

# GLOBAL ECONOMIC OUTLOOK - JULY

Monetary Department  
External Economic Relations Division

2016



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**Cut-off date for data**

15 July 2016

**CF survey date**

11 July 2016

**GEO publication date**

22 July 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.

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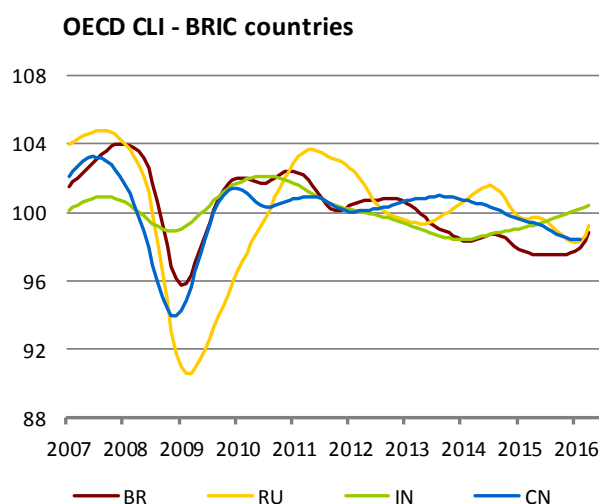
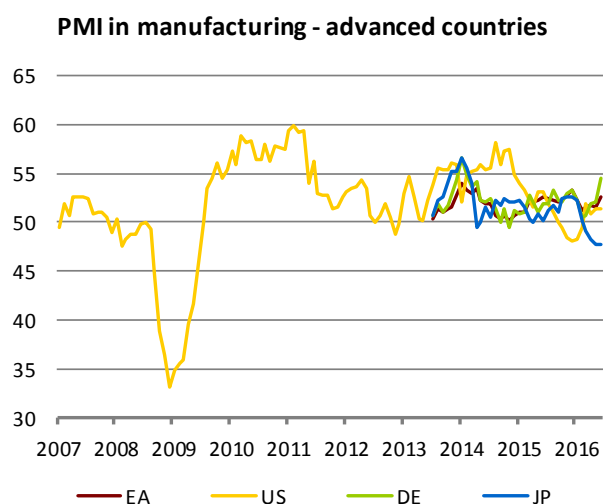
The July issue of Global Economic Outlook presents the regular monthly overview of recent and expected developments in selected territories, focusing on key economic variables: inflation, GDP growth, leading indicators, interest rates, exchange rates and commodity prices. In this issue, we also focus on the observed difference between inflation expectations derived from market instruments and those from surveys of experts. Market outlooks indicate a decline in inflation expectations in the USA, whereas the view of experts is that fulfilment of the Fed's 2% target is not at risk.

The economic growth outlooks for advanced countries were affected above all by the outcome of the June EU membership referendum in the UK. Expected euro area economic growth was lowered for 2017 (by 0.3 pp according to CF). The outlook for the German economy is now slightly lower for both this year and the next. Economic growth in the euro area will thus still be lower than that in the USA, where, moreover, the economy is expected to surge further by 2017. The Brexit referendum also affected the outlook for the Japanese economy. Increased uncertainty in financial markets stimulated investor interest in safe assets, as a result of which currencies such as the yen and the Swiss franc appreciated significantly. Such developments pose a threat to the fragile economic recovery in Japan. Higher inflation pressures are expected in the USA, in line with faster economic growth, while consumer prices in the euro area and Japan will be broadly flat this year, with more sizeable growth not expected until next year. The Fed again postponed the tightening of its monetary policy in June and its rates are expected to remain flat after the next meeting, too.

The GDP growth outlooks for the BRIC countries remain very mixed. The annual growth rate of the Chinese economy stayed at 6.7%, but the outlook suggests a slight decline. The Chinese central bank announced that it would tolerate the renminbi depreciating in order to boost the economy. High economic growth (over 7%) should also be maintained in India. Conversely, Russia and Brazil will not avoid a second year of decline in GDP. However, the current outlooks are showing a revision of the previous pessimism – a more modest contraction of these economies is expected this year, and the growth estimates for next year are also being raised. The inflation outlooks for BRIC countries are positive as well. Consumer price inflation will be approximately 2% in China and 5% in India (i.e. inside the tolerance band around the inflation target). However, prices will also grow at a much slower pace in Russia (roughly half that observed last year) and Brazil owing to a pronounced decline in inflation in recent months. The Russian central bank is expected to continue easing monetary policy.

The outlook for short-term money market interest rates in the euro area remains negative. By contrast, rates in the USA are expected to rise slightly. The German ten-year government bond yield has been negative since June. The difference between it and its US counterpart was 1.6 pp in June. The outlook for both instruments is rising (less so for the German Bund). The dollar is expected to appreciate against all the monitored currencies at the one-year horizon. The upward trend in Brent oil prices halted in June. The market futures curve remains relatively flat (though still rising), reflecting the IEA's view that supply and demand became almost balanced in Q2.

## Leading indicators for countries monitored in the GEO

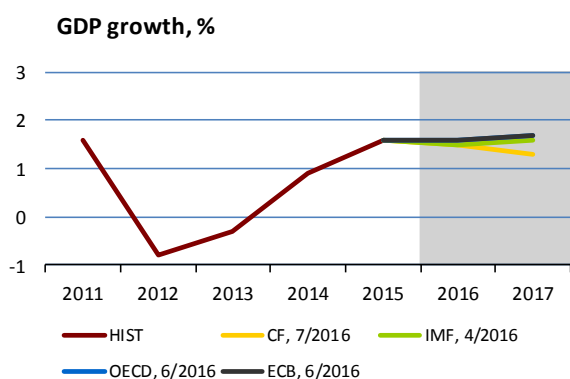


Zdroj: Bloomberg, Datastream

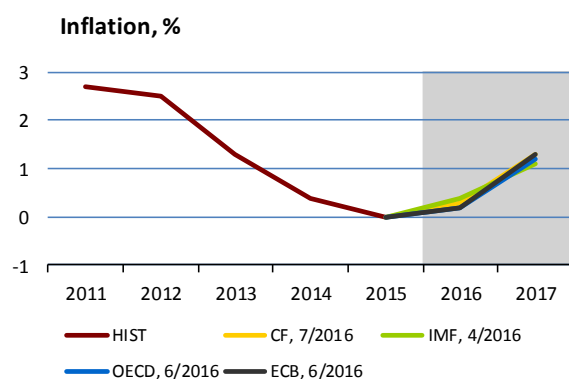
### II.1 Euro area

The latest data on the euro area economy are mixed. Annual growth in industrial production slowed to 0.5% in May, mainly because growth in two large economies – Germany and Italy – turned negative. The euro area as a whole saw a year-on-year decline in output of energy and durable goods; production dropped month-on-month terms in all the main sectors of the economy. However, the PMI leading indicator in manufacturing improved significantly in June, rising by 1.3 points to 52.8 on the back of growth in new orders supported by export performance, job creation and higher sales. It is thus indicating that the slowdown in industrial production will only be short-lived. Both the ZEW economic sentiment indicator and the industrial confidence indicator improved in June. By contrast, consumer and business confidence deteriorated. The unemployment rate went down to 10.1% in May, the lowest level since July 2011. It has been falling gradually for almost two years now and is expected to drop below 10% by the end of the year. The falling unemployment and rising consumption fostered a slight upswing in annual retail sales growth in May (to 1.6%). CF lowered its economic growth outlooks for this year and the next by 0.1 pp and 0.3 pp respectively in response to the result of the UK referendum.

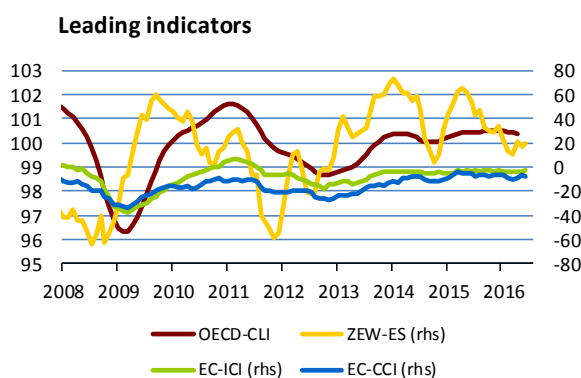
The euro area left the deflation zone in June, with consumer prices rising by 0.1% year-on-year. This was the first positive figure since January this year. Headline inflation was lifted by rising prices of services, food and industrial products and by a further moderation of the decline in energy prices. Core inflation again rose by 0.1 pp, reaching 0.9% in June. The year-on-year decline in producer prices slowed to 3.9% in May. These prices recorded their largest month-on-month increase of this year, mainly due to rising prices in the energy sector. CF thus raised its inflation forecast for this year by 0.1 pp. M3 growth picked up to 4.9% in May due to still low interest rates combined with massive support from the ECB. The ten-year German government bond yield has been negative since 24 June because of continued uncertainty in other markets. However, it is expected to increase to 0.3% at the one-year horizon. Conversely, short-term interest rates are expected to fall even further at the one-year horizon.



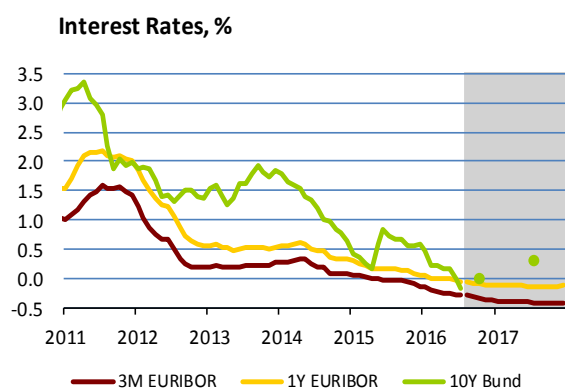
	CF	IMF	OECD	ECB
2016	1.5	1.5	1.6	1.6
2017	1.3	1.6	1.7	1.7



	CF	IMF	OECD	ECB
2016	0.3	0.4	0.2	0.2
2017	1.3	1.1	1.2	1.3



	OECD-CLI	EC-ICI	EC-CCI	ZEW-ES
4/16	100.4	-3.6	-9.3	21.5
5/16		-3.7	-7.0	16.8
6/16		-2.8	-7.3	20.2



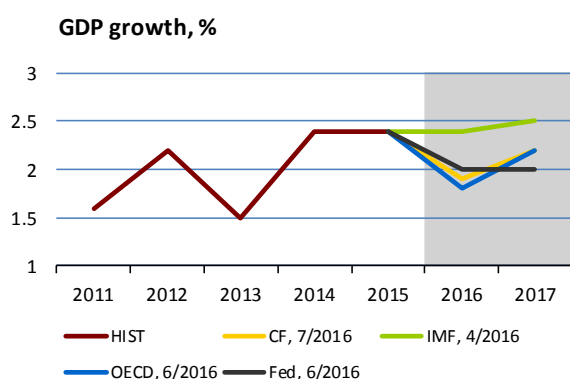
	06/16	07/16	10/16	07/17
3M EURIBOR	-0.27	-0.29	-0.34	-0.41
1Y EURIBOR	-0.03	-0.06	-0.09	-0.13
10Y Bund	0.01	-0.15	0.00	0.30

## II.2 United States

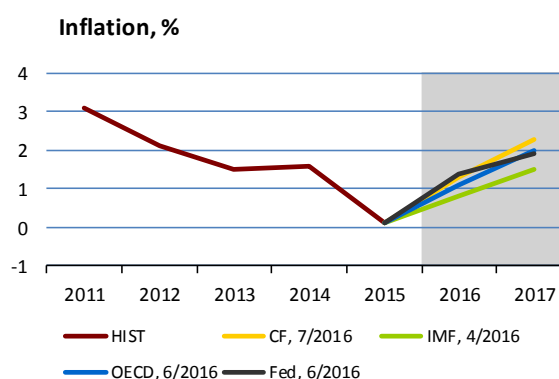
The final estimate for US economic growth in Q1 (1.1%) was again higher than the previous revision and was close to the 2015 Q4 level (1.4%). Growth was negatively affected by falling inventories and capital expenditure. Lower growth is also apparent for private consumption. However, there are concerns that the model used by the government to eliminate seasonal effects is not fully accomplishing its goal. The economy has slowed five times in Q1 over the last six years. The government has therefore promised to publish seasonally unadjusted data as from mid-2018.

The US economy is expected to pick up pace in Q2, but with limited inflation pressures. The labour market again surprised observers, although in the opposite direction than in May. Growth in non-farm payrolls in June (287,000) significantly exceeded market expectations (180,000). The unemployment rate rose only slightly (to 5%). According to the Conference Board survey, consumer confidence reached an eight-month high in June. By contrast, industrial production again recorded a month-on-month decline in May, most notably in the automotive and energy sectors. Corporate investment continues to drop.

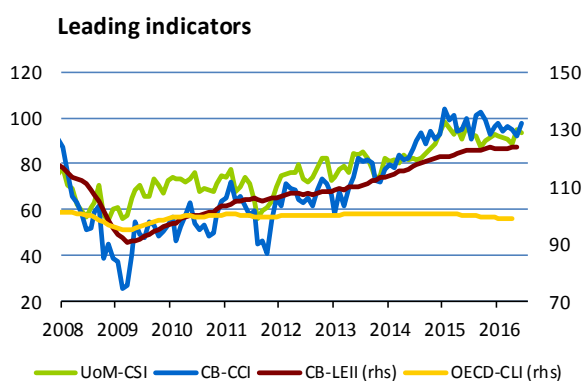
Annual consumer price inflation was unchanged in May (1.1%), while headline inflation rose only slightly to 2.2%. The Brexit referendum and the subsequent financial market turmoil represent new risks whose impact on the US economy is so far unclear. Fed representatives therefore decided in June to postpone further monetary policy tightening, and according to the July CF survey (93% of the panellists) rates are expected to remain stable after the next meeting, too. In response to the UK vote, the dollar appreciated temporarily against other currencies and ten-year government bond yields fell. However, the implied rate path was broadly unchanged from the previous month. The June CF revised downwards its outlook for GDP growth in 2017. The other forecasts saw no changes.



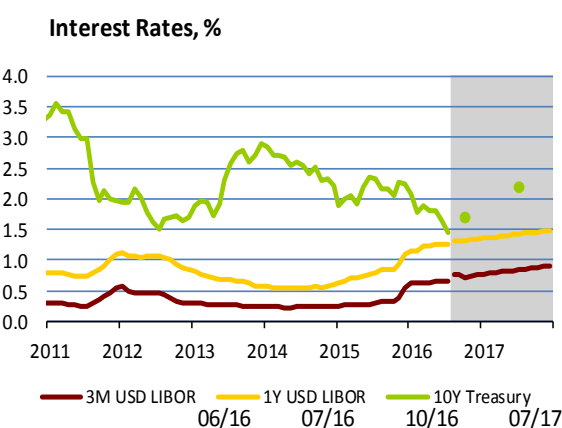
	CF	IMF	OECD	Fed
2016	1.9	2.4	1.8	2.0
2017	2.2	2.5	2.2	2.0



	CF	IMF	OECD	Fed
2016	1.3	0.8	1.1	1.4
2017	2.3	1.5	2.0	1.9



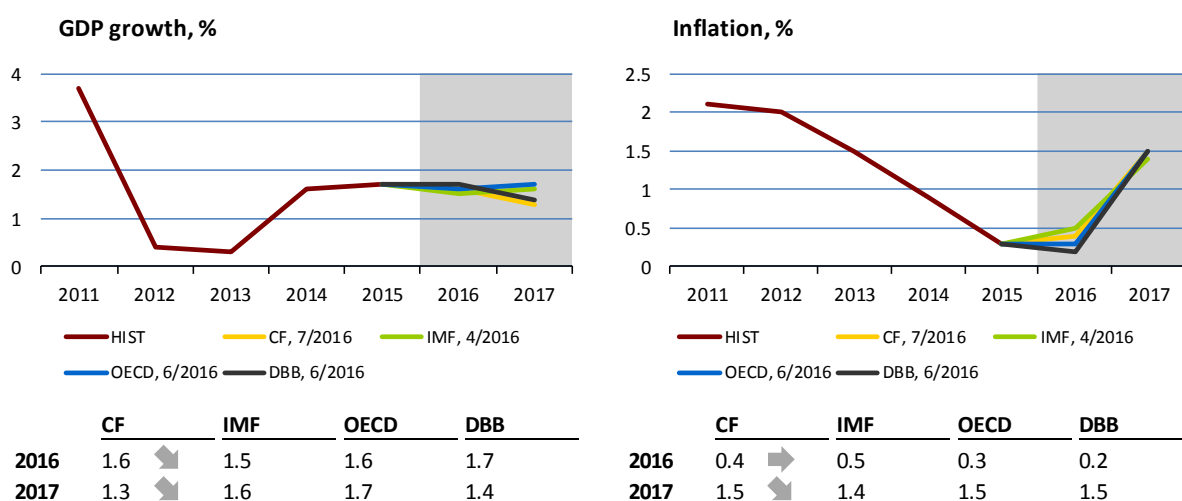
	CB-LEII	OECD-CLI	UoM-CSI	CB-CCI
4/16	123.9	99.0	89.0	94.7
5/16	123.7		94.7	92.4
6/16			93.5	98.0



	3M USD LIBOR	1Y USD LIBOR	10Y Treasury
06/16	0.65	1.26	1.64
07/16	0.66	1.26	1.45
10/16	0.72	1.31	1.70
07/17	0.84	1.43	2.20

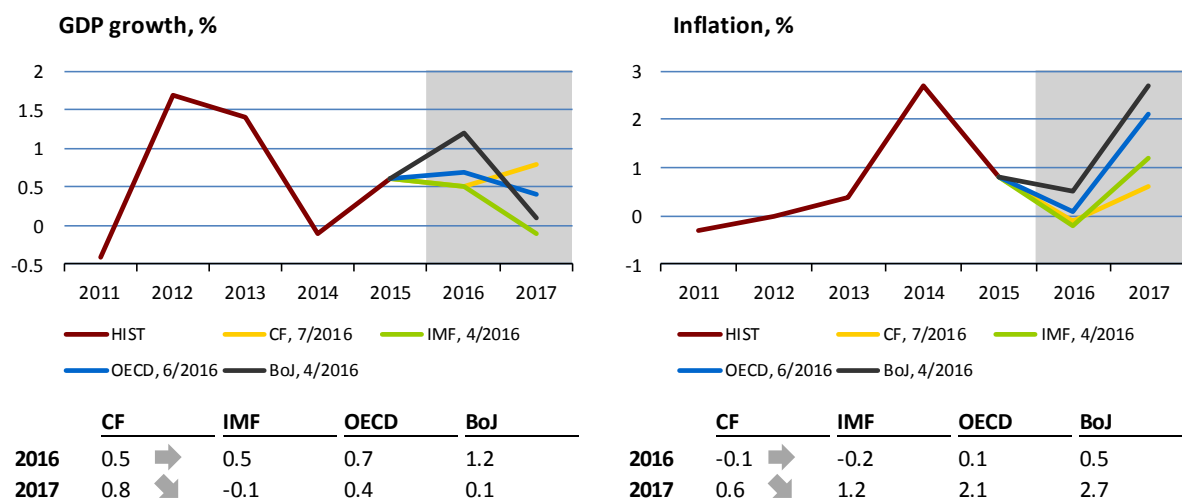
### II.3 Germany

Economic growth in Germany intensified in 2016 Q1. The quarterly GDP growth rate rose from 0.3% to 0.7% and the annual growth rate from 1.3% to 1.6%, mainly due to higher growth in domestic demand. According to the Bundesbank and the July CF, economic growth will slow in Q2. The same is also indicated by a sharp slowdown in average annual growth in industrial production and retail sales in April and May compared to Q1. After the UK referendum, the July CF lowered its outlook for economic growth in Germany for 2016 as a whole from 1.7% to 1.6% and for 2017 as a whole from 1.5% to 1.3%. Inflation in Germany rose by 0.2 pp to 0.3% in June, mainly because of a smaller decline in energy prices and slightly faster growth in food and services prices. CF left its consumer price inflation estimate for 2016 as a whole at 0.4% and lowered its forecast for next year to 1.5%.



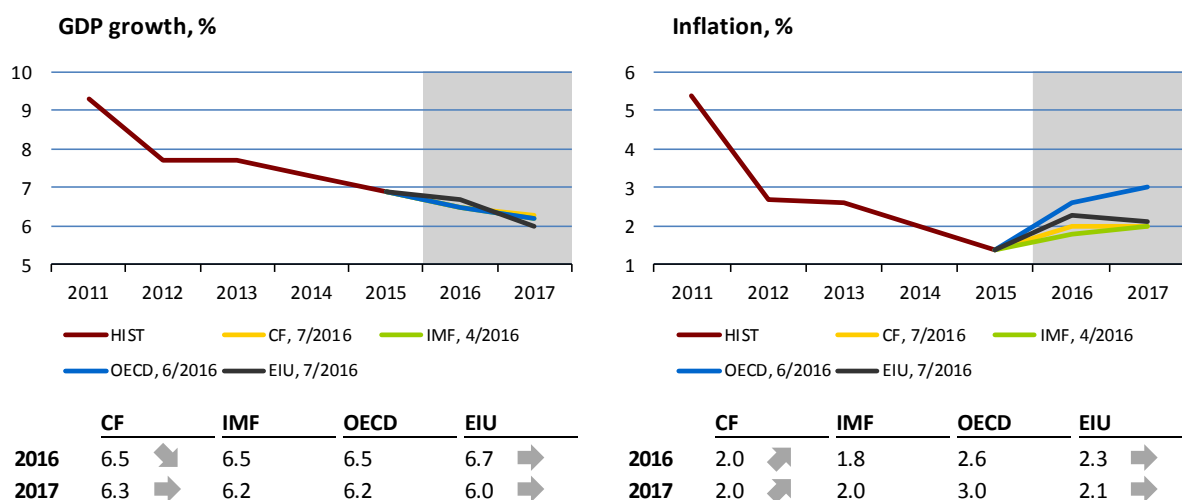
### II.4 Japan

The uncertainty in financial markets following the UK referendum increased investors' interest in safe assets, and currencies such as the yen and the Swiss franc appreciated strongly. The yen reached the threshold of JPY 100 to the US dollar in early July. In year-on-year terms, it appreciated by more than 17%, which poses a threat to the fragile recovery of the Japanese economy. The strong yen and lower external demand are reflected in a cautious approach of Japanese firms, as indicated by the July business survey (tankan). Export performance and industrial production have been decreasing in year-on-year terms since last autumn. Consumer demand did not improve significantly either. Retail sales fell by 2% year on year in May and consumer confidence has not improved since the start of the year. The July CF lowered its outlooks for both growth and inflation in 2017. The forecast for 2016 is unchanged.



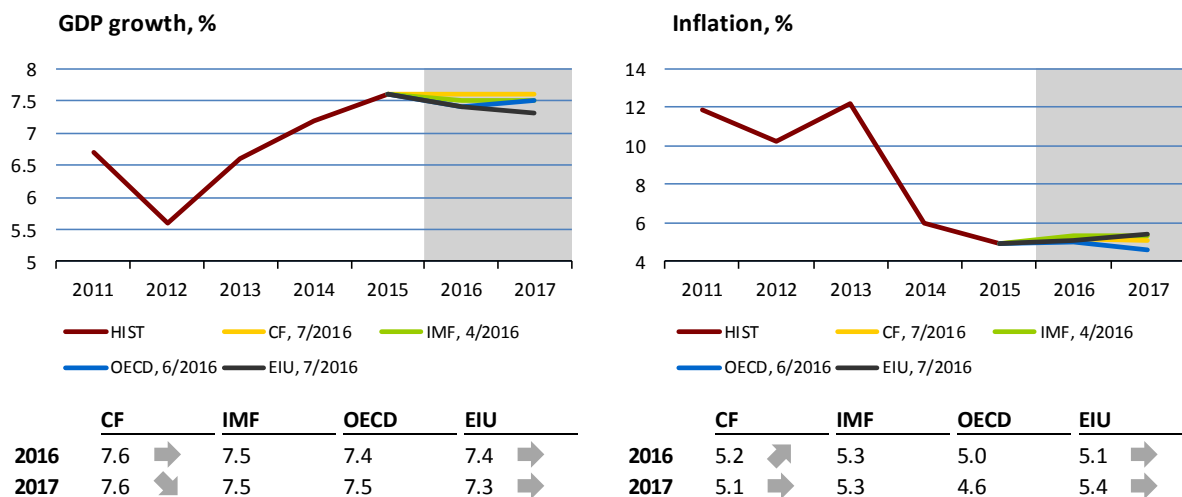
### III.1 China

Economic growth in China increased by 0.6 pp quarter on quarter to 1.8% in 2016 Q2. The annual growth rate remained at 6.7%. Reuters analysts were expecting it to slow to 6.6% due to insufficient growth in industrial production. The world's second-largest economy may therefore slow again in the coming quarters. The government and central bank would have to take further and stronger growth-supporting measures to avert this. Although economic growth was weaker in the first half of this year than last year, it remains in the target range of 6.5%–7.5%. The central bank of China announced at the end of June that it would tolerate the renminbi depreciating in order to boost the economy. The exchange rate gradually weakened to CNY 6.69 to the dollar as of mid-July. The new CF and EIU outlooks expect economic growth to slow gradually from 6.5%–6.7% this year to 6.0%–6.3% next year. Inflation will be between 2.0% and 2.3% in the same period.



### III.2 India

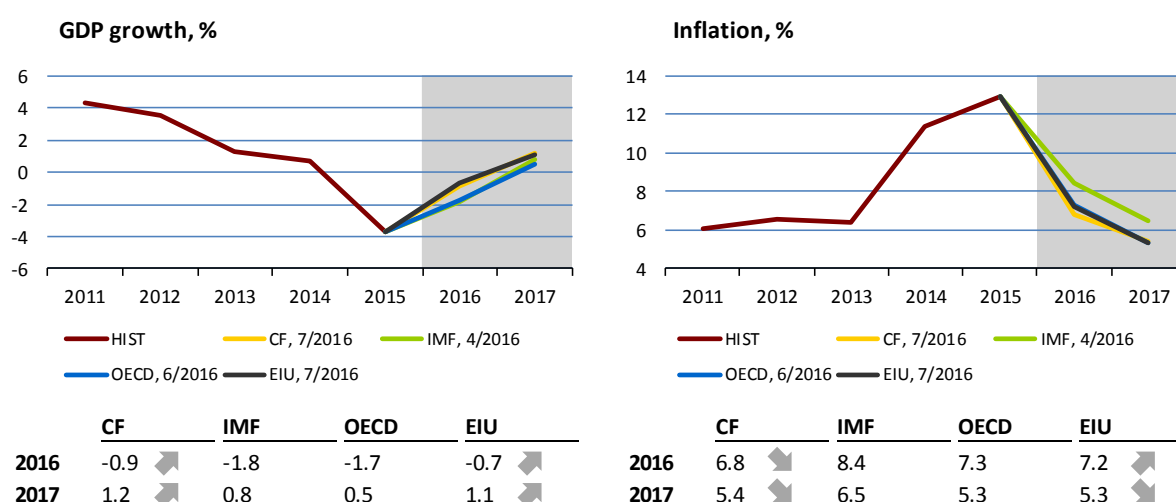
According to a recently published UNCTAD ranking, India was the 10th largest FDI recipient in the world last year (as in 2014; USD 44 billion). The latest data from the Indian economy are also broadly positive. Industrial production rose by 1.2% year on year in May (following a decrease in April), with manufacturing and mining and quarrying performing particularly well. The PMI leading indicator in manufacturing is in the expansion band (51.7), signalling a further recovery. The monitored institutions agree that the economy will continue to grow by around 7.5% this year and the next. Inflation stood at 5.8% in June (as in May), the highest level since August 2014, but was still inside the tolerance band around the inflation target ( $4\% \pm 2$  pp). Food prices are growing particularly strongly. A further reduction in the central bank's policy rate (currently 6.5%) seems unlikely in the near future. The inflation outlooks remain just above 5% for both years and the rupee is likely to depreciate modestly against the dollar.





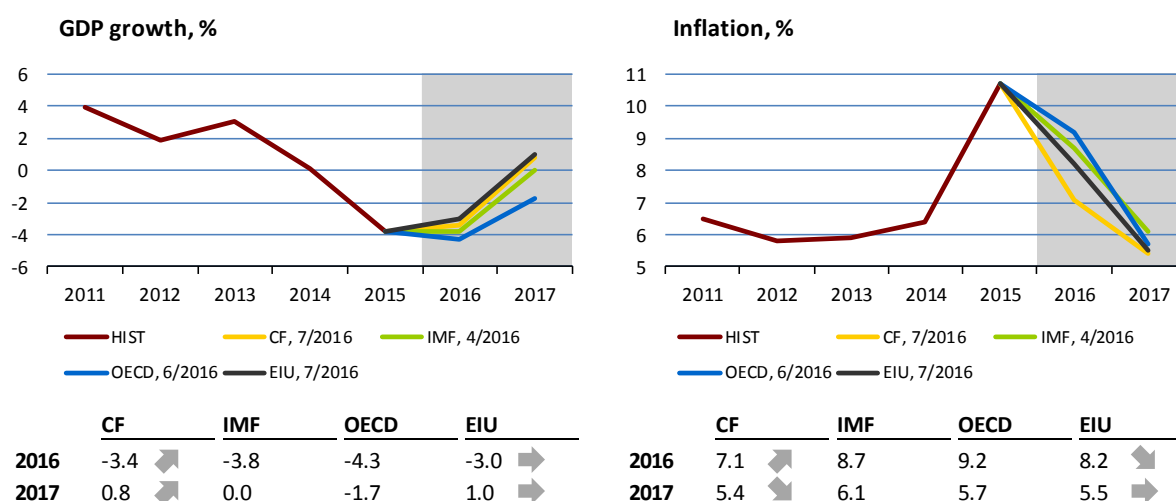
### III.3 Russia

According to a flash estimate for the components of Russian GDP, foreign trade was the worst performer in Q1 (exports fell by 5.6% and imports by 10.9% year on year). Annual growth in the other main GDP components was also negative, albeit less so than in the previous quarter. The slower economic contraction was reflected in the monitored institutions' new outlooks. In an Article IV consultation document, the IMF lowered its contraction estimate for this year to 1.2% (compared to 1.5% in May and 1.8% in the April WEO) and raised its GDP growth forecast for next year to 1%. CF and the EIU also revised their outlooks significantly, cutting their contraction estimates for this year by 0.3–0.4 pp to 1.1%–1.2% and improving their growth outlooks for 2017. The inflation outlooks were also lowered (except for the EIU forecast for 2016, which was raised). In June, the RCB lowered its key rate for the first time since November 2015 (to 10.5%). Russian analysts expect it to fall further by the year-end (to 9.0%–9.5%). The government budget deficit reached 4.0%–4.3% of GDP in H1, significantly exceeding the 3% planned in the 2016 budget, which had assumed a higher oil price. The Russian Federation's external debt rose by 0.6% in 2016 H1.



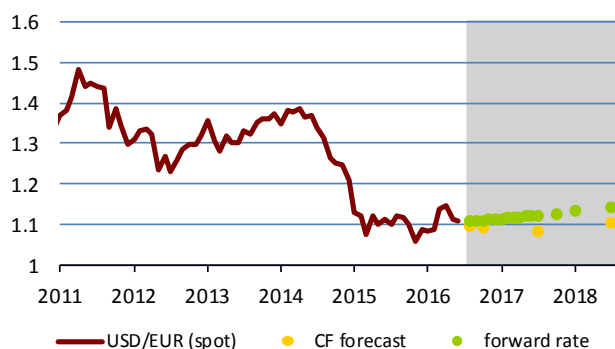
### III.4 Brazil

Although the political situation in Brazil is calming down, the economic situation remains difficult. Following a previous slight month-on-month increase in April, the economic activity index in Brazil recorded an unexpected sharp fall in May (of 0.5%) due to a deterioration in farming and industry. Industrial production fell by 7.8% year on year (compared to 6.9% in April). Retail sales were also worse than expected. Unemployment stayed at the April level of 11.2% in May. The July CF and the EIU forecast expect GDP to decline by 3.0%–3.4% this year and grow by 0.8%–1.0% next year. Consumer price inflation has been gradually slowing since January (from 10.7% to 8.8% in June) and will continue to do so – to 7.1%–8.2% this year and 5.4%–5.5% the next. The central bank's key rate has been at 14.25% for almost a year now.



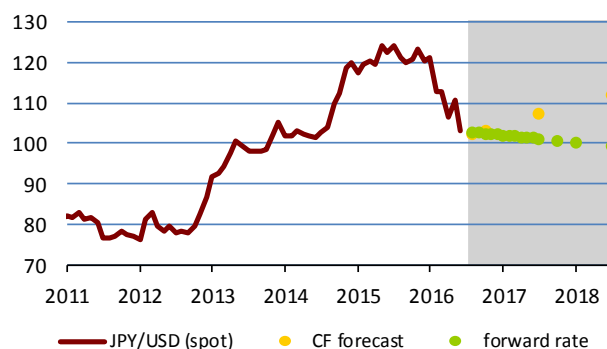
## IV. Outlook of exchange rates

The US dollar (USD/EUR)



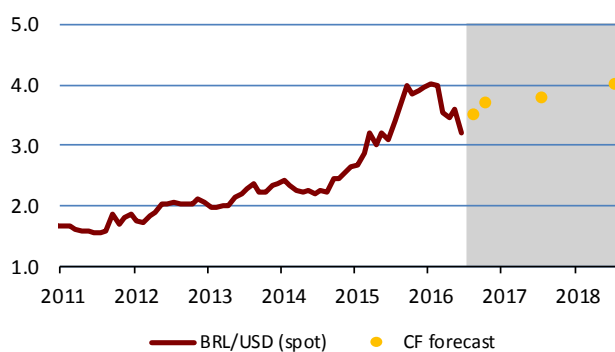
	11/7/16	08/16	10/16	07/17	07/18
spot rate	1.105				
CF forecast		1.096	1.090	1.084	1.104
forward rate		1.107	1.110	1.123	1.143

The Japanese yen (JPY/USD)



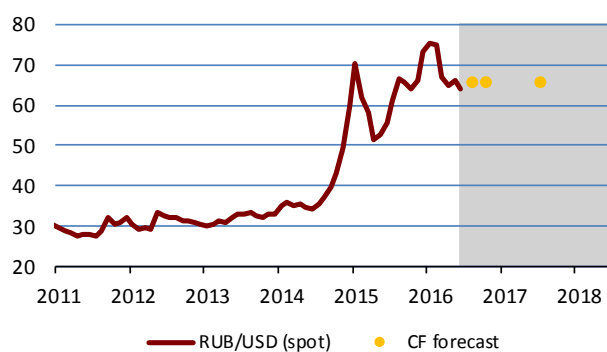
	11/7/16	08/16	10/16	07/17	07/18
spot rate	102.6				
CF forecast		102.2	103.2	107.3	111.7
forward rate		102.7	102.4	101.2	99.2

The Brazilian real (BRL/USD)



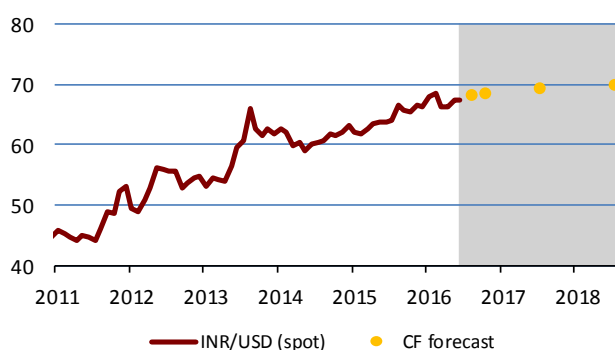
	11/7/16	08/16	10/16	07/17	07/18
spot rate	3.301				
CF forecast		3.511	3.697	3.803	4.014

The Russian rouble (RUB/USD)



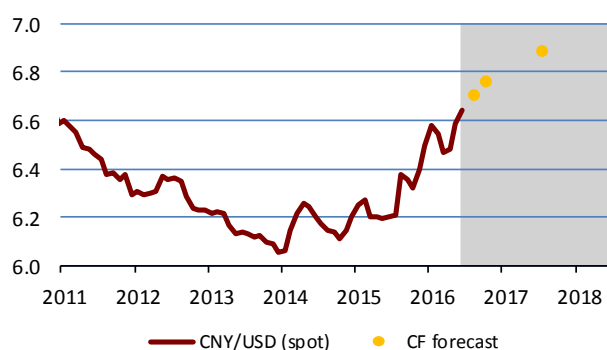
	11/7/16	08/16	10/16	07/17	07/18
spot rate	64.06				
CF forecast		65.69	65.88	65.49	66.69

The Indian rupee (INR/USD)



	11/7/16	08/16	10/16	07/17	07/18
spot rate	67.17				
CF forecast		68.08	68.41	69.31	69.95

The Chinese renminbi (CNY/USD)



	11/7/16	08/16	10/16	07/17	07/18
spot rate	6.688				
CF forecast		6.705	6.759	6.890	6.981

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.

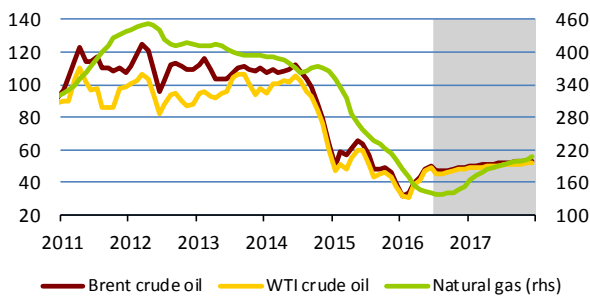
### V.1 Oil and natural gas

The upward trend in the crude oil price observed since February continued into early June, when the Brent price reached USD 52.5/bbl, its highest level since October 2015. However, the trend later halted and the Brent price is now fluctuating in the range of USD 46–51/bbl. It is being pushed down by increased uncertainty and a stronger dollar after the UK referendum. Stocks of refined products grew rapidly in Q1 owing to increased production at refineries, which are taking advantage of the low oil prices and favourable margins. The current large stocks (especially of petrol) are also one of the factors limiting any further growth in oil prices, particularly if the buoyant growth in demand for fuels weakens. Another limiting factor is a reduction in the net long positions of investors, who do not want to speculate on a further rise in the price of oil at a price of over USD 50/bbl. Conversely, a decline in oil stocks and shale extraction in the USA is limiting the room for a more pronounced fall in oil prices.

The market futures curve of 11 July shifted downwards compared to the previous month, implying an average Brent oil price of USD 44.5/bbl this year and USD 51.7/bbl next year. The EIA is expecting virtually the same levels. The CF forecast for the end of July 2017 shifted downwards only minimally and is less than a dollar above the market curve (USD 52.8/bbl). The market curve remains relatively flat (though still rising), reflecting the IEA’s view that demand and supply became almost balanced in Q2 due to large supply disruptions, following a huge excess of production over consumption in 2016 Q1.

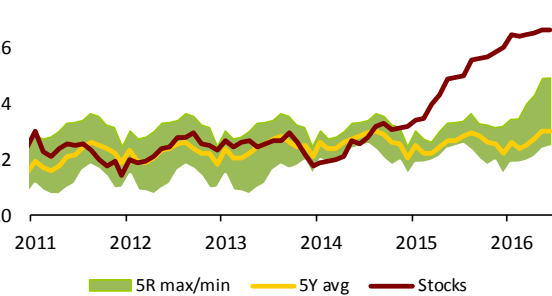
Prices of natural gas rose in the USA (by 34% month on month) as warm weather boosted electricity consumption and hence demand for gas, while gas extraction decreased. The price of gas at terminals in Europe increased only slightly (by 2.2% month on month).

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

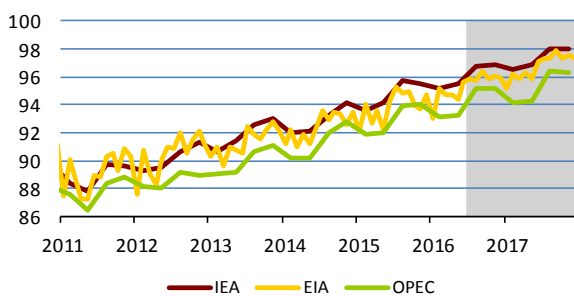


	Brent	WTI	Natural gas
2016	44.51 ↘	43.12 ↘	149.73 ↗
2017	51.66 ↘	50.39 ↘	188.97 ↗

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

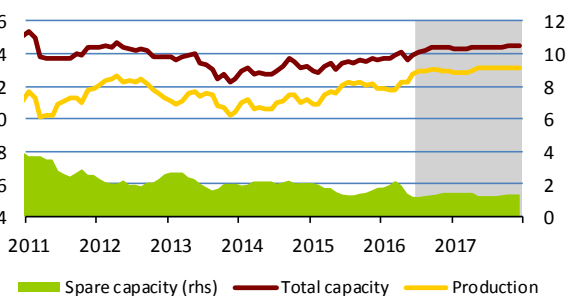


**Global consumption of oil and oil products (mil. barrel / day)**



	IEA	EIA	OPEC
2016	96.07 ↗	95.29 ↗	94.20 ↗
2017	97.36	96.78 ↗	

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



	Production	Total capacity	Spare capacity
2016	32.53 ↗	34.06 ↗	1.53 ↘
2017	33.04 ↗	34.39 ↗	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

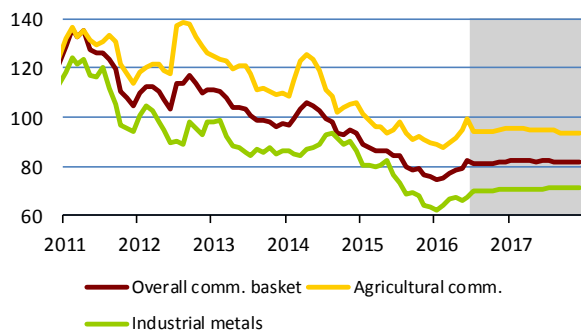
## V.2 Other commodities

The average monthly non-energy price index recorded an upswing in growth in June and declined only slightly in the first half of July. This mainly reflected strong growth in the food commodity price index in June and a rapid return below the May level in the first half of July. The industrial commodity price index fluctuated within a narrow band for the fourth consecutive month in June, but rose by almost 4% in the first half of July. The outlooks for all three indices are only modestly rising.

Prices of most food commodities increased in early July due to bad weather. Prices of corn and soy went up due to droughts in the USA and after the USDA lowered its outlook for the harvest in Brazil. Heavy rains also delayed the sugar cane harvest in Brazil, to which sugar prices responded by rising significantly. However, rain came to US agricultural regions in the second half of June and grain prices were falling until early July. The price of wheat decreased the most (to a ten-year low), as the USDA is still expecting a bumper crop this year. The price of coffee continued to rise in line with the price of sugar. The price of lean hogs recorded a seasonal high in June and is expected to decline for the remainder of the year. By contrast, the price of live cattle continued to fall sharply, in line with the trend observed since March.

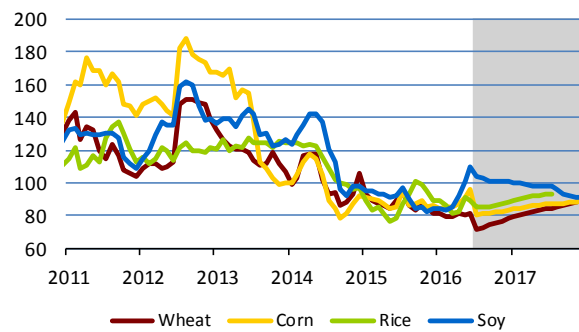
Industrial commodity prices were affected by contrary factors. The UK referendum caused the dollar to strengthen and pushed down commodity prices. The outlooks for industry were mixed, with the PMI rising in the USA and the euro area in June while falling in China. However, this was offset by an upturn in the Chinese property market. Prices of most industrial metals went up last month. Prices of nickel (production is expected to be regulated in the Philippines) and zinc (due to production constraints) went up the most.

### Non-energy commodities price indices



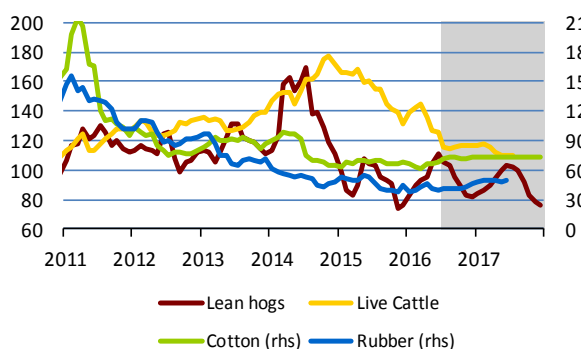
	Overall	Agricultural	Industrial
2016	79.6	93.3	67.9
2017	82.0	94.6	71.0

### Food commodities



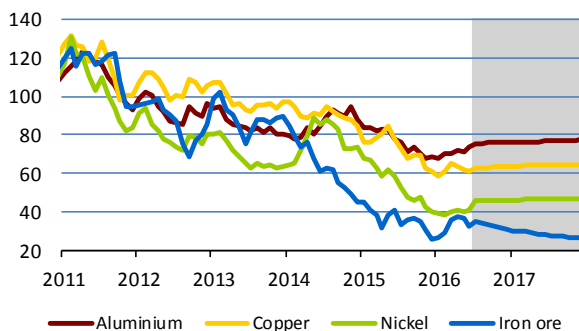
	Wheat	Corn	Rice	Soy
2016	77.8	85.0	86.6	97.0
2017	84.4	86.9	91.8	96.2

### Meat, non-food agricultural commodities



	Lean hogs	Live Cattle	Cotton	Rubber
2016	94.3	125.9	68.8	41.7
2017	90.6	113.2	72.8	48.8

### Basic metals and iron ore



	Aluminium	Copper	Nickel	Iron ore
2016	73.4	62.5	42.9	33.0
2017	76.7	64.0	46.5	28.1

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.

## Inflation expectations in the USA: An illusion of a fall?<sup>1</sup>

A persistent decline in inflation expectations is a strong signal for central banks whose mandates include maintaining price stability. The USA serves as an example of how difficult inflation expectations can be to interpret when the outlook inferred from market contracts starts to deviate from experts' opinions in the long term. Current market outlooks indicate a decline in inflation expectations, whereas the view of experts and analysts is that fulfilment of the Fed's target is not at risk. As the literature suggests, financial markets can be more sensitive than bank experts to new information and reflect it in outlooks more quickly. The long period of low inflation is thus leading to a decline in inflation expectations, and a change in trend can only be expected after the temporary anti-inflationary pressures (the drop in oil prices, the strengthening of the dollar and the spillover of inflation expectations from the euro area) fade away. Moreover, alternative studies suggest that the decline in inflation expectations may also be due to a lower risk of inflation differing significantly from the target (hyperinflation, deflation). However, the possibility that the outlook for the US economy has been fundamentally revised cannot be ruled out. According to financial markets, such a scenario would entail a long period of low inflation below the central bank's target.

### 1 Measurement of inflation expectations in the USA

In a speech given in Philadelphia in June,<sup>2</sup> Fed Chair Janet Yellen said that she had given close attention to the decline in inflation expectations inferred from market instruments (inflation compensation)<sup>3</sup>. A persistent decline in inflation expectations is a strong signal for central banks whose mandates include maintaining price stability. Not only can it undermine the credibility of the central bank's target, but expectations of low inflation are often self-fulfilling. Market instruments suggest that inflation expectations in the USA have declined sharply over the past two years. On the other hand, the Survey of Professional Forecasters (SPF) indicates a very stable inflation outlook over the 10-year horizon. We will therefore start by looking at the different ways of measuring inflation expectations – from market contracts and from surveys.

The most widely used instruments for measuring **market** inflation expectations are Treasury Inflation Protected Securities (TIPS). The difference between the yield on TIPS and that on classic government bonds is called the break-even inflation rate and is seen as an indicator of inflation expected on bond markets. As Chart 1 shows, the break-even inflation rate fluctuated in the range of 2.0%–2.3% in 2013. Since mid-2014, however, it has been falling, and in February 2016 it was close to the April 2009 level. At that time, TIPS were indicating that the average inflation rate at the 10-year horizon would be just 1.2% (see

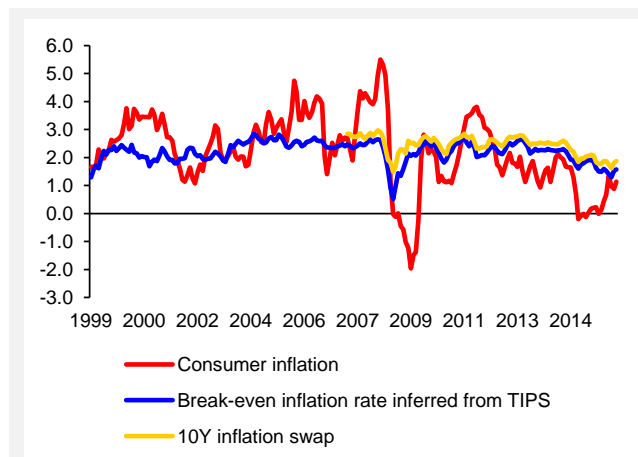


Chart 1 Market inflation expectations and actual inflation

Source: Datastream, Gurkaynak, Sack and Wright (2008)

Note: Monthly data. The break-even inflation rate is inferred from TIPS with a 10-year reference horizon.

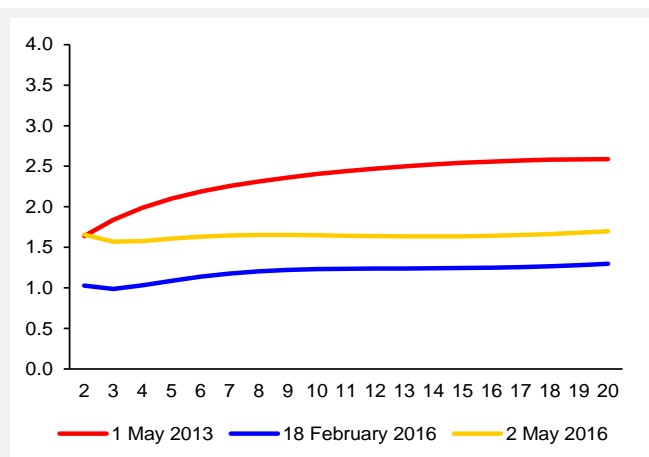


Chart 2 The break-even inflation rate on selected days

Source: Gurkaynak, Sack and Wright (2008)

Note: Horizontal axis – number of years ahead of the given date. Vertical axis – break-even inflation rates at this horizon as of the given date.

<sup>1</sup> Author: Soňa Benecká (Sona.Benecka@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. The topic of inflation expectations was also covered in an article in the December 2013 issue of *Central Bank Monitoring*.

<sup>2</sup> <https://www.federalreserve.gov/newsevents/speech/yellen20160606a.htm>

<sup>3</sup> Compensation is derived from the purchase or sale of protection against inflation in the form of a financial instrument, whereas inflation expectations should be the market's overall view of future inflation with regard to the current available data.

Chart 2).<sup>4</sup> A higher inflation rate is currently expected (1.6%), but the figure is still well below the Fed's 2% inflation target. The slope of the curve is also lower compared to May 2013, so the question is whether bond markets are expecting an environment of persistently low inflation in the USA.

However, many studies have shown that the TIPS value can reflect more factors than just expected inflation. Bonds were undervalued before 2004 (e.g. Shen, 2006), and sell-offs at the peak of the financial crisis in the second half of 2008 pushed yields above a reasonable level (Christensen et al., 2010). Risk premium and varying liquidity on the TIPS market thus make the break-even inflation rate hard to interpret.

As a result, inflation outlooks derived from inflation swaps, which are highly liquid and transparent, are being discussed as an alternative. The drawback of this approach is that the time series are substantially shorter. Nonetheless, as with TIPS-inferred break-even inflation, a decline is visible for swaps at the end of the period under review (see Chart 1).

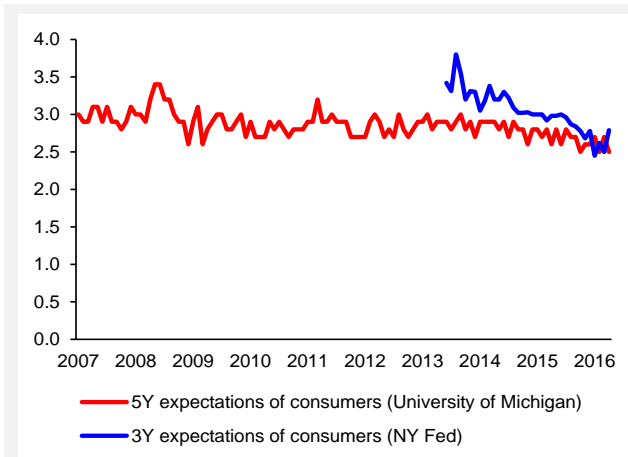


Chart 3 Inflation expectations of consumers

Source: Datastream, NY Fed

Note: Monthly data. The institutions conducting consumer surveys are given in parentheses.

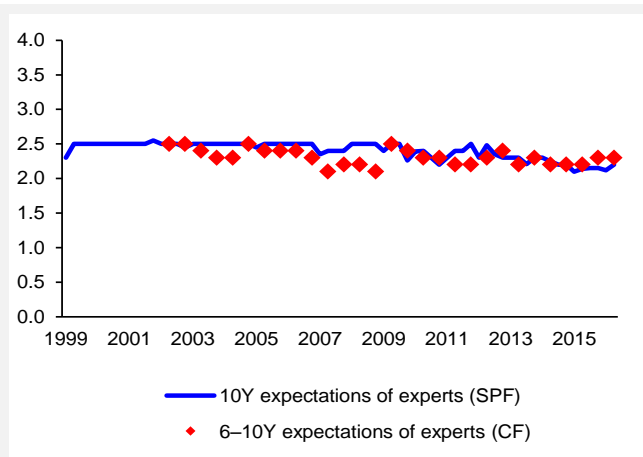


Chart 4 Inflation expectations of experts

Source: Datastream, CF

Note: Monthly data. Expectations of experts are derived from the Survey of Professional Forecasters (SPF) and publications (Consensus Forecasts; only in April and October; outlook for 6–10 years)

However, **survey-based** inflation expectations indicators are also available. As Charts 3 and 4 show, the medium- and long-run inflation expectations of both consumers and experts were stable during the crisis. In 2013, experts' 10-year inflation expectations (SPF) were close to the break-even inflation rate (2.3%), while consumers' expectations at the shorter 5-year horizon were 0.5 pp higher (University of Michigan survey). Here again, however, a moderate decline has been recorded since then, although both surveys are still indicating an inflation outlook above the Fed's target. Except during the financial crisis, long-term Consensus Forecasts outlooks were at the same level as SPF expectations.

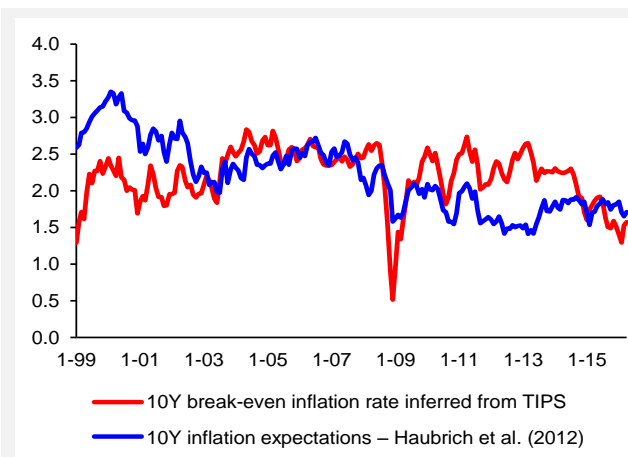


Chart 5 Alternative indicators of inflation expectations

Source: Gurkaynak, Sack and Wright (2008), Haubrich et al. (2012)

Note: Monthly data. The break-even inflation rate is inferred from TIPS with a 10-year reference horizon.

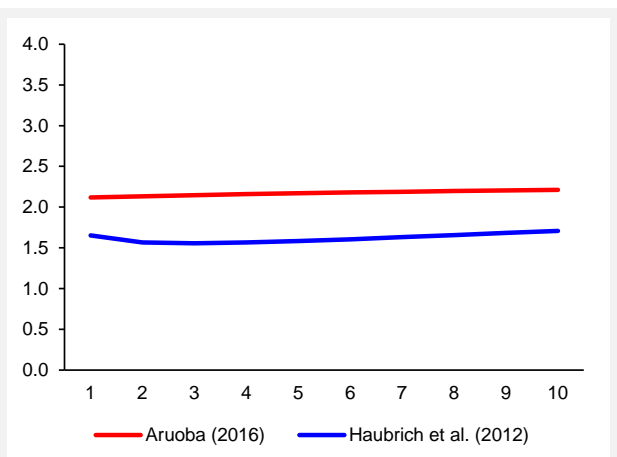


Chart 6 Time curve of inflation expectations, April 2016

Source: Haubrich et al. (2012), Aruoba (2016)

Note: Haubrich et al. (2012) – aggregate indicator, Aruoba (2016) – expectations of experts

<sup>4</sup> The chart shows the break-even inflation rate (average expected inflation at the given horizon) as a function of the maturity of the security on the horizontal axis. More on this method can be found in Gurkaynak, Sack and Wright (2008).



It might seem from the comparison that financial markets are much less optimistic than respondents about expected inflation. One way of dealing with the differences between the alternatives is to pool information from multiple sources into a single indicator. Haubrich, Pennacchi and Ritchken (2012) have developed an approach based on swaps and survey results and are continuing to update their estimates (see Chart 5).

Their measure of inflation expectations shows a slight decline in the pre-crisis period and relative stability during the global financial crisis. Unlike the break-even inflation rate inferred from TIPS, it has been stable since 2013. The yield curve again indicates a persistently low-inflation environment in the USA – 0.5 pp lower than experts' expectations (Aruoba, 2016; see Chart 6). In the next section, we will therefore look at the possible causes of this difference, in particular with regard to factors that are currently affecting inflation expectations.

## 2 Long-run versus short-run inflation expectations

Long-run inflation expectations are usually very stable. According to Marcet and Nicolini (2003), agents' estimates of long-run inflation change only very slowly as the number of observations gradually increases. Only if they are surprised **repeatedly** or **significantly** do economic agents shift their emphasis to the latest news and long-run inflation expectations become more sensitive to new information. A revision thus occurs if new information significantly changes short-run inflation expectations. Another factor is agents' different behaviour. If financial market participants are more sensitive to new information than bank experts as regards internal dynamics (i.e. market liquidity, risk premium, etc.), they may reflect it in their outlooks more quickly. Experts may rely more on the steps taken by a central bank whose mandate focuses on price stability. The long-run inflation expectations of Consensus Forecasts (6 to 10-year outlook) for Japan, for example, were positive and stable (at around 1%) in the last decade despite the country facing moderate but persistent deflation for many years.

The current downward pressures on inflation expectations might be just a temporary phenomenon related to the relatively long period of low inflation, and expectations might rise again after the anti-inflationary pressures fade out. The overall inflation rate in the USA slumped to zero in March 2015 and did not exceed 1% until 2016 Q1 (see Chart 1). The main reason was a sharp drop in oil prices, while the performance of the US economy improved considerably last year. However, inflation has averaged just 1.6% over the last ten years. The strengthening of the US dollar against other currencies, particularly those of emerging economies, has also had an anti-inflationary effect. In the past two months, however, the trend has changed, with oil prices rising again and the dollar weakening. The break-even inflation rate (at the 5-year horizon) has thus also increased (see Chart 7). The anti-inflationary effects should therefore subside over the next six months, and inflation and inflation expectations should reflect the strong economic performance and upward wage pressures. According to the Atlanta Fed's Wage Growth Tracker, hourly wages have been rising steadily since the financial crisis, although they are still below the 2007 level (see Chart 8).

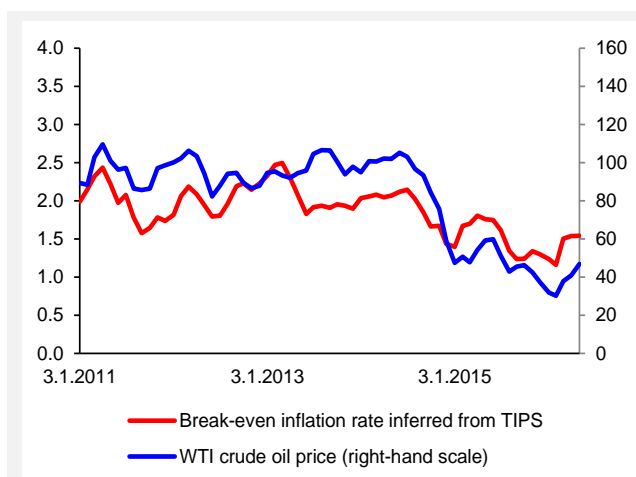


Chart 7 Inflation expectations and oil price

Source: Gurkaynak, Sack and Wright (2008)

Note: Monthly data. The break-even inflation rate is inferred from TIPS with a 5-year reference horizon. Oil price in USD/barrel.



Chart 8 Inflationary factors – wage growth

Source: Atlanta Fed Wage Growth Tracker

Note: Monthly data. Three-month moving average, median, total population.

As a result, the latest FOMC rate outlook contains a gradual monetary policy tightening. However, the risks to the scenario include not only low growth in domestic productivity, but also a significant slowdown abroad (particularly in China). Markets may thus be signalling that they do not consider the scenario of continuing recovery in the USA and a gradual rate increase realistic. The US economy is slowing, the improvement on the labour market has halted and leading indicators are not very positive either. On the other hand, it cannot be ruled out that the current decline in the break-even inflation rate also reflects other factors.

### 3 Market factors and the spillover effect

As indicated in the first section, TIPS may not be the ideal instrument for estimating inflation expectations. A whole range of studies have attempted to analyse the causes. For illustration, we provide a decomposition of the break-even inflation rate taken from Abrahams et al. (2015). This model suggests that adjusted inflation expectations were stable above 2% (see Chart 9). The negative liquidity premium only had a major effect during the financial crisis, whereas the current decline is related to a lower risk premium. The risk premium expresses the compensation of investors for the risk that their estimate of future inflation is wrong. This premium is closely linked to current developments, i.e. persistently stable inflation reduces the compensation for the risk an investor must bear. Here we might be seeing not only the effect of oil prices, but also financial markets' confidence in central banks' readiness to intervene against an unwanted divergence from the expected scenario. The distributions of expected inflation derived from options also indicate greater financial market confidence in stable inflation.

Another factor may be spillovers between markets on the global scale. Ciccarelli and García (2015) show that since autumn 2014, developments in the euro area have also contributed to the decline in US inflation expectations (see Chart 10). An asymmetric effect is only present in long-run inflation expectations regardless of the type of the financial instrument. This shock was probably due to the sharp deterioration in the inflation outlook in the euro area caused by lower oil prices and a negative output gap. According to the authors, short-run inflation expectations are affected mostly by internal (idiosyncratic) shocks, whereas spillover explains almost one-third of long-run inflation expectations.

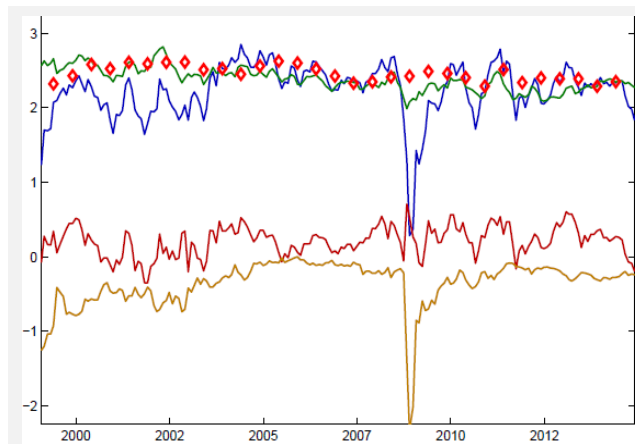


Chart 9 Decomposition of the break-even inflation rate

Source: Abrahams et al. (2015).

Note: Break-even inflation rate (blue), risk premium (red), liquidity component (yellow), expected inflation (green), Blue Chip Financial Forecasts (red dots)

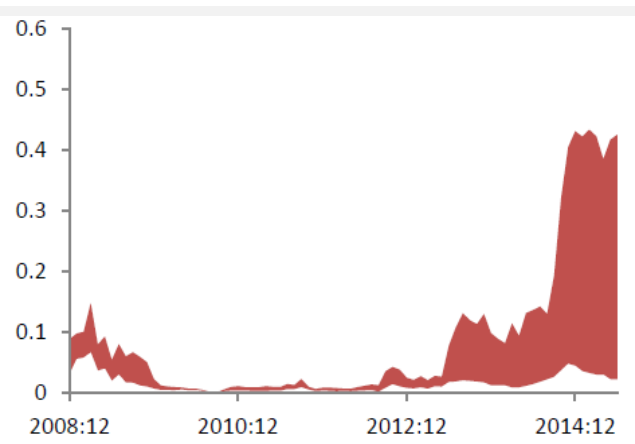


Chart 10 Time-varying spillover

Source: Ciccarelli and García (2015)

Note: Spillover of domestic shocks on a 48-month window (rolling estimates)

### 4 Conclusion

To sum up, market outlooks indicate a decline in inflation expectations in the USA, whereas the view of experts is that fulfilment of the Fed's target is not at risk. We have attempted to describe the possible reasons (different sensitivity to new information, the effect of the risk premium, and spillover effects). Most of them are temporary and should not be a source of concern for the Fed. However, the possibility that the outlook for the US economy has been fundamentally revised cannot be ruled out. According to financial markets, such a scenario would entail a long period of low inflation below the central bank's target.

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## A1. Change in GDP predictions for 2016

	CF		IMF		OECD		CB / EIU	
EA	<b>-0.1</b>	2016/7	<b>-0.2</b>	2016/4	<b>+0.2</b>	2016/6	<b>+0.2</b>	2016/6
		2016/6				2016/1		
US	<b>0</b>	2016/7	<b>-0.2</b>	2016/4	<b>-0.2</b>	2016/6	<b>-0.2</b>	2016/6
		2016/6				2016/1		
DE	<b>-0.1</b>	2016/7	<b>-0.2</b>	2016/4	<b>+0.3</b>	2016/6	<b>-0.1</b>	2016/6
		2016/6				2016/1		
JP	<b>0</b>	2016/7	<b>-0.5</b>	2016/4	<b>-0.1</b>	2016/6	<b>-0.3</b>	2016/4
		2016/6				2016/1		
BR	<b>+0.3</b>	2016/7	<b>-0.3</b>	2016/4	<b>-0.3</b>	2016/6	<b>0</b>	2016/7
		2016/6				2016/1		
RU	<b>+0.3</b>	2016/7	<b>-0.8</b>	2016/4	<b>-1.3</b>	2016/6	<b>+0.4</b>	2016/7
		2016/6				2016/1		
IN	<b>0</b>	2016/7	<b>0</b>	2016/4	<b>0</b>	2016/6	<b>0</b>	2016/7
		2016/6				2016/1		
CN	<b>-0.1</b>	2016/7	<b>+0.2</b>	2016/4	<b>0</b>	2016/6	<b>0</b>	2016/7
		2016/6				2016/1		

## A2. Change in inflation predictions for 2016

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

### A3. List of abbreviations

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

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

### 2016

	<b>Issue</b>
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

	<b>Issue</b>
Competitiveness and export growth in selected Central European countries (Oxana Babecká Kucharčuková)	2014-9
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