Global
Economic Outlook

1ST QUARTER 2016 | ECONOMIC SCENARIOS UNIT

01
A global outlook of anaemic and more fragile growth

02
Uncertainty about China, oil prices drop and central banks activism, in the spotlight

03
Oil prices decline: the role of the expectations

Index

Closing date: 5 February 2016

1 Editorial

The events unfolding over recent months have led to a downward revision in growth expectations for the global economy, now standing at 3.2% for 2016 (the same figure forecast for 2015) and 3.5% for 2017. These rates are at all-time lows, lower than growth rates for the first years of the previous decade, the lowest since 2009, and with a significant downside bias. This will be even more so the case if the downward trend in the value of high risk financial assets continues unchecked, as it has done since mid-2015, with particularly sharp falls in early 2016. **The current and expected anaemic global growth is particularly vulnerable** to any shock waves that may affect consumer and investor confidence and their corresponding decisions to spend or invest.

The improvement in developed economies, with base scenario growth forecasts for the US around 2.5% and 1.8% for the eurozone, **is not enough to offset the slowdown in emerging and developing economies that make up almost 60% of global GDP.** Deleveraging must continue in the developed world, with inflation at an all-time low, weak global trade and doubts that discourage investment. Given this outlook, emerging economies must also face China's "landing", the monetary normalization in US and falling prices in commodities.

The key to the global scenario will be the end result of China's transition to lower yet more sustainable growth rates while rebalancing its economy, with greater weight given to services and the market when allocating resources and restructuring public companies while at the same time managing the complexity of greater capital account openness. A huge challenge. Forecasts suggest a "**soft landing", bringing GDP growth to around 6%** for 2016-17. However, doubts concerning the credibility of statistics, and therefore the real rate of rebalancing towards services, are added to questions related to the yuan in its new role as an IMF reserve currency or on the true extent of commitment to affording the private sector greater weight. This situation may **lead to the risk of negative expectations feeding back into markets** and ultimately affecting global growth. The **capacity of Chinese authorities** to implement measures to stabilize markets and point to tangible progress in strengthening private sector balance sheets and increased business competitiveness will be decisive in encouraging a positive change in market outlook.

The **normalization of US monetary policy**, however gradual, will lead to a rise in interest rates and therefore less investor appetite for emerging markets, in particular for credit operations or leveraged projects, and more so in the case of industries with lower-than-expected demand growth, such as the energy sector. The pace at which the Fed raises interest rates over 2016 and 2017 will be a good barometer to judge the US, and global, cycle. In any case, the path of interest rates hikes will be slow given low inflation rates and the scarce signs of robust recovery other than in consumption and employment.

Lastly, the **fall in the price of commodities**, due to production levels outstripping demand, has intensified the downturn in exporting economies, while also affecting those economies with a greater need to finance domestic growth with external savings and foreign currency. All of which also means a series of **difficult decisions facing central banks** and the economic authorities in general, given a major fall in exchange rates for many emerging economies. Decisions, which if flawed, could lead to risks in a context which may require some kind of coordinated action to avoid a shortage of lending to a given country which would, in turn, lead to contagion to others.

To sum up, **the outlook is uncertain, fragile and there is little room for manoeuvre in the light of new global risks**, with the Fed just starting to raise interest rates very cautiously, an ECB and Bank of Japan announcing new measures for the base scenario outlined above, and great uncertainty surrounding China's objectives and its ability to meet them. **Weak growth and downside risks.**

2 A global outlook of anaemic and more fragile growth

The intensification during the last quarter of 2015 of some of the risk clusters with a global impact led to a further downward revision of world economic growth forecasts for this year. The transition to a lower growth pattern in China, with economic reforms and changes to key objectives such as the exchange rate, is being accompanied by bouts of intense financial volatility and falling commodity prices. All this leads to a much less favourable global panorama for large commodity-exporting economies such as Russia or Brazil, but also for those perceived as more vulnerable financially.

Although the level of activity seen in the second half of 2015 is consistent with quarterly growth of 0.75% in world GDP, above those seen in the first half of the year, **the leading indicators (confidence indices) and the increase in financial stresses point to more moderate growth in early 2016 than was foreseen three months ago**, as reflected in our estimates for the first few months of the year[1]. If this trend is confirmed, **world GDP will grow by just 3.2% in 2016, repeating the advance of 2015 and postponing the recovery to 2017** when it should reach rates of around 3.5%. **This lower growth rate, still the lowest since 2009, reflects slackening demand in the emerging economies**, particularly those of Latin America, which look like contracting for two years in a row. **Recovery in the developed economies is still fragile,** and highly dependent on the eventual impact of the slowdown in world trade and the increase in financial instability on industrial output, corporate capital expenditure decisions and consumer spending. With the US growing at 2.5% and the euro zone by less than 2%, **the tenuous improvement in activity in the developed economies as a whole will not be enough to offset emerging markets' expected relatively poor performance**.

Figure 2.1
World GDP, % YoY
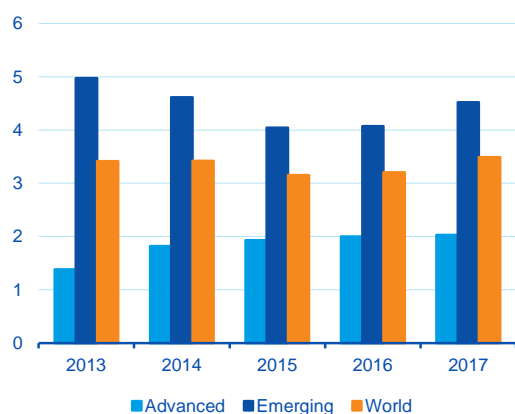
Source: BBVA Research and IMF

Figure 2.2
World industrial output and trade of goods, % quarterly rates
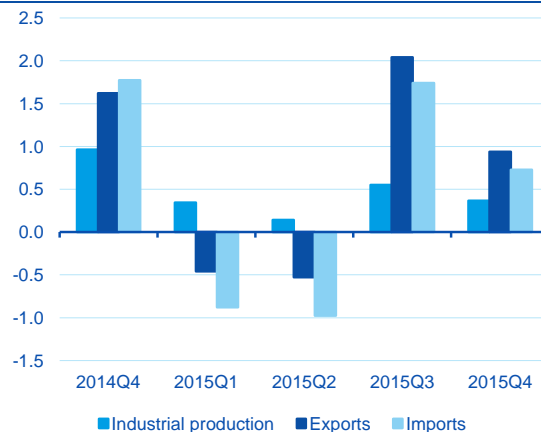
Source: BBVA Research and CPB

The recent behaviour of the financial markets is largely explained by doubts about the strength of the world economic cycle. Activity indicators continue to show the greatest degrees of deterioration concentrated in manufacturing and trade: as to the former, world output grew by less than 2% YoY (the lowest rate since 2012), while in the case of exports, weighed down by developments in the US and emerging Asia, the increase on the previous year was less than 1% (figures to October 2015 in both cases).


1: Estimate based on the BBVA Research global activity indicator (GAIN). Details of methodology at http://bit.ly/1nl5RIn

Activity in services, which until now had benefited from the recovery of private consumption in the major developed economies, is also starting to show signs of less dynamism.

Even leaving the extent of China's slowdown out of the equation, **the fact that the major emerging economies are all being affected by the persistent fall in commodity prices** (with only a few net oil-importing countries likely to benefit from cheaper energy) **has contributed to increasing risk aversion on a global scale**. Moreover, a further source of uncertainty has arisen in the form of the Chinese yuan, a reserve currency with an exchange rate more subject to market forces since the summer of 2015 and on which the authorities are not succeeding in anchoring market expectations. In this situation, **the capital outflows that the emerging economies have been suffering since the beginning of 2015 are rivalling those seen in 2013**, when the markets had factored in an interest rate hike by the US Federal Reserve which in the end did not take place. As shown by the persistent withdrawal of capital, across the board, with very little discrimination among economies, the nature of the current episode is such that it may have more serious consequences for access to financing and for the growth rate of those economies that are most reliant on external savings.

China and the Latin American countries are together those with the biggest capital outflows and consequently those in which financial conditions are deteriorating most. **BBVA Research's Financial Stress Index for emerging countries has climbed back up to the levels seen in the summer of 2015 (first wave of the Chinese stock exchange crisis), reaching the stress levels of 2011.** Unlike then, volatility remains contained in the developed economies, in a context in which the reallocation of capital to financial assets with a lower risk profile is intensifying the flight-to-safety in sovereign bonds of countries such as Japan, the US and Germany.

Figure 2.3
BBVA index of financial tensions (normalized values)

Developed   Emerging
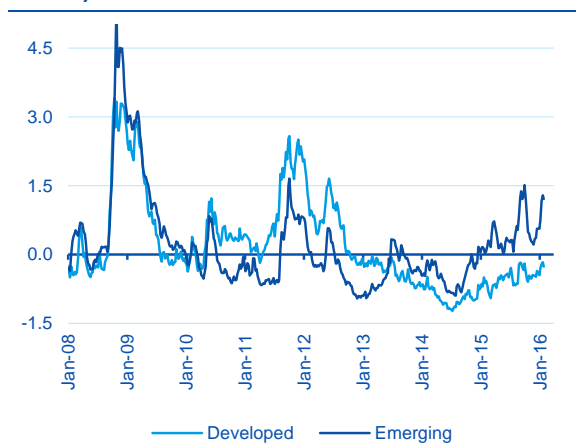
Source: BBVA Research and Bloomberg

Figure 2.4
China, FX reserves (US$100 million) and exchange rate

FX Reserves   CNYUSD (rhs)
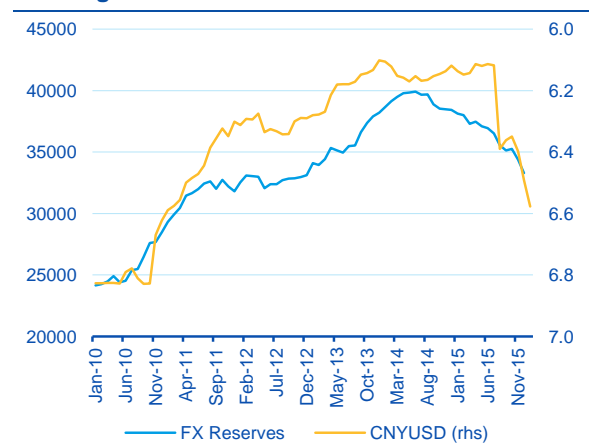
Source: BBVA Research and Haver

The depreciation of emerging currencies, which in some cases has brought their exchange rates to similar or even higher levels than those seen in the crisis of 2008, is one of the most clear signs of the punishment suffered by the emerging financial markets. In addition to doubts about the effects of the China's economy adjustment on global trading channels and financing, external imbalances, renewed flare-ups of geopolitical tension and the **constraints faced by the authorities in managing the economic slowdown without compromising financial stability** are growing. In those cases where the cumulative depreciation of the currency is more intense and lasting, **rates of inflation are starting to pick up and to diverge from the levels set by their central banks as monetary policy targets**. The change of regime in the pricing of the

yuan constitutes, without doubt, an additional depreciation factor for most emerging currencies, in an environment of lower external demand in which a significant deterioration in the terms of trade may exacerbate the correction of domestic demand.

The dilemma faced by emerging market central banks is heightened by the risks entailed by the accumulation of debt by the business sector over the past decade and, with greater intensity, from 2007. The abundant liquidity in the capital markets and the reduction of financial costs were triggers for the private sectors of quite a few emerging countries to increase the recourse to debt, in many cases denominated in foreign currency. **An increase in financial costs** (and corporate credit spreads have come under significant stress in the past few months), **in a context of lower revenues and falling business profitability, may jeopardise debt servicing and lead to a sharp reduction in capital expenditure**, raising credit risk and endangering the stability of the banking system and the country's external creditworthiness.

In this regard, **the approach to monetary policy adopted by the developed economies' central banks will continue to be of decisive importance**. **The start of the process of normalisation of interest rates by the US Federal Reserve in December 2015** has not led to any substantial increase in financial volatility, thanks to the Fed's repeated assurances that the process will be a gradual one. **The majority of Latin American central banks matched the measure**, increasing their reference interest rates in similar or greater proportions, since it was in their economies that the effect of currency depreciation on consumer prices was being felt most. **In Europe and emerging Asia, management of monetary policy was characterised by stable rates** (in consonance with the strengthening of the stimulus measures by the ECB) **or even rate reductions, as in China and India.**

The recent correction in inflation figures in the developed countries in response to falling oil prices and the renewed fall in medium-term price expectations **may once again change how their central banks react**; in the case of the Fed, delaying the next rate hike; in that of the ECB and the Bank of Japan, making their monetary strategy even more accommodative. Following the temporary extension of the bond-buying programme and the cut in its deposit facility rate to -0.3% in December, at the beginning of this year the ECB hinted at its readiness to continue stimulating price recovery; the Bank of Japan for its part has decided to follow the lead of its European counterpart in penalising the holding of liquidity positions, taking reference rates into negative territory. With average inflation rates in the world's four biggest economies (USA, euro zone, Japan and China) below 1% since mid-2014, **monetary policy in the developed countries will continue to be highly accommodative, even more so than was being forecast in mid-2015**.

However, with this price containment taking place within a context of weak growth in demand, persistently high indebtedness and reference interest rates firmly anchored to the bottom, close to zero in Europe and Japan, **the margin for monetary policy to reactivate growth and dispel doubts about the effects of the adjustment in emerging markets is very limited**. This is particularly so when the downturn in emerging market activity is due not just to cyclical factors but also to a secular decline in key sources of revenue such as the export of commodities.

The fall in prices of the major commodities since mid-2014, most marked in the case of oil, **and the adjustments to China's manufacturing sector have created an entirely new growth scenario for emerging markets** as a whole. The downward revision of medium-term forecasts of the price of oil bears testimony to this. Compared with the $100 a barrel at which Brent crude was trading in 2014, our forecasts put the expected price for 2016 at an average of around $30, recovering gradually to around $55 in 2018 (nearly $20 below our previous forecast).

The sharp correction in oil prices is explained, in part, by the intense increase in stocks (as result of a persistent excess of supply on the contemporaneous demand needs), unprecedented in recent years, but

also by the expectations that this evolution of stocks could remain in the future due to an deterioration of global economic growth and/or an slow adjustment of the high oil supply.

Until the spring of 2015, the excess supply was due to increased US output, plus the change in OPEC policy from late 2014, with no cuts in production in response to falling prices. Since September 2015, production has started to decrease, especially in the US and other non-OPEC countries where production costs and increased leverage are beginning to take their toll. However, there is still excess supply equivalent to 1.2% of world consumption. Added to this resistance of supply to a lower price environment, more recently we have started to see a context of financial instability and risk aversion that is symptomatic of a gradual lowering of expectations of demand. All these factors have accelerated the falling prices in the last part of 2015 and early 2016. In the medium term, as excess supply dwindles, there should be a gradual increase in prices, albeit less intense than that forecast in a scenario in which the world economy were to regain more vigorous growth rates than the current ones.

Figure 2.5
Oil prices (Brent, dollars per barrel)
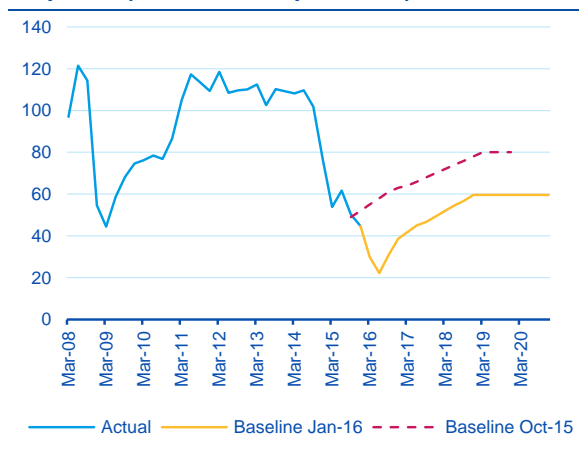
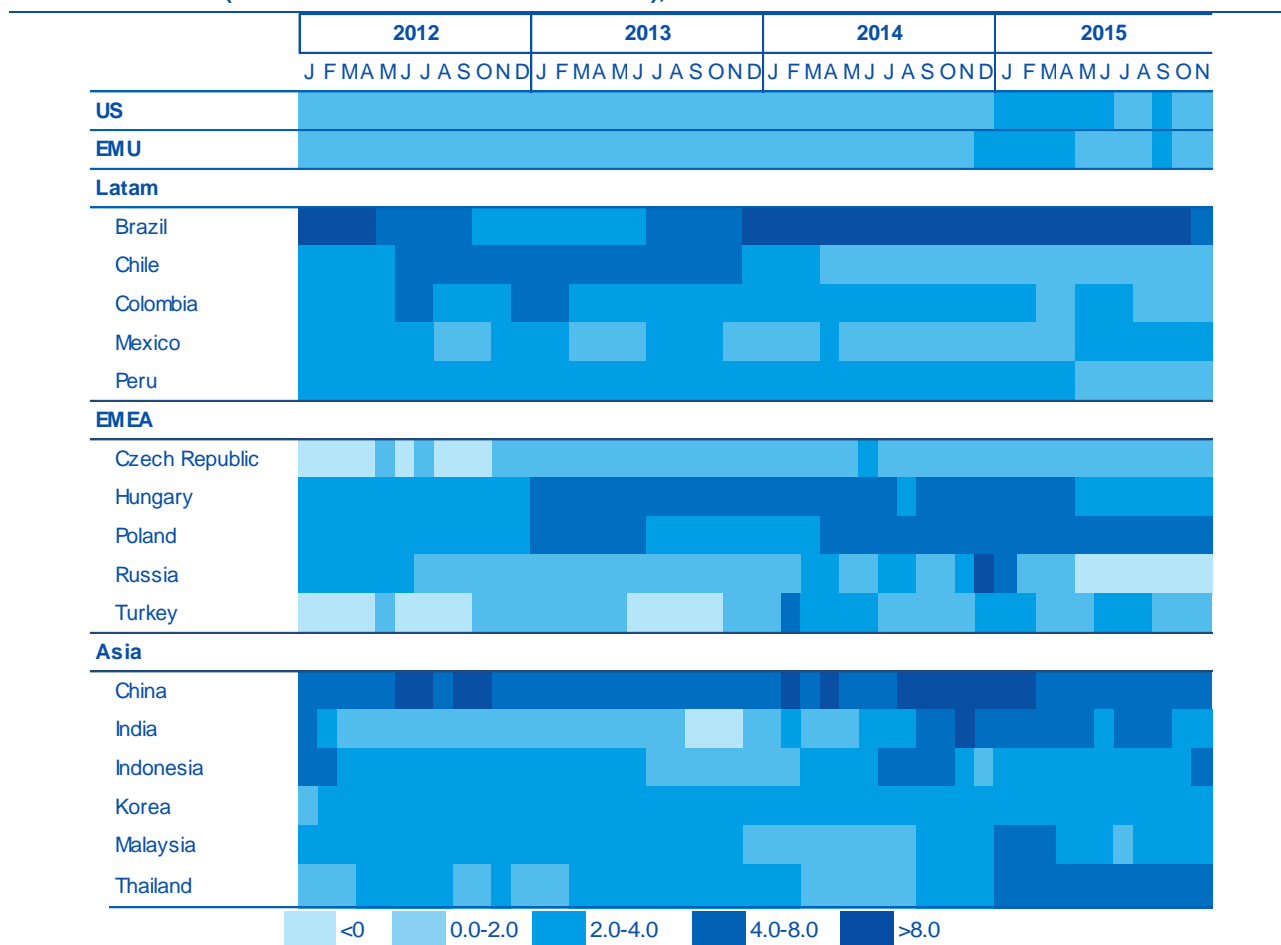Source: BBVA Research and Bloomberg

Figure 2.6
Real effective exchange rate (base 100 = January 2007). Increases means appreciation
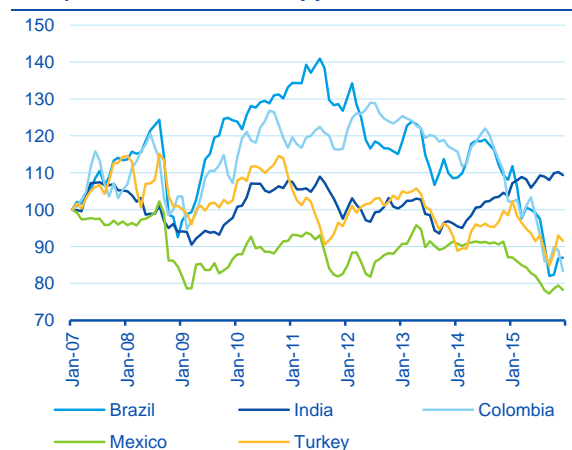
Source: BBVA Research and BIS

All the same, **the world economy faces a 2016 of limited growth (3.2%), similar to that of 2015, and with a balance of risks showing a negative bias and concentrated in the emerging bloc**. How China's economy evolves, both as regards the degree of slowdown in activity and how the authorities manage the financial imbalances that exist, will continue to have a significant influence on capital flows and commodity prices in general, not just oil. The level of corporate indebtedness in those emerging countries most vulnerable to the circumstances described constitutes an additional source of instability, in a context of lower profits and higher funding costs (high risk premia). Allied to this, geopolitical tensions in certain parts of the world and the risk of a scenario of low growth and low inflation in the major developed economies complete the outlook for the world economy in 2016.

Figure 2.7
Real interest rates (reference interest rates less inflation), %

Source: BBVA Research and Haver

USA: moderate growth and depending on consumer spending. Weak capital expenditure, low inflation and increased global financial volatility limit the Federal Reserve's scope for increasing interest rates

In the second half of 2015, **US economic growth steadied at around 2.5%**, in line with forecasts of three months ago. However, **the slowdown in activity in the fourth quarter**, together with advance signals given by business confidence indicators, increases the likelihood of growth in 2016 being less. Our base scenario maintains estimated growth of 2.5% for this year and next. Even if private consumption maintains the dynamism showed in the last two years, becoming the main growth driver, **weak capital expenditure and stagnating exports will limit the extent to which aggregate demand can improve**.

The sustained increase in employment, with an average of 240,000 jobs being created every month, in a context of low prices, will continue to boost households' disposable income and growth in private consumption, which could settle at annual rates of 2%. The positive effect of cheaper energy products on spending decisions may be countered by loss of domestic consumer confidence, as a result of the economic and political uncertainty at both domestic and international level and the reduction of their financial wealth in answer to the recent fall in stock markets.

The very limited increase expected in capital investment reflects the impact of the adjustment to capital expenditure in the energy sector, as a result of the fall in oil prices, **and the gradual recovery in the residential sector**. The possibility that decreased dynamism of energy production and the deteriorating profitability that companies in the sector have already started to suffer might also have more serious spillover effect than expected on manufacturing employment cannot be discounted. This, combined with the weakness of exports, a consequence of the slowdown in international trade, but above all of the cumulative appreciation of the dollar[2] (in 2015 it appreciated by 10% in terms of real effective exchange rates), explains the fall in the business sentiment indices in industry (compatible with a contraction of activity at the end of 2015) and the stabilisation of economic growth at low rates – lower than those seen in other expansionary periods. The slowdown foreseen in bank lending, particularly to businesses, is in line with the moderated advance described for domestic demand.

In the absence of any upward pressure on underlying inflation from a substantial reactivation of private spending, **falls in oil prices will again drive headline inflation far below the 2% set as a monetary policy objective by the Federal Reserve**. **Our projections put headline inflation for 2016 at 1.3% (compared with 0.1% in 2015), 0.5% below the previous quarter's estimate**. The absence of inflationary pressures, accentuated by lower commodity prices (the fall in import prices reached 10% YoY in the last few months of 2015) and the appreciation of the dollar, will continue to determine the Federal Reserve's action, in a context in which the high degree of uncertainty about the strength of the global economic cycle and the response of other developed country central banks (maintaining or strengthening monetary stimulus measures) will also exert influence.

For these reasons, **the Federal Reserve has repeatedly stressed that the path of interest rate increases that started in December 2015 will be gradual** and subject to the continuation of the dynamic of domestic demand and inflation. The latest forecasts of the FOMC (Federal Open Market Committee) include four rate hikes for 2016, which would put federal funds at 1.5% at year-end, whereas **the market consensus (including BBVA Research) expects at most two interest rate hikes**, a divergence that has been widened recently by the decline in inflationary expectations, the increase in volatility in the financial markets ("safe haven effect") and the downward adjustment of US GDP in the fourth quarter. In fact, the probability of the next hike's taking place before September, already factored in by the markets, has decreased substantially, at the same time reducing the yields of long-term sovereign debt (the ten-year interest rate could fluctuate around 2% until the end of 2016). **The financial context of risk aversion may continue to prevail over interest rate differentials among the major economic areas when explaining the strength of the dollar at medium term**.
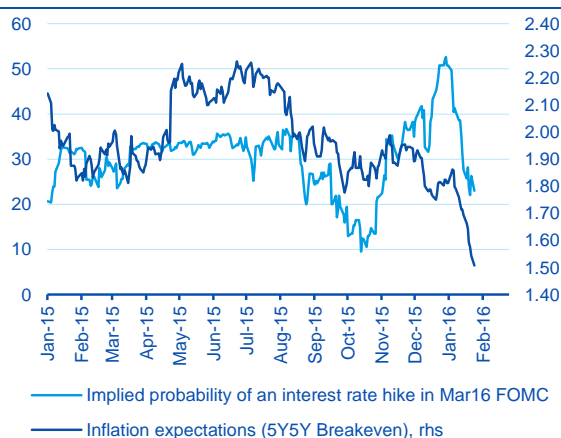

2: If the dollar appreciates by 5% in any given year, US real GDP growth may fall by 0.6% for that year and by nearly 0.4% in the following year, according to BBVA Research estimates.

Figure 2.8
USA, economic growth, % YoY
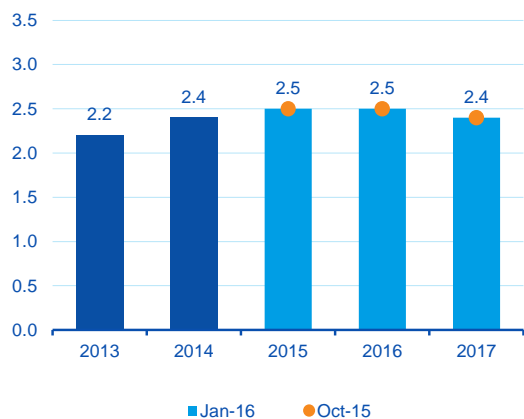
Source: BBVA Research

Figure 2.9
USA, inflation expectations and probability of an increase in interest rates in March 2016 (%)

Source: BBVA Research and Haver

China: the main challenges in the short term are eliminating financial instability and confining the impact of the industrial adjustment on aggregate demand

Doubts about China's ability to successfully manage the transition to a more moderate and balanced economic growth model resurfaced in the last quarter of 2015 following a new bout of financial instability deriving, as last August, from the stock and currency markets. The measures adopted by the authorities to limit the volatility of shares, suspending trading on days with sharp falls (circuit breakers) and limiting sales by investors with significant shareholdings, further exacerbated the financial stresses. The gradual but persistent depreciation of the yuan (against the dollar, it was trading at 6.35 in September and at more than 6.55 at year-end), accompanied by divergent prices in the onshore and offshore markets (greater depreciation in the latter), also played a key role in contagion of the remaining financial markets, the more liquid emerging markets being the most penalised.

The volume of capital outflows in the past year highlights the pressures for the yuan to devalue, contained only by the sale of foreign currency reserves by the central bank (**the total volume of reserves fell by nearly US$520 billion in 2015, approximately 10% of the total**). Capital outflows, as well as limiting liquidity in yuan and the domestic markets, are hampering management of monetary policy: further cuts in key interest rates may give residents extra incentive to hold positions in currency abroad. In fact, **according to BBVA Research estimates, the fall in value of the reserves in the past year is 55% due to the process of diversification embarked upon by the private sector in its portfolios of financial assets (increased proportion of dollar-denominated assets) and to exporters' deciding not to repatriate their income to China**. Only 25% of the fall is due to the loss of value of reserves denominated in currencies other than the dollar ("valuation effect") and nearly 15% is due to debt repayment (reducing external liabilities). In this context, the central bank is opting for more flexible monetary stimulus measures than simply cutting interest rates, such as the direct provision of liquidity to banks.

While maintaining financial stability is crucial in order to avoid any repetition of episodes of risk aversion such as the recent one (a sudden depreciation of the yuan would lead to a sharp correction in other emerging market currencies and a significant increase in sovereign and corporate risk premia from current levels), the growth dynamic shown by China in the short and medium term continues to be of decisive importance for the world economic cycle. **Any deterioration in activity increasing the likelihood of a sharp slowdown in**

China's GDP could intensify the withdrawal of capital, the fall in commodity prices and the adjustment in demand already being suffered by most of the emerging economies.

The official National Accounts figures still show a continuation of the gradual moderation of growth that started in 2011. **In the fourth quarter of 2015, GDP grew by 6.9% on an annualised basis, supported by the increase in private sector consumption** (the tax incentives might partly explain the reactivation of expenditure on durable goods and services). **The weakness of capital expenditure and the downturn in exports are mirrored in the slowdown in manufacturing activity** (with output growing at the lowest rate of the past few years, at 5% YoY, and business confidence indices contracting for several months in a row) **and in the persistent decline in the flow of imports**. It is for this reason that the current account surplus continued to increase in the second half of 2015.

The speed at which the process of rebalancing from a growth model based on industry and investment to one more biased towards consumption and services takes place is one of the big question marks, the answer to which will define China's economic scenario. The increased share of services in nominal GDP (its weight has gone from 42% in 2006 to 48% in 2015) can be considered the most convincing evidence of this process. However, **trends in prices and the sectoral structure of employment show that, although the process is under way, it is still a process aimed more at a relative adjustment of prices that at an incipient reallocation of employment**.

Specifically, while industrial prices show annualised falls since 2012 (-6% to the end of 2015), consumer prices, although slowing down somewhat, grew at a rate of 1.5%. The structure of employment by branches of activity shows that between 2010 and 2014 the manufacturing sector retained its share of the total, and the decline in agricultural employment was more than offset by the increase in employment in construction. In the case of services, the trends are divergent: the slight increase in the relative weight of trade and catering is in contrast with the diminished importance of other services such as transport and particularly education.

Nevertheless, **our base scenario holds GDP growth for 2016 at 6.2% and at 5.8% for 2017, with inflation at 1.7% and 2.5% respectively**. Additional monetary stimulus measures during 2016 in the form of key interest rate cuts cannot be discounted (specifically to 3.85% from the 4.35% at year-end 2015), although they will be constrained by the impact they might have on capital flows. **The yuan could continue to depreciate to a level of 7.10 against the dollar next year, although uncertainty about the outlook for the exchange rate is running high, and indeed is one of the reasons for the financial volatility and the fall in asset prices worldwide**. Finally, this soft landing scenario, being the more probable, is quite likely to lead to another scenario of greater risk given the doubts about the pace of rebalancing of the economy and the authorities' room for manoeuvre for managing it smoothly.

Figure 2.10
China, economic growth, % YoY
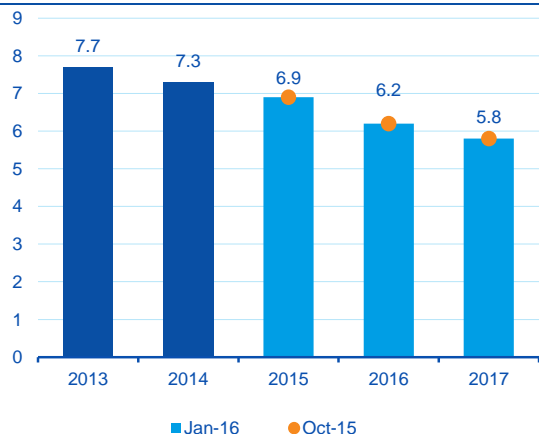
Source: BBVA Research

Figure 2.11
China, structure of employment by branches of activity (% of total)
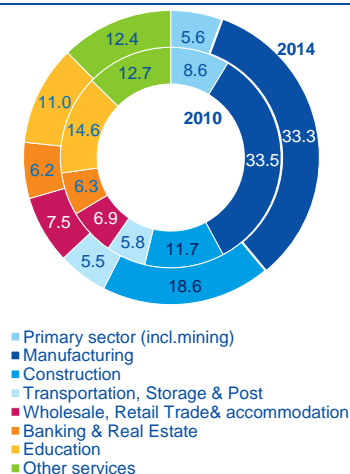
Source: BBVA Research and Haver

Eurozone: no changes to expected growth, inflation forecasts revised sharply downwards. The ECB, prepared to strengthen monetary stimulus measures

No changes in economic growth forecasts but inflation forecasts for 2016-17 revised sharply downwards. Eurozone GDP has replicated the behaviour expected three months ago, settling at quarterly growth rates of 0.3-0.4%, giving **an advance expected figure of 1.5% for the whole of 2015**. If the recent recovery dynamic is maintained, **the eurozone could grow this year by 1.8% and 2.0% in 2017**, the same figures as forecast last quarter. The positive effect that the fall in energy prices, a more expansionary fiscal policy and the continuation of loose monetary conditions would have on domestic demand and specifically on private consumption, would be partly offset by the negative impact of the slowdown in international trade on the export of goods and of increased financial and political instability on investment decisions.

In fact, **the composition of GDP for the third quarter of 2015 and forecast for the fourth shows consumption, both public and private, as the most dynamic item,** thanks to the recovery in employment and the fall in prices due to cheaper oil, in a context in which household confidence has remained high. **The negative surprises come basically from capital expenditure,** despite businesses' improved perception of the economic situation, the increase in new bank lending and the low interest rates.

Doubts about the strength of external demand (trade in eurozone goods is suffering as a result of both falling sales to the emerging bloc and a slowdown in sales to developed countries) **and the political uncertainty prevailing in certain countries** (the forming of a new government in Spain, elections in Germany and France in 2017, the stability of the current Greek and Portuguese governments) **could be acting as a drag on investment**. Furthermore, **the delay in meeting public deficit objectives and implementing key structural reforms to revitalise activity in the medium term are other factors that may also be hindering capital expenditure decision taking**.

In this context of political instability, exacerbated by the lack of progress on economic and fiscal integration at European level, the risk associated with the possibility of the UK's leaving the EU and the rifts brought about by the handling of the refugee crisis, **the role of the ECB will continue to be decisive in avoiding a sharp deterioration in financing conditions**. In December de 2015, faced with a deterioration in the global economic context and the fall in commodity prices, the ECB decided to bolster its stimulus measures with a further cut in its deposit facility rate to -0.3% and the extension of its bond-buying programme until at least
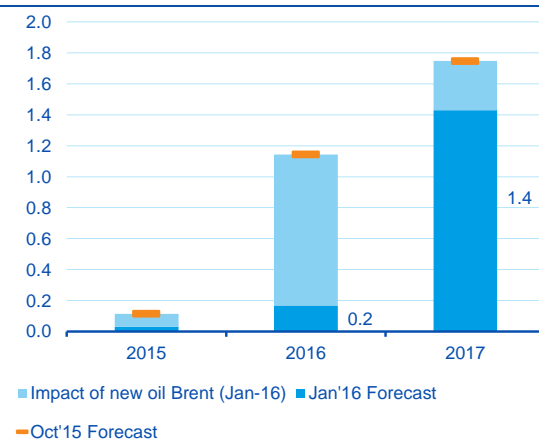
March 2017. The stability of the euro exchange rate against the dollar, in a range of 1.08 to 1.10 in the past two months, and above all **the fall in inflation rates caused by the downward revision of the oil price forecast for 2016 led the ECB to open the door to a new round of stimulus measures at the January meeting of its Governing Council**, steps which might even be announced in March. **If Brent crude trades at an average of 30 dollars a barrel in 2016, eurozone headline inflation would be just 0.2%, 0.9 percentage points less than was forecast three months ago**. The gradual recovery of energy prices in 2017 also reduces expected inflation for the following year, which at an average of 1.4% is far removed from the ECB's objective of price stability. All this, without assuming significant second round effects on core inflation deriving from cheaper energy.

Figure 2.12
Eurozone, economic growth, % YoY

Legend: ■ Jan-16   ● Oct-15
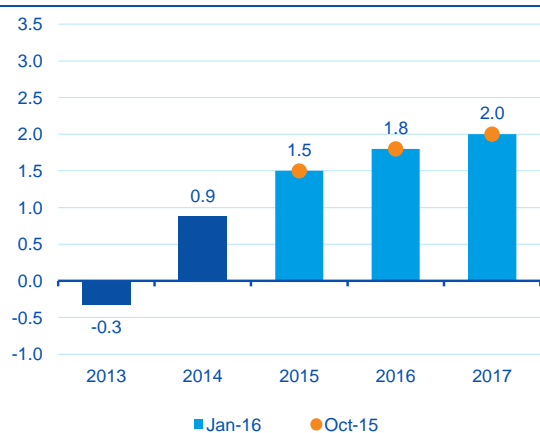
Source: BBVA Research

Figure 2.13
Eurozone, headline inflation, %

Legend: ■ Impact of new oil Brent (Jan-16)   ■ Jan'16 Forecast   ▬ Oct'15 Forecast
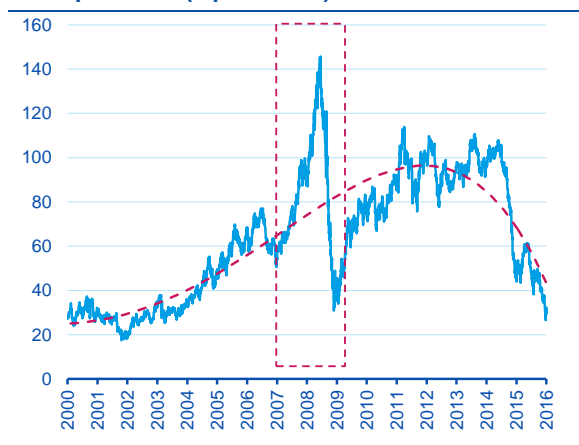
Source: BBVA Research and Haver

3 What's next for oil prices?

The End of an Era

Between the early 2000's and the second half of 2014, oil prices exhibited a period of sustained gains interrupted momentarily by the Great Recession. In this commodity super-cycle, oil market conditions were characterized by robust growth in both non-OECD demand and non-OPEC supply of crude oil, supported by loose monetary policy, unprecedented technological advancements and search-for-yield investment strategies. As a result, a massive amount of resources were allocated throughout the oil and gas (O&G) value-chain.

Global demand was largely driven by the formidable economic expansion of emerging markets. Between 2000 and 2015, emerging markets contributed with 70 cents per each additional dollar –PPP adjusted- of world's GDP. In the same period, the increase of global demand for petroleum products was entirely driven by emerging markets. Moreover, **China's staggering 9.5% average GDP growth in this period and its large spillover effects on other emerging markets, explain 62% of the net increase in petroleum products demand in the last 15 years**.

Figure 3.1
WTI Spot Price ($ per barrel)
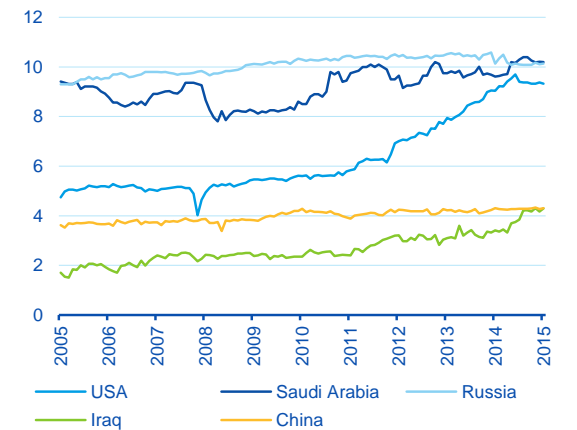

Source: BBVA Research & Haver

Figure 3.2
Oil Product Demand (yoy change, thous b/d)
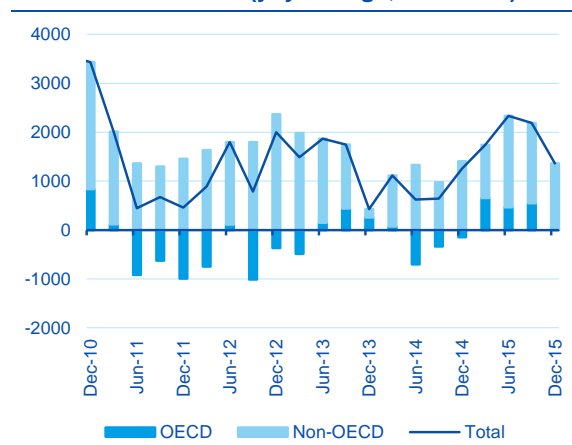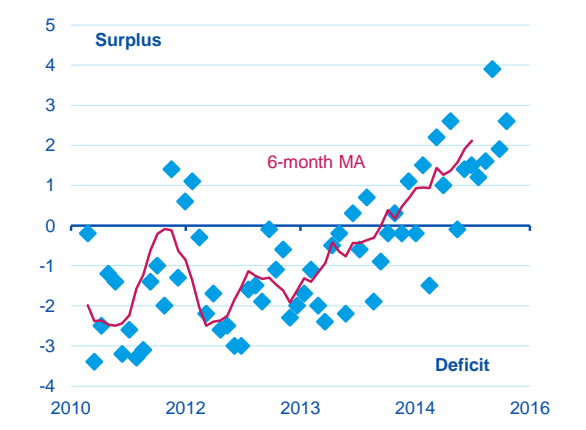

Source: BBVA Research & Haver

Non-OPEC supply's surge was driven by the U.S., where a combination of high oil prices, hydraulic fracturing, horizontal drilling, deep-water technologies and historically low interest rates encouraged a significant amount of investments in the O&G industry. In fact, the ratio of total capital expenditures in O&G to GDP increased from 0.4% in 2000 to 2.1% in 2014, accumulating $2.8tn in 15 years. As a result, U.S. crude oil production increased from 5.7 million b/d in 2011 to 9.7 million b/d in April 2015. In this period, the U.S. accounted for 83% of the cumulative net increase in global crude oil supply.

Figure 3.3
Crude Oil Production (million barrels per day)

Source: BBVA Research & Haver

Figure 3.4
Global Oil Supply and Demand Balance (million barrels per day)
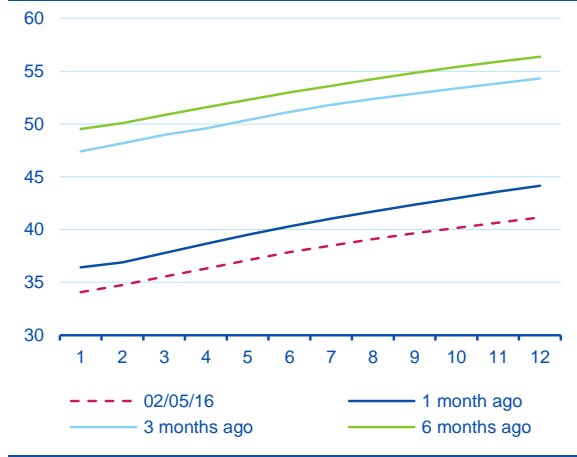

Source: BBVA Research & Haver

Throughout much of this period, crude oil prices increased consistently suggesting that demand-side factor dominated market expectations. However, beginning in 2011, when U.S. supply began to surge, oil prices stabilized as expectations discounted a more balanced market. However, by 2014, demand was unable to absorb supply, leading to a decline in prices that continues until today.

In previous episodes of price downturns, OPEC would have reacted by cutting production as it did during 2001 and 2008; however, **in November 2014, the cartel surprised markets by deciding to keep its production quota unchanged which was interpreted as an attempt to protect market share**. The reluctance to cut production and even revamp it in 2015, when prices continued declining, was seen by some experts as an attempt to force higher-cost producers to exit the market.

At the same time, in mid-2014, China's economic deceleration became more evident. This trend has persisted ever since. For example, the manufacturing PMI has decelerated consistently since July 2014, after it reached a peak of 51.7. The spillover effects into emerging markets have been significant. For instance, growth of industrial production in emerging markets and the volume of foreign trade from and to this region have slowed to their lowest levels in six years.

Our econometric analysis confirms that the drop in oil prices has been primarily driven by fundamentals: supply and demand, including expectations about both factors. In particular, resilience –and expectations about- the non-OPEC oil supply and the weakness –and expectations about- the non-OECD aggregate demand have had a relevant role in the oil prices level and volatility. In addition, the reassessment of global growth expectations in favor of developed economies relative to emerging markets along with monetary policy divergence in developed economies –both of which strengthened the relative value of the U.S. dollar-, have generated further downward price pressures. Price volatility has also reflected geopolitical developments such as the lifting of sanctions on Iran and military conflicts in the Middle East. **Our baseline scenario projects a downward adjustment in 1H16 followed by a mild recovery thereafter. By the end of 2018, prices are expected to stabilize around $60bbl, level around we estimate the long-term equilibrium level**.

Figure 3.5
Brent Crude Futures ($ per barrel)

Source: BBVA Research & Haver

Figure 3.6
**Crude Oil Price Forecast – Baseline (Brent, $ per barrel)**
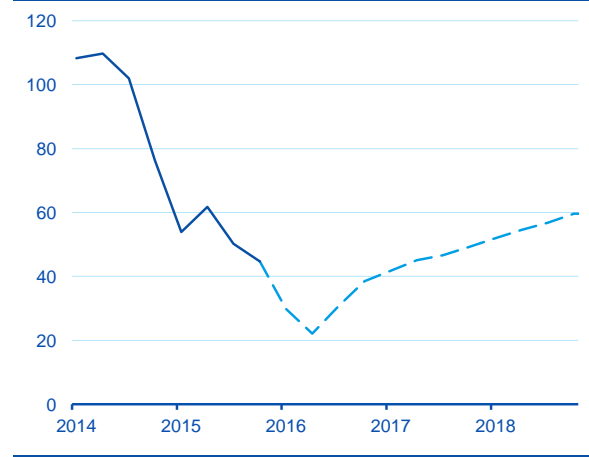
Source: BBVA Research & Haver

## Further prices correction is possible in the next few months

Since prices began to fall, futures contracts have persistently reassessed expectations to the downside, suggesting that it is still uncertain when prices could reach a bottom. Concerns on oversupply persist. OPEC has not shown any convincing signs of a potential cut in production. This could be explained by two factors. On the one hand, the marginal cost per barrel for Saudi Arabia and other OPEC members remains well below $20bbl. On the other hand, Saudi Arabia –the biggest producer and holder of the second largest proven reserves- has been able to absorb the impact of low prices on its economy through a combination of austerity measures and selling foreign reserves. Considering the foreign reserves level ($616bn, 100% of GDP) and that public debt is low (6.7% of GDP), the country has ample room to withstand a longer period of low oil prices.

Figure 3.7
Saudi Arabia: foreign reserves (total minus gold, EOP, billion US$)
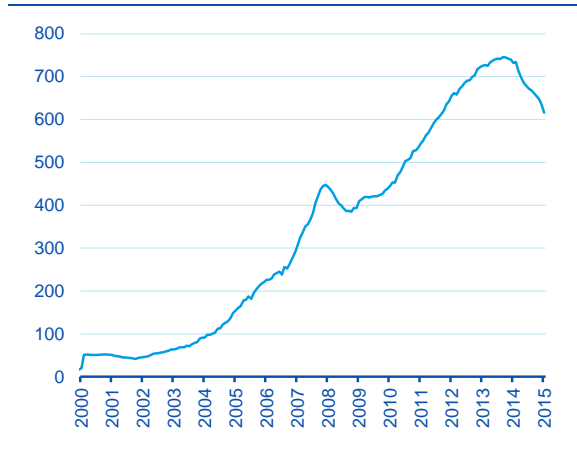
Source: BBVA Research & Haver

Figure 3.8
Iran: crude Oil Production (million barrels per day)
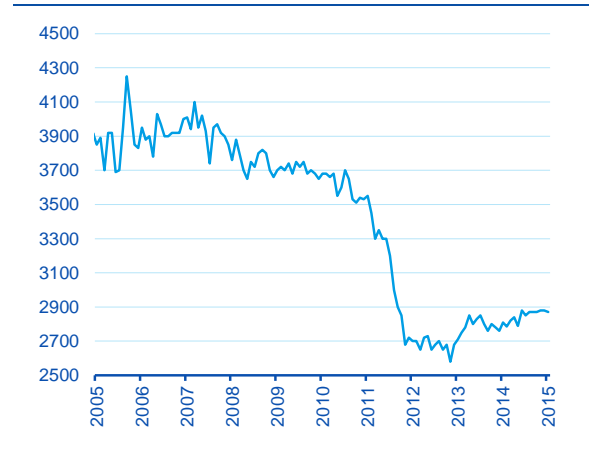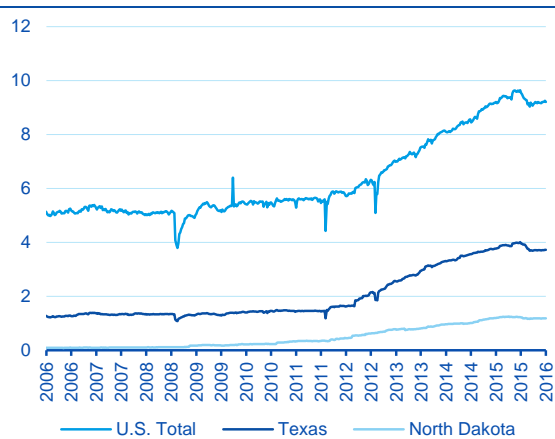

Source: BBVA Research & Haver

Divisions within OPEC obscure the possibility of agreement among members. The cartel is split in two groups. The first includes countries like Venezuela, Nigeria, Iran, Iraq and Libya whose troubled economies desperately need higher prices and would like to see production cuts coming from members with stronger economic conditions. The second group is comprised by Saudi Arabia and other Gulf states who believe that any cut in production should be shared not only by all OPEC members but by non-OPEC producers as well; a necessary condition to maintain market shares unchanged. However, non-OPEC countries like Russia – the second world's largest producer- and Brazil may find it difficult to cut production voluntarily as their economies are contracting and oil revenues are critical to support countercyclical fiscal policy. Not surprisingly, recent efforts to persuade Russia to join OPEC in cutting production have been unsuccessful.

Another source of downward price pressures has to do with Iran's ability to export crude after the lifting of sanctions resulting from the nuclear deal with the P5+1. The Iranian government aims to increase production by 1 million b/d in 2016, which would mean returning to full production capacity, estimated at nearly 4 million b/d. However, a more reasonable estimation suggests that the amount of additional oil that the country can inject into the global market in the short-term is between 300K b/d and 500K b/d. A larger expansion in production will take time as significant amounts of investments are needed to modernize a deteriorated infrastructure. These investments will not flow swiftly given tighter credit conditions and diminished risk appetite.

Given OPEC and Russia's impasse together with Iran's reintegration to the global market, the attention has turned to the U.S. where production has shown a significant degree of resiliency. Since its last peak of 9.7 million b/d in April 2015, U.S. crude oil field production went down gradually to 9.3 million in November 2015. **Until now absence of an abrupt decline in U.S. production can be explained by a series of factors**. First, highly- leveraged operators need to continue producing and selling crude in order to service debt. Second, variable costs have adjusted faster than expected providing a temporary relief to partially absorb the impact of declining prices. The third factor is the heterogeneity of the industry and its assets. For instance, break-evens vary across shale plays and so do operators' responses to declining prices. Some companies are more diversified than others or have assets of better quality. Adjustments in production have been heterogeneous across shale plays; for example, as of December 2015, production continued to expand in the Permian and Utica, but contracted in the Bakken and the Eagle Ford. However, those factors are not permanent. **In the extent that the scenario of low prices remains, the decline of U.S. oil production would be more intense.**

Figure 3.9
U.S. Crude Oil Production (millions barrels per day)

Source: BBVA Research & Haver

Table 3.1
Real GDP Growth (YoY % change)

|	Estimates	Projections	
	2015	**2016**	**2017**
Russia	-3.7	-1.0	1.0
China	6.9	6.2	5.8
India	7.3	7.5	7.5
Brazil	-3.8	-3.0	1.3
South Africa	1.3	0.7	1.8

Source: BBVA Research, IMF and Haver

From the demand side, prospects for global growth have diminished due to weakness in emerging markets and modest growth in developed economies. In particular, China's economic growth is expected to go from 6.9% in 2015 to 6.2% in 2016 and 5.8% in 2017. Our baseline scenario assumes a "soft landing"; however, uncertainty about the magnitude of the slowdown and the government's ability to manage the cycle through fiscal and monetary policy is likely to exert downward pressures on crude prices in the short-run. Slower growth in China will have spillover effects on other emerging markets with negative implications for the demand of crude. Another factor preventing prices to go up anytime soon are persistently high levels of inventories, mainly in the U.S. where crude stocks excluding strategic reserves are the highest in eighty years, and where despite their exponential growth, pressures on working storage capacity are still contained.

## Modest improvement in 2H16 and 2017

Although prices could decline further in 1H16, a stronger adjustment in U.S. production could bring them up in 2H16 and 2017, particularly if the drop in US production is larger than the potential increase in supply from other producers (e.g. Iran). The rapid reduction of active rigs suggests that U.S. crude oil production could decline by around $1 million b/d over the next twelve months. This would trim a substantial portion of excess supply in the market, currently estimated to be between 1.5 and 1.8 million b/d. In 2015, U.S. real private fixed investment in mining exploration, shafts and wells contracted 35%, $47.3 billion less than in 2014. This trend is likely to continue in 2016 as O&G make further CAPEX reductions in response to pressures on profitability. As a share of GDP, CAPEX in the U.S. O&G industry declined to 1.5%, the lowest since 2008. U.S. production will also be affected by an increasing number of bankruptcies and a more risk-averse environment reflected by tighter credit standards for O&G financing[3].

Figure 3.10
**U.S. Active Rig Count and WTI
(units and $/barrel)**
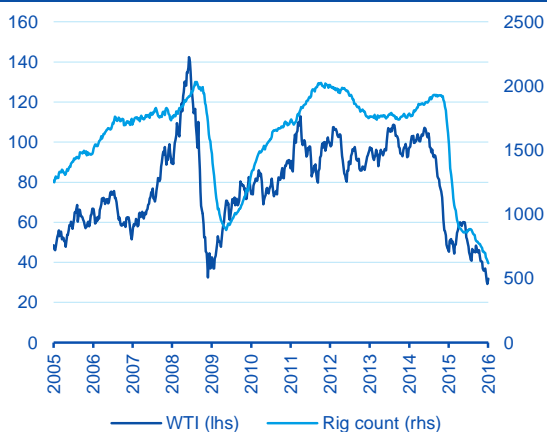
Source: BBVA Research & Haver

Figure 3.11
**U.S. Capital Expenditures in O&G
(share of GDP, %)**
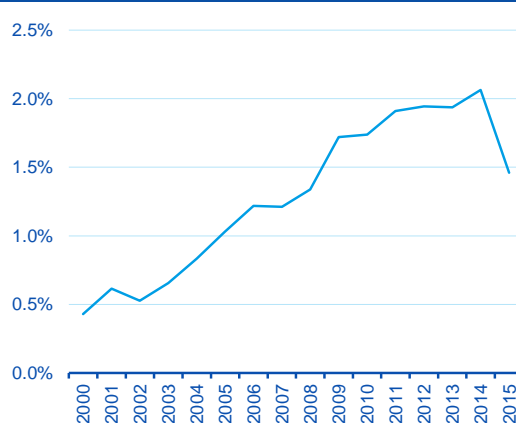
Source: BBVA Research & Haver

3: According to the Shared National Credit Program, approximately $34.2bn of outstanding syndicated debt in O&G may be at risk of default, that is one in seven loans of more than $20 million. In 2015, around 40 firms declared bankruptcy with an estimated total debt of $16.7bn.

Global production could also decline if OPEC manages to convince Russia to reduce production; however, as we prepare this document, there is no solid evidence that this could happen soon.

Although a deeper adjustment of U.S. production or an OPEC agreement with Russia could bring prices up again, the upside will be limited by the following factors: first, if Saudi Arabia and its partners want to maintain or gain market share, they need prices to be just below the breakeven prices of high-cost producers. This means that they cannot cut production to a point that high-cost producers become competitive again. Second, the flexibility and efficiency of the U.S. shale industry suggest that firms may revamp production relatively quickly once they perceive prices are increasing again. **The short time between investment decisions and production will prevent the U.S. shale industry to be the key factor in sustaining a price upturn**. Third, prospects for slower economic growth could counterbalance any upside coming from a supply adjustment. In other words, **for Saudi strategy to work, the period of low oil prices needs to be somewhat prolonged in order to avoid a quick return of shale oil producers**.

Figure 3.12
**North America Average Break-Even Prices
(Tight oil, $ per barrel)**
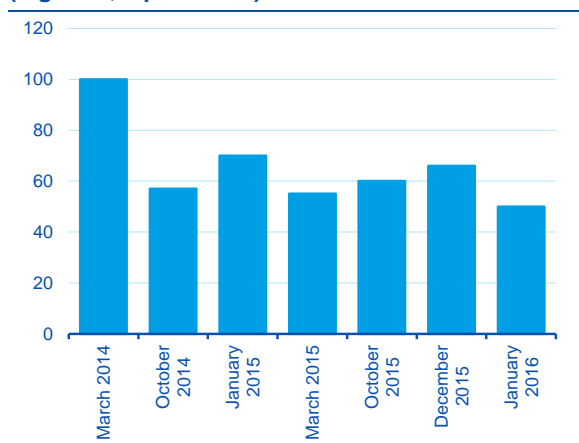
Source: BBVA Research, FT, HIS, Wood Mckenzie

Figure 3.13
**Rig Count Productivity
(B/d per rig)**
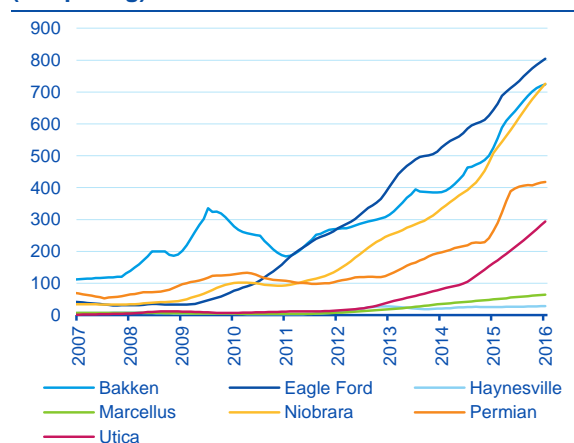
Source: BBVA Research & EIA

Are oil prices heading to lower long term equilibrium? Yes, they probably are, but uncertainty is huge

Structural changes in the energy market will have a significant impact in the long-run. **From the supply side, increasing competition from non-OPEC producers will continue to weaken the role of OPEC as a price stabilizer**. More competition will foster innovation that could bring break-even prices down, making currently high-cost producers more competitive in the future. The U.S. shale revolution proved that a more competitive environment encourages innovation that boost productivity and grants access to once unavailable resources. **Technological advancements have rendered the notion of "peak oil"** –that is the hypothetical point in time when production reaches its maximum and declines thereafter to depletion– **less relevant in a world where reserves continue to be discovered and extraction is increasingly feasible**. One example of productivity enhancers is plasma-pulse, a technology that maximizes oil recovery by using a high-energy plasma arc rather than by injecting fluids at high pressure to stimulate the reservoir. Plasma-pulse is a more efficient and more environmentally friendly option than traditional techniques.

Figure 3.14
China: GDP and Energy Demand
($tn PPP, and million tonnes of oil equivalent)
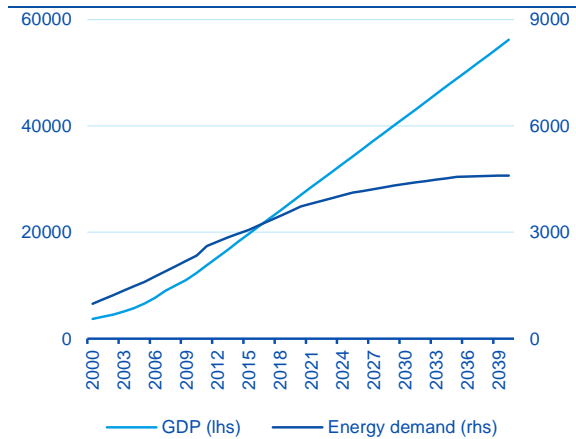
Source: BBVA Research & EIA

Figure 3.15
World Energy Consumption by Fuel
(million tons of oil equivalent)
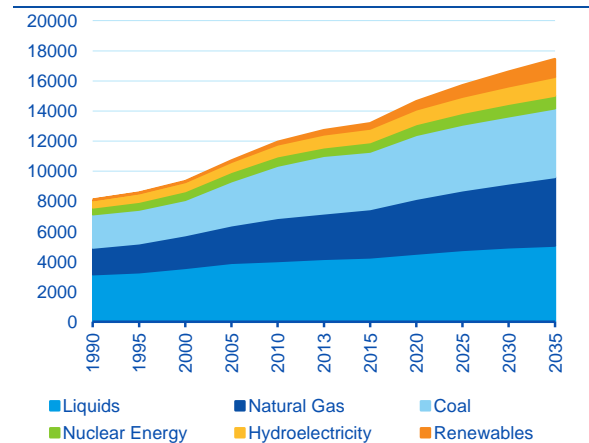
Source: BBVA Research & EIA

From the demand side, emerging markets will continue to drive growth while demand in developed countries will continue to lose relative importance; however, **the rebalancing of the Chinese economy could have far reaching implications for oil**. While China's GDP may well remain above 6%, a re-composition of growth sources could imply a much sharper adjustment in crude oil demand than if growth remains supported mainly by the industrial sector.

As China transits from an investment-driven to a consumption-driven economy, energy use per GDP is likely to change as it has been the case for developed countries. In this regard, the International Energy Agency projects Chinese energy demand to start decoupling from GDP by the end of this decade and stabilize near 4000 million tons of oil equivalent by 2040[4]. This divergence will bring the energy to GDP ratio downward implying higher energy efficiency in transportation, commercial and industrial activity.

Finally, **commitments to reduce CO2 emissions to the atmosphere –epitomized by the unprecedented success of the 2015 UN Climate Change Conference– are expected to encourage significant amounts of investments in order to increase the share of renewables in the global energy mix**. These investments together with fiscal incentives across the globe promise to increase the cost-competitiveness of clean energy relative to fossil fuels. As technology adopters, emerging markets could make a relatively quick transition to energy efficiency and renewable sources even if oil prices remain low for a prolonged period of time. **These trends would imply a new and certainly lower than previously expected equilibrium price for crude oil, although the uncertainty is huge about the intensity or even about the effective manifestation of those long term factors in the forecast horizon**.


4: Source: EIA, World Energy Outlook 2015.

From a long term perspective, oil markets may be moving to a new paradigm. One in which hydrocarbons are abundant and accessible, but energy demand is shifting towards multiple sources. The world's energy needs are massive, but also complex. On the one hand, vast amounts of cheap energy are needed to support economic growth in developing countries where population is expected to grow the most. However, as the impact of climate change becomes more acute and governments and private agents around the world take it more seriously, the need for "clean and cheap" energy is no longer an option but an imperative. Hydrocarbons fit only in the "cheap" part of the equation. Renewables, on the other hand, are clean, but it will take some time before they become a cost-effective alternative for economic development, more so if prices remain low. In this new paradigm, oil will still be needed, but in less quantities, and companies will produce "energy" in the most holistic sense of the term.

Huge uncertainty around our baseline scenario, also in the short- and mid-run

The uncertainty doesn't vanish in the short and mid-term than in the long term. Prices could stop falling and resurge rapidly if 1) OPEC decides to cut production, 2) U.S. production shows a faster than expected adjustment with long-lasting impact on the industry, and/or 3) the deceleration of the global economy turns out to be milder than expected. Opposite events could outcome the opposite scenario of prices, i.e.: 1) a "hard-landing" of the Chinese economy materializes; 2) OPEC maintains its current production quotas and engages in a price war against other producers, and 3) U.S. production remains resilient while break-even prices decline due to innovation. **The financial resilience of oil producers – OPEC and non-OPEC- to low oil prices scenario, the uncertainty about the soft landing of EM and the real impact of incoming innovation in oil industry will shape the final outcome of oil prices**.

Figure 3.16
**Crude Oil Price Forecasts
Brent, $/b**
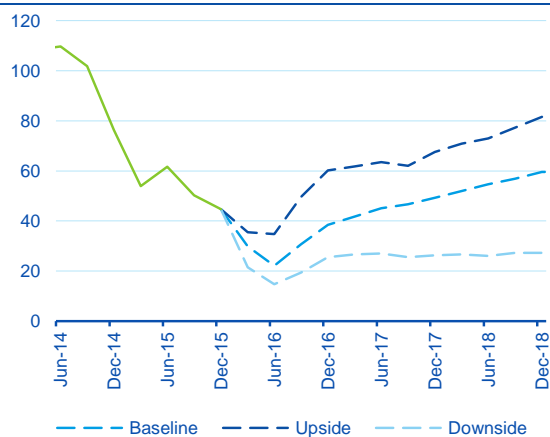
Source: BBVA Research

Table 3.2
**Crude Oil Price Forecasts
(Brent, $/b, annual average)**

	Baseline	Upside	Downside
2015	52.6	52.6	52.6
2016	**30.3**	**45**	**20.3**
2017	**45.7**	**63.7**	**26.4**
2018	**55.7**	**75.7**	**26.8**

Source: BBVA Research

Box 1. Long-term trend in raw material prices: renewable vs non-renewable[5]

Introduction

The recent slump in oil prices has meant that in January 2016 the price of oil was nominally at minimum compared to the past 12 years. In point 3 of this publication we analyse the situation and prospects of oil prices, while in this box we will analyse the behaviour of raw material prices over the very long term, trying in addition to **establish whether there are different evolutions between renewable products (agricultural raw materials) and non-renewable resources (such as energy)**.

With this article we complete a previous study[6] in which **we estimated quadratic deterministic trends for raw material prices, but with very inconclusive results**. Thus, for the vast majority of analysed raw materials the existence of a trend reversion process towards could not be found and, contrary to the theory, neither did we find differences in the specification of the deterministic trends between renewable and non-renewable products.

The key: a stochastic trend

Those inconclusive results could be related with the lack of reliability of the statistical test considered. As the literature warns[7], a discrete change in the trend can significantly skew the results of the unit root test, and thus alter conclusions regarding the existence of a long-term trend.

That is to say, **what is inappropriate is not to put forward the existence of a trend to which prices should roll back to, but to assume that this is deterministic**. In this way the possibility arises that **the estimation of raw material prices is carried out under the assumption that these prices follow stochastic trends**. This means that the equation representing the trend has time varying coefficients accordingly to a probability distribution.[8]

5: This article summarises the main conclusions of the economic observatory: "Renewed focus on long-term trends in prices of raw materials", published in January 2016.

6: A preliminary analysis of long-term trends in the real prices of raw materials". Chapter 3. Global Situation. BBVA Research. 4th Quarter 2015. https://www.bbvaresearch.com/wp-content/uploads/2015/11/Situacion_Global_4T15_Cap4.pdf.

The article follows the strategy proposed by Pindyck in chapter 2 of his article: "The long-run evolution of energy prices", Robert S. Pindyck, The Energy Journal, 1999.

7: In particular one can read the discussion that Perron has on the subject: "The great crash, the oil price shock, and the unit root hypothesis", Journal of political economy (December) 57.

8: Therefore, we believe again that what was signalled by Pindyck is correct because it is this same author who warns us of the need to work with stochastic trends, finding, like us, poor results in the tests conducted in his Chapter 2. That is why Pindyck, in his Chapter 4 derives **a raw material pricing model (real prices) that incorporates a stochastic trend** like the one presented here, where P_t is the logarithm of the real price of the raw material and T is the linear trend.

$$P_t = c_2 * P_{t-1} + \phi_{1,t} + \phi_{2,t} * T + \varepsilon_t$$

$$\phi_{1,t} = c_3 * \phi_{1,t-1} + \upsilon_{1,t}$$

$$\phi_{2,t} = c_4 * \phi_{2,t-1} + \upsilon_{2,t}$$

This is a space-state representation type model, where the first equation (measurement) establishes the relationship between the price of the raw material and the linear trend. The second and third equation (state) characterise the rule of motion of the coefficients which are part of the trend, including a stochastic component that comes from the term υ_1 and υ_2 respectively. These are the innovations that randomly 'shock' the level and slope following a distribution that in principle is assumed to be Normal (Gaussian) with a zero mean, and a finite and constant variance over time.

Estimating a model with a stochastic trend

In order to estimate the stochastic trend in the price of raw materials and detangle if there are differences between renewable and non-renewable products, we work with two aggregate indices of nominal prices of raw materials constructed by the World Bank[9]: the price index for agricultural (renewable) raw materials, and the (non-renewable) energy index. Each of the nominal rates is transformed into a real one upon being deflated by the United States Consumer Price Index, and finally transformed logarithmically to reduce the volatility of the data series.

The functional form inherent in the equations of the current model characterises a trend whose level and slope varies over time, which provides greater flexibility when compared with the deterministic trend previously considered. We expect this to adequately represent the evolution of most raw material prices[10].

The components[11] of the estimated trend are unobserved variables or states of the model. This means that estimates thereof cannot be made using traditional methods (e.g. least squares). The procedure used (usually) to estimate such models (state-space representation) is that which passes through a Kalman filter[12].

The estimated coefficients for each of the two raw material categories are presented in Table 1. A first point to emphasise is related to the values that are assumed by coefficient C_2. This coefficient is that which accompanies the autoregressive term and, in practice, determines if

prices revert back to the trend. If the value of this coefficient is greater than 1, it means that price dynamics are explosive and, therefore, will not revert back to the trend; on the contrary, if this coefficient exhibits a value of less than 1, we can guarantee that prices shall revert back to the trend.

Table B.1.1
Estimated Coefficients

	Energy	Agriculture
C2	0.8867	0.8882
	(0.0657)	(0.0629)
C3	1.0033	0.9999
	(0.0115)	(0.0001)
C4	0.7822	0.8224
	(0.3298)	(0.0149)

Note: Standard errors in parentheses
Source: BBVA Research

As we can see in Table 1, **the estimates imply a trend reversion,** although, as might be expected (and as happens to Pindyck in his estimates about energy products), the relatively high values are consistent with a **slow convergence.**

The coefficients C_3 and C_4 govern the dynamics of the trend itself. As in the case of coefficient C_2, if any of these coefficients show a value (in absolute terms) which is greater than 1, the dynamics of the trend will become explosive, while if both coefficients show a value of less than 1, the trend in the long term will end up converging at a certain level.

9: World Bank Commodity Price Data (The Pink Sheet). The database of the World Bank includes the price of 65 raw materials on an annual basis and for a period that goes from 1960 to 2015. For this exercise we have used two of the aggregate indices of nominal prices that are put together by the World Bank: agricultural and energy indices for the whole extension of the existing sample, from 1960 to 2015. The index of agricultural products contains 24 commodities (including, cereals, vegetable oils, beverages and agricultural supplies), and incorporates three energy raw materials (oil, natural gas and coal).
10: As can be read in chapter 4 of Pindyck's study, the model derived, and the one we use for our estimates is based on an Ornstein - Uhlenbeck process, which is a very flexible structure. Pindyck chooses this process because he is (only) trying to fulfill two desirable characteristics: i) reversion to a trend (unobservable); and (ii) random fluctuations in both the level as in the slope of the trend. Pindyck himself points out that the process on which he bases his estimates because of its general nature is consistent with a model for the price of raw materials from non-renewable assets such as Hotelling.
11: These components (ϕ_1, ϕ_2) can be understood as the coefficients of the trend, with the characteristic that they vary over time.
12: The Kalman filter is an algorithm that is used to identify a state (or states) which is not observable in a dynamic linear system, when this is subject to shocks. Additionally, and if we assume the measurement error in the equation is distributed according to a normal function, the (fixed) coefficients in the model (C2, C3, C4) can be estimated using the maximization of the associated plausibility function.

As it can be seen in Table 1, **the estimate for the case of agricultural raw materials shows a high coefficient C_3 although not at all in the explosive range, while in the case of energy goods, the coefficient is clearly greater than 1**. The properties of the dynamics of the trend are very important in out of sample forecasts, as they determine expectations on prices, and then, **whether the available information provides an increasing decreasing or explosive trend**.

To see this trend we perform the following exercise, we stop in 2015, the last available year, and project these real prices over a period of 20 years (track P.2015). Additionally, and with the aim to analyse the robustness of the results vis-a-vis different cyclical situations, we included the same trends in the graphs by estimating the model until 2013 and 2014 (P.2013 and P.2014). As we can see in Graph 1, **in the case of energy raw materials predicting their trend, as we would have expected from a theoretical point of view for a non-renewable resource, it is increasing**. In Graph 2 we can see that **the estimated model projects a slight negative trend for prices of agricultural raw materials,** this is what we would expect, taking into account what has been stated in the literature on prices of renewable resources.

However, the levels of the trends obtained differ greatly depending on the estimation date, as we can see with the comparison P.2013, P.2014 and P. 2015. Nonetheless, **what the trend indicates does not change**; the trend for energy goods continues to be positive, and the trend for agricultural goods remains slightly negative over the very long term.

Figure B.1.1
Energy prices (*): Projected trend
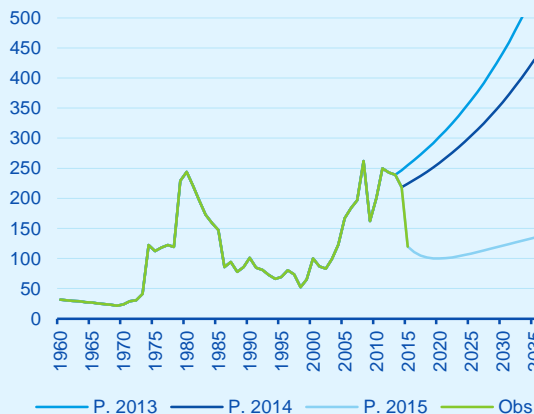
(*) Real price index. Index 100 = year 2000
Source: BBVA Research

Figure B.1.2
Agriculture prices (*): Projected trend
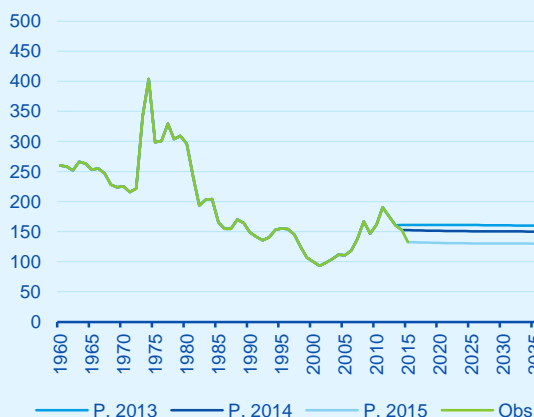
(*) Real price index. Index 100 = year 2000
Source: BBVA Research

Neither are the changes in the dynamics verified in the case of agricultural products. Only a slight change in the level is shown as a result of the differences in the starting points. In the case of energy goods, however, although the dynamics and the level show largely the same path in 2013 and 2014, the sharp fall in prices recorded over the last year means the change in the trend during 2015 is highly significant[13]. **This impact on the trend is reason enough to justify further analysis about the factors behind the recent evolution of energy prices.**

In conclusion, in this article we have stressed that it is inappropriate to impose a deterministic (quadratic) function as a model for determining the price trend of raw materials. **The estimation of a stochastic model with time varying coefficients makes possible to take into account data innovation and helps to reconcile the results of estimations of the trend in prices of raw materials with the theory of differing evolution for renewable and non-renewable products**. The impact of falling real energy prices on the stochastic trend over the long-term justifies a more detailed analysis of the factors behind their recent behaviour.

13: The problem noted is well known in the literature concerning filters to extract trends from series. The problem of "end point" is observed when there is a sudden change in the last value of a series under analysis giving rise to a change of similar magnitude in the trend, even when the latter can represent abnormal data and does not provide information with regard to the trend.

## Box 2. The role of expectations in the oil price collapse

Only a fraction of the substantial drop in oil prices since mid-2014 (64% between June 2014 and December 2015) can be attributed to the observed trend of production, consumption and global oil inventories during that period. **A substantial portion of this decline has been caused by revisions of the expectation about the future path of demand and supply of oil made by oil producers and consumers, as well as financial investors.**

Looking at the actual gap between production and consumption of oil is not sufficient to explain the fluctuations in the price

Basic microeconomic theory on the determination of the price of a good (relative to the price of other goods) argues that the variation of this price over time depends on the gap between the supply and demand for oil at the current price. Thus, if the amount offered at the initial price (what suppliers want to sell at that price) exceeds the quantity demanded at the same price (what consumers want to buy at that price), then the price will tend to fall during the ensuing periods, prompting suppliers to reduce supply and consumers to increase their demand until eliminating the supply excess.

In principle, this simple logic can provide a consistent explanation for the recent fall in oil prices provided that we take as an good estimate for the excess of supply over demand for oil (which is not observable) to the observed gap between the production and consumption of oil (equivalent to the change in the total level of oil inventories). Figure 1 shows that the gap between production and consumption followed an upward trend from late 2012 to mid-2015 (becoming positive from early 2014), which is consistent within the framework of basic microeconomic theory with the downward trend in oil prices in the period. Table 1 also shows that much of this expansion in the gap between production and consumption exceeded that expected by the International Energy Agency in mid-2014.

Figure B.2.1
Global oversupply (gap between production and consumption) in oil (millions of barrels/day) and annual change in the price of Brent (%)

Global oil oversupply ——— price of Brent (YoY) (rhs)
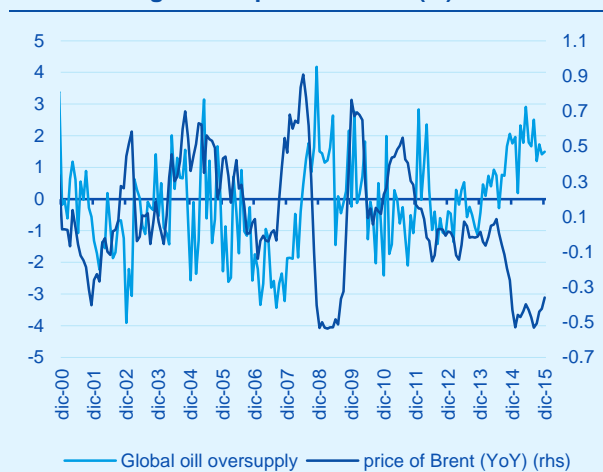
Source: BBVA Research, EIA

Table B.2.1
Production and consumption of oil (millions of barrels/day)

	3Q14	4Q14	1Q15	2Q15	3Q15	4Q15
Effective production - effective consumption	0.97	1.28	1.49	2.30	1.51	1.83
Expected production - expected consumption	-0.20	0.00	1.10	2.20	1.10	1.18
Effective oversupply - expected oversupply	**1.17**	**1.28**	**0.39**	**0.10**	**0.41**	**0.65**

(*): Forecasts as of July 2014
Source: BBVA Research, IEA

On the other hand, the upward trend in the gap between production and consumption is primarily attributable to the extraordinary behaviour of oil supply. The average growth of oil production in the period was higher than its historical average, due largely to the resurgence of oil production in the United States thanks to the technology of "fracking", the return to the oil market of various suppliers from the Middle East, and the reluctance of Saudi Arabia to cut its production rate in response to declining oil prices. All this, while oil consumption developed at a relatively steady pace.

However, in the light of historical evidence, this simple explanation for the fall in oil prices is only partially true. The correlation between the variation in oil prices and the gap between production and consumption for the 1997-2015 period is less than 30% and an econometric model that summarises the historical relationship between these variables shows[14] that **only around 27% of the fluctuations of the former can be associated with variations in the latter** and, furthermore, only about 20% of the fall in oil prices since mid-2014 can be predicted from the behaviour shown by the gap between production and consumption during the period (see Figure 2).

This deficiency of the information about the gap between production and consumption as a basis for predicting fluctuations in oil prices, and in particular its recent decline, partly reflects the failure of basic microeconomic theory to account for the behaviour of the oil market. This theory is designed to account for goods and markets which are much simpler in nature than oil and its market, essentially perishable goods (those which need to be consumed in the same period in which they are produced) which are traded on relatively unsophisticated markets (for example, cash transactions, spatial and temporal coincidence of suppliers and consumers, etc.).

Oil has at least two features that differentiate it markedly from the simple goods considered by basic microeconomic theory. The first is its non-perishable and storable nature[15], which allows the temporal separation of the moments of production, purchase and consumption of any given barrel of oil. **The second, closely connected with the first, is the indexation of a large volume of conventional financial products to oil prices**.

Given these characteristics, it is no longer correct to think that a large excess of oil production over consumption, i.e., a large increase in inventories, must necessarily drive down the price of oil. For example, in occasions there are desired or planned increases in inventories aimed at deriving profit from an expected increase in oil prices in the future (in excess of the costs of maintaining such inventories). Thus, taken together, **these two features have the effect of substantially reducing the importance of the current value of the gap between production and consumption in determining oil prices and substantially increasing the role of expectations** about the future path of the demand and supply of oil held at each moment by consumers, producers and financial investors.

Quantifying the weight of expectations in the fall in the price

In recent years, different approaches have been developed to analyse the fluctuations in oil prices that allow the incorporation of the role of changes in expectations. Among them, one of those with greater scientific recognition is the approach developed by the researcher at the School of Economics at the University of Michigan, Lutz Kilian[16], which we used below to obtain an estimate of the role of current changes and expected changes in the demand and supply of oil in the cumulative fall in oil prices (in real terms) since mid-2014.

The methodology used by Kilian is based on an empirical econometric model (an Structural Vector Autoregressive model) which **summarises the historical monthly interrelation between global oil production, an indicator of global economic activity and the oil price** (deflated by the US CPI)[17]. Using this model and with the help of a small and reasonable set of theoretical assumptions[18], it is possible to estimate what

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14: This is a bivariate Autoregressive Vector model (VAR) for the gap between supply and demand and the price of a barrel of Brent oil (in real terms).

15: There are various ways of storing oil: from its reinjection into underground reservoirs (the form that characterises the strategic reserves of some countries) through storage in tanks and caves on land to the use of cargo ships.

16: "Not All Price Shocks Are Alike" published in 2009 in the American Economic Review, 99(3)Not all Price shocks are alike" publicado en 2009 en American Economic Review, 99(3).

17: There is no single indicator of global economic activities, and in particular there is no global GDP estimate of the same nature and quality as GDP estimates for national economies. Therefore, Kilian produces his own monthly global economic activity indicator (based on data on international maritime freight rates), specifically aimed at capturing the movements of global economic activity with the greatest impact on the global demand for commodities.

18: The theoretical assumptions used by Kilian are as follows: only oil supply shocks have an immediate impact on oil production, any shock that has an immediate impact on the world economy but not on oil production is a shock to the aggregate demand for commodities and, lastly, those shocks with an immediate impact on the price of oil but which do have an impact on either oil production or global economic activity are shocks based on expectations..

proportion of the deviation in the price of oil from its historical trend can be attributed to observed fluctuations in the oil supply, the aggregate demand for commodities (associated to global economic growth) and, finally, to changes in expectations about the future behaviour of both.

Figure B.2.2
Oil prices ($): observed vs. consistent with the behaviour of oversupply
VAR model by BBVA Research
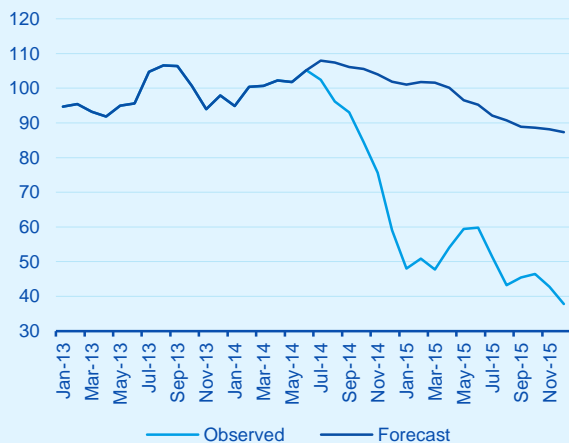
Source: BBVA Research, EIA

Figure B.2.3
Breakdown of shocks on the deviation of oil prices (%) from their linear trend
SVAR model by Kilian
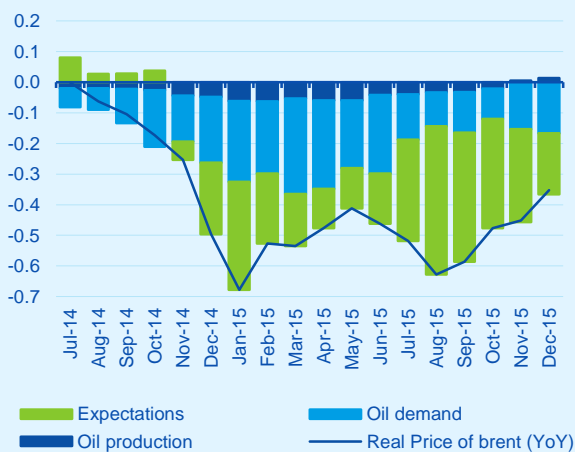
Source: BBVA Research, EIA

Figure 3 shows the results of our implementation of Kilian's approach to the analysis of the fall in oil prices (relative to their trend) between June 2014

and December 2015. **The line represents the year-on-year logarithmic variation in the price of oil** and the bars show the portion of said variation which, in each period, is explained by shocks (unforeseen fluctuations) in oil supply, oil demand or shocks to the expectations regarding both[19].

Focusing on the drop in price by January 2015 (expressed in the logarithmic year-on-year variation), a fall of 70% since January 2014 (equivalent to US$56), we found that about **5 percentage points (US$2.80) of it can be attributed to oil supply shocks, around 20 percentage points (US$11.20) can be attributed to oil demand shocks and the remaining 75 percentage points (US$42) would have been caused by shocks to expectations**. IMF researchers[20] associate the expectation shocks of this period to an upward revision of the expected future growth of oil supply based on the announcement made by Saudi Arabia in late 2014 that it would not reduce its production in response to falling prices (it would give priority to defending its market share). Also, they associate it to surprises in the recovery of production by certain exporters in the Middle East and an upward revision of the resistance attributed to the growth of oil production due to "fracking" in America against future declines in price. However, in another article, Kilian[21] offers evidence that challenges this interpretation and gives a more prominent role to a downward revision of expectations for global economic growth.

As for the further drop experienced by the price by December 2015 (expressed in logarithmic year-on-year changes), an additional fall of 40% since December 2014 (US$22), **we find that the supply shocks have not made an appreciable contribution to the fall, while demand shocks account for about 18 percentage points (US$10) and expectation shocks the remaining 22 points (US$12)**. In this case, there are indications that these expectation

19: More details in a Méndez and Redondo (2016), "Oil price collapse since 2014: What can be learned from its comovement with other commodities". BBVA Reserach Economicwatch forthcoming.
20: Arezki and Blanchard, "Seven Questions about the Recent Oil Price Slump" IMFdirect, December, 204. Link: https://blog-imfdirect.imf.org/2014/12/22/seven-questions-about-the-recent-oil-price-slump/
21: Kilian and Baumeister (2015): "Understanding the decline in the price of oil since 2014", CFS Working paper 501.

shocks are associated with expectations about future developments in both oil demand and supply. **With regard to supply, what is noteworthy is the gradual upward revision of the probability assigned to a return to normality in Iran's oil exports, while, on the demand side, key points include the growing signs of difficulties for the Chinese economy in avoiding a sharp slowdown** in growth and the consequent upward revision of the probability assigned to a "hard landing" scenario.

Conclusions

In short, the application of Kilian's methodology shows that **the collapse in oil prices since mid-2014 is not only the result of the acceleration of oil supply growth in recent years but also the result of the weakening of the growth of the aggregate demand for commodities** (captured by the index of economic activity elaborated by the author) **and, especially, a substantial revision of expectations about the pace of future growth of both aggregate commodity demand** (downward revision) **and oil supply** (upward revision).

This important role of aggregate demand and expectations in explaining the drop in oil prices is key to comprehend the differences between the effects to be expected in a situation of supply abundance and what has been actually taking place. Instead of the predicted impulse on world economic growth, so far, the drop in oil prices has been accompanied by increasing doubts on its sustainability and flourishing financial volatility.

4 Tables

Table 4.1
Macroeconomic Forecasts: Gross Domestic Product

(Annual average, %)	2012	2013	2014	2015	2016	2017
United States	2.2	1.5	2.4	2.5	2.5	2.4
Eurozone	-0.8	-0.3	0.9	1.5	1.8	2.0
Germany	0.6	0.4	1.6	1.5	1.9	1.8
France	0.2	0.7	0.2	1.1	1.4	1.7
Italy	-2.8	-1.8	-0.4	0.7	1.5	1.6
Spain	-2.1	-1.7	1.4	3.2	2.7	2.7
United Kingdom	0.7	2.2	2.9	2.2	2.0	2.0
Latam *	2.9	2.7	0.8	-0.5	-0.9	1.9
Mexico	4.0	1.4	2.1	2.5	2.2	2.6
Brazil	1.9	3.0	0.1	-3.8	-3.0	1.3
Eagles **	5.8	5.6	5.2	4.6	4.7	5.0
Turkey	2.1	4.1	2.9	3.6	3.9	3.9
Asia Pacific	5.7	5.8	5.7	5.5	5.2	5.2
Japan	1.7	1.5	0.0	0.6	1.0	0.7
China	7.7	7.7	7.4	6.9	6.2	5.8
Asia (ex. China)	4.1	4.3	4.2	4.3	4.4	4.6
World	3.4	3.3	3.4	3.2	3.2	3.5

* Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela.
** Bangladesh, Brazil, China, India, Indonesia, Iraq, Mexico, Nigeria, Pakistan, Philippines, Russia, Saudi Arabia, Thailand and Turkey.
Forecast closing date: 5 February 2016.
Source: BBVA Research and IMF

Table 4.2
Macroeconomic Forecasts: Inflation

(Annual average, %)	2012	2013	2014	2015	2016	2017
United States	2.1	1.5	1.6	0.1	1.3	2.0
Eurozone	2.5	1.4	0.4	0.0	0.2	1.4
Germany	2.1	1.6	0.8	0.1	0.1	1.3
France	2.2	1.0	0.6	0.1	0.2	1.4
Italy	3.3	1.3	0.2	0.1	0.0	1.4
Spain	2.4	1.4	-0.2	-0.5	-0.1	1.7
United Kingdom	2.8	2.6	1.5	0.0	0.8	1.6
Latam *	7.8	9.2	12.6	15.5	32.6	32.7
Mexico	4.1	3.8	4.0	2.7	2.7	3.2
Brazil	5.4	6.2	6.3	9.0	8.2	5.1
Eagles **	5.2	5.2	4.6	4.4	4.1	4.0
Turkey	8.9	7.6	8.9	7.7	9.5	7.9
Asia Pacific	3.8	4.0	3.3	2.3	2.6	3.1
Japan	0.0	1.6	2.7	1.0	1.0	1.6
China	2.6	2.6	2.1	1.4	1.7	2.5
Asia (ex. China)	4.8	5.2	4.4	3.0	3.4	3.6
World	4.5	4.2	3.9	3.7	5.0	5.3

* Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela.
** Bangladesh, Brazil, China, India, Indonesia, Iraq, Mexico, Nigeria, Pakistan, Philippines, Russia, Saudi Arabia, Thailand and Turkey.
Forecast closing date: 5 February 2016.
Source: BBVA Research and IMF

Table 4.3
Macroeconomic Forecasts: Current Account

(Annual average, % GDP)	2012	2013	2014	2015	2016	2017
United States	-2.8	-2.3	-2.9	-2.7	-3.1	-3.4
Eurozone	1.2	1.9	2.4	3.0	3.3	2.8
Germany	7.0	6.5	7.4	8.5	8.0	7.1
France	-1.2	-0.8	-0.9	0.0	0.3	0.1
Italy	-0.4	1.0	1.9	2.1	2.6	2.1
Spain	-0.2	1.5	1.0	1.8	2.8	3.2
United Kingdom	-3.3	-4.5	-5.1	-4.2	-3.8	-3.2
Latam *	-1.9	-2.5	-2.9	-3.5	-3.9	-2.4
Mexico	-1.3	-2.4	-1.9	-3.1	-3.2	-3.2
Brazil	-3.1	-3.2	-4.4	-3.4	-2.7	-1.1
Eagles **	0.9	0.5	0.6	0.6	0.5	0.7
Turkey	-6.1	-7.9	-5.7	-4.5	-4.2	-4.8
Asia Pacific	1.1	1.3	1.7	2.4	2.2	1.9
Japan	1.0	0.7	0.5	2.5	3.0	3.0
China	2.6	2.0	2.1	2.7	2.7	2.5
Asia (ex. China)	-0.1	0.7	1.4	2.2	1.8	1.4

* Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela.
** Bangladesh, Brazil, China, India, Indonesia, Iraq, Mexico, Nigeria, Pakistan, Philippines, Russia, Saudi Arabia, Thailand and Turkey.
Forecast closing date: 5 February 2016.
Source: BBVA Research and IMF

Table 4.4
Macroeconomic Forecasts: Government Balance

(Annual average, % GDP)	2012	2013	2014	2015	2016	2017
United States	-6.8	-4.1	-2.8	-2.5	-2.4	-2.3
Eurozone	-3.7	-3.0	-2.6	-2.0	-1.8	-1.5
Germany	-0.1	-0.1	0.3	0.5	0.0	0.3
France	-4.8	-4.1	-3.9	-3.8	-3.4	-2.7
Italy	-3.0	-2.9	-3.0	-2.6	-2.3	-1.1
Spain	-6.7	-6.6	-5.8	-4.8	-3.4	-2.3
United Kingdom	-8.4	-5.7	-5.6	-4.3	-3.4	-2.2
Latam *	-2.3	-2.3	-4.2	-6.0	-5.2	-4.5
Mexico	-2.6	-2.3	-3.2	-3.5	-3.0	-2.5
Brazil	-2.5	-3.1	-6.7	-9.7	-8.6	-7.2
Eagles **	-1.4	-2.0	-2.7	-4.3	-4.5	-3.8
Turkey	-2.1	-1.2	-1.6	-1.2	-1.4	-1.4
Asia Pacific	-2.6	-2.9	-2.8	-3.0	-3.6	-3.2
Japan	-7.6	-9.2	-7.9	-7.2	-6.5	-6.0
China	-1.1	-1.5	-1.8	-2.3	-4.0	-3.5
Asia (ex. China)	-3.8	-4.1	-3.7	-3.7	-3.3	-2.9

* Argentina, Brazil, Chile, Colombia, Mexico, Peru and Venezuela.
** Bangladesh, Brazil, China, India, Indonesia, Iraq, Mexico, Nigeria, Pakistan, Philippines, Russia, Saudi Arabia, Thailand and Turkey.
Forecast closing date: 5 February 2016.
Source: BBVA Research and IMF

Table 4.5
Macroeconomic Forecasts: 10-year government bond yield

Annual Average, %	2012	2013	2014	2015	2016	2017
United States	1.79	2.34	2.53	2.13	2.19	2.62
Germany	1.57	1.63	1.25	0.54	0.54	0.75

Forecast closing date: 5 February 2016.
Source: BBVA Research and IMF

Table 4.6
Macroeconomic Forecasts: Exchange Rates

Annual Average	2012	2013	2014	2015	2016	2017
USD-EUR	0.78	0.75	0.75	0.90	0.93	0.89
EUR-USD	1.29	1.33	1.33	1.1	1.1	1.1
GBP-USD	1.59	1.56	1.65	1.53	1.54	1.65
USD-JPY	79.8	97.5	105.8	121.1	127.9	129.9
USD-CNY	6.31	6.20	6.14	6.30	6.70	6.70

Forecast closing date: 5 February 2016.
Source: BBVA Research and IMF

Table 4.7
Macroeconomic Forecasts: Official Interest Rates

End of period, %	2012	2013	2014	2015	2016	2017
United States	0.25	0.25	0.25	0.50	1.00	2.00
Eurozone	0.75	0.25	0.05	0.05	0.05	0.05
China	6.00	6.00	5.60	4.35	3.85	3.85

Forecast closing date: 5 February 2016.
Source: BBVA Research and IMF

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