

# GLOBAL ECONOMIC OUTLOOK - SEPTEMBER

Monetary Department  
External Economic Relations Division

2016



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**Cut-off date for data**

16 September 2016

**CF survey date**

12 September 2016

**GEO publication date**

23 September 2016

**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. Historical data are taken from CF.

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**

<b>Luboš Komárek</b> lubos.komarek@cnb.cz Editor-in-chief I. Summary VI. Focus	<b>Oxana Babecká</b> oxana.babecka-kucharukova@cnb.cz Editor III.3 Russia III.4 Brazil	<b>Pavla Břizová</b> pavla.brizova@cnb.cz Editor IV. Outlook of exchange rates	<b>Iveta Polášková</b> iveta.polaskova@cnb.cz II.1 Euro area	<b>Soňa Benecká</b> sona.benecka@cnb.cz II.2 United States II.4 Japan
<b>Milan Klíma</b> milan.klima@cnb.cz II.3 Germany	<b>Filip Novotný</b> filip.novotny@cnb.cz III.1 China III.2 India	<b>Jan Hošek</b> jan2461.hosek@cnb.cz V. Commodity market developments		

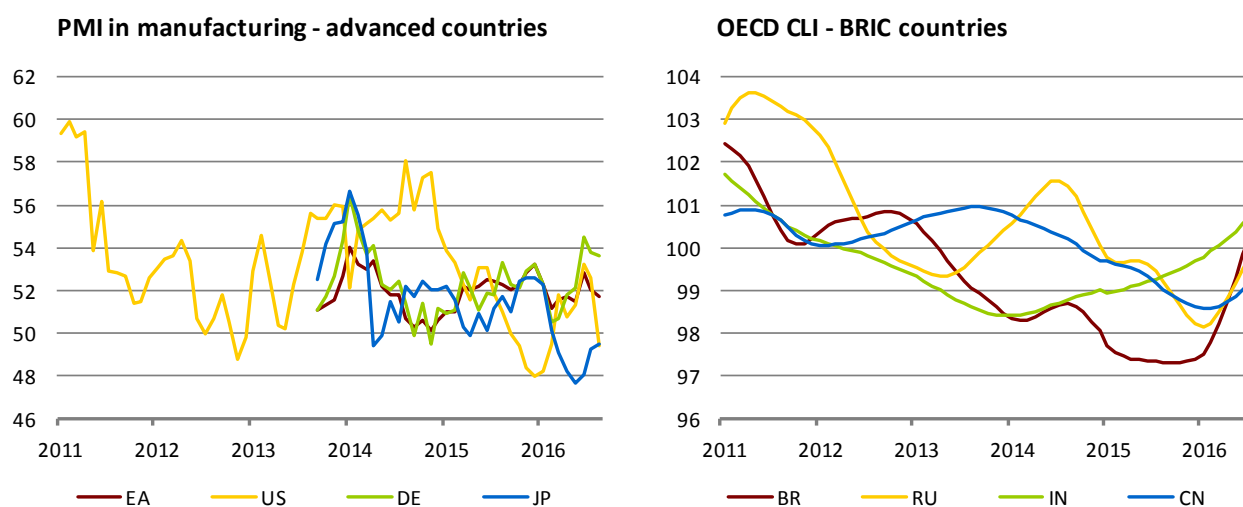
The September issue of Global Economic Outlook presents the regular monthly overview of recent and expected developments in selected territories, focusing on key economic variables: inflation, GDP growth, leading indicators, interest rates, exchange rates and commodity prices. In this issue, we also focus on the closing of the output gap in OECD countries in the current low-inflation environment. We point out that the output gap is currently closing at near-zero inflation rates rather than at rates close to 2% (corresponding to the generally accepted price stability criterion). The current output gap and inflation outlooks signal<sup>1</sup> a gradual return to the output gap closing at consumer inflation rates of approximately 2%.

The annual economic growth outlooks for the euro area and Germany are showing a downward tendency to levels of just above 1% until the end of 2017. GDP growth in Germany slowed again quarter on quarter, and the current decline in leading indicators in both Germany and the euro area is showing a similar pattern (see the chart below), although the latter remain in the optimistic band, i.e. above 50. The world's strongest economy – the USA – is expected to show almost identical economic growth as the euro area this year. However, this represents a fall from its glory days, as only a couple of months ago the US economy seemed to be maintaining its “traditional” positive growth differential vis-à-vis not only Europe, but also Japan. The inflation outlooks saw no major changes compared to the previous month. They were mostly confirmed, except for a decline for the US economy in 2017 and for the Japanese economy in both years under review. Nevertheless, the US economy is expected to remain one of the few advanced economies to achieve consumer price inflation above the “magic” level of 2% next year.

The GDP growth outlooks for the BRIC countries were mixed as usual in August. On the one hand, the fast-growing Indian economy is expected to surge next year to almost 8% amid non-accelerating inflation. This positive development is complemented – despite all the well-known twists and turns – by still high economic growth in China, albeit with a weak downward tendency (to levels slightly below 6.5%) and a declining outlook for inflation, which might drop below 2% for the first time in a long time. On the other hand, the economies of Russia and particularly Brazil are certain to see slumpflation (an economic slump accompanied by relatively high inflation) this year. However, the outlooks for next year bring hope of renewed economic growth at inflation rates of just below 5.5% for both countries.

The outlooks for euro area interest rates remain very low, staying negative at the shorter end of the yield curve and still showing no sign of growth until the end of 2017. However, the degree of unconventional monetary policy was not intensified at the ECB's last meeting. This resulted in the ten-year bond yield turning positive again, which might be the “first swallow” of the process of normalisation of European monetary policy. As for the USA, the expected interest rate hike by the Fed is likely to occur at the end of this year rather than at the next meeting. According to CF, the US dollar will appreciate with varying intensity at the one-year horizon against all the monitored currencies except the Russian rouble, against which it will remain broadly stable. The market outlook for oil prices shows a slight increase compared to the previous month, i.e. the oil price will be only slightly above USD 50/bbl until the end of 2017. Natural gas prices based on long-term contracts, which are indexed to oil prices usually with a lag of 6 to 9 months, are expected to rise until the end of this year. The outlooks for prices of food commodities and industrial metals for the end of 2017 decreased compared to the previous month.

## Leading indicators for countries monitored in the GEO



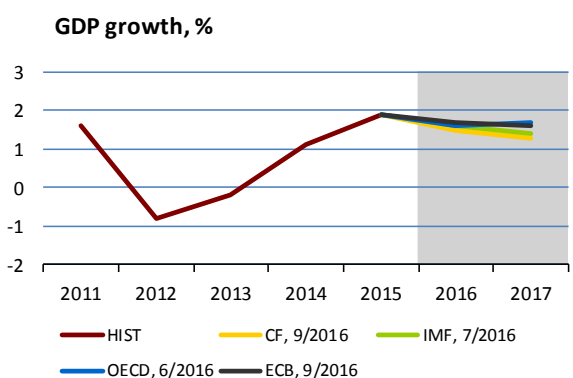
Source: Bloomberg, Datastream

<sup>1</sup> However, this was also the case in the post-Lehman past, when the outlooks did not subsequently materialise.

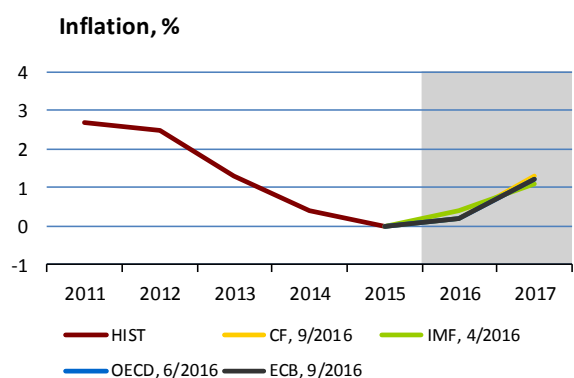
II.1 Euro area

After the shock of the UK referendum result faded, the ZEW economic sentiment indicator improved in August. By contrast, the European Commission's indicators of consumer and business confidence and industrial sentiment fell further, reflecting the still high uncertainty. Industrial production recorded a sharp year-on-year fall in July compared to the previous month. This was due mainly to a decrease in production of energy and capital goods. The PMI leading indicator in manufacturing dropped again in August as growth in production, job creation and new orders slowed. However, it remains in the expansion band. As regards individual countries, France remains below 50 points. It was joined by Italy (in place of Greece) in August. Purchasing managers are most optimistic about the outlooks for manufacturing in Germany and the Netherlands. Unemployment remains flat, having stayed at 10.1% in July. Retail sales rose by 2.9% year-on-year in July, with all components of sales surging despite steadily worsening consumer confidence and subdued wage growth. The ECB adjusted its growth outlooks 0.1 pp upwards for this year and downwards for next year. Conversely, the September CF lifted its prediction for 2017 by 0.1 pp.

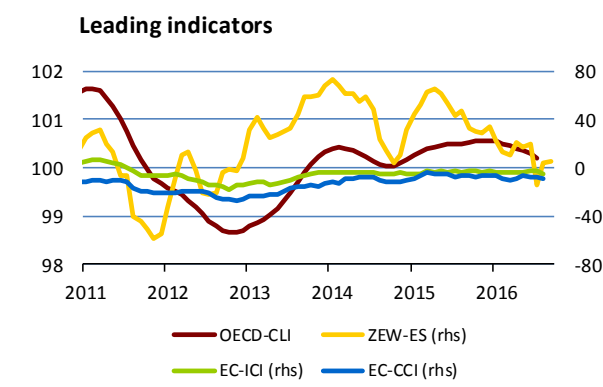
Inflation remained flat at 0.2% in August despite a continued moderation of the decline in energy prices, which was, however, offset by slower growth in prices of food, services and industrial products. This was also reflected in a decline in core inflation (to 0.8%). The year-on-year decline in industrial producer prices slowed again in July (to 2.8%), but the month-on-month reduction in this fall slowed due to a slight price decrease in the energy sector. M3 growth slowed to 4.8% in July. At its meeting in September, the ECB reduced its inflation outlook for 2017 by 0.1 pp but left its unconventional monetary policy stance unchanged. As a result, the 10Y Bund yield turned positive again. It is expected to rise by 0.2% at the one-year horizon, i.e. somewhat less than suggested by previous predictions. Short-term interest rates should continue to edge down at the one-year horizon.



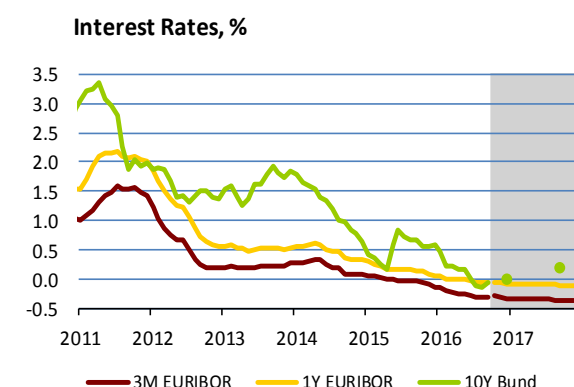
	CF	IMF	OECD	ECB
2016	1.5 →	1.6	1.6	1.7 ↗
2017	1.3 ↘	1.4	1.7	1.6 ↘



	CF	IMF	OECD	ECB
2016	0.2 →	0.4	0.2	0.2 ↗
2017	1.3 ↘	1.1	1.2	1.2 ↘



	OECD-CLI	ZEW-ES	EC-ICI	EC-CCI
6/16	100.3	20.2	-2.8	-7.2
7/16	100.2	-14.7	-2.6	-7.9
8/16		4.6	-4.4	-8.5



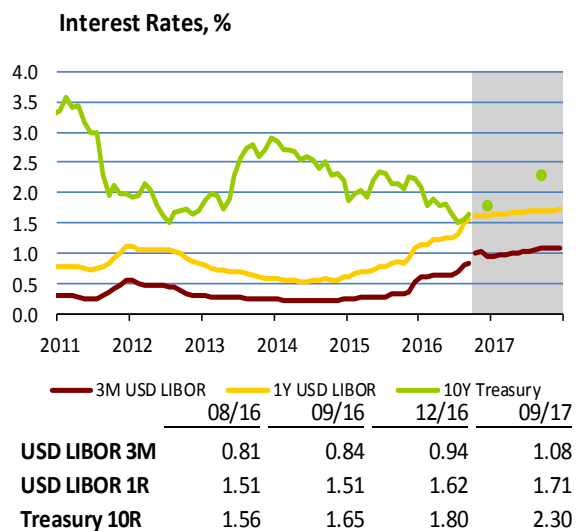
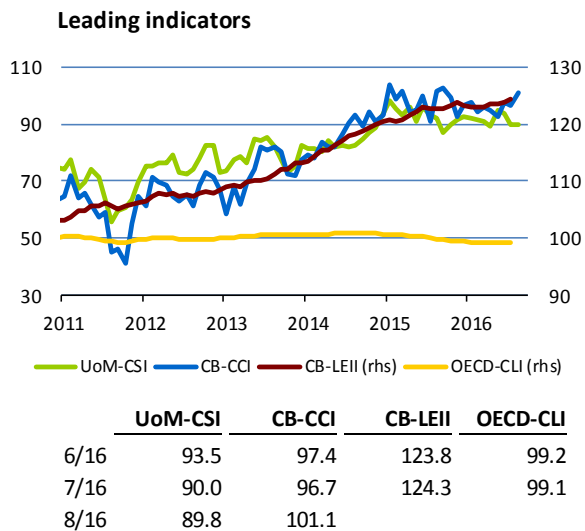
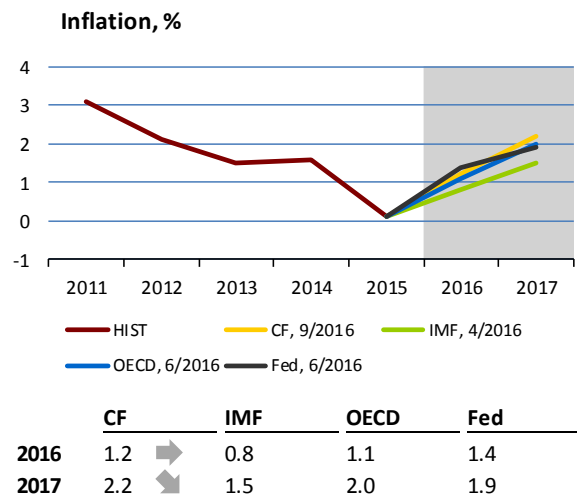
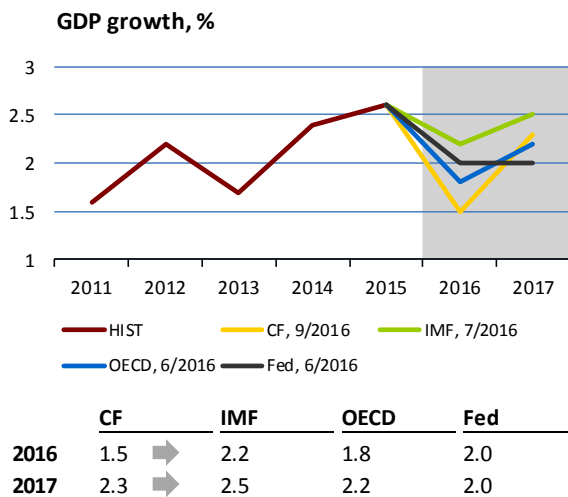
	08/16	09/16	12/16	09/17
3M EURIBOR	-0.30	-0.30	-0.32	-0.35
1Y EURIBOR	-0.05	-0.06	-0.07	-0.10
10Y Bund	-0.13	-0.05	0.00	0.20

## II.2 United States

The current outlooks for the US economy suggest a more pronounced slowdown this year than expected just a few months ago. The second estimate of quarterly annualised GDP growth for Q2 was 1.1%, i.e. 0.1 pp less than suggested by the first estimate. The revision reflects higher imports and lower government consumption. However, the economy should pick up significantly in Q3. The Fed's current outlook expects growth at 2.4%. Private consumption will continue to be the driver of growth, as confirmed by leading indicators.

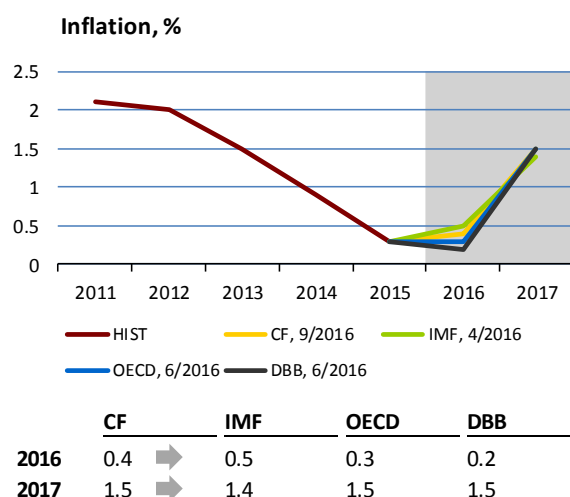
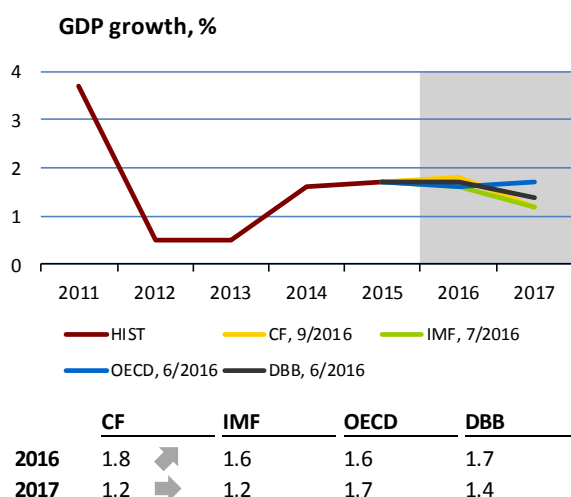
As in May, the labour market saw a temporary slowdown. Non-farm payrolls rose by just 151,000 in August (versus expectations of 180,000). The unemployment rate and the participation rate remained unchanged at 4.9% and 62.8% respectively. According to the Conference Board survey, consumer confidence reached an 11-month high in August, but retail sales fell slightly in the same month. Following a month-on-month increase (0.7%) in July, industrial production decreased in August (by 0.4%).

Annual consumer price inflation went down slightly in July but returned to 1.1% in August. Rents and health care expenditure continued to rise, while fuel prices decreased and food price inflation halted for the first time in six years. New data from the economy are fuelling speculation that a further rate increase will be agreed at the Fed's meeting in December. Chair Yellen also spoke in favour of higher rates in the coming months at the Jackson Hole conference. According to the September CF survey, 81% of the panellists expect rates not to be hiked at the meeting on 21 September. The exchange rate of the dollar has been relatively stable over the past few weeks, with financial markets waiting for indications of the future course of monetary policy. The September CF slightly lowered its inflation forecast for 2017 (by 0.1 pp).



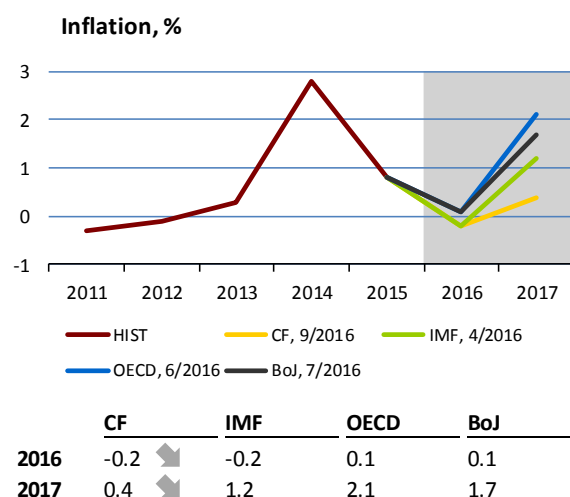
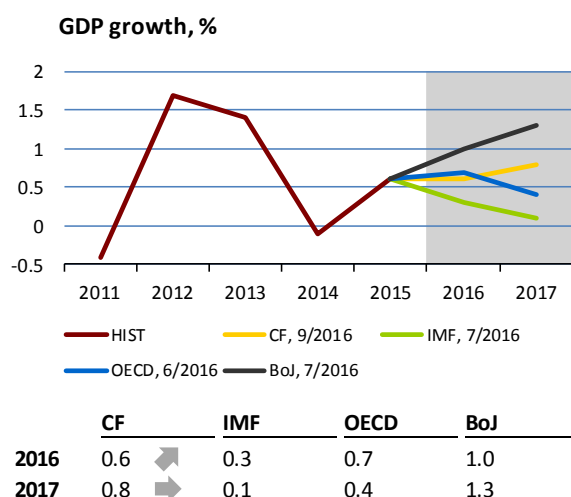
### II.3 Germany

The quarterly growth rate of the German economy slowed visibly from 0.7% to 0.4% in 2016 Q2. This has so far had a slight downward effect (of 0.1 pp) on the annual growth outlook for Germany, which, however, is still enjoying robust growth of 1.7%. The current favourable economic growth is being accompanied by a month-on-month and year-on-year decline in unemployment and growth in employment. The German Finance Ministry expects the expected economic growth rate to allow it to achieve a slight government budget surplus in this fiscal year. According to the September CF estimate, robust economic growth will also be recorded in the second half of 2016, although the expected slowdown will be reflected in a decline from 1.8% this year to 1.2% the next. Inflation remained unchanged at 0.4% in August. A slower decline in energy prices was offset by slower growth in food and services prices. Inflation is expected to reach 0.4% in 2016 as a whole and increase to 1.5% in 2017.



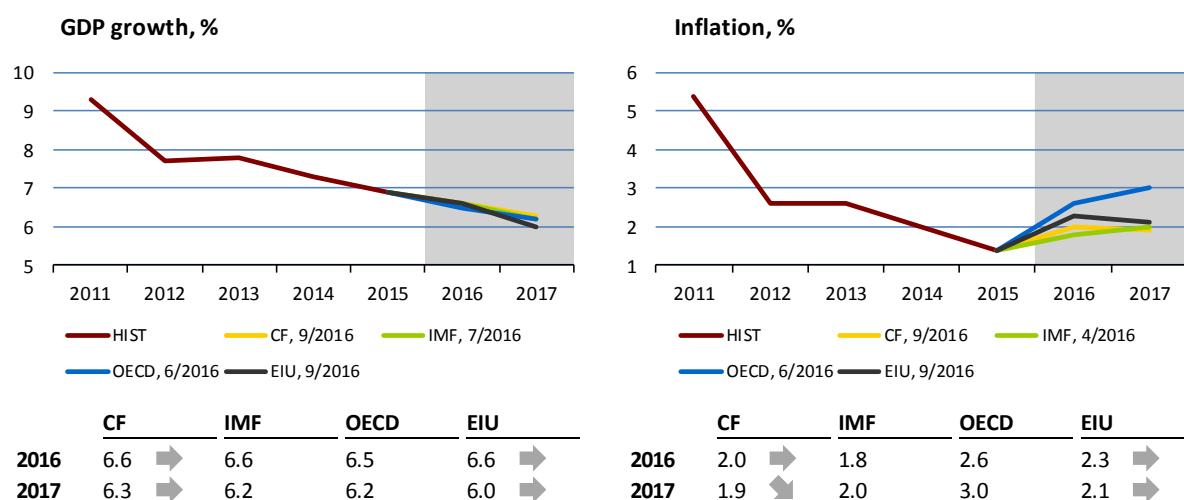
### II.4 Japan

The unemployment rate in Japan dropped to its lowest level in 21 years in July (3%) and the economy thus moved closer to full employment. However, inflation pressures are not rising and the economy is not accelerating. Headline inflation fell again in July, as did core inflation excluding food prices (to -0.5% in both cases). According to preliminary data, the economy slowed sharply in Q2, with quarterly annualised growth running at just 0.2%. This was due mainly to lower capital investment and exports. The central bank has meanwhile been preparing a review of the effects of previous support measures and reiterated its readiness to continue supporting the economy. However, Governor Kuroda admitted for the first time that a policy of negative rates might disrupt financial intermediation and harm confidence in the Japanese banking sector. The new CF outlook raised GDP growth expectations by 0.1 pp in 2016. On the other hand, the inflation outlook was revised downwards by 0.1 pp for this year and 0.2 pp for next year.



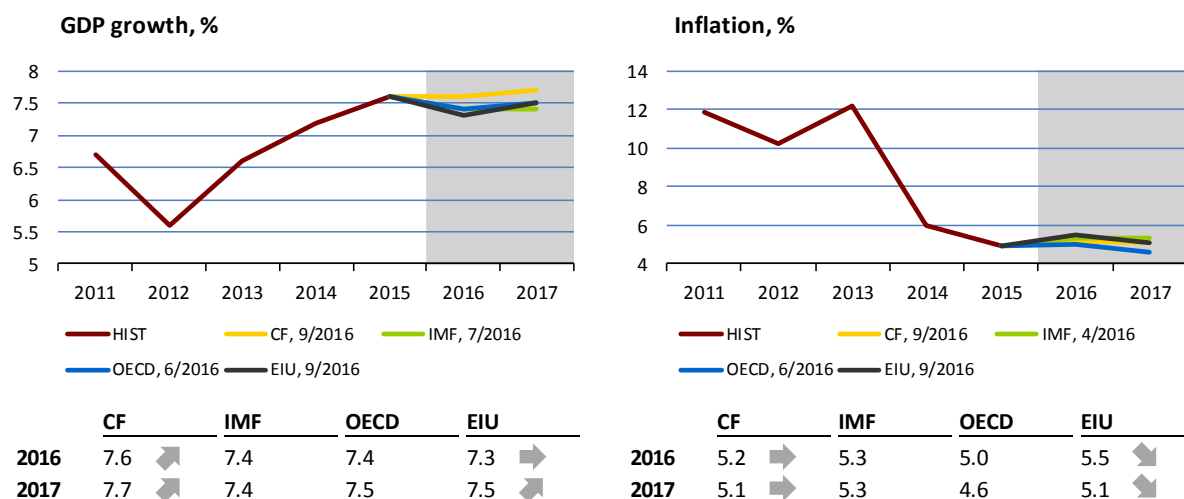
### III.1 China

Annual GDP growth in China amounted to 6.7% in 2016 Q2. It is expected to drop slightly in the second half of the year and continue slowing in 2017. Especially worrying is the downward trend in factor productivity observed since 2012, fostered by massive government investment in infrastructure projects in response to the global financial crisis. Overall, the post-2009 economic growth was driven by a massive expansion in credit, and the current slowdown is thus also due to the ongoing process of deleveraging of Chinese firms. Consumer price inflation was subdued in August, reaching only 1.3%. However, the outlook for the rest of this year and next year suggests a slight acceleration. The exchange rate of the renminbi against the dollar has depreciated by 10% since January 2014 and, according to the CF outlook, it will depreciate by a further almost 5% at the one-year horizon. The main factor of this depreciation is a capital outflow caused among other things by the planned monetary policy tightening in the USA.



### III.2 India

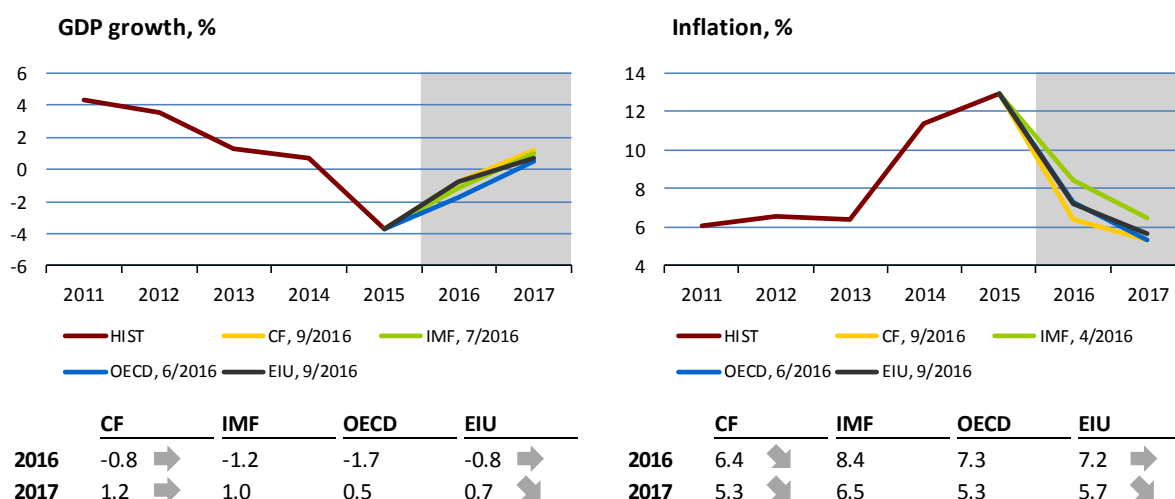
Although annual GDP growth slowed to 7.1% in Q2, the growth estimates have increased over the last month (both CF and EIU). Annual GDP growth is expected to remain stable at around 7.5% until 2017. Private consumption is the main growth factor, while investment and exports have been slowing. Supported by a favourable monsoon season, agricultural production will also have a positive effect this year. The inflation outlook remains stable just above 5%, i.e. inside the target band. The change in leadership at the Reserve Bank of India is not viewed negatively by investors. Monetary policy is expected to continue in the stance set by Governor Rajan, which was assessed as hawkish by the markets. Following a long period of trend depreciation, the exchange rate of the rupee against the dollar has stabilised over recent months, but a slight depreciation of the rupee is likely.





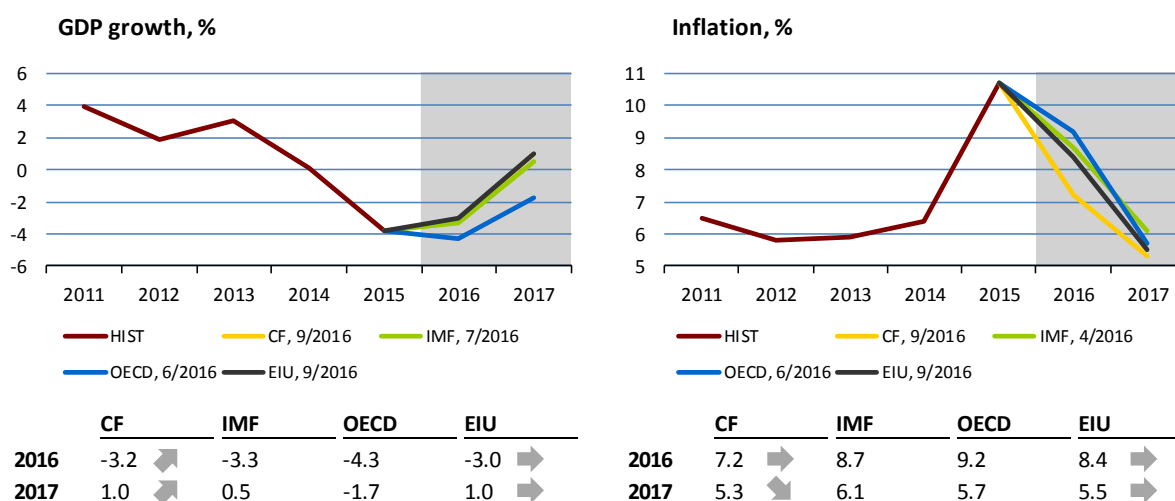
### III.3 Russia

According to Rosstat’s initial estimate, the decline in Russian GDP slowed to 0.6% year-on-year in 2016 Q2. Moreover, quarter-on-quarter growth improved significantly, rising by 7% compared to the previous quarter. Industrial production recorded positive growth in August in both year-on-year terms (0.7%, as against -0.3% in July) and month-on-month terms (1.2%, as against 0.2 in July). The Markit PMI in manufacturing also exceeded 50 points in August. Although the PMI in services declined, it remains safely in the expansion band. CF and the EIU left their outlooks for this year unchanged (a contraction in GDP of 0.8%). The economy will grow at a rate of 0.7 %–1.2% next year. Inflation continued to decline in August, reaching 6.9% year-on-year, as compared to 7.2% a month earlier. According to CF and the EIU, consumer price inflation will be in the range of 6.4%–7.2% at the end of 2016 and slow to 5.3%–5.7% next year.



### III.4 Brazil

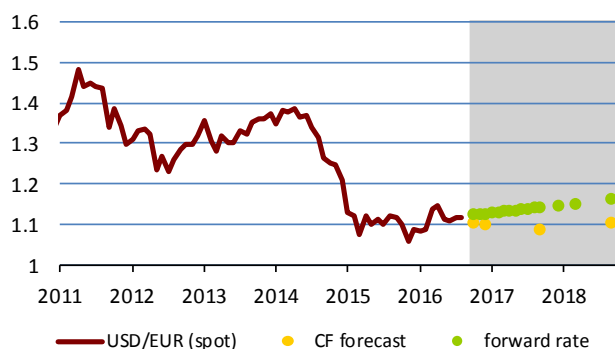
The Brazilian economy contracted by 3.8% year-on-year in Q2. Although the current figure is 0.1 pp worse than expected, it represents a marked slowdown in the decline in GDP (from the 5.4% recorded in Q1). The latest short-term macroeconomic and leading indicators suggest mixed developments. While the business confidence index rose to 51.5 in August (from 47.3), the PMI in manufacturing and services declined. The composite PMI dropped by 2 points to 44.4. The decline in industrial production deepened in July compared to the previous period (to 6.6% year-on-year) and the unemployment rate increased (to 11.6%). By contrast, the productivity index published by Brazil’s central bank improved. The September CF reduced its GDP growth outlook to -3.2% this year. The EIU outlook remained at -3%, but the economy is expected to record positive growth of 1% next year.<sup>2</sup>



<sup>2</sup> An analysis of Brazilian monetary policy can be found in the September issue of Central Bank Monitoring – see [http://www.cnb.cz/miranda2/export/sites/www.cnb.cz/en/monetary\\_policy/monitoring/download/1603\\_cbm.pdf](http://www.cnb.cz/miranda2/export/sites/www.cnb.cz/en/monetary_policy/monitoring/download/1603_cbm.pdf).

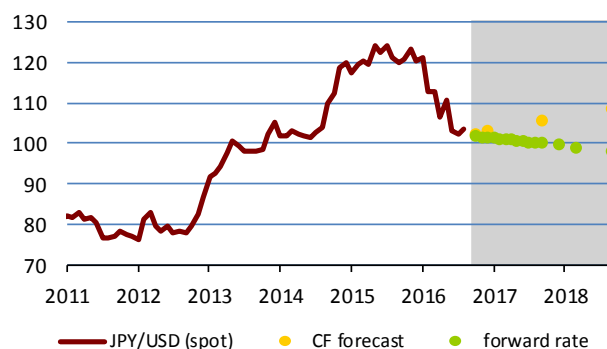
## IV. Outlook of exchange rates

The US dollar (USD/EUR)



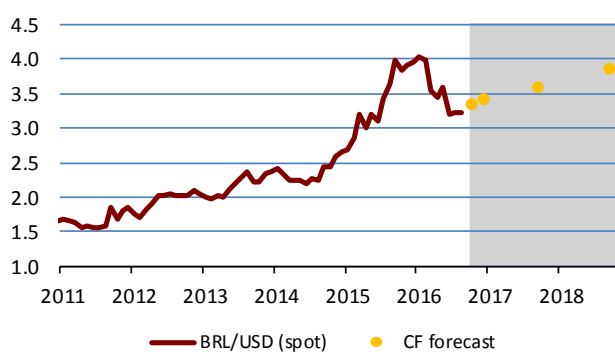
	12/9/16	10/16	12/16	09/17	09/18
spot rate	1.122				
CF forecast		1.104	1.101	1.087	1.106
forward rate		1.125	1.128	1.142	1.164

The Japanese yen (JPY/USD)



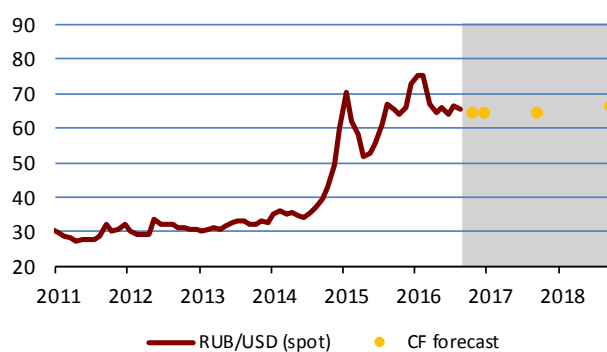
	12/9/16	10/16	12/16	09/17	09/18
spot rate	101.9				
CF forecast		102.1	102.9	105.8	108.7
forward rate		101.7	101.5	100.1	98.0

The Brazilian real (BRL/USD)



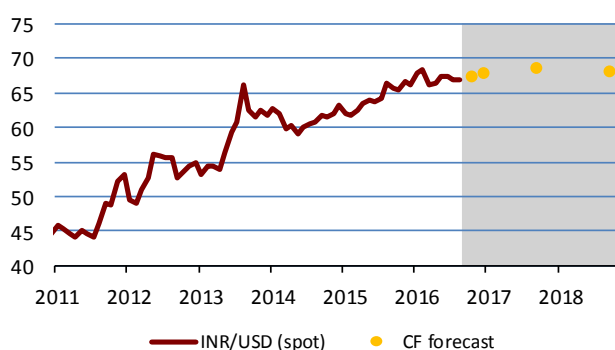
	12/9/16	10/16	12/16	09/17	09/18
spot rate	3.286				
CF forecast		3.339	3.414	3.580	3.858

The Russian rouble (RUB/USD)



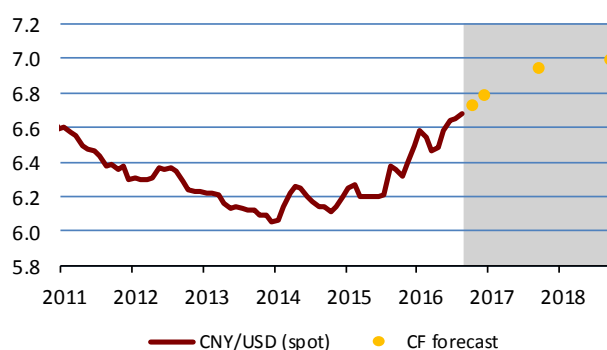
	12/9/16	10/16	12/16	09/17	09/18
spot rate	64.70				
CF forecast		64.38	64.34	64.47	66.41

The Indian rupee (INR/USD)



	12/9/16	10/16	12/16	09/17	09/18
spot rate	66.91				
CF forecast		67.31	67.78	68.53	68.10

The Chinese renminbi (CNY/USD)



	12/9/16	10/16	12/16	09/17	09/18
spot rate	6.680				
CF forecast		6.733	6.784	6.946	6.996

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.

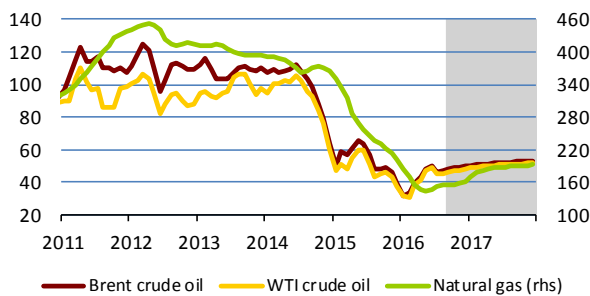
### V.1 Oil and natural gas

The Brent oil price rose in the first three weeks of August from a four-month low of USD 42/bbl to above USD 50/bbl as investors stopped speculating on a further drop in oil prices following the arrival of favourable data from the USA (a decline in petrol stocks, the labour market). Prices were later also pushed up by news of a planned meeting of large oil producers in Algeria in late September. The weakening dollar also played a role. However, concerns of a fundamental excess of oil predominated again at the end of August and the price of oil dropped well below USD 50/bbl as traders took into account growth in oil stocks and the rig count in the USA, strong oil production in OPEC countries and Russia, record-high exports of fuel from China (and thus weaker domestic demand in China) and the again appreciating dollar.

According to the market futures curve, the price of Brent oil will remain below USD 50/bbl until the year-end and then continue to rise gradually to an average of USD 52/bbl in 2017. The current EIA forecast gives the same figure, although it expects price growth to pick up in the second half of 2017 to USD 58/bbl in the last quarter of the year, reflecting an expected faster decline in global stocks beyond its forecast horizon. At USD 52.7/bbl, the September CF forecast for one year ahead is in line with the market curve. According to the EIA, the WTI price will be about USD 1/bbl lower.

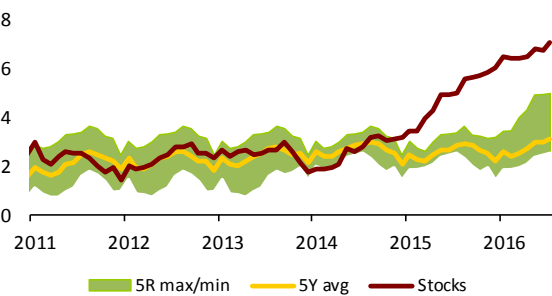
The natural gas price fell in Europe due to constant excess supply and increasing stocks. Prices were flat in the USA, with stronger demand from power stations due to high summer temperatures and the low gas price causing a below-average tank filling rate. Tanks were unusually full after the extremely warm winter, but stocks are currently only 7.5% higher than last year and 10.9% above the five-year average. The growth in coal prices observed since April came to a halt in August.

**Outlook for prices of oil (USD/barrel) and natural gas (USD / 1000 m<sup>3</sup>)**

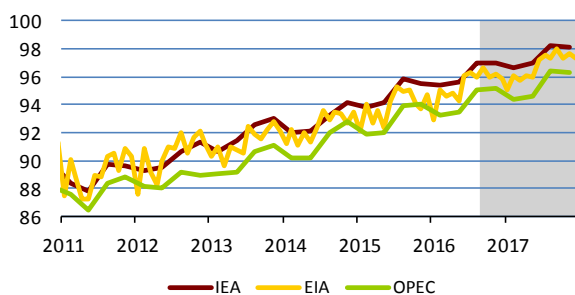


	Brent	WTI	Natural gas
2016	44.68 ↗	42.95 ↗	156.78 ↗
2017	51.92 ↗	50.50 ↗	185.50 ↗

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

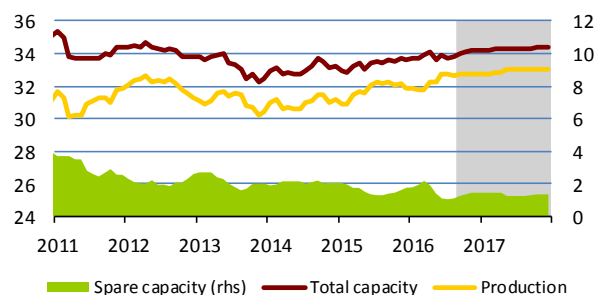


**Global consumption of oil and oil products (mil. barrel / day)**



	IEA	EIA	OPEC
2016	96.25 ↗	95.36 ↗	94.25 ↗
2017	97.49 ↗	96.78 ↗	

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



	Production	Total capacity	Spare capacity
2016	32.41 ↗	33.91 ↗	1.50 ↗
2017	32.95 ↗	34.30 ↗	1.35 ↗

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. 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 calculation

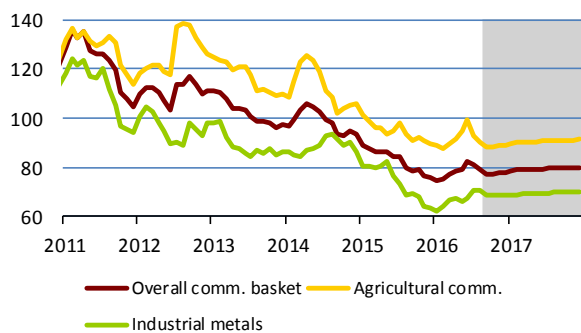
## V.2 Other commodities

The average monthly non-energy commodity price index continued to decline in August and the first half of September. The food commodity price index followed a similar pattern. The industrial metals price index remained flat at the July level in August, but also declined in the first half of September. The outlook for food commodity prices is increasing until the end of the year, as a correction of the previous decrease is expected for grains (except soy). Basic metal prices should be broadly flat at the current levels.

The drop in agricultural commodity prices stemmed mainly from a decline in grain prices thanks to expected large stocks after this year's harvest due to continued favourable weather in the USA. However, the USDA also increased its estimates for the wheat harvest in Russia, Kazakhstan and Ukraine, which offset an expected strong fall in the harvest in the EU. The price of wheat fell sharply again to a ten-year low. Prices of beef and pork also decreased, although for pork this was in line with the seasonal pattern.

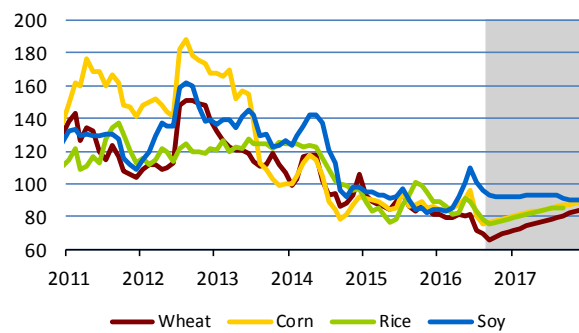
Basic metal prices were mixed. A fall in annual growth in industrial production in China from 6.2% in June to 6.0% in July acted against an increase. By contrast, continued price growth in the property market in China supported metal prices in July. The price of copper dropped the most, mainly because of a jump in stocks at the LME (of 40% month on month). The price of aluminium edged down, while prices of other metals mostly went up. The price of iron ore was flat following a previous increase. It was kept at higher levels by a year-on-year rise in imports to China in the first eight months of this year and by an increase in steel production in July, especially in China. The outlook for iron ore prices is falling.

**Non-energy commodities price indices**



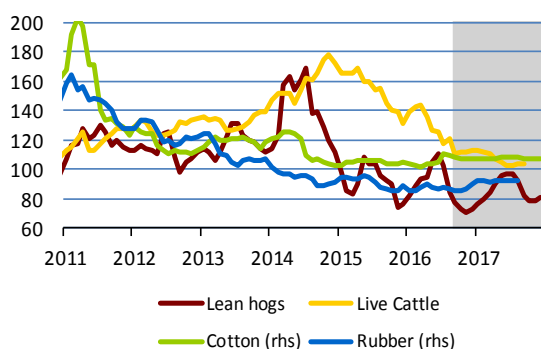
	Overall	Agricultural	Industrial
2016	78.1	90.8	67.4
2017	79.4	90.8	69.6

**Food commodities**



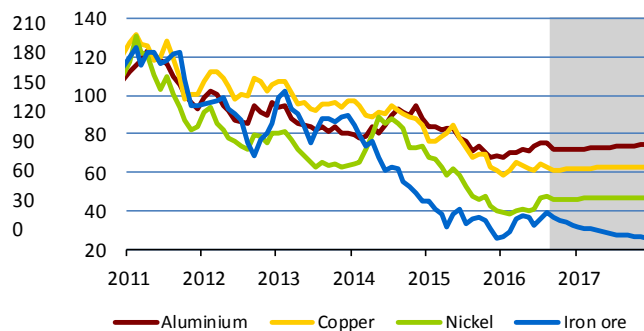
	Wheat	Corn	Rice	Soy
2016	75.0	83.2	82.6	93.5
2017	78.1	84.9	83.2	92.1

**Meat, non-food agricultural commodities**



	Lean hogs	Live Cattle	Cotton	Rubber
2016	88.0	125.0	68.9	41.1
2017	86.3	107.0	71.8	48.3

**Basic metals and iron ore**



	Aluminium	Copper	Nickel	Iron ore
2016	71.9	62.0	43.1	34.4
2017	73.2	62.4	46.6	28.6

Note: Structure of non-energy commodity price indices corresponds to composition of The Economist commodity indices. All prices are given as indices, 2010 = 100 (charts) and percentage changes (tables).

Source: Bloomberg, CNB calculations.

## The closing of the output gap in OECD countries in the current low-inflation environment<sup>3</sup>

This article sets out to examine the closing of the output gap in the post-Lehman low-inflation environment from the perspective of the most advanced nations (OECD member countries). The article shows that in the pre-crisis period the output gap was usually closing at inflation rates close to 2%, i.e. the level of inflation consistent with the definition of price stability in many advanced countries. Recently, however, the output gap has usually been closing at near-zero consumer inflation rates. The current output gap and inflation outlooks signal a gradual return to the output gap closing at consumer inflation rates of approximately 2%.

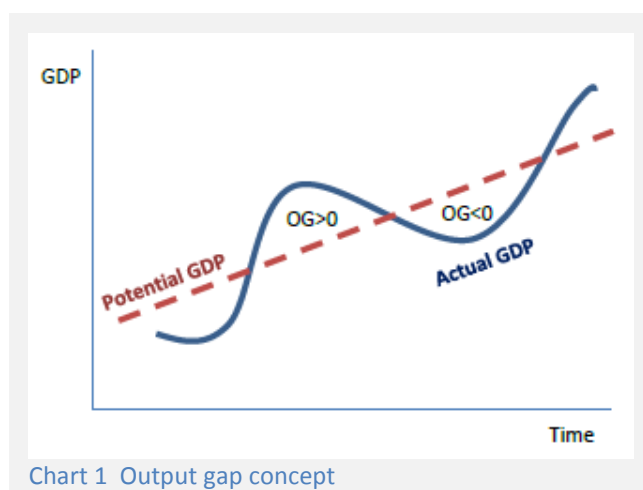
### 1 The output gap phenomenon

The output gap (OG), i.e. the difference between GDP actually produced and the potential output of the economy, is one of the fundamental applied concepts of macroeconomics and economic policy (see Chart 1). The output gap provides valuable information in concentrated form on the presence or absence of demand pressures in the economy. If actual output is visibly below potential output, i.e. the output gap is positive, prices will tend to rise. Conversely, if actual output is well below potential, prices will tend to fall and we speak of a negative output gap. The output gap is usually calculated using relation (1):

$$OG = \frac{GDP_t^{actual} - GDP_t^{potential}}{GDP_t^{potential}} \cdot 100 \quad (1)$$

Potential output<sup>4</sup> can be defined as the level of real GDP that can be produced and sold without giving rise to additional pressures for a change in inflation. A complication in calculating the output gap is that potential output is not directly measurable or observable and can only be estimated. It is usually obtained either by estimating the production function<sup>5</sup> or by applying various filtration methods.<sup>6</sup>

The size of the output gap is affected by the lagged effects of past economic activity, the setting of the interest rate and exchange rate components of the monetary conditions by the central bank, government fiscal policy and the external economic environment, which is a particularly significant exogenous factor for small open economies. Easy monetary conditions, expansionary fiscal policy and a positive foreign output gap foster growth in the domestic output gap. If the output gap is simultaneously positive, these factors foster growth in domestic prices. Conversely, monetary or fiscal restrictions or recession in the domestic economy's major trading partners foster a decline in the domestic output gap.



### 2 The output gap in OECD countries since the start of the new millennium

The Organisation for Economic Co-operation and Development (OECD) currently comprises the world's 34 most advanced countries that have adopted the principles of democracy and the market economy. Their economic power generates about two-thirds of global GDP. The USA accounts for the largest share, followed by Japan and Germany (see Chart 2).

<sup>3</sup> Author: Luboš Komárek (Lubos.Komarek@cnb.cz). The views expressed in this article are those of the author and do not necessarily reflect the official position of the Czech National Bank.

<sup>4</sup> There are two key output gap concepts in the economic literature, each stemming from a different understanding of potential output. The first approach views potential output as the level of output at which inflation does not accelerate or rise in the medium run. The other approach sees potential output as the maximum attainable level of output in the long run, which is constrained by technical barriers to capacity utilisation.

<sup>5</sup> Usually the Cobb-Douglas production function,  $Q = AL^\alpha K^\beta$ , where Q is total production (the monetary value of all goods produced over a given period of time), L is labour input, K is capital input and A is total factor productivity;  $\alpha$  and  $\beta$  are the output elasticities of labour and capital respectively; these are parameters determined by available technology. These coefficients take values between 0 and 1 and are usually estimated using past statistical data.

<sup>6</sup> Filtration here refers to a method for obtaining from a real GDP time series those components which are closely linked to inflation. Filtration techniques include both univariate approaches (e.g. the Hodrick-Prescott filter and the band-pass filter) and more sophisticated multivariate approaches (the Kalman filter). A disadvantage of univariate filtration techniques is the existence of bias at the start and, in particular, at the end of the time series.

Chart 3 shows the average output gap across OECD countries since the start of the new millennium together with the outlook up to 2020, both unweighted and weighted by the economic significance of each country. The output gap was obtained by filtering real GDP by the Hodrick-Prescott filter using (1).<sup>7</sup>

Chart 3 shows both the pre-crisis, near-global economic boom – when the average output gap was strongly positive – and the painful aftermath of the financial crisis that erupted in the second half of 2008 after the collapse of US investment bank Lehman Brothers. Since then, though, the output gap in OECD countries has been showing a closing trend, albeit with a dip in 2013. The differences between the output gap not reflecting and reflecting the economic power of OECD countries show that the output gap is – and, until the end of 2018, will continue to be – more closed “in reality” (the weighted value) than suggested by the average unweighted values.

The output gap is often compared with consumer inflation from the macroeconomic perspective. Again, as with the output gap for OECD member countries, Chart 3 shows the unweighted and weighted consumer inflation rates, with the weights based on the economic power of each OECD member. A new tendency where the average output gap closes at ever lower inflation rates has been observed since 2013. This finding is also visible in the individual panels of Chart 4, where the output gap and consumer inflation values for OECD countries are shown at time intervals of five years. This information is complemented with kernel densities,<sup>8</sup> which are plotted on both

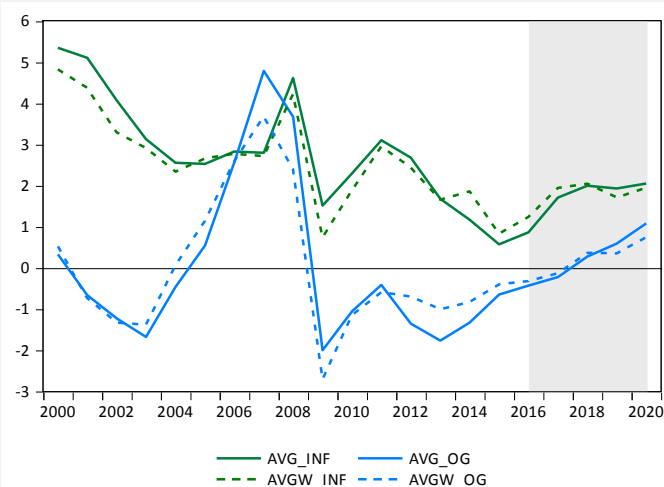


Chart 3 Average level of the output gap and consumer inflation in OECD countries in 2000–2020 (in %)

Source: EIU (*The Economist*), authors' calculations

Note: The OECD, for example, also publishes output gaps, but only with an outlook of around one year ahead. In order to cover a longer future period, we opted to perform our own calculation of the output gap based on the Hodrick-Prescott filter. AVG\_INF is the average consumer inflation of the OECD countries and AVGW\_INF is inflation weighted by the economic significance of each country in the group of OECD countries. Similarly, AVG\_OG is the average output gap across the OECD countries and AVGW\_OG is the output gap weighted by the economic significance of each country in the group. The grey area shows the EIU's forecasts for each variable as of August 2016.

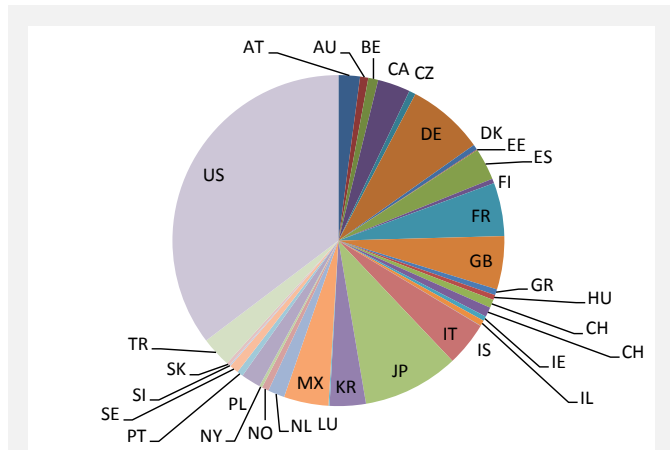


Chart 2 Shares of individual countries in the OECD's economic power

Source: OECD

Note: Percentages calculated using 2014 GDP data. AT – Austria, AU – Australia, BE – Belgium, CA – Canada, CH – Switzerland, CZ – Czech Republic, CL – Chile, DE – Germany, DK – Denmark, EE – Estonia, ES – Spain, FI – Finland, FR – France, GB – United Kingdom, GR – Greece, HU – Hungary, IE – Ireland, IL – Israel, IS – Iceland, IT – Italy, JP – Japan, KR – South Korea, LU – Luxembourg, MX – Mexico, NL – Netherlands, NO – Norway, NZ – New Zealand, PL – Poland, PT – Portugal, SE – Sweden, SI – Slovenia, SK – Slovakia, TR – Turkey, US – United States.

axes of Chart 4. The selected five-year snapshots in the past reveal that the output gap was usually closing at inflation rates close to 2%, i.e. the level of inflation consistent with the notion of price stability in advanced countries. Recently, however, the output gap has usually been closing at near-zero consumer inflation rates (as illustrated by the 2015 data in Chart 4).

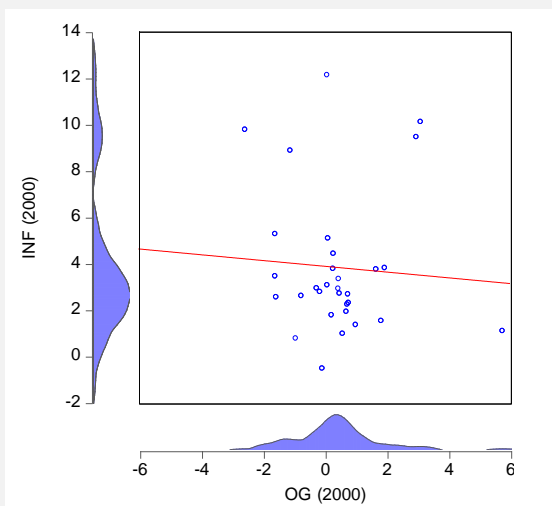
Charts 5 and 6 complement the view of the past and expected evolution of the output gap and inflation from the perspective of several other criteria. The former plots the number of countries that had a positive output gap in the given year and the number of countries whose output gap was not negative by more than 0.5 pp (see Chart 5). This information can be paired with how many countries recorded consumer inflation above 2% in the given years<sup>9</sup> and how many countries recorded deflation (see Chart 6). The outlooks for the coming roughly five-year period indicate closing output gaps in almost all OECD member countries even though less than half of them will record inflation rates of above 2%.

<sup>7</sup> Smoothing parameter  $\lambda = 100$  (the recommended value for time series of annual frequency: see Backus and Kehoe, 1992).

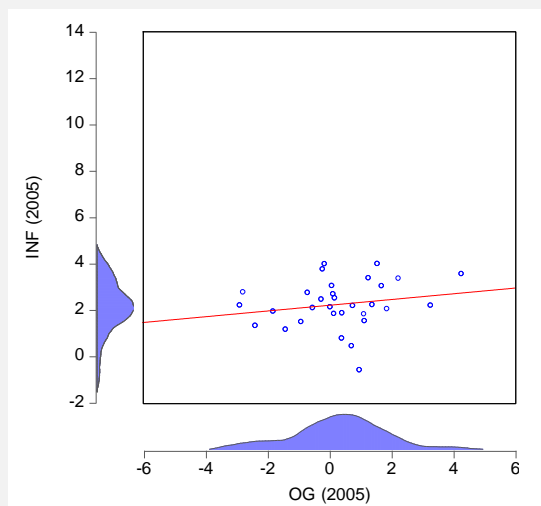
<sup>8</sup> The kernel density is an adjusted histogram in which the columns of a standard histogram are replaced by a smoothed curve; see Silverman (1986).

<sup>9</sup> The level of inflation consistent with the definition of price stability in most advanced countries.

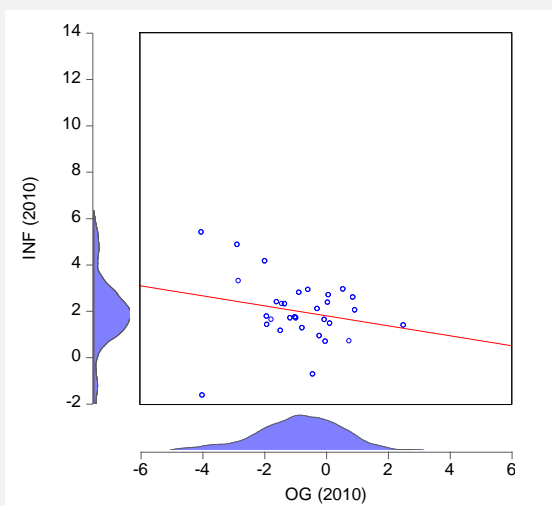
a) 2000



b) 2005



c) 2010



d) 2015

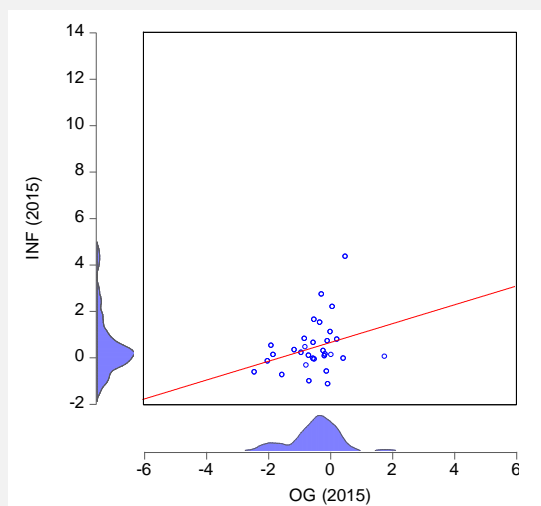


Chart 4 Size of the output gap and consumer inflation for OECD countries (in %)

Source: EIU (The Economist), authors' calculations

Note: INF is consumer inflation and OG is the output gap for each OECD country in the given years, i.e. 2000, 2005, 2010 and 2015. The kernel density is also plotted on both axes. Of the 34 OECD member countries, the observations for Turkey (hyperinflation at the start of the new millennium) and Estonia (strong impacts of the global financial crisis on the output gap) have been excluded for the sake of clarity.

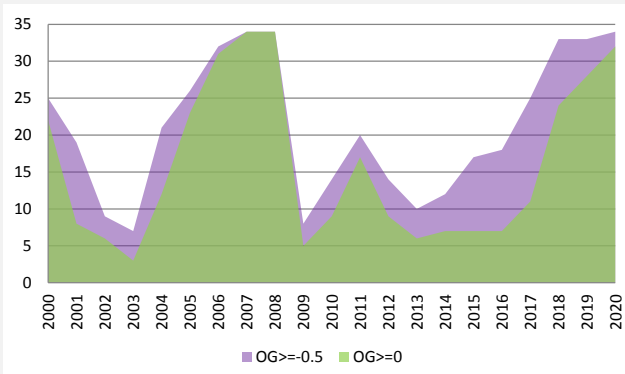


Chart 5 Number of OECD countries with a positive and a slightly negative or larger output gap (2000–2020)

Source: OECD and EIU (The Economist)

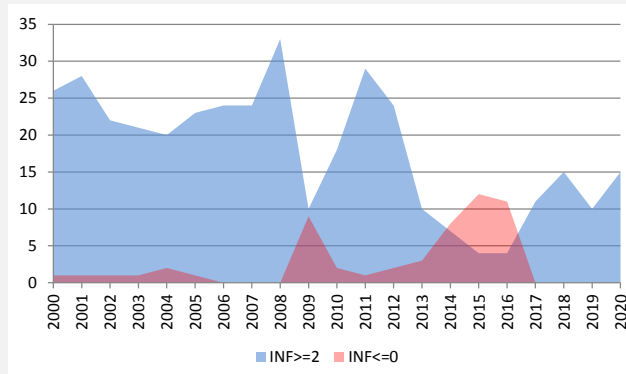


Chart 6 Number of OECD countries with inflation of above 2% and with zero or lower inflation (2000–2020)

Source: OECD and EIU (The Economist)

### 3 In lieu of a conclusion: Why is the output gap closing at lower inflation rates than in the past?

The current situation – or maybe the new macroeconomic tendency – where the output gap is closing at very low consumer inflation rates can be attributed mainly to a positive supply shock in the form of the recent dramatic decline in the dollar price of oil. It has not only boosted economic growth (in countries that are net oil importers), but has also exerted downward pressure on prices – both industrial producer prices and, in turn, consumer prices. The plot of core inflation (i.e. inflation abstracting from prices of energy, food, alcohol and tobacco) in Chart 7 shows that if we were to exclude these price items (oil prices in particular), the current level of inflation would be higher than that reflecting developments in the overall consumer basket.<sup>10</sup>

The very low level of interest rates is also a complicating factor for the global economy and advanced countries (OECD). In many cases, monetary policy rates have dropped to zero and interbank market rates have turned negative. The room for sending out a monetary policy stimulus using standard (conventional) monetary policy has thus been exhausted in many countries, and numerous countries are therefore failing to hit their inflation targets, which are defined in terms of the consumer price index.<sup>11</sup> Fiscal policy is unlikely to substitute for these limited monetary policy options, as many OECD countries have exhausted the “safe” debt space for possible fiscal expansion.

The current output gap and inflation outlooks signal a gradual return to the output gap closing at consumer inflation of approximately 2% (see Charts 3 and 8). The return to pre-crisis levels will probably depend on how successfully monetary policy can be normalised and public finances consolidated in OECD countries.

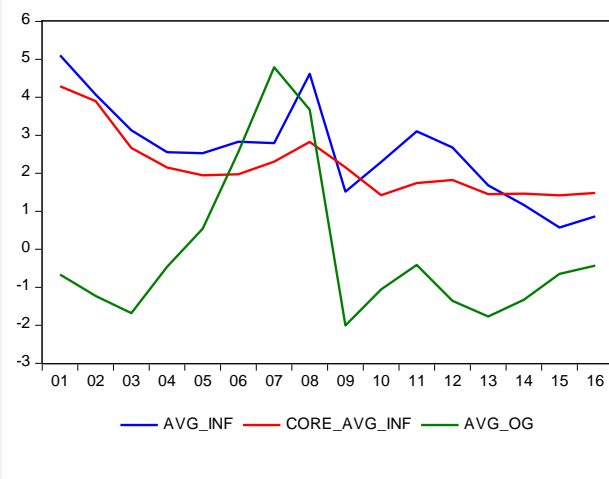


Chart 7 Change in the size of the output gap and consumer inflation in 2020 (%)

Source: EIU (*The Economist*), individual central banks, authors' calculations

Note: AVF-INF is average consumer inflation in OECD countries, CORE\_AVG\_INF is average core inflation (inflation abstracting from prices of energy, food, alcohol and tobacco) and AVG\_OG is the average output gap across OECD countries.

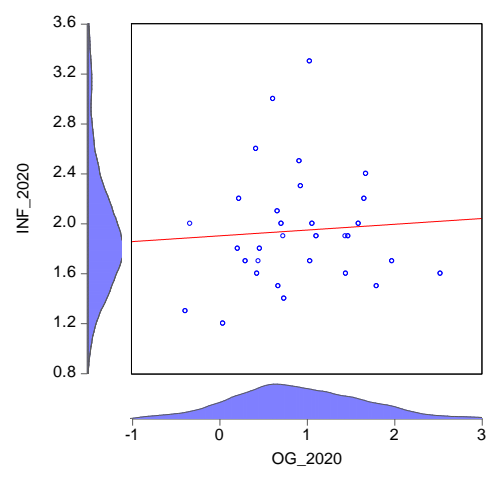


Chart 8 Size of the output gap and consumer inflation in 2020 (%)

Source: EIU (*The Economist*), authors' calculations

## References

- Backus, D. K., and P. J. Kehoe, 1992. “International Evidence on the Historical Properties of Business Cycles,” *American Economic Review* 82, 864–888.
- Silverman, B. W. 1986. *Density Estimation for Statistics and Data Analysis*, London: Chapman & Hall.

<sup>10</sup> From the past perspective, however, the average core inflation level was lower than the average consumer inflation level.

<sup>11</sup> The very low level of interest rates in advanced countries is fostering growth in property prices. As their prices are not included in consumer prices, this is probably distorting “actual” inflation downwards.



## A1. Change in GDP predictions for 2016

	CF		IMF		OECD		CB / EIU	
EA	0	2016/9	+0.1	2016/7	+0.2	2016/6	+0.1	2016/9
		2016/8		2016/4		2016/2		2016/6
US	0	2016/9	-0.2	2016/7	-0.2	2016/6	-0.2	2016/6
		2016/8		2016/4		2016/2		2016/3
DE	+0.2	2016/9	+0.1	2016/7	+0.3	2016/6	-0.1	2016/6
		2016/8		2016/4		2016/2		2015/12
JP	+0.1	2016/9	-0.2	2016/7	-0.1	2016/6	-0.2	2016/7
		2016/8		2016/4		2016/2		2016/4
BR	+0.1	2016/9	+0.5	2016/7	-0.3	2016/6	0	2016/9
		2016/8		2016/4		2016/2		2016/8
RU	0	2016/9	+0.6	2016/7	-1.3	2016/6	0	2016/9
		2016/8		2016/4		2015/11		2016/8
IN	+0.1	2016/9	-0.1	2016/7	0	2016/6	0	2016/9
		2016/8		2016/4		2016/2		2016/8
CN	0	2016/9	+0.1	2016/7	0	2016/6	0	2016/9
		2016/8		2016/4		2016/2		2016/8

## A2. Change in inflation predictions for 2016

	CF		IMF		OECD		CB / EIU	
EA	0	2016/9	-0.6	2016/4	-0.7	2016/6	0	2016/9
		2016/8		2015/9		2015/11		2016/6
US	0	2016/9	-0.3	2016/4	+0.1	2016/6	+0.2	2016/6
		2016/8		2015/9		2015/11		2016/3
DE	0	2016/9	-0.7	2016/4	-0.7	2016/6	-0.9	2016/6
		2016/8		2015/9		2015/11		2015/12
JP	-0.1	2016/9	-0.6	2016/4	-0.6	2016/6	-0.4	2016/7
		2016/8		2015/9		2015/11		2016/4
BR	0	2016/9	+2.4	2016/4	+3.4	2016/6	0	2016/9
		2016/8		2015/9		2015/11		2016/8
RU	-0.2	2016/9	-0.2	2016/4	-2.2	2016/6	0	2016/9
		2016/8		2015/9		2015/11		2016/8
IN	0	2016/9	-0.2	2016/4	+0.1	2016/6	-0.1	2016/9
		2016/8		2015/9		2015/11		2016/8
CN	0	2016/9	0	2016/4	+0.1	2016/6	0	2016/9
		2016/8		2015/9		2015/11		2016/8

### A3. List of abbreviations

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

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

### 2016

	<b>Issue</b>
The closing of the output gap in OECD countries in the current low-inflation environment (Luboš Komárek)	2016-9
Seasonal agricultural commodity price movements (Martin Motl)	2016-8
Inflation expectations in the USA: An illusion of a fall? (Soňa Benecká)	2016-7
Annual assessment of the forecasts included in GEO (Filip Novotný)	2016-6
International comparison of competitiveness using composite indicators (Iveta Polášková)	2016-5
How global inventory levels affect commodity prices (Jan Hošek)	2016-4
The Europe 2020 strategy: Will it be fulfilled? (Pavla Břízová)	2016-3
Changes in global imbalances in the world economy (Luboš Komárek and Vladimír Žďárský)	2016-2
The FDI life cycle on the example of the Czech Republic (Filip Novotný)	2016-1

### 2015

	<b>Issue</b>
The role of China in the slowdown in international trade (Oxana Babecká Kucharčuková)	2015-12
Central banks' gold reserves (Iveta Polášková)	2015-11
Shadow policy rates – alternative quantification of unconventional monetary policy (Soňa Benecká, Luboš Komárek and Filip Novotný)	2015-10
The economic reforms of Indian Prime Minister Narendra Modi (Pavla Břízová)	2015-9
The Chinese renminbi in the SDR basket: A realistic prospect? (Soňa Benecká)	2015-8
Annual assessment of the forecasts included in GEO (Filip Novotný)	2015-7
Seasonal price movements in the commodity markets (Martin Motl)	2015-6
Assessment of the effects of quantitative easing in the USA (Filip Novotný)	2015-5
How consensus has evolved in Consensus Forecasts (Tomáš Adam and Jan Hošek)	2015-4
The US dollar's position in the global financial system	2015-3
The crisis and post-crisis experience with Swiss franc loans outside Switzerland (Alexis Derviz)	2015-2
The effect of oil prices on inflation from a GVAR model perspective (Soňa Benecká and Jan Hošek)	2015-1

## 2014

	<b>Issue</b>
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

	<b>Issue</b>
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**

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