

# GLOBAL ECONOMIC OUTLOOK - MAY

Monetary Department  
External Economic Relations Division

2017



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**Cut-off date for data**

12 May 2017

**CF survey date**

8 May 2017

**GEO publication date**

19 May 2017

**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, with exception of MT and LU, for which they come from EIU.

Leading indicators are taken from Bloomberg and Datastream.

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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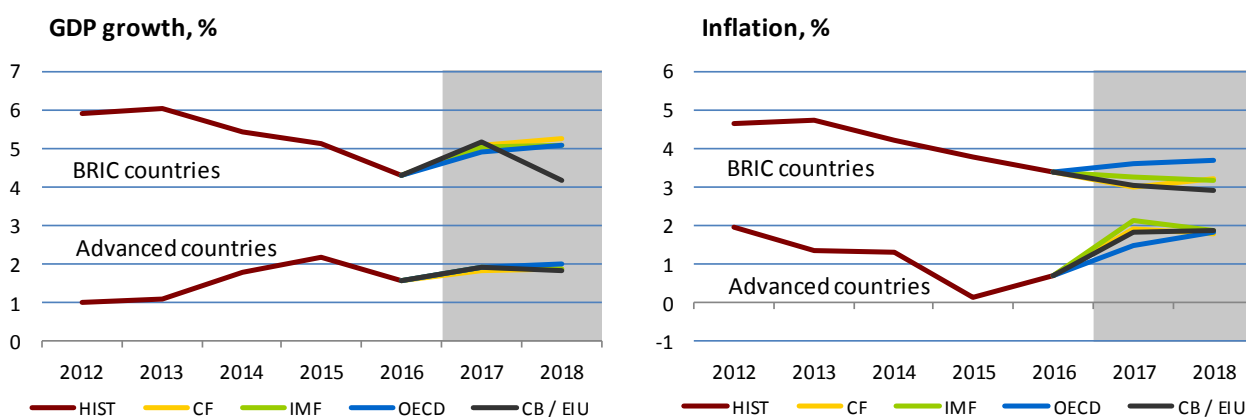
The May issue of Global Economic Outlook presents the regular monthly overview of recent and expected developments in selected territories, focusing on key economic variables: inflation, GDP growth, leading indicators, interest rates, exchange rates and commodity prices. In this issue, we focus on the question of whether the oil market is approaching equilibrium. We consider in more detail, among other things, the behaviour of OPEC and US shale oil producers observed over the last three years. We also attempt to identify the causes of occasional sharp swings in oil prices.

Compared to the previous month, the outlooks for annual GDP growth in selected advanced economies up to the end of 2018 recorded a slight increase in the euro area and Germany, and also in Japan. The US economy will probably slow more markedly this year than was expected just a few months ago. However, the estimates of its performance in 2018 are unchanged (expecting economic growth of just under 2.5%), offering hope that the current slowdown can be regarded as only temporary. The GDP growth outlook for the UK this year has also been lowered slightly, as the broader economic impacts of last year's Brexit referendum have started to manifest themselves gradually. However, the outlooks for next year have been raised, pointing indirectly to confidence that the Brexit negotiations will run smoothly. The expected inflation figures for the individual countries for both this year and the next remain close to the economic growth figures given above and, from the perspective of Consensus Forecasts, are lower than the March outlooks only in the case of the USA. There, as in the UK, inflation is expected to be visibly above 2%. Neither the euro area nor Germany will reach this targeted level by the end of next year. In Japan, inflation will probably struggle to reach 1%.

The annual GDP growth outlooks for the BRIC group saw no visible revisions in April. A gradual slowdown in Chinese economic growth continues to be expected, although the pace of this slowdown for this year is lower compared to the previous month. The Indian economy is expected to maintain impressive growth of about 7.5%. This is satisfactory news not only for these two large economies, but also for the global economy as a whole. A shift towards lower imbalances was recorded by the less dynamic emerging economies recently hit by slumpflation (Russia and Brazil). They are thus expected to show a modest rise in GDP growth and a fall in consumer price inflation.

The outlooks for euro area interest rates remain very low. They dropped slightly compared to the previous month in response to inflation in the euro area and communications by ECB representatives. In the USA, by contrast, interest rates can probably be expected to be raised further already in H1 by the standard amount of 0.25 pp despite a slight slowdown of the US economy. According to CF, the US dollar will appreciate slightly against all the monitored currencies at the one-year horizon. The price of Brent crude oil is expected to average around USD 52 a barrel this year and the next, i.e. a lower level than signalled by the April outlooks. Prices of non-energy commodities are expected to rise very slightly at the one-year horizon due to food commodities, with prices of wheat, rice and corn expected to go up, and due to metals prices.

## GDP growth and inflation development and outlook in monitored countries

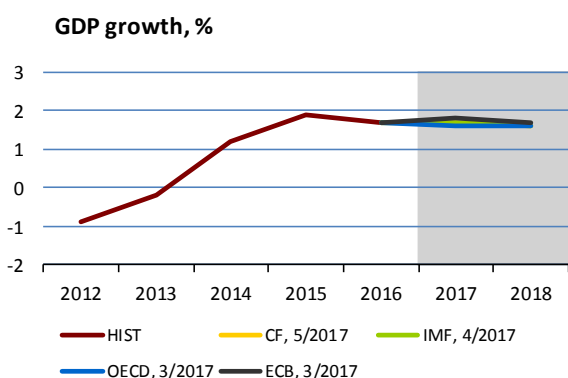


Note: The figures represent the weighted averages of historical series / outlooks in individual countries. The weights are based on nominal GDP measured in USD during 2011–2015 (source: EIU). Advanced countries: euro area, United States, United Kingdom, Japan. BRIC countries: China, India, Russia, Brazil.

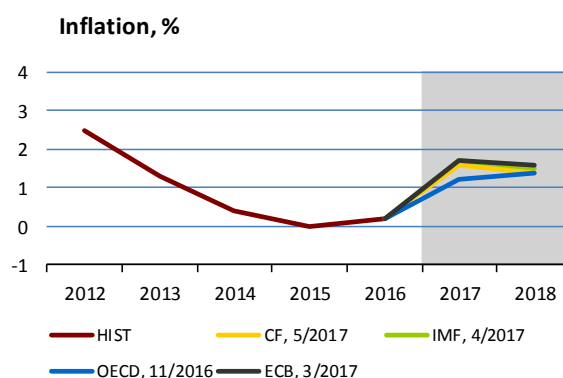
II.1 Euro area

The favourable monthly data at the start of this year are reflected in the preliminary estimate of euro area GDP growth, which reached 0.5% quarter on quarter, i.e. the same growth rate as at the end of last year, according to Eurostat. Leading indicators rose again in April, signalling a solid start to Q2. The [PMI](#) in manufacturing reached a six-year high, reflecting growth in all its components. The European Commission's Economic Sentiment Indicator (ESI) is at its highest level since 2007, buoyed, among other things, by favourable labour market developments. The performance of the economy is being supported by the still easy monetary policy of the ECB, the recovery of the global economy and the weak exchange rate of the [euro](#). GDP growth is expected to be in the range of 1.6%–1.8% this year and slow slightly next year. The decrease in political uncertainty following the presidential elections in France could lead to further upward revisions of the growth outlook.

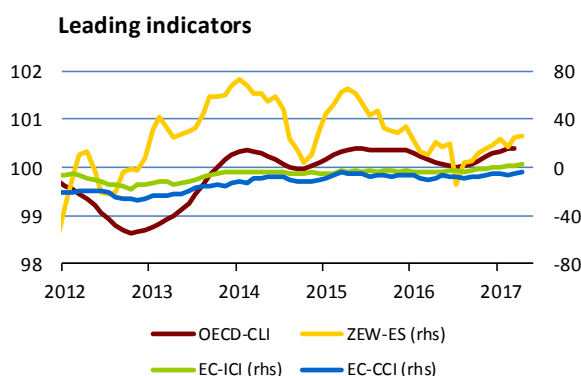
According to Eurostat's flash estimate, inflation rose from 1.5% to 1.9% in April, mainly on account of higher services prices. In the months ahead, however, inflation is expected to fall as the contribution of energy prices fades. It is expected to average around 1.7% this year. Next year it should be driven mainly by its core components and should therefore fall to around 1.5%. The financial market uncertainty associated with the elections in France on 7 May dissipated, leading to a decrease in the spread between French and German bond yields. However, government bond yields in the euro area generally increased slightly on expectations of earlier normalisation of monetary policy by the ECB. At its April meeting, the ECB repeated its commitment to continue its asset purchases at least until the end of this year and to leave its key rates at the current or lower level at least for the duration of the asset purchase programme. This is reflected in the 3M EURIBOR market outlook, which is negative over the entire monitored horizon.



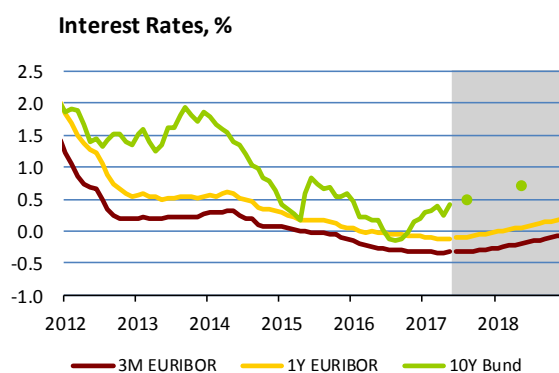
	CF	IMF	OECD	ECB
2017	1.7 →	1.7 ↗	1.6	1.8
2018	1.6 ↘	1.6 ↘	1.6	1.7



	CF	IMF	OECD	ECB
2017	1.6 →	1.7 ↗	1.2	1.7
2018	1.4 ↘	1.5 ↘	1.4	1.6



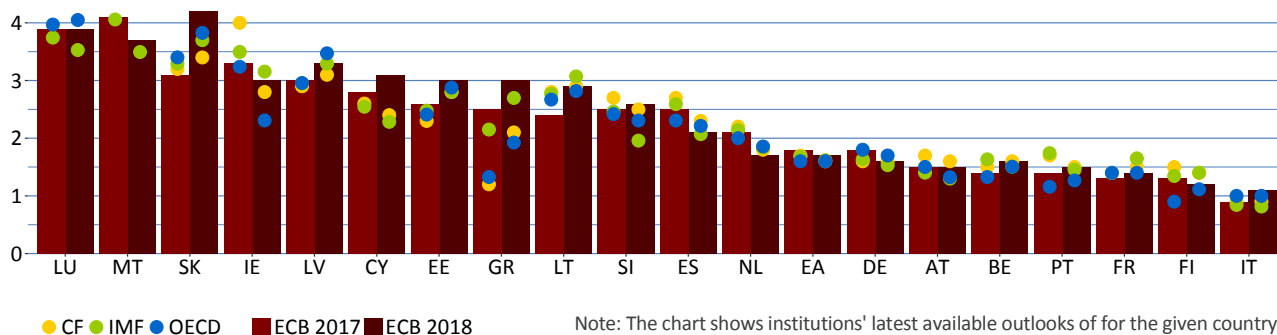
	OECD-CLI	ZEW-ES	EC-ICI	EC-CCI
2/17	100.4	17.1	1.3	-6.2
3/17	100.4	25.6	1.3	-5.0
4/17		26.3	2.6	-3.6



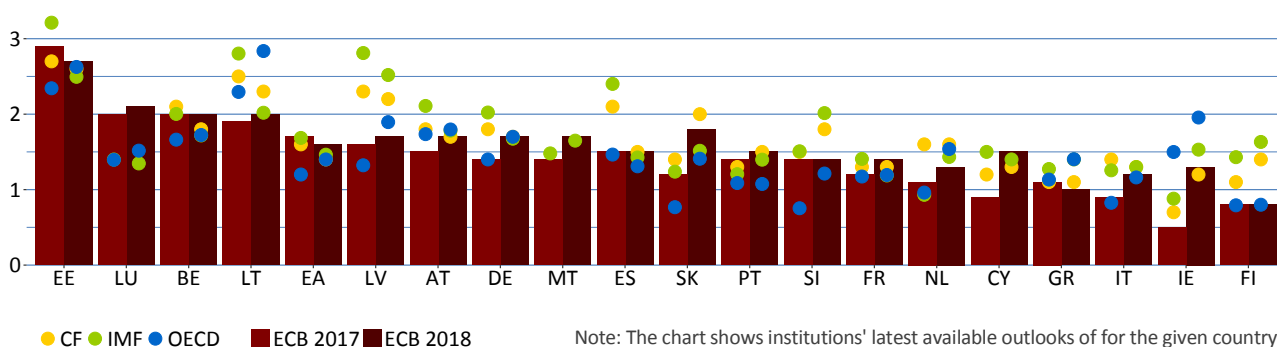
	04/17	05/17	08/17	05/18
3M EURIBOR	-0.33	-0.33	-0.32	-0.19
1Y EURIBOR	-0.12	-0.12	-0.09	0.06
10Y Bund	0.25	0.42	0.50	0.70

## II. ECONOMIC OUTLOOK IN ADVANCED ECONOMIES

### GDP growth outlooks in the euro area countries in 2017 and 2018, %

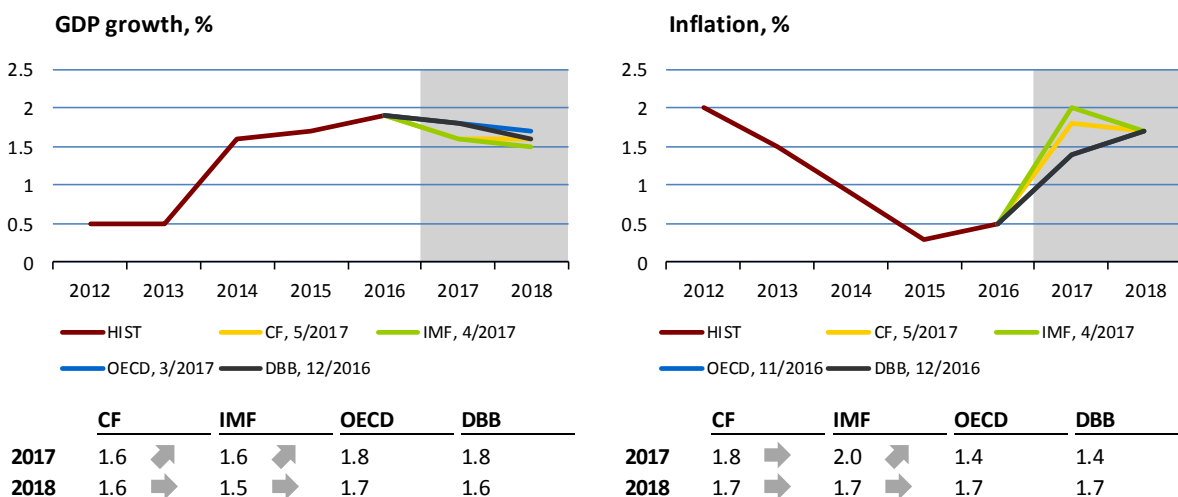


### Inflation outlooks in the euro area countries in 2017 and 2018, %



## II.2 Germany

The outlook for German economic growth this year was raised. In 2017 Q1, the economy grew at a solid pace. Quarterly growth accelerated to 0.6%. In year-on-year terms, GDP rose by 1.7%. Industrial production recorded strong quarterly growth in Q1. The growth was due to both domestic and external demand, which favourably affected the labour market. The unemployment rate fell to 5.8% in April. The April [PMI](#) in manufacturing stayed at roughly the same high level as a month earlier. Together with increases in the IFO and ZEW leading indicators, this indicated expectations of solid economic growth in Q2 as well. After recording a lower level in March, inflation reached 2% in April, owing mainly to a positive contribution from energy prices. Core inflation rose to 1.6% in April. Following modest growth at the close of last year, the ten-year government bond yield was flat at 0.3%.

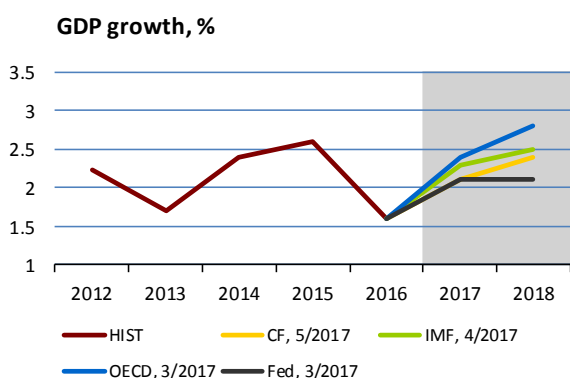


### II.3 United States

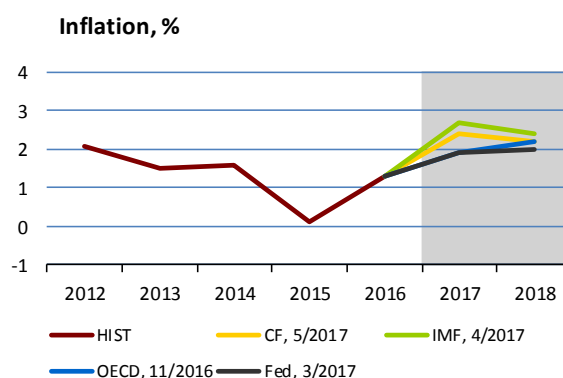
According to the first estimate, the US economy slowed markedly in 2017 Q1. GDP growth was just 0.7% (in annualised quarterly terms), the lowest level in three years. The first estimate was below financial market expectations but is likely to be revised up given the labour market situation. A fall in government consumption (-1.7%) and low household consumption growth (0.3%) made negative contributions to GDP growth. However, investment and exports showed robust growth (of 4.4% and 5.8% respectively).

The US labour market saw a substantial improvement in April compared to March. Non-farm payrolls rose by 211,000 (versus an expected 190,000). The unemployment rate dropped further to 4.4% and the average hourly wage rose by 2.5% year on year. According to the Conference Board survey, consumer confidence declined in April but remains relatively high. Consumers considered their current situation and, to a lesser extent, the labour market situation to be favourable. Annual growth in retail sales remains high (5.2%), but sales decreased for the second consecutive month in month-on-month terms. The [PMI](#) leading indicator continues to suggest an expansion in industry (54.8), but it dropped compared to March, mainly because of the assessment of new orders and employment.

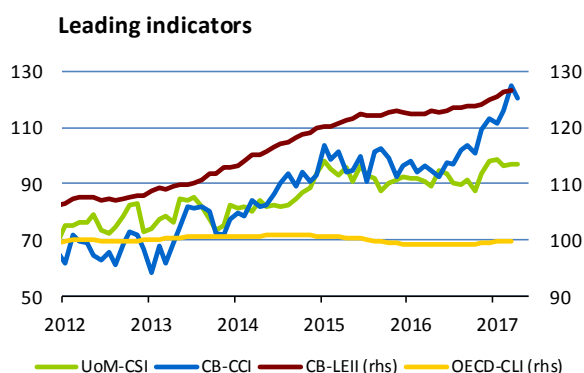
In April, annual headline inflation in the USA slowed to 2.2% and core inflation fell to 1.9%. By contrast, industrial producer prices rose at the fastest pace since February 2012 (2.5% year on year) as the effect of low oil prices and appreciation of the US [dollar](#) gradually faded. No changes were made to the monetary policy settings at the May FOMC meeting. According to the Fed, the current slowdown of the US economy is only temporary and growth will pick up pace again in the coming months. Markets thus continue to expect a gradual increase in the range for the policy rate, with 73% of the CF panellists expecting the next move to come in June. Compared to a month earlier, the May CF lowered its GDP growth outlook for 2017 and its inflation outlook for both years. The IMF left its growth outlook unchanged but revised its inflation outlook upwards for 2017 and downwards for 2018.



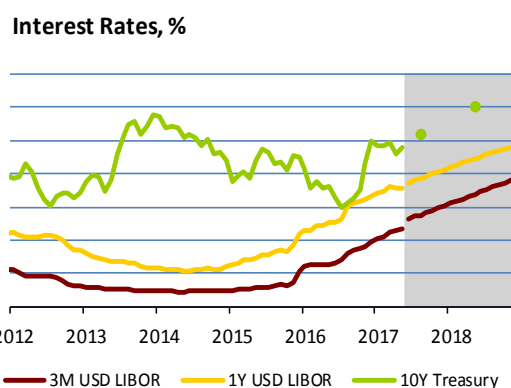
	CF	IMF	OECD	Fed
2017	2.1	2.3	2.4	2.1
2018	2.4	2.5	2.8	2.1



	CF	IMF	OECD	Fed
2017	2.4	2.7	1.9	1.9
2018	2.2	2.4	2.2	2.0



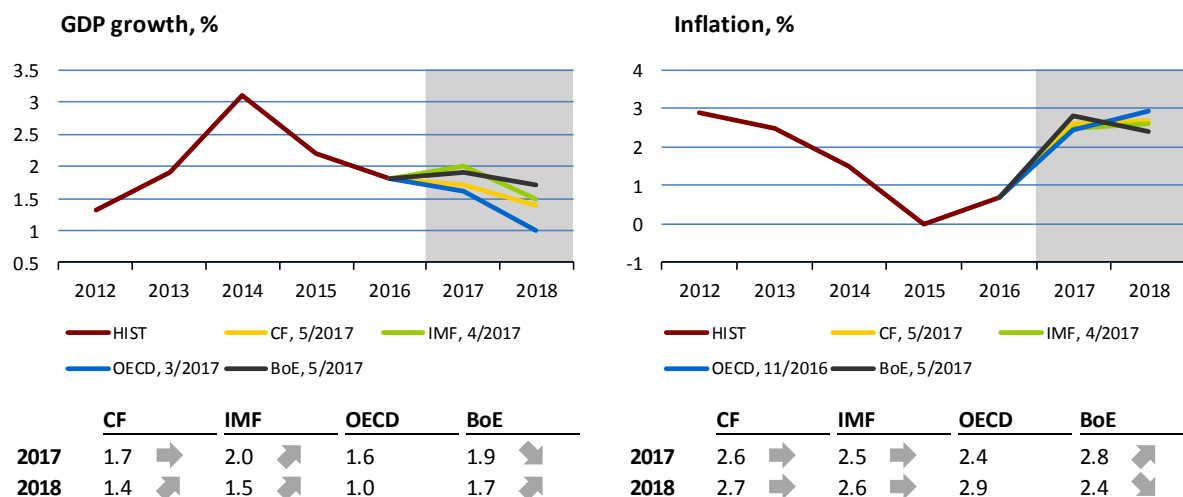
	UoM-CSI	CB-CCI	CB-LEII	OECD-CLI
2/17	96.3	116.1	126.2	99.8
3/17	96.9	124.9	126.7	99.8
4/17	97.0	120.3		



	04/17	05/17	08/17	05/18
USD LIBOR 3M	1.16	1.18	1.37	1.69
USD LIBOR 1R	1.78	1.78	1.92	2.23
Treasury 10R	2.29	2.39	2.60	3.00

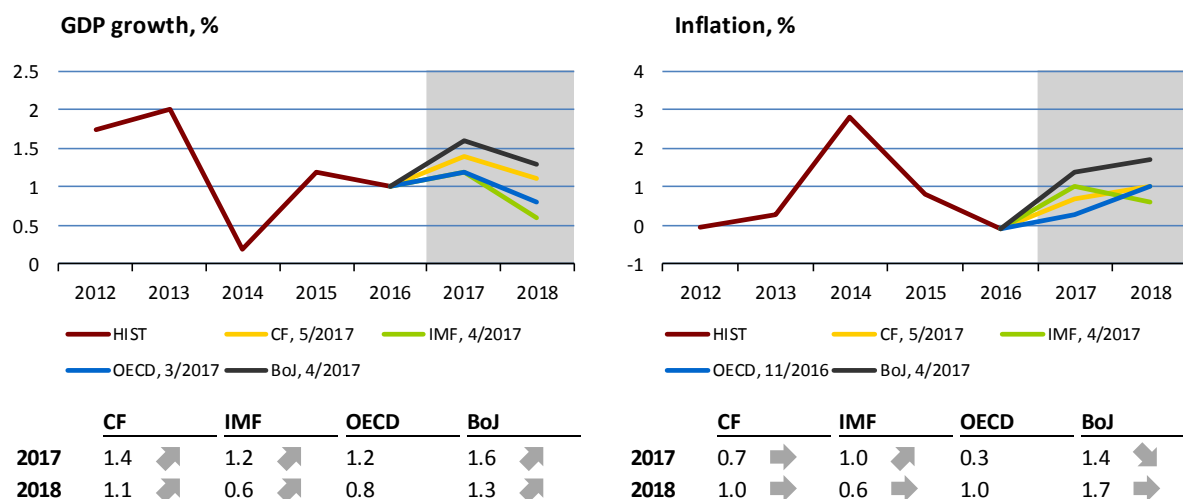
## II.4 United Kingdom

The UK economy is beginning to run out of steam. Quarterly GDP growth slowed to 0.3% at the start of the year (from 0.7% in 2016 Q4). Growth in services was particularly disappointing, but other consumption-linked sectors also rose at a slower pace. This is because the UK economy is slowly starting to feel the effects of last year's decision to leave the EU, which was reflected mainly in a marked depreciation of the [pound](#). Sterling has appreciated recently (in reaction to the surprise calling of parliamentary elections in the UK for June this year) but remains far below its pre-referendum level. The weaker currency was reflected mainly in higher consumer prices. Inflation is above the BoE's target (2.3% in March), real wage growth has halted and the household saving rate has dropped to a historical low. This is leading to a drop in retail sales (of 1.8% in March) and industrial production (which fell for the third consecutive month in April). The new BoE outlook is thus more pessimistic for 2017, but concerns regarding 2018 are easing.



## II.5 Japan

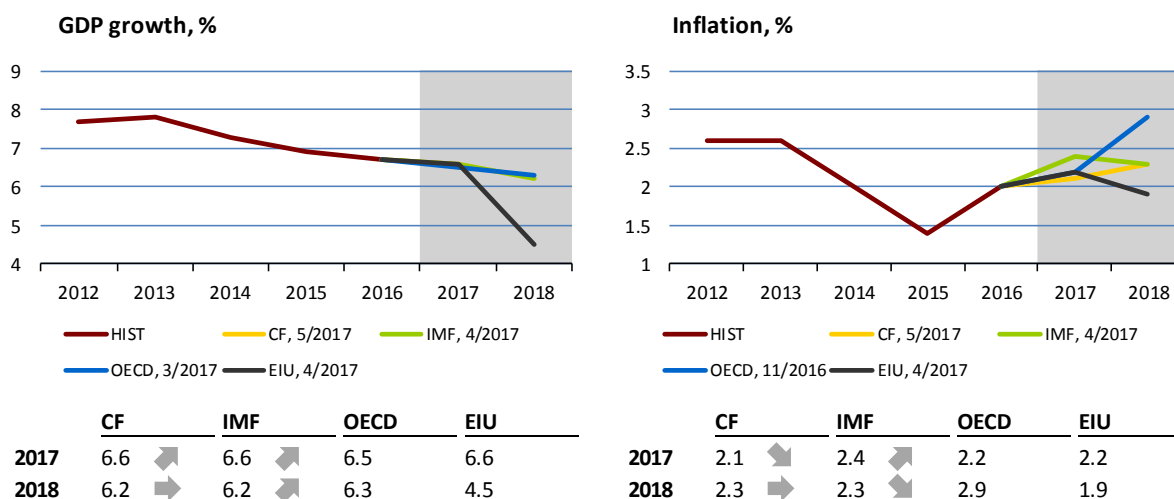
Retail sales saw a marked year-on-year rise in March despite a slowdown in wage growth. The decline in household expenditure also slowed. The unemployment rate remains very low. The annual change in industrial production decreased in March owing to a drop in mining and manufacturing. The [PMI](#) in manufacturing increased in April. According to purchasing managers, export growth strengthened considerably and output and employment rose at a solid pace, but growth in new orders slowed further. CF, the IMF and the BoJ increased their growth outlooks for the Japanese economy for both monitored years. Inflation edged down in March due to a fall in prices of fresh food. The inflation outlooks differ significantly. The monitored institutions expect inflation to be in the range of 0.3%–1.4% in 2017 and 0.6%–1.7% in 2018. The monetary policy settings were left unchanged at the BoJ's April meeting.





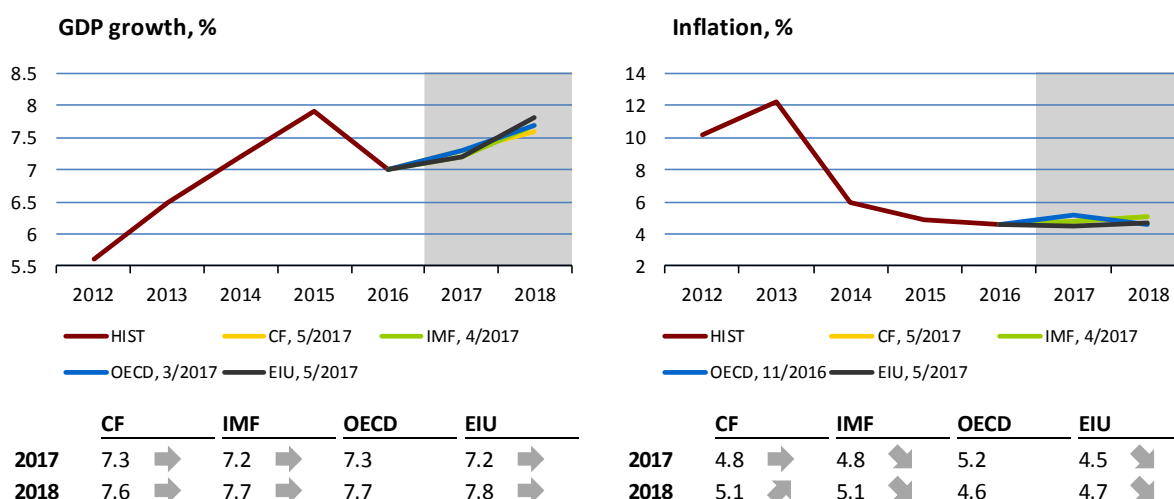
### III.1 China

An improvement in the economic situation in China in 2017 Q1 and a decline in the outflow of capital helped stabilise the [renminbi](#). The decline in international reserves halted and in April the central bank lifted its capital restrictions, which had been fuelling an expansion of the grey banking sector and property market. The current data for April indicate a rather moderate start to Q2. Slower annual growth was recorded for both retail sales (10.7%) and industrial production (6.5%). However, lending activity remains high, with domestic currency loans rising by 7.8% month on month in April. Consumer price inflation accelerated to 1.2% in April, due mainly to its non-food component. By contrast, producer price inflation fell (to 6.4%) in the same period, mainly because of a drop in prices of [commodities](#) (iron and steel). The May CF raised its GDP growth outlook for 2017 and lowered its inflation forecast for 2018. The new IMF forecast is the same as the May CF, except that the inflation outlook for 2017 is 0.3 pp higher.



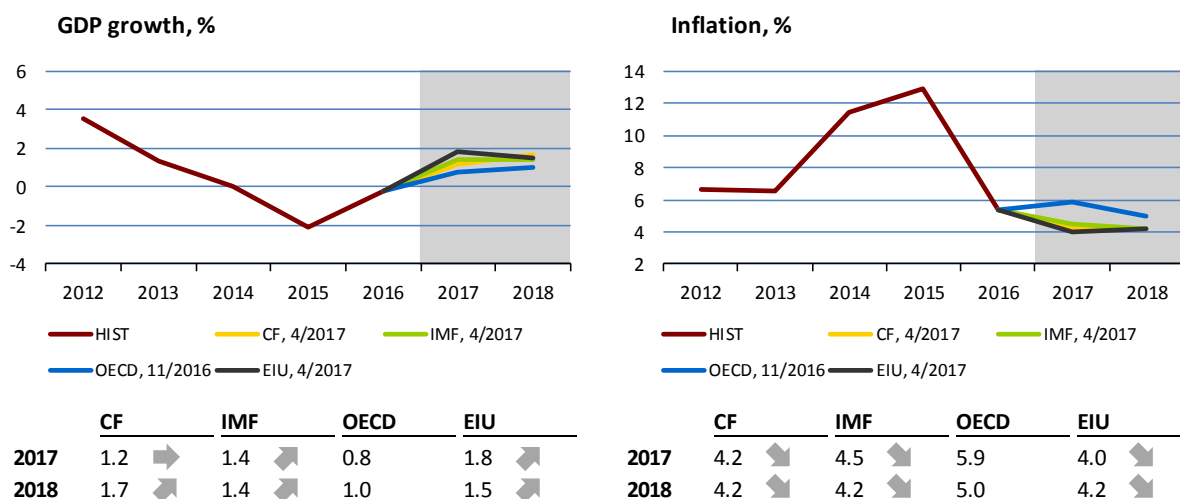
### III.2 India

Industrial production growth rose to 2.7% in March despite a slight decrease in manufacturing output. The [PMI](#) in manufacturing stayed at 52.5 points in April. According to purchasing managers, all the monitored categories recorded solid growth, but output and new orders grew at a slower pace. The predictions for India's economic growth were unchanged. According to the IMF, GDP growth will still be affected in this fiscal year by last year's demonetisation. However, its effect will disappear fully this year and economic growth should thus reach 7.7% on average next year. Inflation dropped to 3% in April owing to slower food price growth. Last year's monsoon season favourably affected the harvest and food production, so food prices can be expected to continue falling in the months ahead. This was also reflected in the IMF and EIU lowering their inflation outlooks for this fiscal year and the next. By contrast, CF increased its inflation forecast for fiscal year 2018/2019 by 0.1 pp.



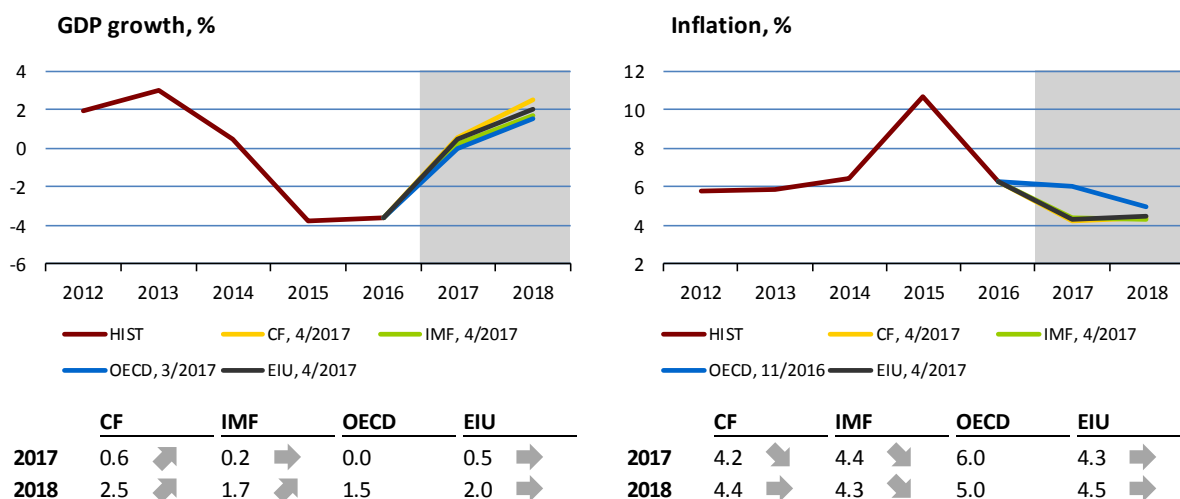
### III.3 Russia

The dynamics of most short-term indicators of the Russian economy have recently been favourable. Following a year-on-year decrease of 2.3%, industrial production returned to growth (0.8%) in April. Moreover, it rose by almost 13% in month-on-month terms. Unemployment fell further in March (to 5.4%). Nevertheless, the [PMI](#) in manufacturing sank to its lowest level (50.8) since August 2016, and the PMI in services declined as well. Inflation slowed by a further 0.2 pp to 4.1% in April. The Russian central bank expects inflation to remain close to the 4% target over the next two years. The bank also assesses inflation expectations as decreasing. Based on this and other assumptions, the RCB lowered its policy rate by 0.5 pp to 9.25% in early May. The most recent CF, IMF and EIU outlooks expect GDP growth of between 1.2% and 1.8% at the two-year horizon and a decrease in consumer price inflation to 4.2% as of December 2018.



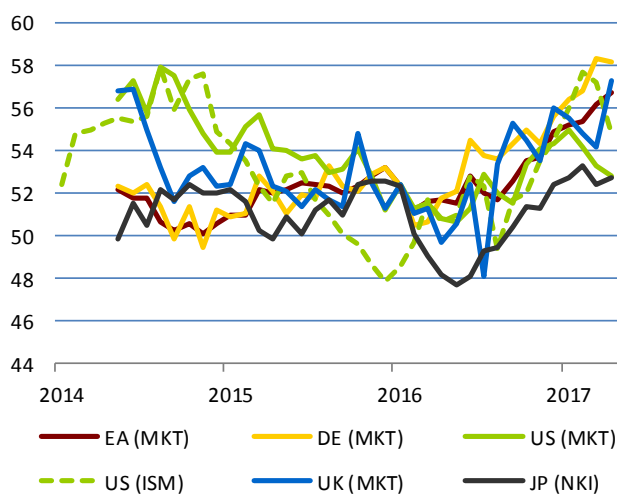
### III.4 Brazil

The [PMI](#) leading indicators for both manufacturing and services returned to the expansion band for the first time since early 2015 (the most recent values are 50.1 and 50.3 respectively). While the month-on-month change in manufacturing was relatively small, the PMI in services recorded a sharp increase due to newly established businesses, which rose at the fastest pace in two years, and purchasing managers expect them to continue rising. For the second consecutive month, the better PMI in manufacturing was due to observed growth in new orders and a general assumption of an improvement in domestic demand. The dynamics of short-term economic indicators were mixed. The new CF revised its GDP outlooks for 2017 and 2018 to 0.6% and 2.5% respectively. This forecast is more optimistic than those of the IMF and EIU, especially as regards next year. Inflation is expected to be in the range of 4.2%–4.5% at the two-year horizon.

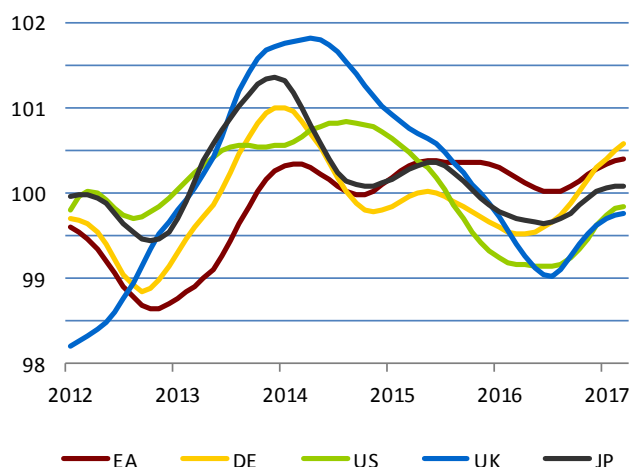


IV.1 Advanced economies

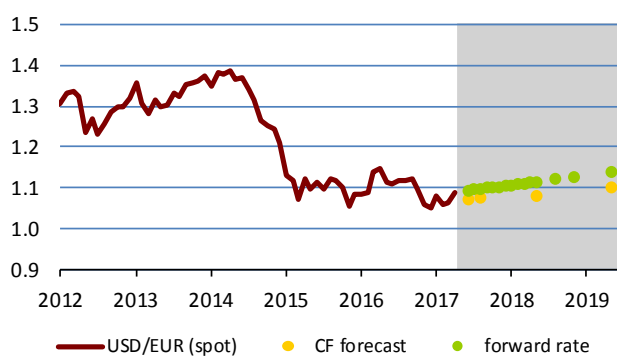
PMI in manufacturing



OECD-CLI

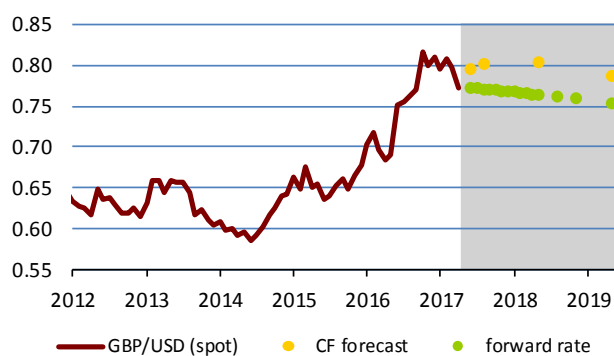


The US dollar (USD/EUR)



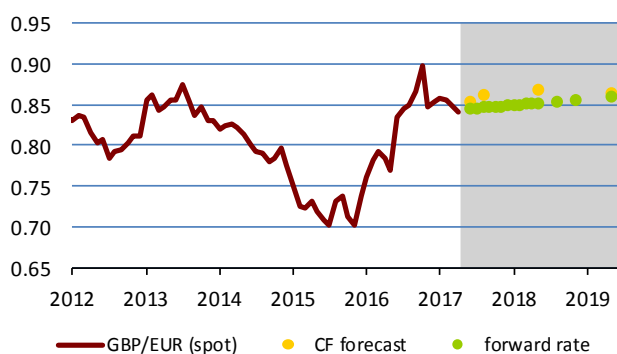
	8/5/17	06/17	08/17	05/18	05/19
spot rate	1.093				
CF forecast		1.073	1.075	1.079	1.099
forward rate		1.094	1.097	1.115	1.140

The British pound (GBP/USD)



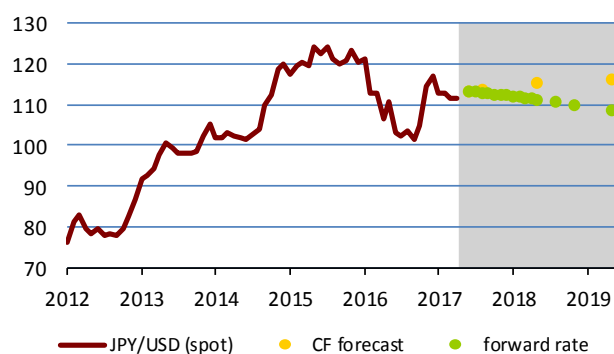
	8/5/17	06/17	08/17	05/18	05/19
spot rate	0.773				
CF forecast		0.794	0.801	0.804	0.786
forward rate		0.772	0.771	0.764	0.754

The British pound (GBP/EUR)



	8/5/17	06/17	08/17	05/18	05/19
spot rate	0.845				
CF forecast		0.852	0.861	0.867	0.864
forward rate		0.845	0.846	0.852	0.859

The Japanese yen (JPY/USD)

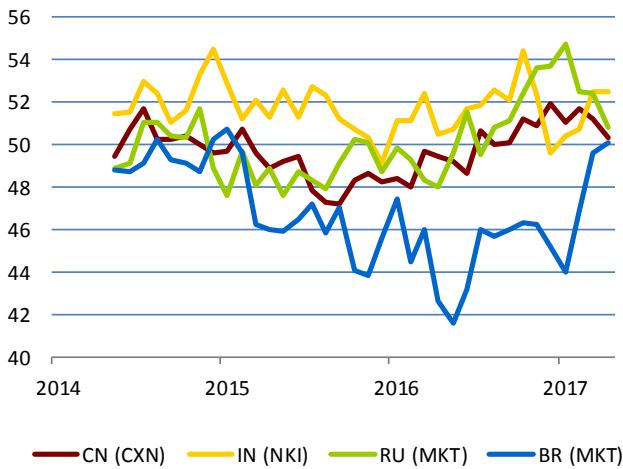


	8/5/17	06/17	08/17	05/18	05/19
spot rate	112.8				
CF forecast		113.0	113.5	115.2	116.3
forward rate		113.1	112.8	111.2	108.5

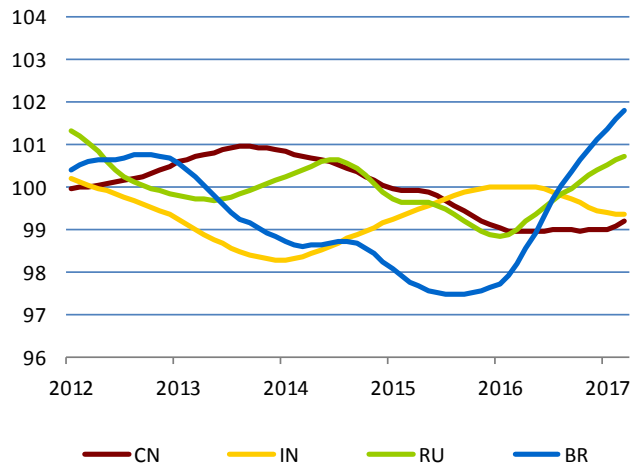
Note: Exchange rates as of last day of month. Forward rate does not represent outlook; it is based on covered interest parity, i.e. currency of country with higher interest rate is depreciating. Forward rate represents current (as of cut-off date) possibility of hedging future exchange rate.

IV.2 BRIC countries

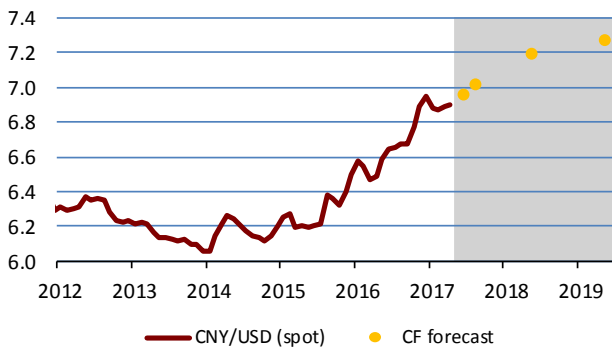
PMI in manufacturing



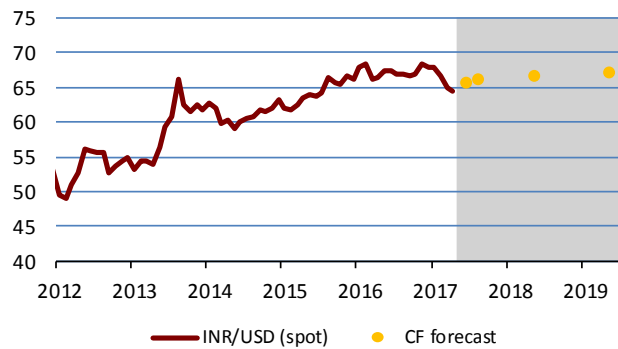
OECD-CLI



The Chinese renminbi (CNY/USD)



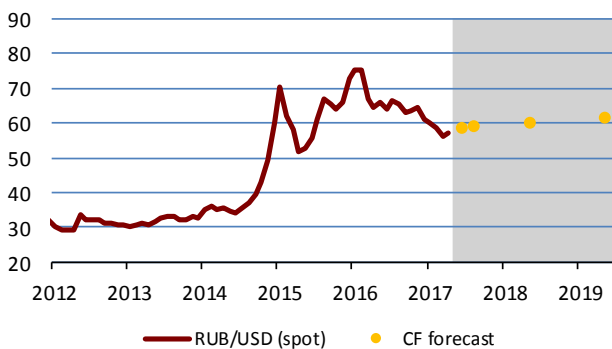
The Indian rupee (INR/USD)



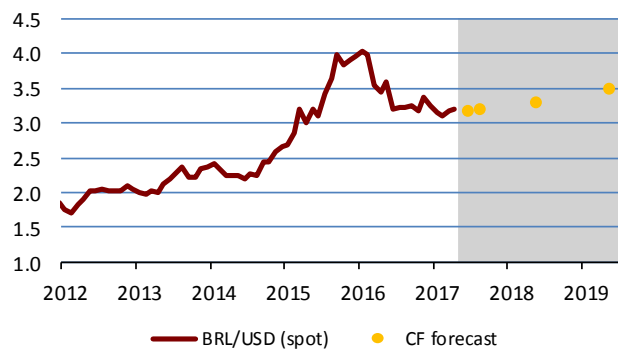
	8/5/17	06/17	08/17	05/18	05/19
spot rate	6.903				
CF forecast		6.962	7.013	7.192	7.273

	8/5/17	06/17	08/17	05/18	05/19
spot rate	64.29				
CF forecast		65.69	66.06	66.76	67.03

The Russian rouble (RUB/USD)



The Brazilian real (BRL/USD)



	8/5/17	06/17	08/17	05/18	05/19
spot rate	58.11				
CF forecast		58.46	59.03	60.19	61.66

	8/5/17	06/17	08/17	05/18	05/19
spot rate	3.194				
CF forecast		3.17	3.193	3.286	3.502

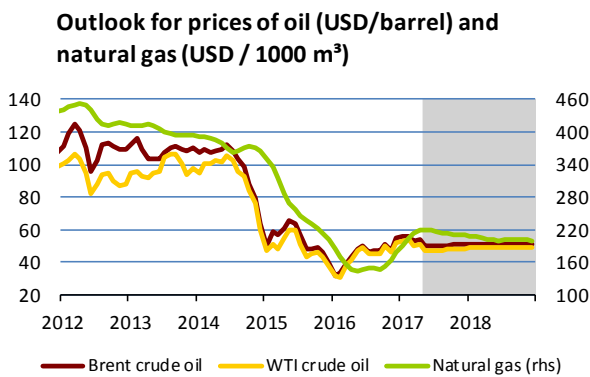
Note: Exchange rates as of last day of month.

### V.1 Oil and natural gas

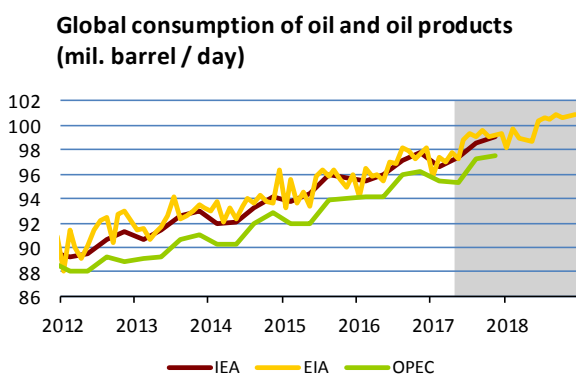
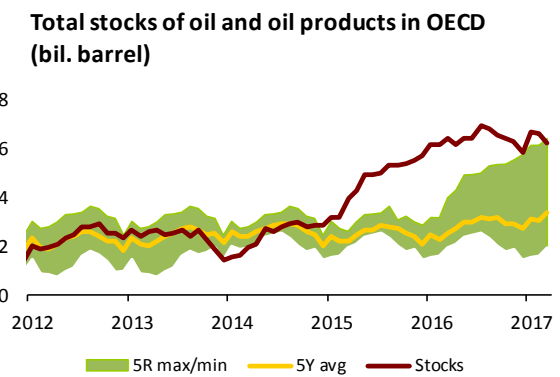
Following three months of stability, the oil price started to fluctuate in March. It rose in the first half of April, briefly returning above USD 55/bbl, as OPEC and other major producers showed willingness to extend their voluntary output limits into the second half of the year. However, concerns later prevailed that strong extraction growth in the USA, which is expected to continue over the outlook horizon, will slow the decline in global stocks, and oil prices started to fall again. In the first week of May, Brent even dropped below USD 50/bbl, although it later corrected by about USD 2/bbl. Oil price volatility was also driven strongly by speculative investors, while changes in the dollar exchange rate dampened the fluctuations. So far, the large agencies do not agree on whether the market is rebalancing. For example, the EIA expects global stocks to rise by 0.2 million barrels a day in 2017 and even by 0.5 million barrels a day in 2018.

The market futures curve as of the May CF survey date shifted downwards, reflecting the renewed strong decline in oil prices. It is now slightly rising until the end of this year and implies an average price of USD 51.7/bbl this year. Thereafter, it is virtually horizontal, with an average price of USD 51.1/bbl next year. The May CF forecast for the one-year horizon is almost USD 4/bbl higher and the current EIA forecast also expects higher prices (USD 53/bbl this year and USD 57/bbl next year).

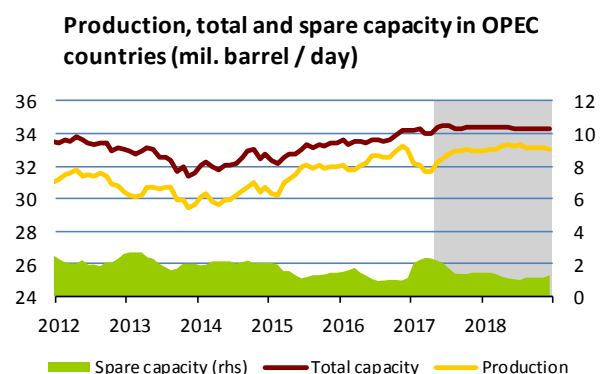
The price of natural gas in the USA fell in mid-April as warm weather in early spring led to faster filling of underground storages. For the month as a whole, however, it was higher on average than in March. The forecast for 2017 and 2018 expects further growth due to rising scope for exports from the USA and expected demand growth. The gas price in Europe was flat in April, as stocks there rose only gradually.



	Brent	WTI	Natural gas
2017	51.70 ↘	49.02 ↘	211.52 ↘
2018	51.07 ↘	48.79 ↘	201.97 ↘



	IEA	EIA	OPEC
2017	97.90 ↘	98.30 ↗	96.38 ↗
2018		99.94 ↗	



	Production	Total capacity	Spare capacity
2017	32.46 ↘	34.29 ↘	1.83 ↗
2018	33.14 ↘	34.34 ↘	1.21 ↗

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

Note: Oil price at ICE, price of Russian natural gas at German border – 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 – IEA estimate. Production and extraction capacity of OPEC – EIA estimate.

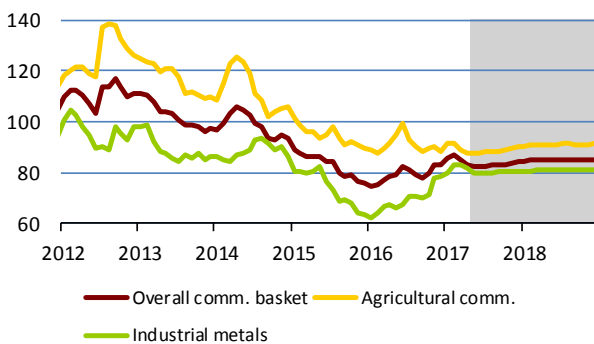
## V.2 Other commodities

The average monthly non-energy commodity price index continued to fall in April and the first half of May. Both its sub-indices showed a similar pattern, although the decline in the food commodity price index halted in early May. The outlook for all three indices is only modestly rising.

The global manufacturing outlook worsened slightly in April, with the JP Morgan PMI edging down from 53 to 52.8. Industrial production growth is expected to slow especially in China and the USA. This was the main reason for the continuing decline in the base metals price index. Weakening prospects of higher infrastructure investment in the USA and the weaker US economic growth in 2017 Q1 also contributed to the decline. Only the depreciating US [dollar](#) acted in the opposite direction. In addition, copper prices fell due to fading concerns of production shortfalls in Chile and Indonesia. Nickel prices plummeted, as government proposals for environmental protection in the Philippines were not approved, and iron ore prices dropped in reaction to a decrease in prices of steel, whose global production rose by 5.7% year on year (and by 1.8% in China) in March. Rubber prices fell further, so only aluminium prices continued to rise on account of expected production limits in China.

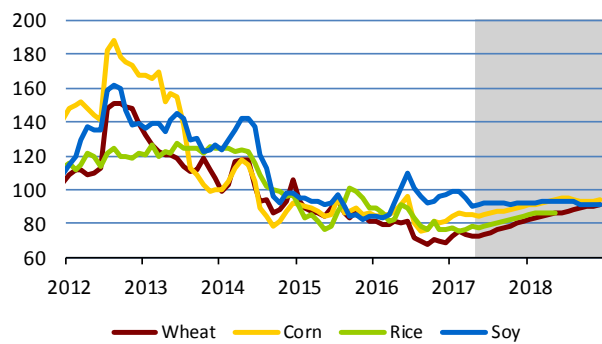
Grain prices fell slightly in reaction to a USDA report which raised the estimate of final global grain stocks for this trading year. Production estimates increased substantially for corn and soy in Brazil (by 38% and 15% respectively). However, wheat prices went up in late April due to frosts in North America's main grain-growing regions. Sugar prices continued to fall (owing to expected lower imports to India), as did cocoa prices. Only beef prices recorded relatively strong growth.

### Non-energy commodities price indices



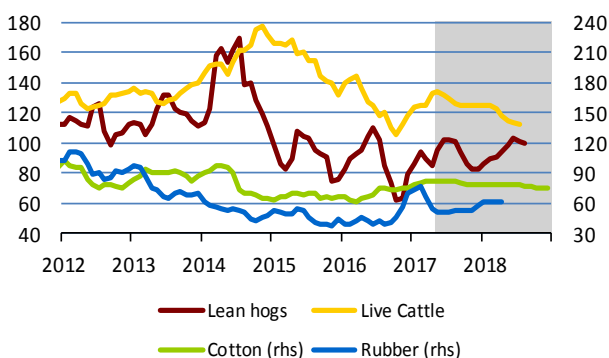
	Overall	Agricultural	Industrial
2017	83.8	89.0	80.7
2018	85.0	91.0	81.0

### Food commodities



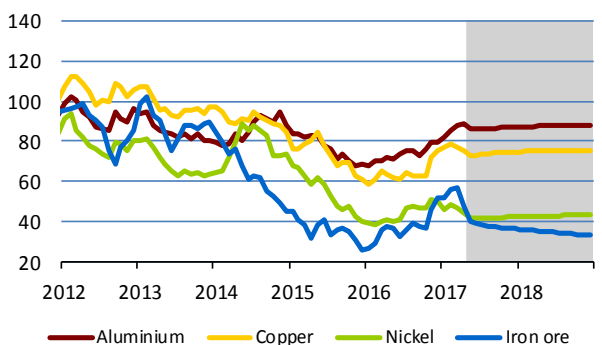
	Wheat	Corn	Rice	Soy
2017	75.8	86.6	79.8	93.2
2018	86.9	93.3	86.1	92.4

### Meat, non-food agricultural commodities



	Lean hogs	Live Cattle	Cotton	Rubber
2017	91.9	127.4	80.8	57.9
2018	95.6	118.8	77.3	61.2

### Basic metals and iron ore



	Aluminium	Copper	Nickel	Iron ore
2017	86.3	74.9	43.5	42.9
2018	87.7	75.0	42.9	34.6

Source: Bloomberg, CNB calculations.

Note: Structure of non-energy commodity price indices corresponds to composition of The Economist commodity indices. Prices of individual commodities are expressed as indices 2010 = 100.

## Is the oil market approaching equilibrium?<sup>1</sup>

An oil surplus in the market from mid-2014 onwards (see Chart 1) gradually pushed down the price of Brent crude oil from above USD 100/bbl in September 2014 to just below USD 30/bbl in February 2016. Then OPEC intervened, striking a deal with other large producers to cut oil output by up to 1.8 million barrels a day for six months. This led oil prices to rise above USD 50/bbl, but at the same time caused shale oil extraction to start going up again in the USA. What, then, is the current situation in the oil market? We try to answer this question in this article. We also look at what causes occasional sharp swings in oil prices.

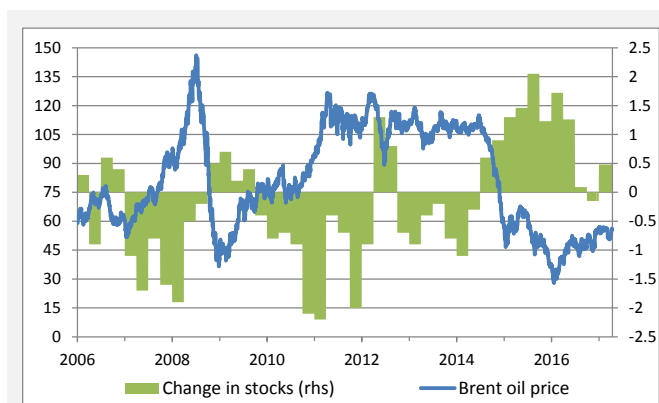


Chart 1 The Brent crude oil price and the difference between global oil output and consumption (change in global stocks)

Source: IEA.

Note: Daily data, oil price in USD/barrel, change in stocks in millions of barrels a day

### 1 Introduction: A look back

The key factor in the oil market since about 2011 has been rapid growth in shale oil output in the USA. It was triggered by high oil prices, which made the initially costly technology viable.<sup>2</sup> A sharp rise in the active rig count oriented on wells producing mostly oil<sup>3</sup> (see Chart 2) was subsequently reflected in growth in shale output, the share of which in total output in the USA soared (see Chart 3). The USA thus gradually reduced its dependence on oil imports,<sup>4</sup> while OPEC tried to keep the oil price high at the cost of growth in its output. This, however, caused its share in the oil market to decrease.

The oil price started to fall in about mid-2014 as growth in demand weakened while global output continued to rise. Everyone looked to OPEC in the hope that it would prop up oil prices by cutting its output. However, OPEC representatives stated that

they had no problem with lower oil prices. At a meeting in late November 2014, they endorsed current production and stated that the oil price should be determined solely by the market in the future.<sup>5</sup> Shale extraction was widely expected to become loss-making below the (relatively high from the present

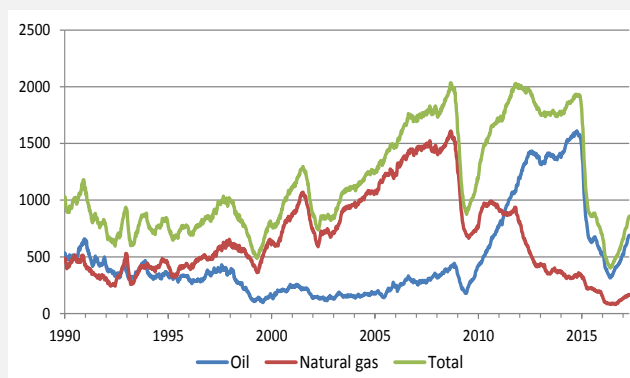


Chart 2 Active rig count in the USA

Source: Baker Hughes

Note: Weekly data

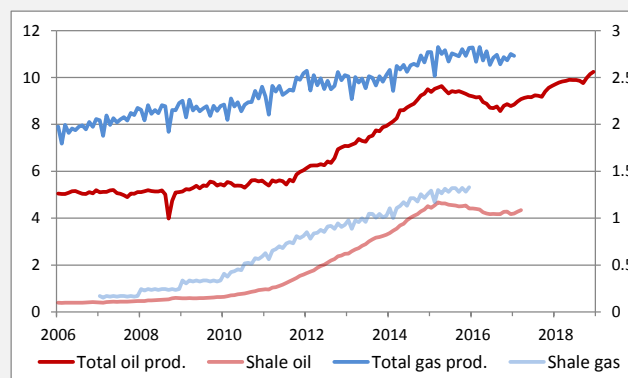


Chart 3 Oil and natural gas output in the USA

Source: EIA

Note: Oil in millions of barrels a day (EIA forecast from April 2017 onwards), gas in trillions of cubic feet a month (right-hand scale)

<sup>1</sup> Author: Jan Hošek. 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>2</sup> The high oil price also led to the development of other extraction methods with high investment and operating costs (from oil sands in Canada, in deep ocean water or in the Arctic). The use of alternative sources also quelled the previously hotly debated theories about peak oil, which had helped fuel the previous sharp price growth.

<sup>3</sup> Shale extraction of natural gas had recorded a similar boom before that. However, rigs geared mostly towards oil simultaneously produce gas, so the number of new rigs geared primarily towards natural gas has dropped sharply since 2009 without causing gas output to fall.

<sup>4</sup> Rising output in the USA, coupled with a long-running ban on crude oil exports from the USA, has resulted, among other things, in a dramatic increase in the Brent-WTI spread.

<sup>5</sup> Representatives of Saudi Arabia, which (as the only country with large spare extraction capacity) had borne the heaviest burden of past production limits, advocated for putting market share before a high oil price. The primary goal of this policy was to curb growth in extraction with high investment and operating costs in various parts of the world.



perspective) price of USD 75/bbl and drop sharply.<sup>6</sup> However, this process was nowhere near as rapid as OPEC had expected. Although investment in new shale fields fell relatively fast, the process was slowed by a number of factors. First, part of future production was hedged by futures contracts, enabling firms to produce even at the current loss-making price. Second, oil firms responded to the lower price with technical and technological changes.<sup>7</sup> Shale output growth thus halted only after the oil price dropped below USD 50/bbl in mid-January 2015. This forced financial investors to close short positions, and oil price growth thus offset a small part of the previous losses until about May. However, drilling activity in the USA started to pick up again at a price of about USD 65/bbl. OPEC output hit a record high (due, among other things, to renewed growth in oil output in Iran after international sanctions and the embargo on buying its oil were lifted) and the oil price fell again. At its Vienna meeting in November 2015, OPEC set no production quotas for the first time in several decades.<sup>8</sup> This caused the fall in prices to accelerate to a new low of below USD 30/bbl in mid-January 2016.

Low prices had caused budget problems in most OPEC countries before, as the government finances of these countries are heavily dependent on oil revenues. However, even Saudi Arabia started to have problems at this price, and its representatives began to consider restricting output<sup>9</sup> and look for allies (in particular Russia) for such action. Although this phase only involved “verbal interventions” and the first meeting between OPEC and Russia was held as late as April, the market responded with sharp growth and then stabilisation of the oil price. The final agreement to cap OPEC output (a six-month cut in oil output of 1.2 million barrels a day) was officially approved in late November 2016. A week later, 11 non-OPEC countries signed up to the deal, pledging to reduce output by a further 600,000 barrels a day. Oil prices soared in response, stabilising above USD 50/bbl despite record output, which OPEC and Russia increased until the end of 2016. At the start of 2017, OPEC as a whole did indeed cut output to almost the agreed extent, and Russia is also gradually reducing its output to the target level. However, the previous low prices seem to have induced action in the USA leading to a substantial drop in shale rig drilling and completion costs and a rise in new rig yields. The break-even price of shale oil<sup>10</sup> fell sharply as a result, and shale output in the USA started rising rapidly again at a price of over USD 50/bbl. This is limiting the effect of the output cut by OPEC and other large producers, and uncertainty about whether the agreed six-month cap on oil output will bring the oil market closer to equilibrium is thus returning to the market.

## 2 Evolution of fundamental factors – demand, supply and stocks

Demand for oil shows strong seasonal swings, but this seasonality is stable. The forecast for demand is thus relatively straightforward and is derived mainly from expected economic growth in various parts of the world.<sup>11</sup> Minor swings can be caused by the weather or planned and unplanned refinery shutdowns. These, however, lead mostly to short-term shifts in demand between seasons lasting several weeks or months. In addition, the structure of demand in terms of oil quality can change.<sup>12</sup>

The aggregate oil supply is generally more difficult to forecast. It is easiest to predict for the USA, where many indicators are monitored almost in real time, some of which may serve as leading indicators (the number of permitted, drilled, uncompleted, completed or producing wells). Forecasts in other countries are complicated, as output can be affected administratively and unplanned outages can occur in geopolitically unstable countries due to political tensions and military conflicts. In these countries, even the officially published data on current output are not very reliable because of strategic interests, while commercial statistics are not commonly (freely) available.

Demand and supply are also very hard to measure in real time. Statistics from different sources therefore differ slightly (see Charts 4 and 5). The market thus mainly follows information about changes in stocks.

<sup>6</sup> Shale wells are characterised by a rapid natural decline in yields.

<sup>7</sup> For example, they moved new rigs from the periphery of shale plays to their most productive areas (“sweet spots”) with better economics of extraction, or invested in processes maintaining higher and longer yields of existing wells rather than investing in new ones.

<sup>8</sup> It has been suggested that OPEC has stopped being a swing producer (i.e. a large producer which, thanks to its large reserve capacity, is able to deliberately adjust its output and so maintain equilibrium between supply and demand in the market) and that this role will in the future be played solely by shale extraction in the USA, which, due to its short investment horizon, can also respond relatively flexibly to price changes. However, the November 2016 Vienna agreement showed that OPEC does not intend to give up its price-setting role entirely, although it will have to take the falling shale extraction costs into account.

<sup>9</sup> The change in Saudi Arabia’s official policy was aided by the replacement of its long-standing oil minister in May 2016.

<sup>10</sup> The price that ensures oil extraction is economically viable and offers a reasonable investment return.

<sup>11</sup> Larger swings in demand are recorded in China, which is building up strategic reserves while responding flexibly to oil prices. Moreover, China has recently licensed a number of small private refineries (“tea pots”), to which ad hoc oil import quotas are allocated.

<sup>12</sup> Modern refineries are geared towards sour and heavy oil, which is more technologically difficult to process, but the price of this oil is usually lower and the refineries have higher margins on it. After agreeing to cap oil output, OPEC mainly cut production of heavy sour oil so as not to raise the price of light WTI oil – which is extracted from shale – too much.



The most reliable statistics are those on stocks in the USA, available weekly.<sup>13</sup> The IEA and OPEC publish monthly data on stocks in OECD countries.<sup>14</sup> Data from national sources are also published, but may not be entirely objective. A major unknown is data on stocks in China, which is using the favourable oil price flexibly to raise its strategic and commercial oil reserves. On the one hand this behaviour is reducing oil price volatility, but on the other it is making the current aggregate demand/supply ratio harder to assess. Besides direct indicators, data from oil transportation companies are used to evaluate supply. Current stocks are usually assessed using their ratio to the average for the previous five years in terms of volume (barrels), weight (tonnes) – which may differ slightly due to the different densities of different products – and days of future consumption. Below-average (above-average) values should lead to a rise (fall) in oil prices.<sup>15</sup>

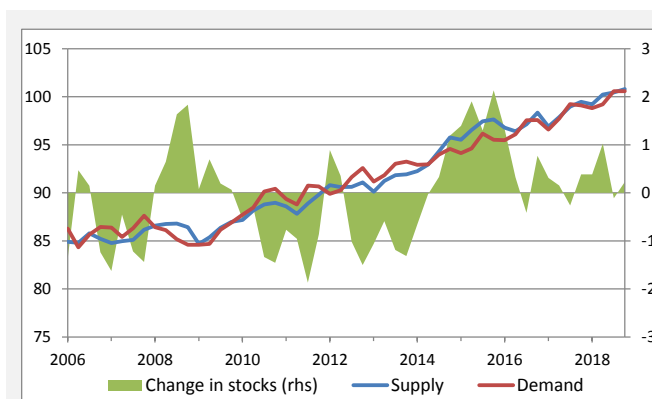


Chart 4 Global supply, demand and change in oil stocks according to the EIA

Source: EIA

Note: Quarterly data in millions of barrels a day, forecast from 2017 Q2 onwards

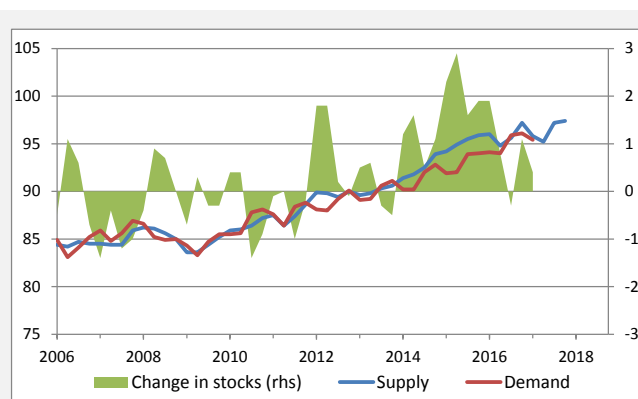


Chart 5 Global supply, demand and change in oil stocks according to OPEC

Source: OPEC

Note: Quarterly data in millions of barrels a day, forecast from 2017 Q2 onwards

### 3 Influence of financial investors

As mentioned above, oil demand and particularly supply can swing unpredictably. These changes are offset by appropriate changes in stocks and by increases in output in countries with spare extraction capacity. Whether, and to what extent, this volatility passes through to oil prices thus depends on the current level of stocks and spare extraction capacity.<sup>16</sup> From time to time, however, oil prices show fluctuations that are unlikely to have been caused by a corresponding change in fundamentals. This is because there are other participants in the oil market besides traders extracting, storing or processing oil. On the one hand those participants aid the functioning of the market by increasing its liquidity (banks providing contract hedging for commercial entities), but on the other they can make it excessively volatile (speculative investment funds trying to guess the future price and make a profit on their investment). These funds are guided by news about fundamental factors, but often excessively amplify the effect of those factors either by making massive purchases or later by selling their positions en masse. Charts 6 and 7 reveal a very striking link between the price (of both Brent and WTI) and the net long positions of speculative funds. We can thus infer the future path of oil prices and its risks from these positions. If net long positions are growing, oil prices are expected to go up and investors are raising their long positions (bets on a rising price) while closing their short positions (bets on a falling price). Usually, the price rises to the expected level over time and investors close their positions and take their profits. However, oil prices may not move in line with expectations.<sup>17</sup> Net long positions may increase to a high level from the historical perspective (the ratio of long to short positions also typically rises) and then the risk of a rapid downward correction of the oil price emerges. This process, of course, also works the opposite way.

<sup>13</sup> These come from three main sources. Preliminary data are published by Genscape and later by API. Official figures are eventually published by the EIA.

<sup>14</sup> Many commercial entities also produce detailed statistics, but these cost money and are hard for the public to access.

<sup>15</sup> Besides oil, stocks of petrol and distillates (mainly diesel and light heating oil) are monitored. The prices of these products may evolve differently from the price of oil in the short term, leading to volatility in refinery margins.

<sup>16</sup> Until recently, the minimum safe spare extraction capacity was considered to be 2 million barrels a day. With growth in stocks running high above the average, however, this criterion has moved into the background for now.

<sup>17</sup> For example, the net long positions of speculative funds on WTI crude oil grew strongly in January 2017, but the price stagnated just above USD 50/bbl. This was probably because the counterparty to these contracts was oil producers, who took advantage of the price to hedge future production. However, the subsequent sell-offs of speculative positions in March found no counterparty in the market and the oil price tumbled rapidly by USD 5/bbl before new investors reopened positions speculating on price growth.

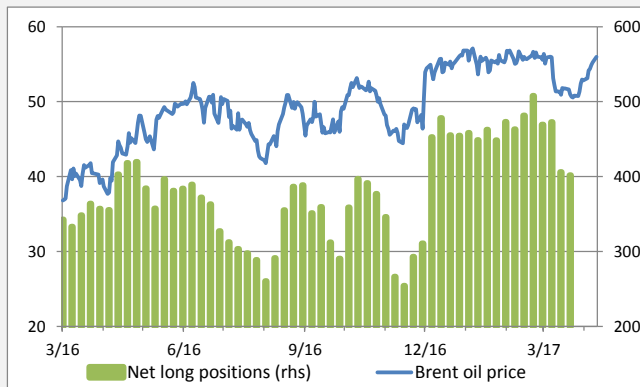


Chart 6 The Brent oil price versus speculative market activity

Source: Bloomberg, ICE

Note: Brent crude oil price in USD/bbl, net long positions of speculative funds (managed money) on futures and options in thousands of contracts, weekly data

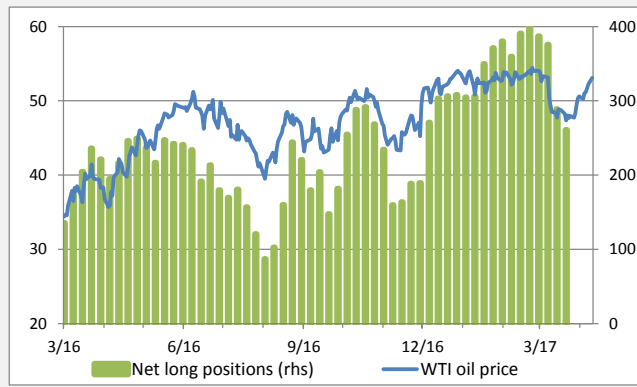


Chart 7 The WTI oil price versus speculative market activity

Source: Bloomberg, CFTC

Note: WTI crude oil price in USD/bbl, net long positions of speculative funds (managed money) on futures and options in thousands of contracts, weekly data

Looking at the relationship between the Brent crude oil price and the net long positions of speculative investors since 2011 (when “managed money” positions started to be monitored separately), we can see that this period can be divided into roughly three parts (see Chart 8). From March 2011 until June 2014, the price of Brent crude oil was relatively stable with no major upward or downward trend. The correlation between the oil price and net long speculative positions was positive (0.18). Although we cannot rule out bidirectional causality on the basis of the Granger causality test, the causality is statistically much more significant in the direction from speculative positions to the price. We can draw similar conclusions for the period from May 2016 to April 2017 (see Chart 9). Here, the positive correlation is much higher still (0.88) and the Granger test rejects causality from the oil price to investor positions, while the causality in the opposite direction is very significant. In the rest of the period (from July 2014 to April 2016), the oil price was seeking a new temporary equilibrium. The correlation between the oil price and financial investors' positions is negative (-0.64) and the Granger causality runs from the oil price to investor positions.

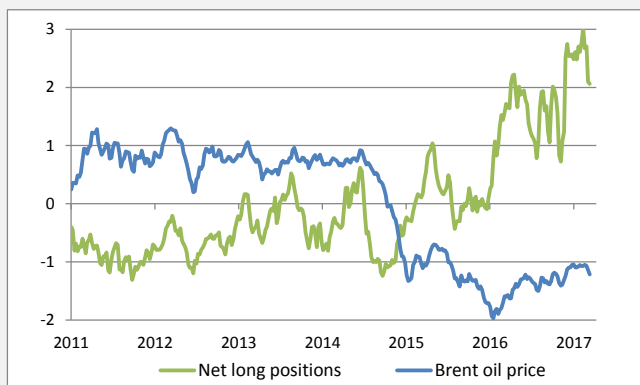


Chart 8 Relationship between the Brent crude oil price and the investment position of speculative investors since 2011

Source: Bloomberg, ICE, CNB calculations

Note: Charts are normalised to emphasise correlation

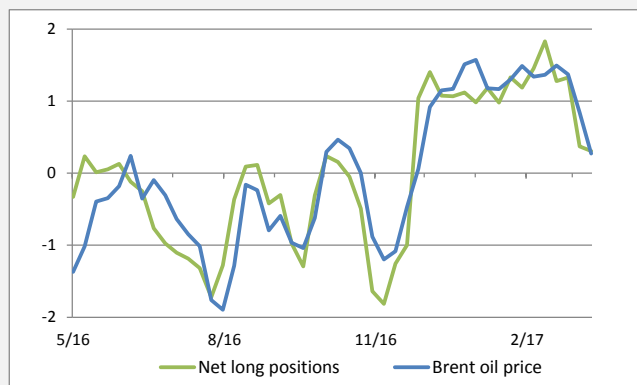


Chart 9 Relationship between the Brent crude oil price and the investment position of speculative investors since May 2016

Source: Bloomberg, ICE, CNB calculations

Note: Charts are normalised to emphasise correlation

Based on this simple analysis we can assert that investors' behaviour differs in different situations. If the oil price reaches a level that the market perceives as a fundamental-based equilibrium, it is the activity of investors which causes cyclical fluctuations around this equilibrium which cannot be explained by the fundamentals themselves. The oil price rises as investors build up (net) long positions and falls as they reduce those positions. If, however, there is uncertainty on the market regarding the “right” price (consistent with current supply and demand, and possibly stocks), investors increase their net long positions as the price falls and reduce them as it rises, and thus behave countercyclically.

## 4 Futures market structure

Whether the oil market is heading towards equilibrium can also be indicated by the time-varying slope of the futures curve (see Chart 10). If the market perceives current supply to be insufficient, the futures curve is in backwardation, i.e. prices of futures with later delivery are lower than those with earlier delivery. This should stimulate current output and channel it to customers, as storage of newly extracted oil is unprofitable under these conditions. A shortage of oil prevailed in the market from 2011 until about mid-2014 (see Chart 11). Conversely, a futures curve in contango, which means that futures prices rise as the delivery date becomes more distant, signals a current excess of supply over demand. A lower spot price stimulates consumption and suppresses output. Oil producers can either reduce output, or extract and store the oil<sup>18</sup> if the slope of the futures curve is sufficient to cover the cost of storing<sup>19</sup> and financing oil stocks. Contango in the oil market was typical for the period from mid-2014 until the end of 2016 and led to growth in global stocks to historic highs. The slope of the futures curve is almost flat at present, signalling that oil demand and supply are roughly balanced.

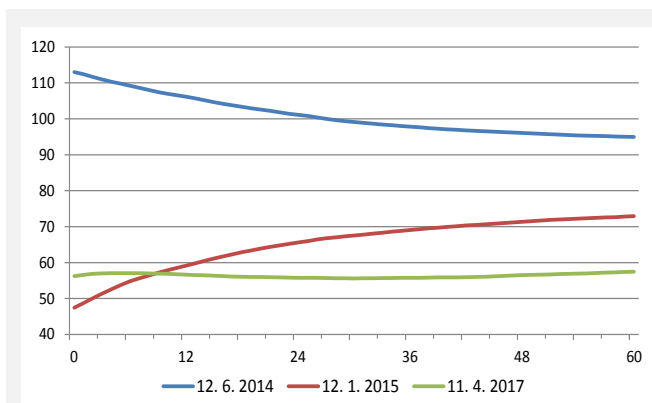


Chart 10 Structure of the futures curve for selected dates

Source: Bloomberg, CNB calculations.

Note: Slopes of Brent crude oil futures prices (ICE futures) as of selected dates, vertical axis shows price in USD/bbl, horizontal axis shows number of months to delivery

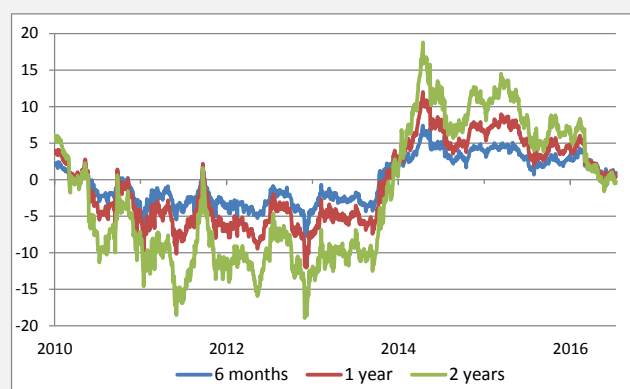


Chart 11 Structure of the futures market

Source: Bloomberg, CNB calculations.

Note: Brent crude oil price (USD/bbl), difference between contract with delivery in given number of months and contract with earliest delivery, daily data

## 5 Conclusion

As mentioned in the previous sections, we can use numerous indicators to assess the (im)balance in the market, and these may send out contradictory signals. Different agencies and analytical units of private companies often provide different assessments of the current market situation and different estimates of its future development. At present, they mostly agree that the market has already reached, or is approaching, the situation where demand for oil will exceed supply and the currently high oil stocks will start to be drawn down. However, OPEC's decision on whether to extend the deal on output limits into 2017 H2 will play an important role. Most analysts agree that the six-month cap on production will not be sufficient to markedly reduce excess stocks given the fast growth in US oil output. The structure of the futures market suggests that stocks will not increase further, but does not signal any sharp drop either. By contrast, the EIA still expects modest growth in global stocks this year and the next. OPEC does not comment on the future evolution of global production and especially its own output, and the IEA says that further developments are conditional on OPEC's decision on whether to extend its production limits by another six months. When making their decision, OPEC representatives are likely to take account mainly of the rate of growth of oil production in the USA. The costs of shale oil production, which have fallen dramatically over the last two years, do not create much space for oil price growth in the medium term. On the other hand, the situation may be affected in the longer run by a shortage of investment in investment-intensive large projects (ocean deep waters, the arctic areas and oil sands). These projects have a long investment horizon and their entry into service have caused a slower decline in global output in the past. However, the effect of the drop in investment over the last two years will be felt only in several years' time and could lead to a temporary shortage of oil in the market.

<sup>18</sup> Oil can be stored not only by producers, but also by various commercial traders and even by financial investors. If the slope of the curve is steeper, oil can also be stored in floating tankers at sea. However, this is more costly than storage in onshore tanks. The economics of these stocks may differ from those of the operational stocks of oil processors and product users. These store oil to ensure smooth operation (or for technological reasons – to ensure even quality) when supplies fluctuate, and are willing to bear even higher costs (a "convenience yield").

<sup>19</sup> For example, Genscape estimates the cost of storing oil at Cushing at about USD 0.4/bbl per month. Kemp (2017) states that the cost of onshore storage is USD 0.2–0.3/bbl per month and the cost of borrowing is 2% per year.

**References**

Kemp, John (2017): COLUMN-Brent Spreads Imply Big Draw Down in Crude Stocks After June. DownstreamToday. 10 January 2017.

[http://www.downstreamtoday.com/news/article.aspx?a\\_id=55301&AspxAutoDetectCookieSupport=1](http://www.downstreamtoday.com/news/article.aspx?a_id=55301&AspxAutoDetectCookieSupport=1)

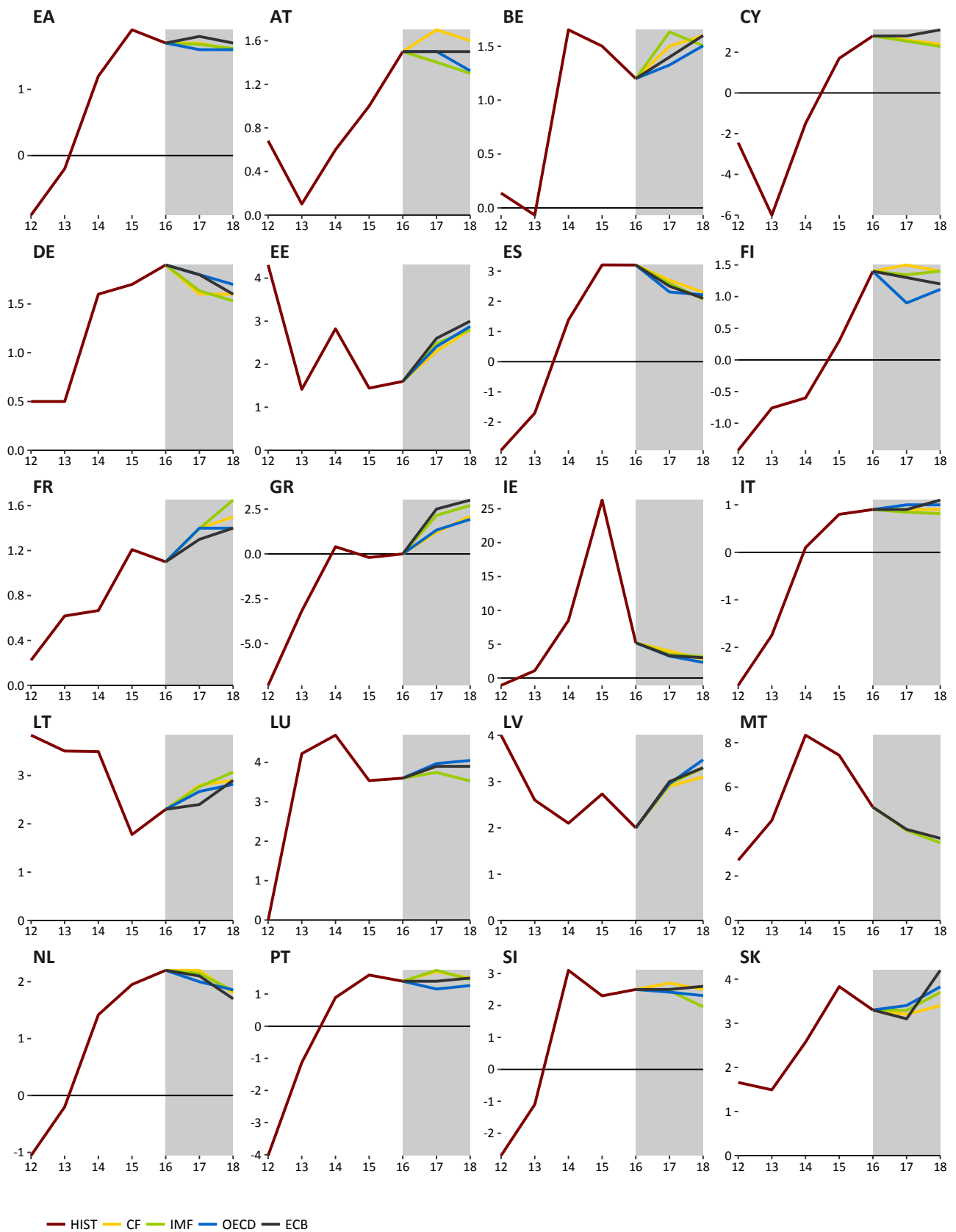
## A1. Change in GDP predictions for 2017

	CF		IMF		OECD		CB / EIU	
EA	0	2017/5	+0.1	2017/4	0	2017/3	+0.1	2017/3
		2017/4				2017/1		
DE	+0.1	2017/5	+0.1	2017/4	+0.1	2017/3	+0.2	2016/12
				2017/4				2017/1
US	-0.1	2017/5	0	2017/4	+0.1	2017/3	0	2017/3
				2017/4				2017/1
UK	0	2017/5	+0.5	2017/4	+0.4	2017/3	-0.1	2017/5
				2017/4				2017/1
JP	+0.1	2017/5	+0.4	2017/4	+0.2	2017/3	+0.1	2017/4
				2017/4				2017/1
CN	+0.1	2017/5	+0.1	2017/4	+0.1	2017/3	+0.2	2017/4
				2017/4				2017/1
IN	0	2017/5	0	2017/4	-0.3	2017/3	0	2017/5
				2017/4				2017/1
RU	0	2017/4	+0.3	2017/4	+0.3	2016/11	+0.9	2017/4
				2017/3				2017/1
BR	+0.1	2017/4	0	2017/4	0	2017/3	0	2017/4
				2017/3				2017/1

## A2. Change in inflation predictions for 2017

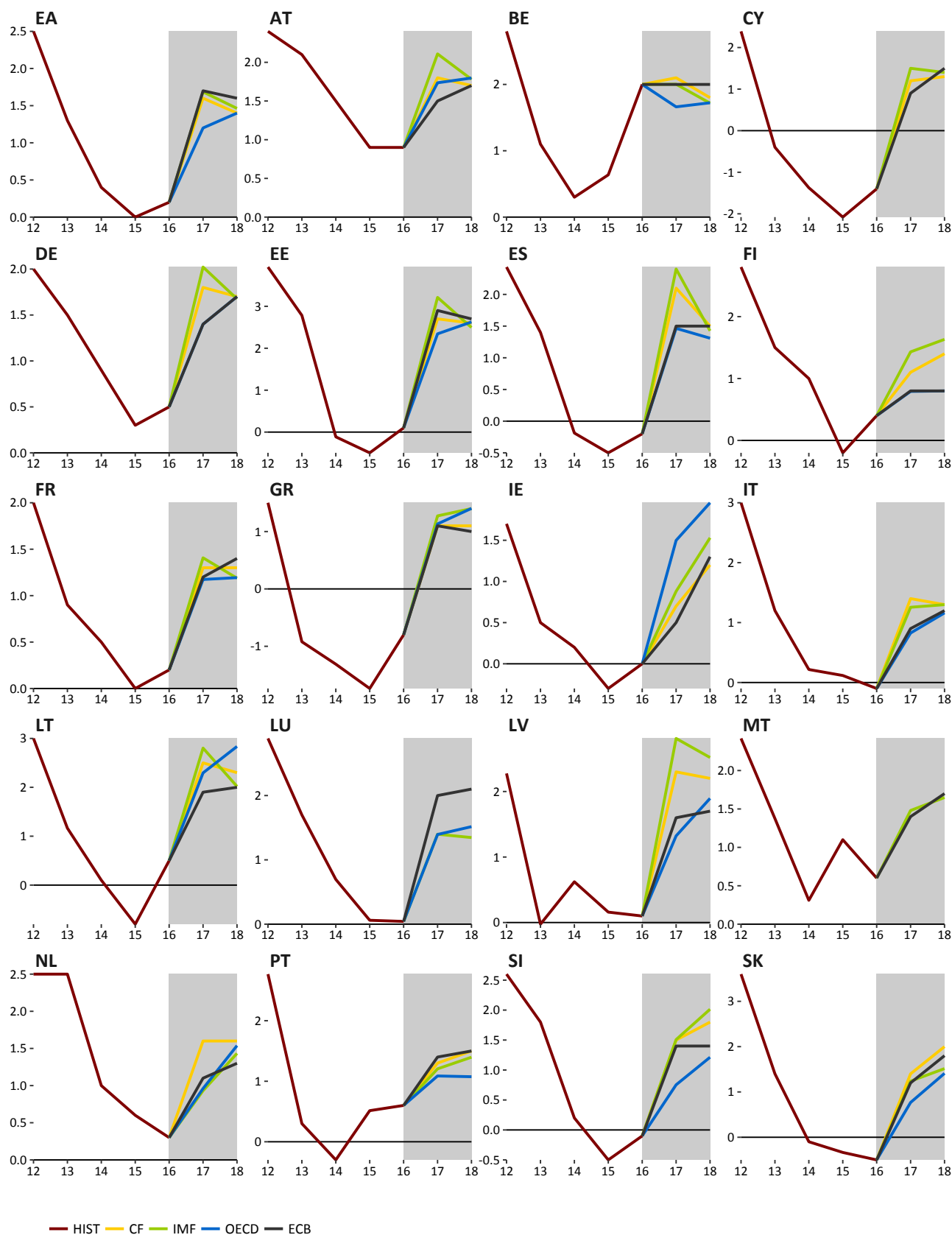
	CF		IMF		OECD		CB / EIU	
EA	0	2017/5	+0.6	2017/4	0	2016/11	+0.4	2017/3
		2017/4				2016/10		
DE	0	2017/5	+0.5	2017/4	-0.1	2016/11	-0.1	2016/12
				2017/4				2016/10
US	-0.1	2017/5	+0.4	2017/4	-0.1	2016/11	0	2017/3
				2017/4				2016/10
UK	0	2017/5	0	2017/4	+0.8	2016/11	+0.1	2017/5
				2017/4				2016/10
JP	0	2017/5	+0.5	2017/4	-1.8	2016/11	-0.1	2017/4
				2017/4				2016/10
CN	-0.2	2017/5	+0.1	2017/4	-0.8	2016/11	-0.1	2017/4
				2017/4				2016/10
IN	0	2017/5	-0.4	2017/4	+0.6	2016/11	-0.1	2017/5
				2017/4				2016/10
RU	-0.2	2017/4	-0.5	2017/4	+0.6	2016/11	-0.4	2017/4
				2017/3				2016/10
BR	-0.1	2017/4	-1.0	2017/4	+0.3	2016/11	0	2017/4
				2017/3				2016/10

### A3. GDP growth in the euro area countries



Note: The chart shows institutions' latest available outlooks of for the given country (in %).

## A4. Inflation in the euro area countries



Note: The chart shows institutions' latest available outlooks of for the given country (in %).

## A5. List of abbreviations

<b>AT</b>	Austria	<b>GR</b>	Greece
<b>bbl</b>	barrel	<b>ICE</b>	Intercontinental Exchange
<b>BE</b>	Belgium	<b>IE</b>	Ireland
<b>BoE</b>	Bank of England	<b>IEA</b>	International Energy Agency
<b>BoJ</b>	Bank of Japan	<b>IMF</b>	International Monetary Fund
<b>bp</b>	basis point (one hundredth of a percentage point)	<b>IN</b>	India
<b>BR</b>	Brazil	<b>INR</b>	Indian rupee
<b>BRIC</b>	countries of Brazil, Russia, India and China	<b>IRS</b>	Interest Rate swap
<b>BRL</b>	Brazilian real	<b>ISM</b>	Institute for Supply Management
<b>CB</b>	central bank	<b>IT</b>	Italy
<b>CB-CCI</b>	Conference Board Consumer Confidence Index	<b>JP</b>	Japan
<b>CB-LEII</b>	Conference Board Leading Economic Indicator Index	<b>JPY</b>	Japanese yen
<b>CBR</b>	Central Bank of Russia	<b>LIBOR</b>	London Interbank Offered Rate
<b>CF</b>	Consensus Forecasts	<b>LME</b>	London Metal Exchange
<b>CN</b>	China	<b>LT</b>	Lithuania
<b>CNB</b>	Czech National Bank	<b>LU</b>	Luxembourg
<b>CNY</b>	Chinese renminbi	<b>LV</b>	Latvia
<b>CXN</b>	Caixin	<b>MKT</b>	Markit
<b>CY</b>	Cyprus	<b>MT</b>	Malta
<b>DBB</b>	Deutsche Bundesbank	<b>NKI</b>	Nikkei
<b>DE</b>	Germany	<b>NL</b>	Netherlands
<b>EA</b>	euro area	<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>ECB</b>	European Central Bank	<b>OECD-CLI</b>	OECD Composite Leading Indicator
<b>EC-CCI</b>	European Commission Consumer Confidence Indicator	<b>PMI</b>	Purchasing Managers' Index
<b>EC-ICI</b>	European Commission Industrial Confidence Indicator	<b>PP</b>	percentage point
<b>EE</b>	Estonia	<b>PT</b>	Portugal
<b>EIA</b>	Energy Information Administration	<b>QE</b>	quantitative easing
<b>EIU</b>	Economist Intelligence Unit	<b>RU</b>	Russia
<b>ES</b>	Spain	<b>RUB</b>	Russian rouble
<b>EU</b>	European Union	<b>SI</b>	Slovenia
<b>EUR</b>	euro	<b>SK</b>	Slovakia
<b>EURIBOR</b>	Euro Interbank Offered Rate	<b>TLTRO</b>	targeted longer-term refinancing operations
<b>Fed</b>	Federal Reserve System (the US central bank)	<b>UK</b>	United Kingdom
<b>FI</b>	Finland	<b>UoM-CSI</b>	University of Michigan Consumer Sentiment Index
<b>FOMC</b>	Federal Open Market Committee	<b>US</b>	United States
<b>FR</b>	France	<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





