Board Leading Indicator Economic Index (2004 = 100); **UoM-CSI** = University of Michigan Consumer Sentiment Index (Dec 1966 = 100); **CB-CCI** = Conference Board Consumer Confidence Index (1985 = 100); **IFO-BE** = IFO Business Expectations (2005 = 100). Values in parentheses indicate the index threshold between expected economic expansion and decline or the period as of which the index was normalised. [Cut-off date for data: 10 April 2013]

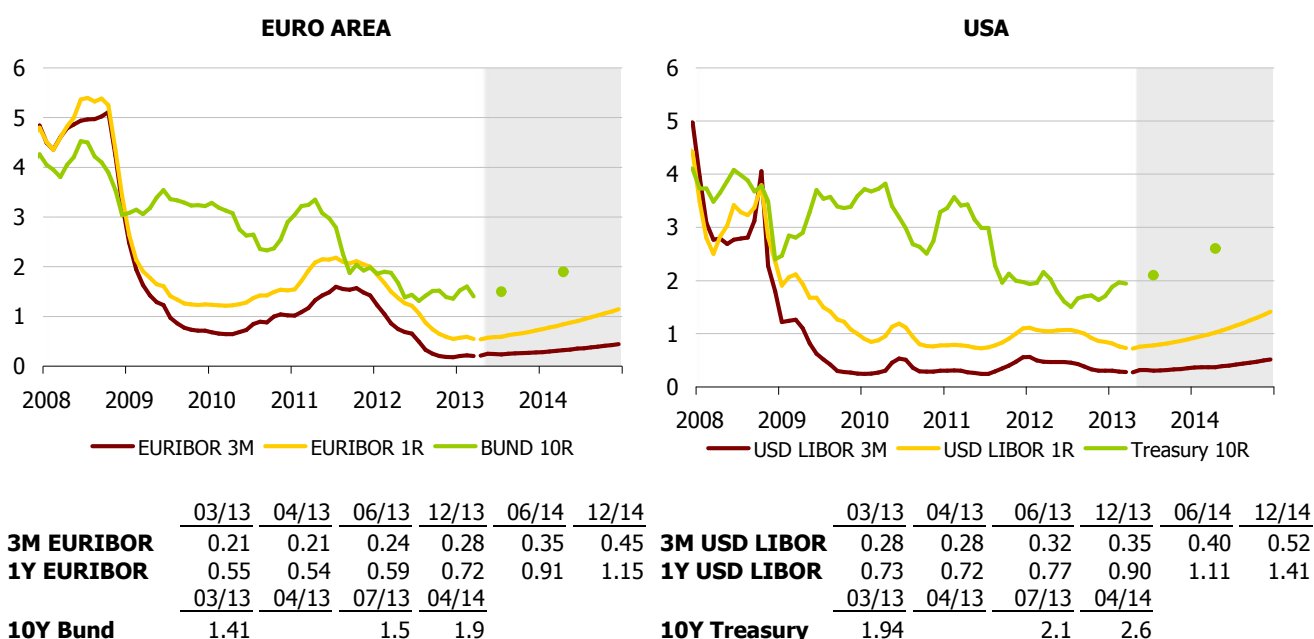
Source: OECD, EC, IFO, Conference Board, University of Michigan, CNB calculations.



### IV.1 Interest rate outlook in the euro area and the USA

The 3M and 1Y EURIBOR rates were flat in March, with the new outlook based on implied rates shifting slightly downwards compared to the previous month. Banks continued with the early repayment of three-year loans from the ECB, so that excess liquidity in the euro area fell further to EUR 442 billion. However, it remains above the level at which an effect on market rates could materialise. At its April meeting, the ECB repeated that it was ready to ease monetary policy if needed, but has not announced any intended measures so far. The April CF also decreased its outlook for German ten-year government bond yields.

Dollar LIBOR rates were also unchanged in this period, and according to the new outlook based on implied rates a larger increase in three-month rates cannot be expected until 2014. US monetary policy remains easy, with the risks to economic growth being slightly on the downside. However, the prematurely published minutes of the most recent meeting of the Fed's monetary committee suggests that a slowdown in asset purchases this year under the quantitative easing programme was discussed, provided that the labour market situation improves.



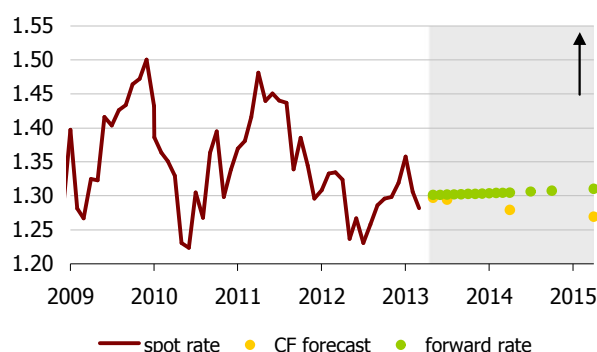
Note: Forecasts for EURIBOR and LIBOR rates are based on implied rates from interbank market yield curve (FRA rates are used from 4M to 15M and adjusted IRS rates for longer horizons). Forecasts for German and US government bond yields (10Y Bund and 10Y Treasury) are taken from CF. [Cut-off date for data: 8 April 2013] Source: Thomson Reuters (Datastream), Bloomberg, Consensus Forecasts, CNB calculations.

### IV.2 Outlook for selected exchange rates

The US dollar appreciated against the euro in February and March, peaking at USD 1.28, but weakened again in early April. The USA's growth outlook is still better than Europe's, although domestic consumer confidence remains limited and the labour market has not improved much. On the other hand, the euro area managed to find a solution to the Cypriot crisis, which reduced financial market tensions. The April CF forecast has been shifted towards a stronger dollar, reaching USD 1.27 to the euro at the two-year horizon. The British pound saw a similar revision, although an improvement in the UK's services PMI has improved its growth outlook. A slight strengthening of the yen vis-à-vis the US dollar in late March was linked with the end of the fiscal year in Japan and the Cypriot crisis. The new governor Mr Kuroda then announced steps towards a new inflation target and the yen weakened again. The new CF forecast has also been moved further towards a weaker yen. The Swiss franc appreciated against the euro owing to the Cypriot crisis, but the new CF continues to expect it to depreciate at the two-year horizon.

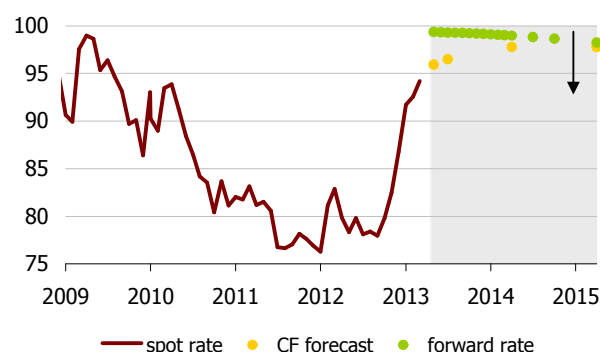
The currencies of the BRIC countries except China weakened in late March/early April. In March the Brazilian real was affected by central bank operations and new unemployment data, while the Russian rouble depreciated on concerns about the impact of financial aid to Cyprus on Russian deposits. India's record-high current account deficit affected the strength of its currency amid a slower capital inflow, but CF expects the deficit to edge down at the one-year horizon. Political uncertainty, which could have a major impact on capital flows, remains a risk. The Chinese renminbi appreciated slightly further due to favourable growth prospects. The BRICS summit (the treaty with Brazil and South Africa) and the agreement on direct trading between the Australian dollar and the renminbi led to a further strengthening of China's currency.

US\$ per Euro



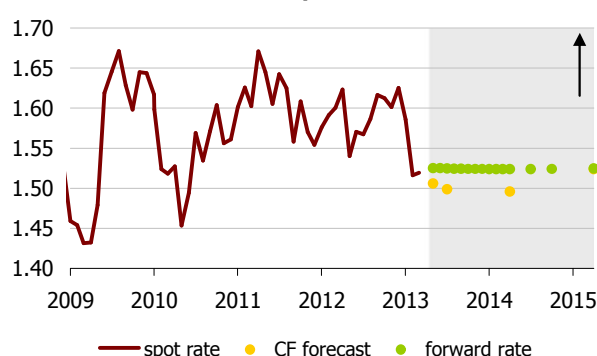
	08/04/13	05/13	07/13	04/14	04/15
spot rate	1.301				
CF forecast		1.297	1.294	1.279	1.269
forward rate		1.301	1.302	1.305	1.310

Yen per US\$



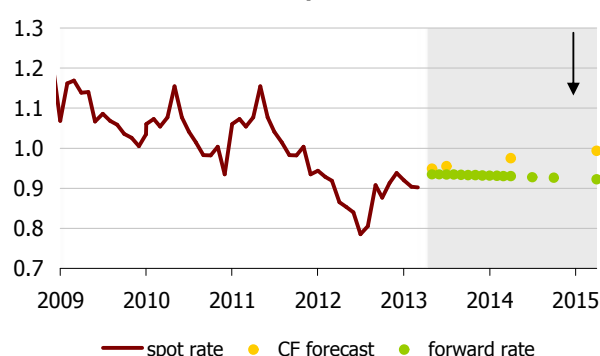
	08/04/13	05/13	07/13	04/14	04/15
spot rate	99.36				
CF forecast		95.91	96.48	97.76	97.76
forward rate		99.34	99.30	98.97	98.22

US\$ per UK£



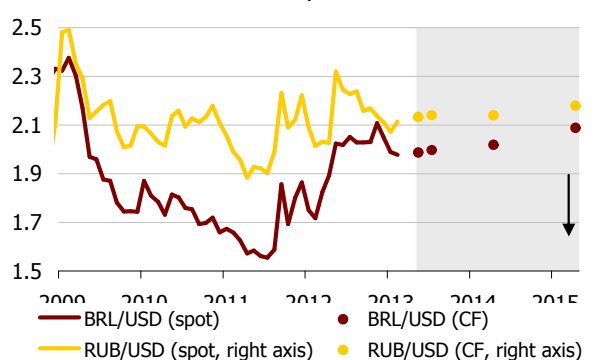
	08/04/13	05/13	07/13	04/14	04/15
spot rate	1.526				
CF forecast		1.506	1.499	1.496	1.524
forward rate		1.525	1.525	1.524	1.525

Swfr per US\$



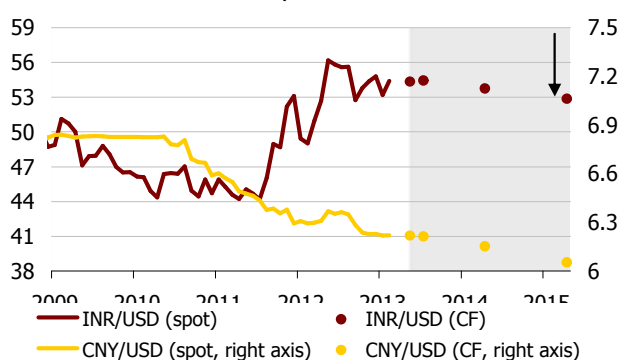
	08/04/13	05/13	07/13	04/14	04/15
spot rate	0.935				
CF forecast		0.949	0.955	0.975	0.994
forward rate		0.935	0.934	0.930	0.923

BRAZILIAN REAL, RUSSIAN ROUBLE



	08/04/14	05/13	07/13	04/14	04/15
BRL/USD (spot)	1.99				
BRL/USD (CF)		1.99	2.00	2.02	2.09
RUB/USD (spot)	31.25				
RUB/USD (CF)		30.86	30.96	30.95	31.50

INDIAN RUPEE, CHINESE RENMINBI



	08/04/14	05/13	07/13	04/14	04/15
INR/USD (spot)	54.56				
INR/USD (CF)		54.35	54.44	53.76	52.87
CNY/USD (spot)	6.20				
CNY/USD (CF)		6.22	6.21	6.15	6.05

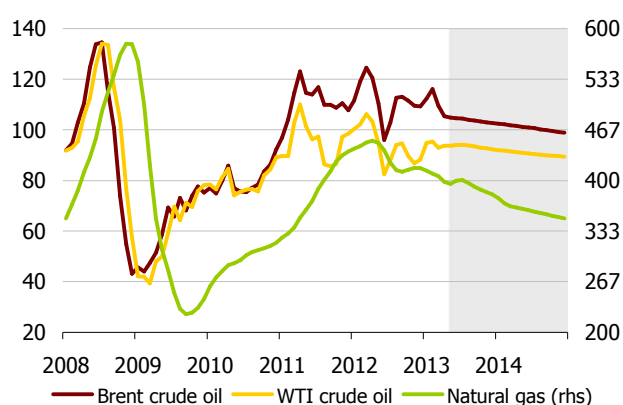
Note: Arrow indicates currency appreciation against US dollar. Exchange rates as of last day of month. Forward rate does not represent outlook; it is based on covered interest parity, i.e. currency of country with higher interest rate is depreciating. Forward rate represents current (as of cut-off date) possibility of hedging future exchange rate. [Cut-off date for data: 8 April 2013]

Source: Thomson Reuters (Datastream), Bloomberg, Consensus Forecasts, CNB calculations.

## V.1 Oil and natural gas

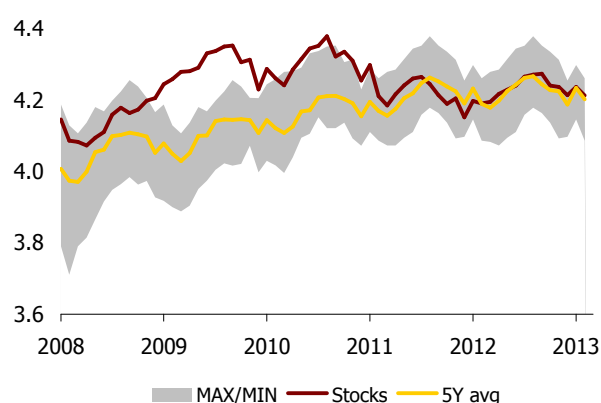
The price of Brent crude oil interrupted its rising trend in mid-February and, except in the last week of March, was falling until the cut-off date of the April GEO, reaching slightly below USD 105 a barrel. This represented a month-on-month drop in the oil price of 5.6% from February. Two main factors contributed to this decline: concerns about lower global oil demand, supported by the Cypriot banking crisis and weak macroeconomic data in the euro area, and low demand from refineries, particularly in Europe, which are undergoing regular maintenance. These factors were not offset by the relatively positive data from the USA (where the WTI oil price was broadly flat) and China. The price outlook based on futures remains falling and has shifted down again at the shorter end compared to February and March, owing chiefly to expected lower oil demand and expected rising extraction capacities, especially in the North Sea. By contrast, the April CF predicts a slight increase in the Brent oil price, which should be just below USD 110 a barrel in late April 2014.

**OUTLOOK FOR PRICES OF OIL AND NATURAL GAS**

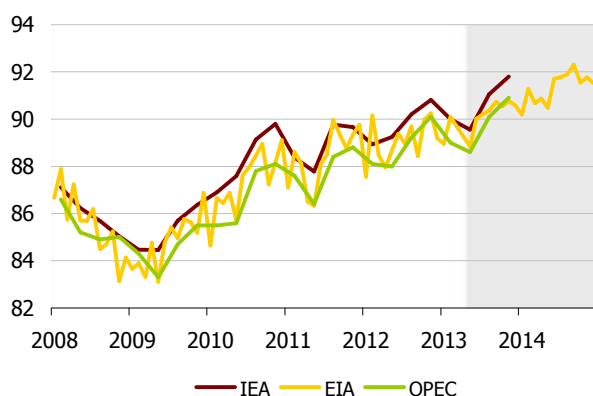


	Brent	WTI	Natural gas
2013	-5.01%	-0.60%	-7.92%
2014	-5.12%	-3.25%	-9.19%

**TOTAL STOCKS OF OIL AND OIL PRODUCTS IN OECD**

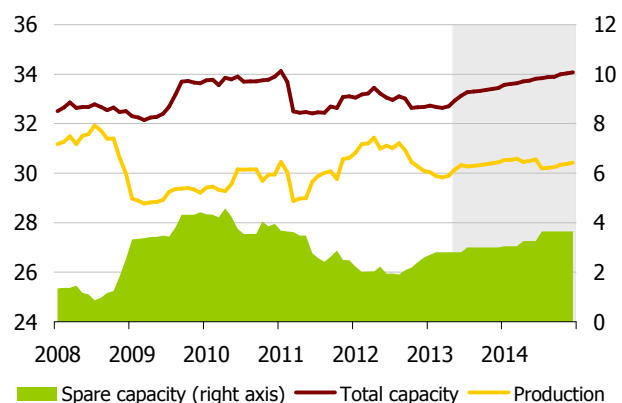


**GLOBAL CONSUMPTION OF OIL AND OIL PRODUCTS**



	IEA	EIA	OPEC
2013	0.90%	1.07%	0.90%
2014		1.48%	

**PRODUCTION, TOTAL AND SPARE CAPACITY IN OPEC COUNTRIES**



	Production	Total capacity	Spare capacity
2013	-2.29%	0.17%	35.87%
2014	0.76%	2.23%	17.58%

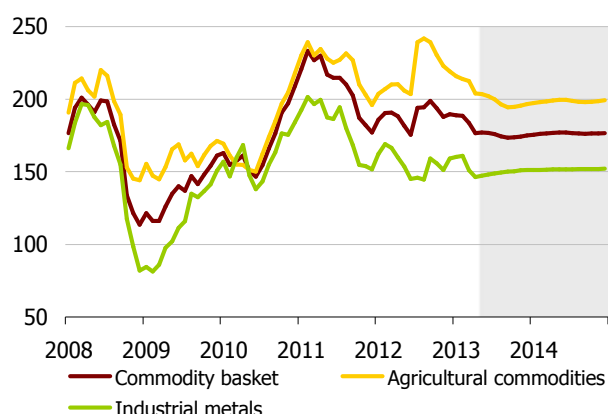
Note: Oil price in USD/barrel, price of Russian natural gas at German border in USD/1,000 m<sup>3</sup> (IMF data, smoothed by the HP filter). Future oil prices (grey area) are derived from futures and future gas prices are derived from oil prices using model. Tables show annual percentage changes. Total 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). [Cut-off date for data: 10 April 2013]

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

## V.2 Other commodities

The overall non-energy commodity price index fell during March and in early April, mainly because of lower prices of industrial metals. Food commodity prices are still expected to fall until mid-2013, owing mainly to decreasing maize prices. Wheat prices, by contrast, are expected to rise. All the components of the metal index fell at roughly the same pace on concerns about the outlook for the global economy and the strengthening dollar. However, the outlook for the metal index and its components is flat. Rubber prices fell to their lowest levels in more than three years, but cotton prices rose in March. The outlook for both these technical crops is flat. The coal price edged down in March and early April, but its outlook is rising over the entire horizon.

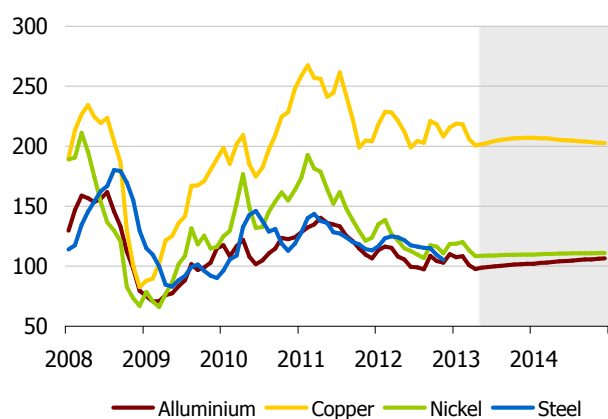
**PRICES OF NON-ENERGY COMMODITIES**



**Overall**

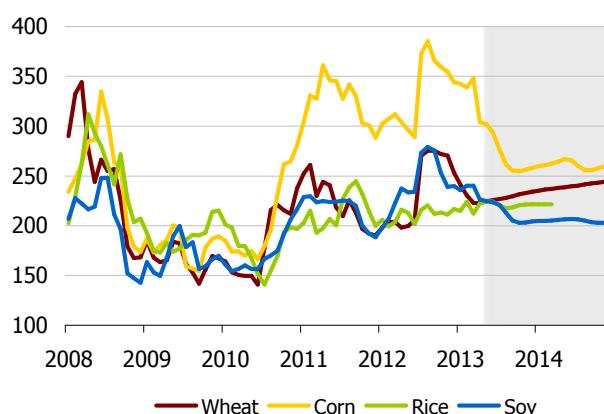
	comm. basket	Agricultural comm.	Industrial metals
<b>2013</b>	-5.8	-7.7	-3.1
<b>2014</b>	-1.0	-1.9	0.3

**METALS**



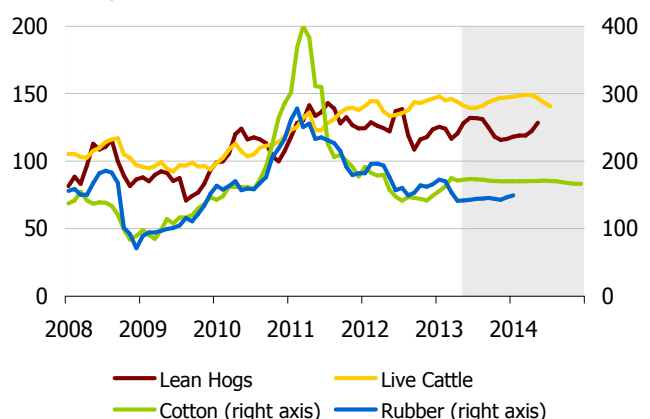
	Aluminium	Copper	Nickel
<b>2013</b>	-4.8	-3.6	-6.6
<b>2014</b>	2.8	-1.1	-0.6

**FOOD COMMODITIES**



	Wheat	Corn	Rice	Soy
<b>2013</b>	-2.7	-12.5	4.5	-8.7
<b>2014</b>	4.7	-10.4	0.6	-6.9

**MEAT, NON-FOOD AGRICULTURAL COMMODITIES**



	Lean hogs	Live Cattle	Cotton	Rubber
<b>2013</b>	-0.1	2.6	7.0	-13.0
<b>2014</b>	-1.9	1.7	-0.2	

Note: Structure of non-energy commodity price indices corresponds to composition of The Economist commodity indices. All prices are given as indices, 2005 = 100. [Cut-off date for data: 10 April 2013].

Source: Bloomberg, CNB calculations.

## SELECTED LEADING INDICATORS FOR THE EURO AREA, GERMANY AND THE UNITED STATES<sup>1</sup>

*Leading indicators are generally constructed using either a suitable combination of short-term economic indicators or qualitative questionnaires. Most of the leading indicators we monitor in GEO contain information about current real economic activity. However, they also contain information about future economic developments, unlike "hard" macroeconomic data, which are released with a lag relative to leading indicators. The Purchasing Managers' Index (PMI) in manufacturing seems to be a reliable leading indicator for the euro area, Germany and the USA. For Germany, there are also the OECD Composite Leading Indicator (CLI) and the expectations component of the Ifo index. For the USA, in addition to the PMI and OECD CLI there are the Conference Board and University of Michigan indicators. The ZEW economic sentiment indicator contains probably the longest lead, but is more suitable for the euro area and Germany than for the USA. By contrast, the European Commission confidence indicators seem less useful.*

Each month, Global Economic Outlook (GEO) monitors several basic leading indicators for the euro area, Germany and the USA. This monitoring is motivated by an effort to obtain preliminary information about future economic developments in these territories. This article presents the methodologies of the leading indicators we monitor and then gives a simple quantitative analysis of the relationship between each indicator and the industrial production index, which we will use to monitor real economic activity. We will examine the intensity of the link between each leading indicator and real economic activity as well as the lead lengths of the indicators.

The lead length is determined both by the publication date (see Figure VI-1), as the leading indicators for the month are usually released earlier than the corresponding "hard" economic data, and by the additional information contained in the leading indicators. We will study the lead length of each indicator in the analytical part of the article. Similarly to Nilsson (2000), Hufner and Schroder (2002) and Fichtner, Ruffer and Schnatz (2009), we will analyse the cross correlations and test the Granger causality between the leading indicators and the industrial production index.

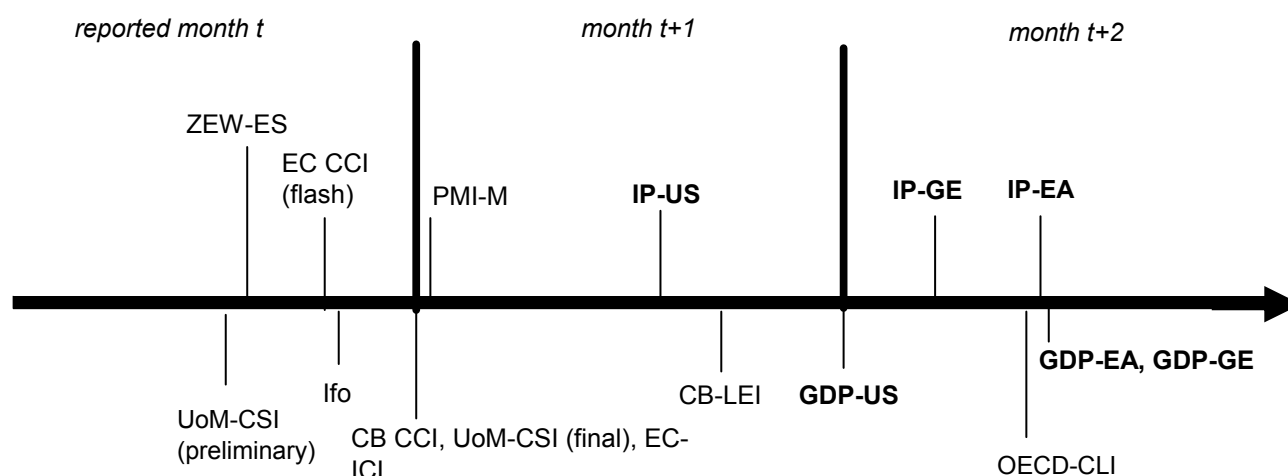
### 1. The leading indicators monitored

One of the best-known leading indicators is the Composite Leading Indicator (CLI) published monthly by the OECD. It is compiled for OECD member states and for Brazil, China, India, Indonesia, Russia and South Africa. The CLI is composed of several short-term economic indicators, selected for their consistent relationship with industrial production. Since March 2012, however, the OECD has used GDP as the reference series instead of industrial production, with the quarterly GDP data broken down into individual months. The variables entering the CLI are normalised and then weighted by equal weights in the aggregate indicator.<sup>2</sup> Given its construction, the CLI should signal turning points rather than the size of the change. As Figure VI-1 shows, the main disadvantage of the CLI is its relatively long (1.5 month) publication lag. It is thus released *de facto* at the same time as the industrial production data for the euro area and Germany.

<sup>1</sup> Author: Filip Novotný (filip.novotny@cnb.cz). The opinions expressed in this article are those of the author and do not necessarily reflect the official position of the Czech National Bank.

<sup>2</sup> The OECD presents the CLI in several different forms – see <http://www.oecd.org/std/41629509.pdf> (p. 9).  
Czech National Bank / Global Economic Outlook – April 2013

Figure VI-1 Publication schedule



Note: **UoM-CSI** – University of Michigan Consumer Sentiment Index, **ZEW-ES** – Indicator of Economic Sentiment, **EC-CCI** – European Commission Consumer Confidence Indicator, **Ifo** – Business Expectations, Business Situation and Consumer Confidence, **CB-CCI** – Conference Board Consumer Confidence Index, **EC-ICI** – European Commission Industrial Confidence Indicator, **PMI-M** – Purchasing Managers Index in Manufacturing, **CB-LEI** – Conference Board Leading Economic Indicator, **OECD-CLI** – Composite Leading Indicator, **IP-US** – US industrial production, **GDP-US** – US GDP, **IP-GE** – industrial production in Germany, **IP-EA** – industrial production in the euro area, **GDP-EA** – GDP in the euro area, **GDP-GE** – GDP in Germany.

Another widely used indicator available for multiple countries is the Purchasing Managers' Index in Manufacturing (PMI-M). As its name suggests, it should be closely linked with developments in manufacturing. Hundreds of respondents from the industrial sector are polled and any change in their sentiment from the previous month is determined. Their qualitative responses are then weighted into the final form of the indicator using the following equation:

$$PMI = (P_1 * 1) + (P_2 * 0.5) \quad (1)$$

where  $P_1$  is the percentage of respondents who reported an improvement and  $P_2$  is the percentage of respondents who reported no change. The PMI-M is by construction a diffusion index, with a number above 50 indicating an improvement and a number below 50 suggesting a deterioration. The advantage of the PMI-M is its relatively long publication lead. The indicator for the month is published right at the beginning of the following month.

The best-known German leading indicators ZEW and Ifo are constructed on the basis of very similar qualitative responses as in the case of the PMI. In addition, ZEW is available for G-7 countries with the exception of Canada. The ZEW index reflects the opinion of the German banking sector (about 350 analysts), thereby complementing the Ifo index, which questions respondents (about 7,000) from industry, construction and wholesale and retail. Thanks to its larger and more diverse panel of respondents, the Ifo tends to be less volatile.



The actual construction of the ZEW and Ifo, however, is essentially the same, as both express the difference between the percentage of respondents reporting an improvement and the percentage of those reporting a deterioration. In addition, both indices have a current sentiment component and an expectations component. As for the ZEW-ES, i.e. the leading indicator of economic sentiment, the questions relate to the six-month prospects. The Ifo expectations index should likewise reflect the situation at a six-month horizon. However, 80% of the questions regarding the Ifo index in fact take into account three-month expectations (Broyer and Savry, 2002).

The resulting ZEW indicator is published as the simple difference between the percentage of respondents with positive expectations and the percentage of those with negative expectations. Respondents with neutral expectations are not taken into account in the calculation. So, a positive (negative) indicator means that the respondents' expectations are mostly positive (negative). Unlike the ZEW, the Ifo basic difference indicator is subsequently converted into an index, with 100 indicating the average for 2005.<sup>3</sup> The ZEW and Ifo indicators are published during the given survey period, i.e. with a large publication lead (see Figure VI-1).

GEO also regularly monitors two leading indicators compiled by the European Commission: the European Commission Industrial Confidence Indicator (EC-ICI) and the European Commission Consumer Confidence Indicator (EC-CCI). These indicators are also constructed by taking the difference between positive and negative qualitative responses to a given set of questions.

The EC-ICI is based on a survey of industrial managers and is the arithmetic average of differences relating to questions on production expectations, order books and stocks of finished products. Similarly, the EC-CCI represents the arithmetic average of differences relating to the financial situation of households, the general economic situation, expected unemployment and savings for the next twelve months.

All the above leading indicators are, by construction, stationary time series. We will take advantage of this in the analysis below. By contrast, the remaining three leading indicators for the US economy – two Conference Board indicators and the University of Michigan Consumer Sentiment Index – are not stationary.

The Conference Board Leading Index (CB-LEI) is the average of the following variables: average hours worked per week in industry; average weekly jobless claims for unemployment insurance; new orders in industry; sales; new building permits; stock prices; M2; the spread between the 10-year Treasury yield and the federal funds target rate; and the index of consumer expectations. These are essentially monthly series available with a publication lag of less than one month and are rebased to 2004.

The Consumer Confidence Index (CB-CCI) is another Conference Board indicator for the USA. It takes a value of 100 in 1985. This index reflects the present and expected levels of economic activity. The current labour market situation and expectations regarding future employment are also assessed. The survey also covers households' expectations about the inflation rate, interest rates and stock prices, as well as their plans to buy cars and housing. Each question has three answer choices: positive, negative and neutral. Positive answers are then divided by the total of positive and negative answers.

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<sup>3</sup> However, the original difference values are also available on the Ifo website.

Another consumer sentiment index is produced by the University of Michigan (UoM-CSI). It focuses on three areas: (i) how consumers view their future financial situation; (ii) the short-term general economic outlook; and (iii) the long-term economic outlook. The survey is based on 500 telephone interviews with households in the USA. It has two main components – current conditions and expectations – and the answers to all five questions have the same weight. The index represents the difference between positive and negative answers, to which 100 is added and the resulting index is rebased to 1966.

## 2 The relationship between leading indicators and real economic activity

We will approximate real economic activity by the industrial production index. Industrial production is generally highly correlated with GDP, as other services are linked to it in addition to production activity. The correlation coefficient between the year-on-year changes in industrial production and GDP for the euro area and Germany was more than 0.92 in 1990–2012. For the USA it was slightly lower (over 0.87), suggesting a more advanced phase of deindustrialisation in the USA. Another argument for using industrial production data is that they are published monthly (as in the case of the leading indicators) and not quarterly (as in the case of GDP data).

The majority of the leading indicators we monitor are stationary, so we can conduct a correlation analysis between the leading indicators in levels and industrial production in year-on-year changes. For the Conference Board and University of Michigan indicators, which are not stationary, we will use their year-on-year changes as in the case of industrial production. The results of the analysis are given separately for each country/territory in the tables below.

Table VI-1 Euro area 1990–2012: Cross correlation between year-on-year changes in industrial production and leading indicators, and Granger causality

	Correlation coefficient	-lag/+lead in months	Granger causality (lag in months)
PMI-M	0.913	-2	yes (2)
OECD CLI	0.863	0	bidirectional
EC-ICI	0.855	1	no (1)
ZEW-ES	0.677	-9	yes (3)
EC-CCI	0.629	0	yes (2)

For the euro area (Table VI-1), the highest correlation with industrial production is achieved by the PMI in manufacturing (PMI-M) with a lag of two months. In addition to a relatively small publication lag (see Fig. VI-1), this indicator contains approximately two-month leading information. The usefulness of this indicator is further supported by the result of the Granger causality test, where the lagged PMI-M levels are statistically significant in helping to explain industrial production, but not vice versa. The ZEW indicator of economic sentiment is another indicator with a relatively large lead over industrial production. It reaches its highest correlation with a lag of nine months. By contrast, the OECD CLI and the European Commission Industrial Confidence Indicator (EC-ICI) behave more like coincident indicators, with the EC-ICI even showing reverse causality, i.e. from industrial production to the indicator, according to the Granger causality test. The European Commission Consumer Confidence Indicator (EC-CCI) also shows coincident performance. Nilsson (2000) presents similar results for the European Commission indicators, also suggesting coincident behaviour.



Table VI-2 Germany 1990–2012: Cross correlation between year-on-year changes in industrial production and leading indicators, and Granger causality

	Correlation coefficient	-lag/+lead in months	Granger causality (lag in months)
OECD CLI	0.909	-2	yes (3)
PMI-M	0.899	-2	yes (2)
IFO-BE	0.858	-3	yes (2)
IFO-BC	0.805	0	yes (1)
EC-CCI	0.698	3	no (1)
IFO-CCI	0.671	3	no (1)
ZEW-ES	0.553	-8	bidirectional

The OECD-CLI (in contrast to the results for the euro area as a whole) seems to be a suitable leading indicator for Germany (see Table VI-2), having about the same correlation coefficient with a two-month lag behind industrial production as the PMI-M. Moreover, the Granger causality here runs from these indicators to industrial production. The expectations component of the Ifo indicator (IFO-BE<sup>4</sup>) shows behaviour comparable to the OECD-CLI and PMI-M. By contrast, the overall Ifo index (IFO-BC<sup>5</sup>), which also contains the current sentiment component, shows coincident performance. The Ifo and European Commission consumer confidence indicators do not seem to be very useful in terms of leading information, as they achieve their highest correlation coefficients with a three-month lead and there is reverse causality running to them from industrial production.<sup>6</sup> The ZEW economic sentiment indicator is also debatable – it potentially achieves the largest lead over the industrial production data, but with the lowest correlation coefficient and an unclear direction of causality.

Table VI-3 United States 1990–2012: Cross correlation between year-on-year changes in industrial production and leading indicators, and Granger causality

	Correlation coefficient	-lag/+lead in months	Granger causality (lag in months)
CB-LEI (y-o-y)	0.887	-2	bidirectional
OECD CLI	0.745	-1	yes (1)
PMI-M	0.701	-3	yes (1)
CB-CCI (y-o-y)	0.684	-4	yes (1)
UoM-CSI (y-o-y)	0.593	-7	yes (1)
ZEW-ES	0.417	-12	no (1)

The Conference Board indicator (CB-LEI) appears to be the most suitable economic indicator for the USA, although the direction of the causality in relation to industrial production is not clear (see Table VI-3). By contrast, the ZEW economic sentiment indicator is unsuitable for the USA. The other indicators contain some leading information and show relatively good correlation with industrial production. However, the one-month lead of the OECD CLI over industrial production is rather overshadowed by a large publication lag.

Overall, the Purchasing Managers Index (PMI) in manufacturing seems to be a reliable leading indicator for the euro area, Germany and the USA. For Germany, there are also

<sup>4</sup> Ifo Business Expectations

<sup>5</sup> Ifo Business Climate

<sup>6</sup> From this perspective, it might be better to use, say, retail sales in real terms instead of industrial production as a proxy for real economic activity.

the OECD Composite Leading Indicator (CLI) and the expectations component of the Ifo index. For the USA, in addition to the above PMI and OECD CLI, there are the Conference Board and University of Michigan indicators. The ZEW economic sentiment indicator contains probably the longest lead, but is more suitable for the euro area and Germany than for the USA. By contrast, the European Commission confidence indicators seem less useful.

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Hufner, F. P., & Schroder, M. (2002): Forecasting Economic Activity in Germany – How Useful Are Sentiment Indicators? ZEW Discussion Paper No. 02-56.

Nilsson, R. (2000): Confidence Indicators and Composite Indicators, paper for presentation at the CIRET Conference in Paris, 10–14 October 2000.

**A1. Change in GDP predictions for 2013**

	CF		IMF		OECD		CB / EIU	
<b>EA</b>	-0.1	2013/4 2013/3	-0.4	2013/1 2012/10	-0.3	2012/11 2012/5	-0.2	2013/3 2012/12
<b>US</b>	0.3	2013/4 2013/3	-0.1	2013/1 2012/10	-0.1	2012/11 2012/5	-0.1	2013/3 2012/12
<b>DE</b>	0.0	2013/4 2013/3	-0.3	2013/1 2012/10	0.1	2012/11 2012/5	-1.2	2012/12 2012/6
<b>JP</b>	0.1	2013/4 2013/3	0.0	2013/1 2012/10	-0.6	2012/11 2012/5	0.0	2012/10 2012/7
<b>BR</b>	-0.1	2013/4 2013/3	-0.5	2013/1 2012/10	-1.7	2012/11 2012/5	0.0	2013/4 2013/3
<b>RU</b>	0.1	2013/4 2013/3	-0.1	2013/1 2012/10	-1.1	2012/11 2012/5	0.0	2013/4 2013/3
<b>IN</b>	0.9	2013/4 2013/3	-0.1	2013/1 2012/10	-2.7	2012/11 2012/5	0.0	2013/4 2013/3
<b>CN</b>	0.0	2013/4 2013/3	0.0	2013/1 2012/10	-0.7	2012/11 2012/5	0.0	2013/4 2013/3

**A2. Change in inflation predictions for 2013**

	CF		IMF		OECD		CB/EIU	
<b>EA</b>	0.0	2013/4 2013/3	0.0	2012/10 2012/4	-0.3	2012/11 2012/5	0.0	2013/3 2012/12
<b>US</b>	0.1	2013/4 2013/3	-0.1	2012/10 2012/4	-0.1	2012/11 2012/5	-0.2	2013/3 2012/12
<b>DE</b>	-0.1	2013/4 2013/3	0.1	2012/10 2012/4	-0.1	2012/11 2012/5	-0.1	2012/12 2012/6
<b>JP</b>	0.1	2013/4 2013/3	-0.2	2012/10 2012/4	-0.3	2012/11 2012/5	-0.2	2012/10 2012/7
<b>BR</b>	0.0	2013/4 2013/3	-0.1	2012/10 2012/4	0.0	2012/11 2012/5	0.4	2013/4 2013/3
<b>RU</b>	0.0	2013/4 2013/3	0.2	2012/10 2012/4	0.6	2012/11 2012/5	0.0	2013/4 2013/3
<b>IN</b>	-1.4	2013/4 2013/3	2.3	2012/10 2012/4	0.6	2012/11 2012/5	0.0	2013/4 2013/3
<b>CN</b>	0.0	2013/4 2013/3	0.0	2012/10 2012/4	-1.3	2012/11 2012/5	0.0	2013/4 2013/3

**A3. Abbreviations**

BoJ	Bank of Japan
BR	Brazil
BRIC	Brazil, Russia, India and China
CB-CCI	Conference Board Consumer Confidence Index
CB-LEII	Conference Board Leading Economic Indicator Index
CBOT	Chicago Board of Trade
CF	Consensus Forecasts
CN	China
CNB	Czech National Bank
DBB	Deutsche Bundesbank
DE	Germany
EA	euro area

EC	European Commission
ECB	European Central Bank
EC-CCI	European Commission Consumer Confidence Indicator
EC-ICI	European Commission Industrial Confidence Indicator
EIU	The Economist Intelligence Unit database
European Economic Area	ES Spain
EU	European Union
EUR	European Monetary Institute
EURIBOR	Euro Interbank Offered Rate
Fed	Federal Reserve System (the US central bank)
FRA	forward rate agreement
GBP	pound sterling
GDP	gross domestic product
GR	Greece
CHF	Swiss franc
ICE	Intercontinental Exchange
IE	Ireland
IFO	Institute for Economic Research
IFO-BE	IFO Business Expectations
IMF	International Monetary Fund
IN	India
IRS	interest rate swap
IT	Italy
JP	Japan
JPY	Japanese yen
LIBOR	London Interbank Offered Rate
N/A	not available
OECD	Organisation for Economic Co-operation and Development
OECD-CLI	OECD Composite Leading Indicator
PMI	Purchasing Managers' Index
PT	Portugal
RU	Russia
UoM	University of Michigan
UoM-CSI	University of Michigan Consumer Sentiment Index
US	United States
USD	US dollar
ZEW-ES	ZEW Economic Sentiment

#### A4. List of thematic articles published in GEO

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