

Cheap Oil?

Making Sense of a Competitive Oil Market

Ramón Espinasa
Carlos G. Sucre

Energy Division
INE/ENE

TECHNICAL
NOTE N°
IDB-TN-830

Cheap Oil?

Making Sense of a Competitive Oil Market

Ramón Espinasa
Carlos G. Sucre

July 2015

Cataloging-in-Publication data provided by the
Inter-American Development Bank
Felipe Herrera Library

Espinasa, Ramón.

Cheap oil? making sense of a competitive oil market / Ramon Espinasa, Carlos Sucre.

p. cm. — (IDB Technical Note ; 830)

Includes bibliographic references.

1. Oil industries. 2. Petroleum industry and trade. I. Sucre, Carlos. II. Inter-American Development Bank. Energy Division. III. Title. IV. Series.
IDB-TN-830

JEL code: Q4; Q41; Q43

Keywords: Crude oil, oil price, oil market, geopolitics, energy economics

<http://www.iadb.org>

Copyright © 2015 Inter-American Development Bank. This work is licensed under a Creative Commons IGO 3.0 Attribution-NonCommercial-NoDerivatives (CC-IGO BY-NC-ND 3.0 IGO) license (<http://creativecommons.org/licenses/by-nc-nd/3.0/igo/legalcode>) and may be reproduced with attribution to the IDB and for any non-commercial purpose. No derivative work is allowed.

Any dispute related to the use of the works of the IDB that cannot be settled amicably shall be submitted to arbitration pursuant to the UNCITRAL rules. The use of the IDB's name for any purpose other than for attribution, and the use of IDB's logo shall be subject to a separate written license agreement between the IDB and the user and is not authorized as part of this CC-IGO license.

Note that link provided above includes additional terms and conditions of the license.

The opinions expressed in this publication are those of the authors and do not necessarily reflect the views of the Inter-American Development Bank, its Board of Directors, or the countries they represent.



Abstract

This technical note discusses the changes in the price of crude oil that occurred in the second half of 2014 and the price dynamics of the first half of 2015. It shows that from 2011 till the first half of 2014 the price of crude oil remained at a remarkably stable level around 100 dollars per barrel, while prices for other commodities were falling as a result of declining demand, particularly in emerging markets. We argue that the resiliency of crude oil prices between 2011 and 1H2014 was a result of deliberate action by Saudi Arabia and other Gulf Cooperation Council (GCC) producers to keep the price of oil stable at a level perceived to be competitive by intervening in the market when the price diverged too far from an established level. Saudi Arabia and the GCC compensated three major supply disruptions by increasing production to prevent prices remaining above the 100 dollars per barrel mark for long. Beyond stabilizing prices, the strategy aimed at maintaining Saudi production competitive, increasing its world market share. Our research finds that the recent and sharp decline in price, a result of increased production from the United States tight oil basins, has led GCC to emphasize its market share strategy by increasing production at the new price level to bring United States shale production increase to a halt. Indeed, this means that the price of crude oil will be set at the marginal price of production of non-conventional crudes in the United States, a characteristic found in competitive markets and heretofore missing from the crude oil market.

JEL Codes

Q4; Q41; Q43

Keywords

Crude oil, oil price, oil market, geopolitics, energy economics

In a note published in December 2014, using a long-term perspective that took into consideration changes in the market since 1986, we argued that the drop in the price of crude oil since July 2014 is mainly due to increased production from tight oil reservoirs in shale formations within the United States, together with lagging world oil demand particularly in non-OECD countries due to slowing economic growth.

This oversupply of crude oil - along with a refusal from OPEC to cut production as it has done in the past - has caused a drop in the price of crude oil from 106 \$/b in June 2014 to 46 \$/b for the third week of January 2015 before recovering slightly and stabilizing around the 60 \$/b mark mid-May 2015.

The evidence and argument

In this paper we take a closer look at the market by using 2011 as our basis year, as shown in Figure 1. We select 2011 for three main reasons.

First, the price of crude oil - using West Texas Intermediate (WTI) crude as the benchmark - has not gone above the level it reached in April 2011. Second, as shown in our previous note, the rapid increase in the production of crude oil from US fields started in earnest during 2011.

The third and most important reason is that after the tremendous increase in commodity prices that began in 2002 as a result of booming demand in emerging markets (particularly in Asia), the price for nearly all commodities has been declining since 2011, as demand growth has declined. As this took place, however, the price of crude oil remained essentially constant while those of other commodities fell gradually before dropping precipitously in the second half of 2014, as Figure 1 shows.

This analysis of more recent dynamics attempts to answer three questions:

The first is why the price of crude oil did not fall along with other commodities in 2011, 2012 and 2013 but instead remained at around 100 \$/b until the middle of 2014. The second question is why this fall in crude prices has been so pronounced and sudden. The last is whether this new pricing scheme is stable in the short to medium run.

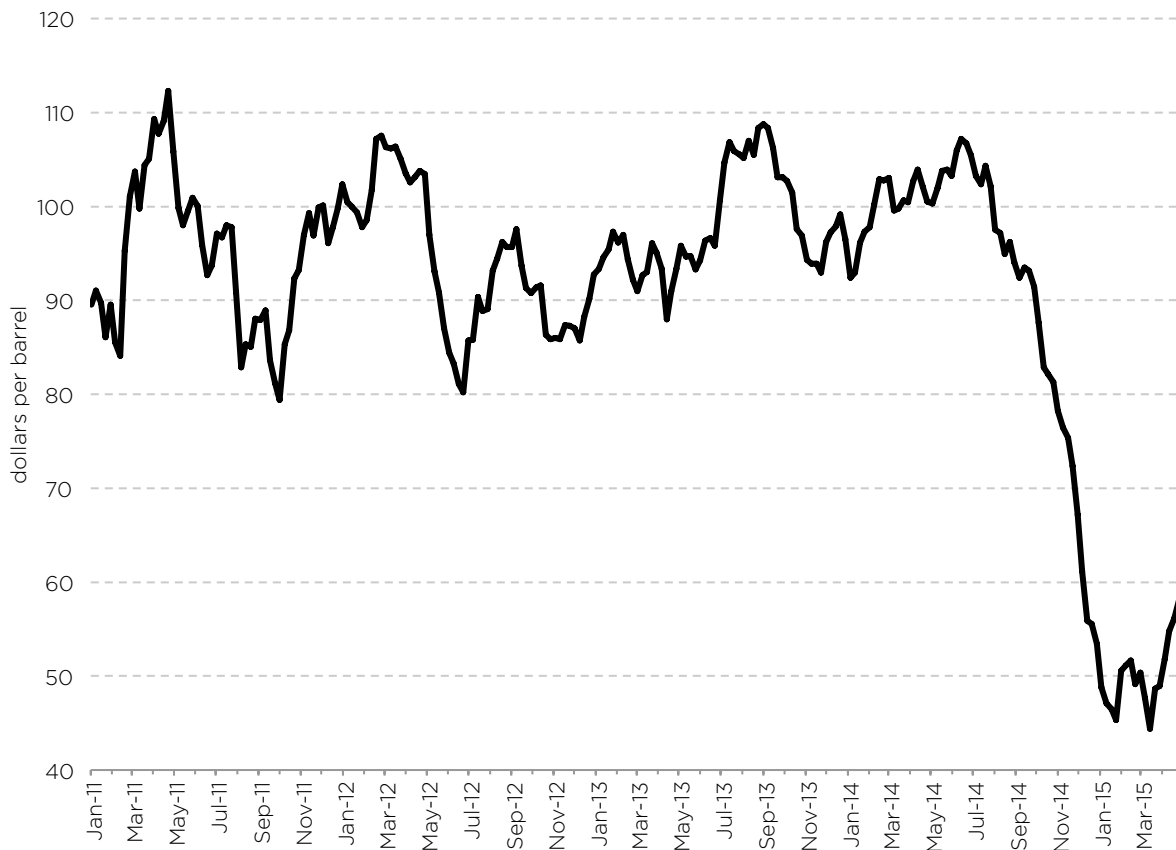
We can draw one conclusion from our answers to these questions:

There are at least four reasons to believe that crude oil prices will not go back to the average price of the last four years over at least the next four.

1. Productivity is increasing in non-conventional oil wells in the US.
2. Saudi Arabia wants to assert its dominion in the world petroleum market and is in fact increasing its production to protect and gain market share.
3. Countries such as Libya and Iran with shut-in production capacity for non-economic reasons will increase production as soon as those factors disappear, regardless of the price level.
4. Other large producers such as Iraq are also regularly increasing production capacity as they also look to regain its market share.

These factors lead us to believe that the price will settle at the marginal price of production of non-conventional crudes in the US, which is well below the price that prevailed on average between late 2010 and mid-2014.

Figure 1 | West Texas Intermediate Price, nominal



Source: Energy Information Administration

Bucking the trend

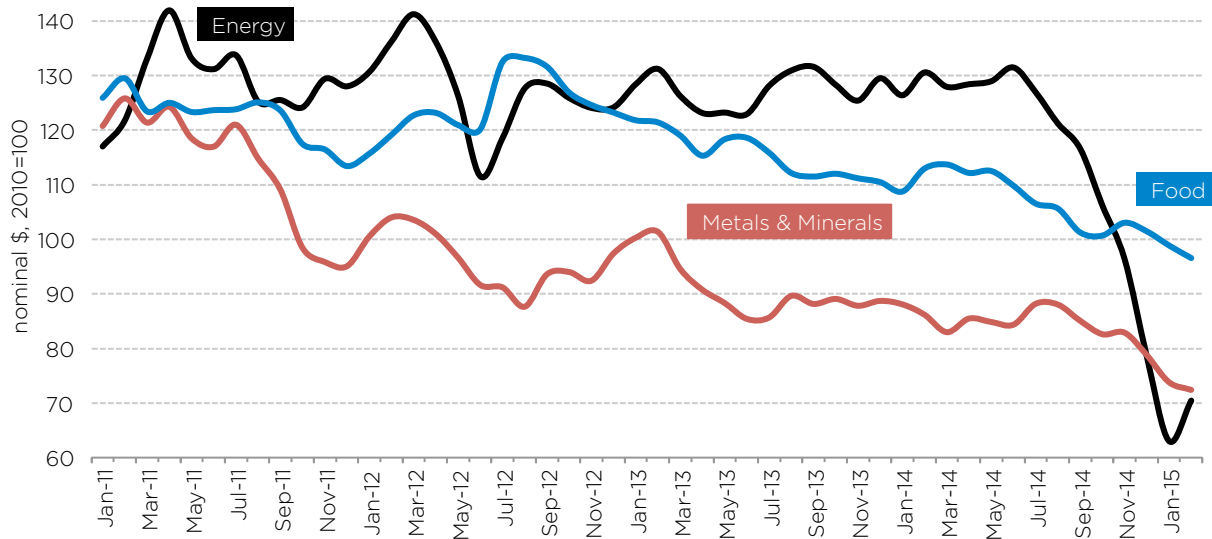
In general terms – as has been widely noted¹ – commodity prices have been on a downturn since early 2011, as shown in Figure 2. Between January 2011 and June 2014, prices for all non-energy commodities fell by 20%; food prices fell by 13%; and metals and minerals by 20%. In sharp contrast, however, prices for energy commodities between January 2011 and June 2014 had actually increased by 11%.

This downward trend for most commodities was the end of the so-called price super-cycle that began in earnest in 2002. As explained in our previous paper, the super-cycle was demand driven, particularly in a context of solid world economic growth and explosive demand for energy and raw materials by Asian non-OECD countries, namely China.

¹ For a sample of discussion on the drop in commodity prices, among others, see

- “Oil and Trouble,” *The Economist*, 4 October 2014. Available here: <http://www.economist.com/news/finance-and-economics/21621875-tumbling-resource-prices-suggest-world-economy-slowing-oil-and-trouble>
- Xan Rice, “Commodity producers face second year of falling prices,” *The Financial Times*, 30 January 2014. Available here: <http://www.ft.com/intl/cms/s/0/092f2b5a-89d8-11e3-abc4-00144feab7de.html#axzz3SbZSwkNS>
- The World Bank, “Most Commodity Prices Expected to Continue Declining in 2015, in Rare Occurrence, Says WB Report,” *The World Bank*, 22 January 2015. Available here: <http://www.worldbank.org/en/news/press-release/2015/01/22/commodity-prices-expected-continue-declining-2015-wb-report>

Figure 2 | Commodity prices, January 2011 - February 2015

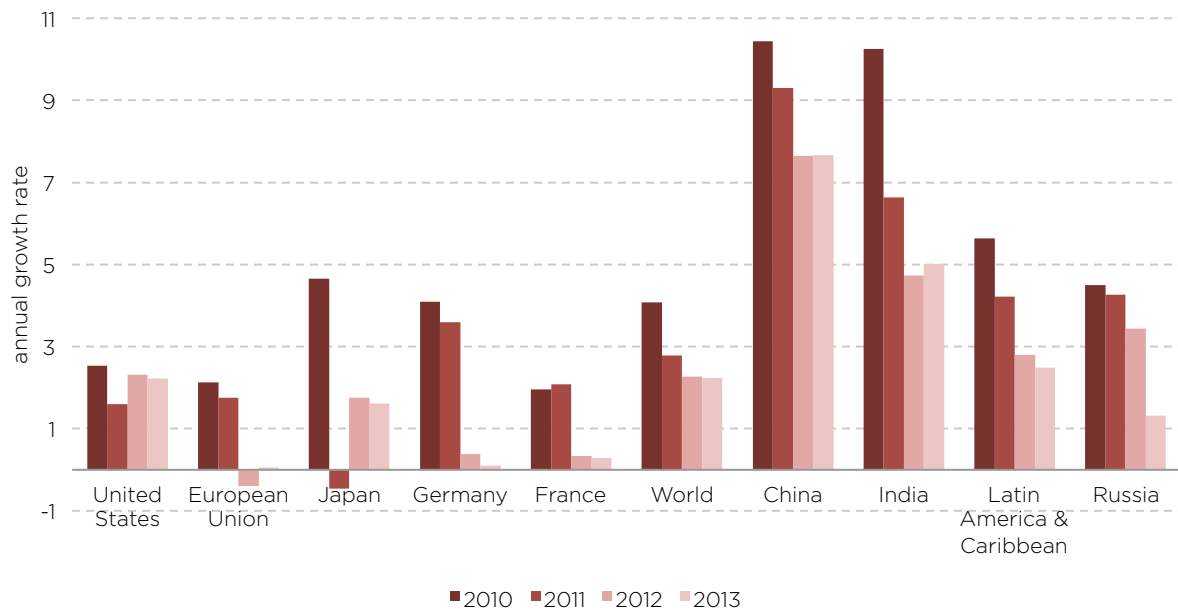


Source: World Bank

Slower economic growth

Declining demand due to lower economic growth particularly in emerging markets has been largely identified as the main reason for the fall in commodity prices over the last few years. As shown in Figure 3, in Asia, for example, China grew at 10.4% in 2010, at 9.3% in 2011, and at 7.7% in 2012. Indian growth fell at similar rates from 10.3% in 2010 to 6.6% in 2011 and 4.7% in 2012. Other economies have seen similar drops in growth rates since 2010, including the rest of the developing world, particularly Latin America & the Caribbean and Russia. Europe contracted in 2012 and did not grow in 2013. The global growth rate was almost halved between 2010 and 2013.

Figure 3 | GDP growth rate, select economies (2010-2013)



Source: World Bank

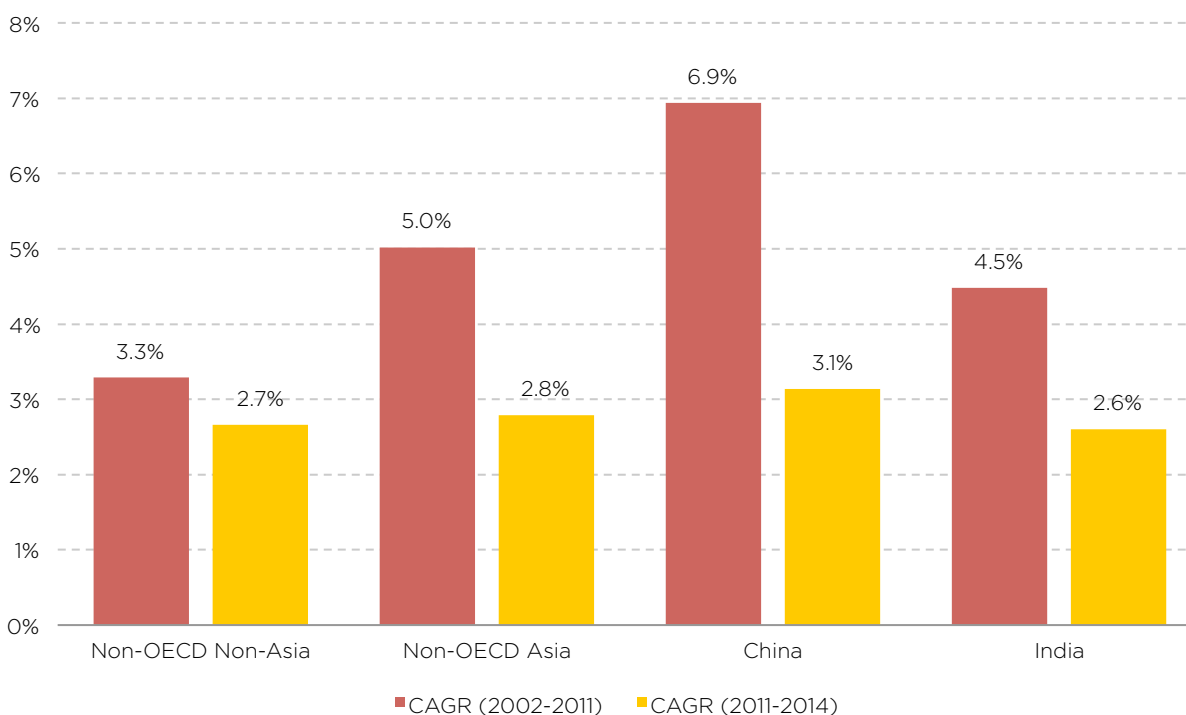
Declining growth in demand for crude oil

As a consequence of diminished overall economic growth, demand for crude oil also showed a decline from 2011 to 2014 particularly with respect to its level from 2002 to 2011, most saliently in the non-OECD markets. Crude oil demand in these countries grew at an annual growth rate of 4.1% between 2002 and 2011, mainly thanks to increases in the Asian developing economies. This pattern changed however after 2011.

Since that time - and as shown in Figure 4 - non-OECD non-Asia demand for oil has grown at 2.7% per year - 30% below its previous average - mainly because of decreased demand growth in Asian markets outside the OECD.

As also seen in Figure 4, demand for oil in non-OECD Asian economies declined to 2.8% between 2011 and 2014 from its 2002-2011 level of 5.0%, representing a 45% decrease in the rate of growth. Significantly, Chinese demand fell from 6.9% to 3.1%, representing a 55% decrease and Indian demand growth dropped from 4.5% to 2.6% over the same two periods, reflecting a 42% reduction in growth.

Figure 4 | Crude Oil Demand Growth Rates 2002-2011 vs. 2011-2014, select non-OECD markets

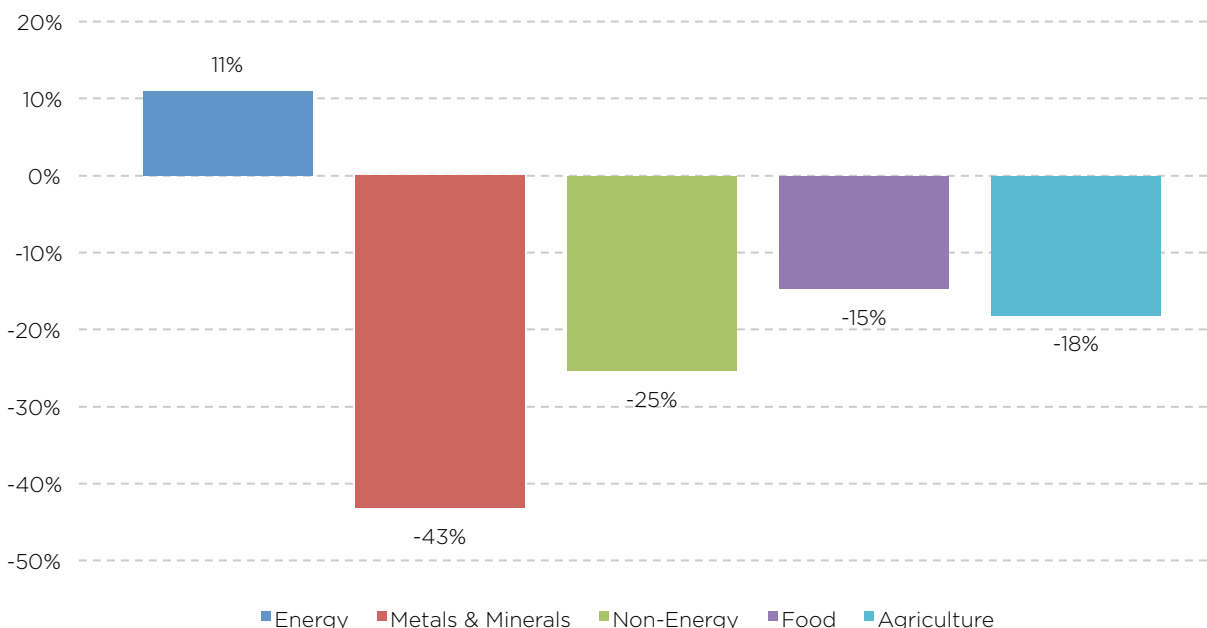


Source: International Energy Agency

Growing demand - particularly in Asian markets - has led to the increase in prices since the turn of the 21st century. A decline in demand growth since 2011 should also have impacted the price of energy commodities, specifically crude oil, coinciding with the drop in all other commodity prices.

However, as shown in Figure 5, from January 2011 to June 2014 the price of energy commodities - of which crude oil is a main component - had not declined but instead increased 11% over the period. The price for all other commodity goods had declined by more than 15%, with metals and minerals showing the sharpest drop of 43% from January 2011 to June 2014.

Figure 5 | Commodity Price Changes, January 2011 to June 2014



Source: Authors' calculations based on World Bank data

Supply-side dynamics in OPEC

The main reason why lower demand led to a price decline in most commodity prices but not in crude oil between January 2011 and June 2014 is found on the supply side of the market. The price of crude oil remained around 100 dollars per barrel (\$/b), as shown above, despite a downward tendency experienced by other commodities.

In essence, crude oil did not fall at the same time as other commodities because of three supply disruption and re-stabilization cycles in the Middle East.² The magnitude and length of the supply disruptions, on the contrary, should have caused considerable permanent price increases that did not take place. As a matter of fact, what we observe are short-lived, moderate spikes in prices in spite of the magnitude of supply disruptions. Yet, prices remained remarkably stable.

During these cycles, illustrated in Figure 6, the price of oil increased by between 10 and 20 dollars vis-à-vis its January 2011 level, only to return to this level in short order. Prices for oil neither fell with other commodities nor sharply increased with the supply disruptions.

What was the force behind the price stability?

The first supply shock

The first of these episodes – outlined as Cycle 1 in Figure 6 – started in February 2011 with the onset of the Libyan Civil War that resulted in the overthrow of the Gaddafi government in October 2011 and in the temporary shutdown of the oil industry in Libya. Between February and May 2011, Libyan crude oil production fell by 1.5 million barrels per day from its January 2011 level. This severe disruption was felt in the market as the price of oil (measured here by the WTI benchmark) moved from 89 \$/b

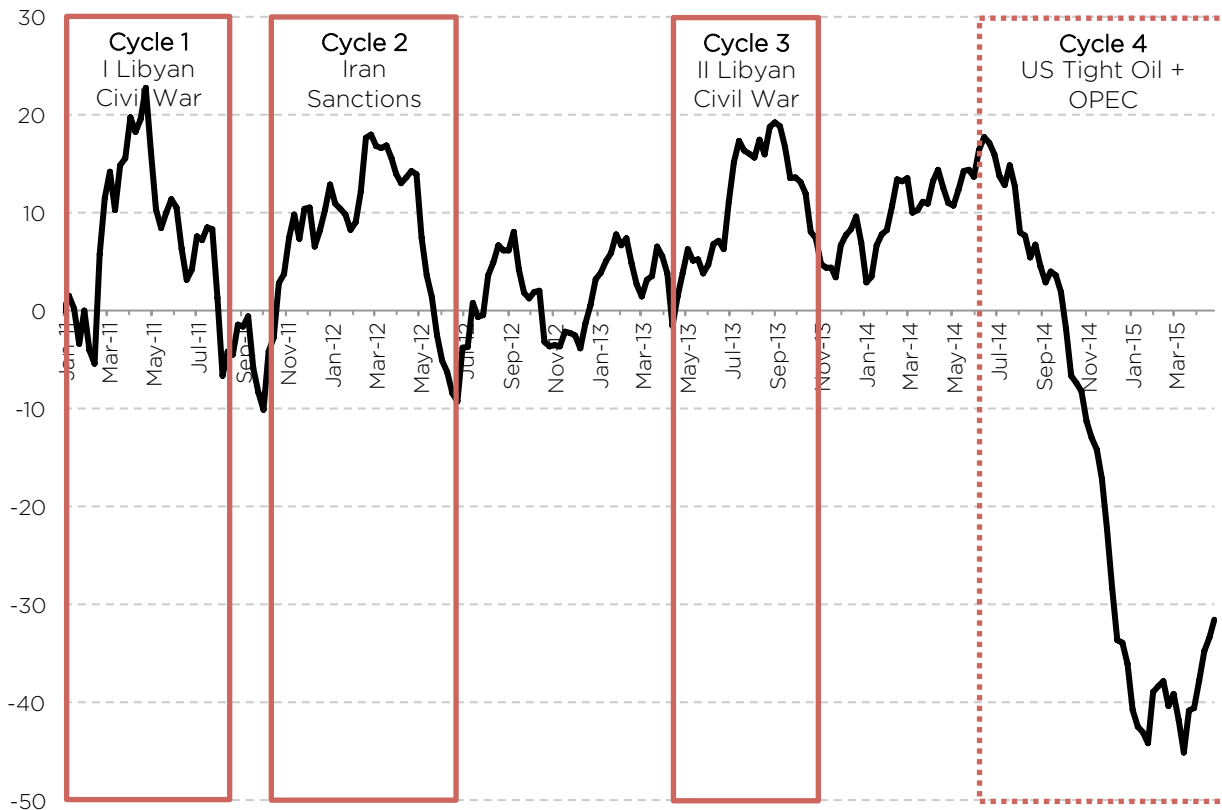
² This view is shared with other analysts, including the former Chief Economist of British Petroleum, Christof Rühl: <http://www.independent.co.uk/news/business/news/long-years-of-oil-price-stability-are-at-risk-bps-top-economist-warns-9540548.html>

to 110 \$/b between February and March 2011, largely in response to the events in Libya.³

Saudi Arabia, mostly counteracted this disruption in supply and subsequent price hike, as Figure 7 shows under Cycle 1.⁴ Between January and June 2011, following an OPEC meeting where Saudi Arabia and other Persian Gulf states agreed to raise output,⁵ Saudi production increased by 1.1 million b/d – nearly the entirety of lost Libyan production – it would remain at this high level for the duration of the conflict in Libya. By late September 2011, Libyan production was returning to the market and by January 2012 it had nearly reached its level from a year before.

The increase in production from Saudi Arabia – along with the introduction into the market of crude oil from strategic reserves in the United States and increased production elsewhere – brought the price of crude oil back to its January 2011 level at the close of 2011. The upswing in price that occurred during the Libyan Civil War was essentially tapered by the incorporation of more than a million barrels per day from Saudi Arabia in less than six months.

Figure 6 | Changes in the Price of Crude Oil with Identified Cycles, dollars per barrel



Source: Energy Information Administration and Authors

³ Tim Webb and Tom Bawden, “Libya uprising forces oil price to highest point since 2008,” The Guardian, 21 February 2011. Available here: <http://www.theguardian.com/business/2011/feb/21/libya-uprising-oil-price>

⁴ Clifford Krauss and Christine Hauser, “Oil Soars as Libyan Furor Shakes Markets,” The New York Times, 22 February 2011. Available here: <http://www.nytimes.com/2011/02/23/business/global/23oil.html>

⁵ John M. Broder and Clifford Kraus, “Global Oil Reserves Tapped in Effort to Cut Cost at Pump,” The New York Times, 23 June 2011. Available here: <http://www.nytimes.com/2011/06/24/business/24oil.html>

The second supply shock

A second price cycle, shown in Figures 6 and 7, occurred towards the end of 2011 and over the first quarter of 2012 when, following increased tensions over Iran's nuclear program, the United States government issued Executive Order 13590,⁶ which authorized the Secretary of State to impose sanctions on institutions involved in the purchase of Iranian oil. The European Union followed suit in January 2012 with its own set of sanctions and the imposition of a ban on the import of Iranian crude oil.⁷

Though most of these sanctions were scheduled to take effect in July 2012, the market reacted very quickly to the imposition of sanctions on a large producer – at the time Iran's crude oil output hovered around 3.5 million b/d. The price of oil increased from 100 \$/b in December 2011 to 110 \$/b in March 2012.

Iran's threats to close the Strait of Hormuz⁸, the narrow body of water through which 17 million barrels of oil pass every day⁹, only added to the market uncertainty and fostered an increase in price.

In this second instance, again supply side responses brought the price of oil back to its level of around 100 \$/b. The reintroduction to the market of the 1.5 million b/d of Libyan oil missing during the civil war towards the end of 2011 and the beginning of 2011 along with a rapid increase in Saudi production of around 800,000 b/d day in the last quarter of 2011 that was sustained through the Iranian episode leveled off the price of oil.

Following those two cycles, crude oil remained at just under 100 \$/b through 2012 and over the first half of 2013, even as Iran lowered its output by around 1 million b/d due to sanctions and Saudi Arabia lowered its production – as was expected – following the stabilization of Libya.

A third supply shock

The third cycle began in Libya with the onset of a second Libyan Civil War in May 2013. Hostilities quickly led to a second collapse in Libyan oil production and only two months after the start of the conflict, Libyan output was down by more than 1 million barrels per day, seen under Cycle 3 in Figures 6 and 7.

Renewed conflict in Libya again led to a strong increase in the price of oil – by around 12 \$/b – and for the second time in two years, Saudi Arabia ramped up production to keep the price of oil stable at around 100 \$/b. Between April 2013 and August 2013, Saudi output increased by nearly 1 million barrels per day, thus offsetting the removal of Libyan crude from the market.

The market responded to this assurance of supply by returning the price of crude back to its 100 \$/b average by October 2013. Saudi Arabia has maintained this increased level of production until today and the conflict in Libya has continued, keeping production deflated by about 1.5 million b/d. Saudi Arabia's entry and exit from the market following the supply disruptions in its OPEC partners described above for Libya and Iran is illustrated in Figure 7 and Figure 8.

⁶ U.S. Department of State, "Fact Sheet: Energy-related sanctions under Executive Order (E.O.) 13590," 25 November 2011. Available here: <http://www.state.gov/e/eb/rls/fs/2011/177760.htm>

⁷ The Economist Intelligence Unit, "Oil Sanctions on Iran: Cracking under pressure?" 18 December 2018.

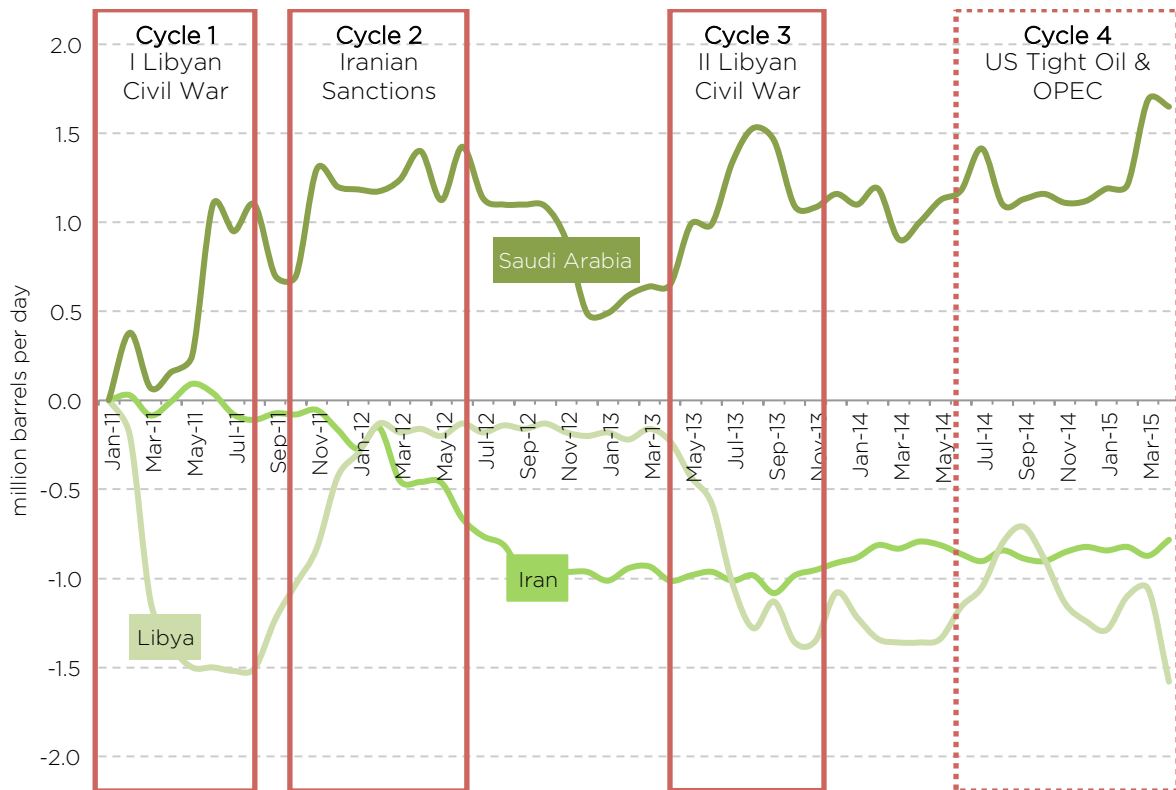
Available here: http://www.eiu.com/Handlers/WhitepaperHandler.ashx?fi=Iran_Oil_Sanctions_WEB.pdf

⁸ Farnaz Fassihi and John M. Biers, "EU Bans Imports of Iran's Oil, Raising Pressure on Tehran," The Wall Street Journal, 24 January 2012. Available here:

<http://www.wsj.com/articles/SB10001424052970203718504577178231285985826>

⁹ U.S. Energy Information Administration, "World Oil Transit Chokepoints," 10 November 2014. Available here: <http://www.eia.gov/beta/international/regions-topics.cfm?RegionTopicID=WOTC>

Figure 7 | Monthly Changes in Production for Saudi Arabia, Iran and Syria with Identified Price Cycles



Source: International Energy Agency

The shifting Saudi priority

It is important to note that between 2011 and the first half of 2014, the motivation for Saudi Arabia (and the Gulf Cooperation Council) for supply assurances was to keep the price stable at around 100 \$/b, a level they perceived as fair and competitive.

This was made publicly evident several times by Saudi oil officials, including oil minister Ali Al-Naimi, who described his country's policy as against prices that did not reflect supply and demand fundamentals.¹⁰ It was made clear that Saudi Arabia's objective was not to have high prices for oil at whatever cost but rather to have a stable price that balanced supply and demand forces.¹¹

It was largely this deliberate Saudi aim to maintain supply stability that kept the price of crude oil stable between January 2011 and June 2014, in spite of severe supply disruptions and in the face of sustained drops in the prices of other commodities as described above.

In the meantime, while the oil market's attention was on political developments in the Middle East and North Africa, an oil revolution in oil was taking place in the United States, as will be detailed below, that led the US to increase production by more than three million barrels per day between 2011 and 2014. The market did not react to this

¹⁰ Tellingly, Minister Al-Naimi commented: "Saudi Arabia is not happy with a high price for oil, particularly one which does not reflect market fundamentals, and in this regard, we have worked hard in recent months to do what we can to moderate prices". For the full statement, see: <http://www.iea.org/ieaenergy/iea-journal-issue-3/name,32882,en.html>

¹¹ Al-Naimi, Ali, "An Enduring Legacy," Center for Strategic & International Studies, 30 April 2013. Available here: http://csis.org/files/attachments/130430_Ali_al-Naimi_speech.pdf

large and unexpected supply surge, focusing its attention on the political disruptions in the Middle East and awaiting a recovery of robust world economic growth that never materialized. Stockpiling reached record levels during the first half of 2014, as growing global supply outstripped lagging demand.

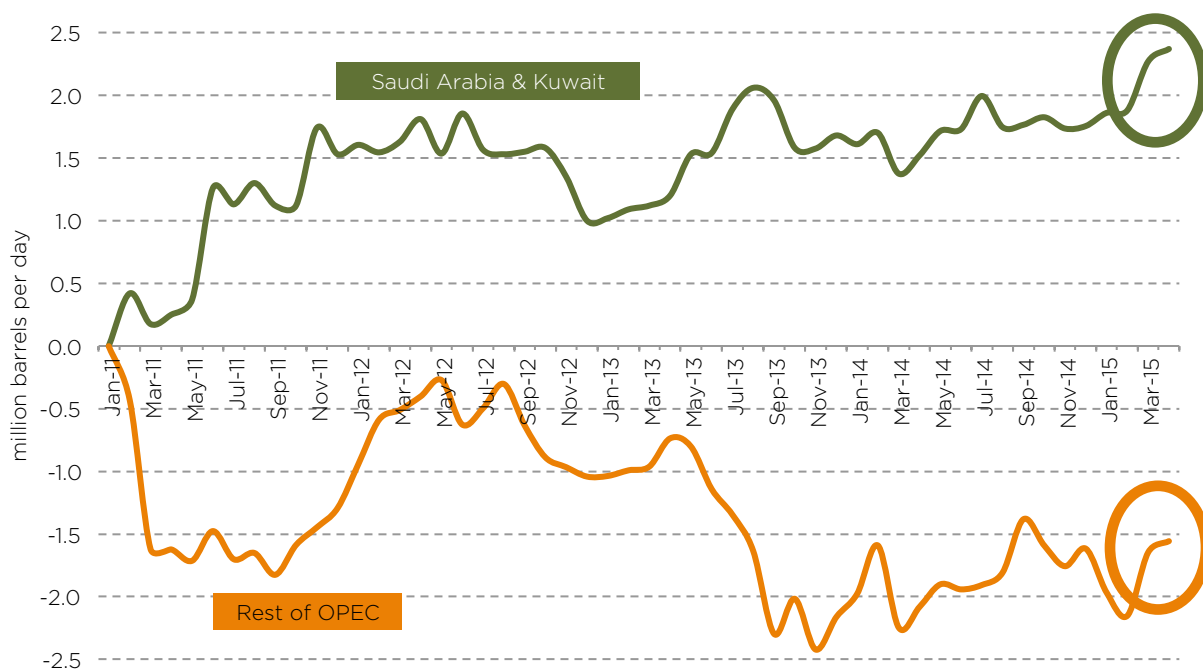
The oil market came to terms with this new reality in September 2014 during the International Monetary Fund and World Bank fall meetings, when the world economic growth forecast for 2015 was revised downwards. The realization that higher growth would not absorb growing oil supply led the markets to factor in the market unbalance and prices fell sharply for the first time since 2008. The price dropped by almost 20% between late August and late October 2014, from 98 to 81 dollars per barrel.

The reaction by Saudi Arabia to the shifting market dynamics was to not concede market share to accommodate growing US production. Indeed, Saudi Arabia was prepared to let prices drop and compete with growing US production before letting markets go¹².

This was made clear at the 166th OPEC meeting in Vienna on 27 November 2014 where Saudi Arabia – and its Gulf Cooperation Council partners – refused to yield to the petition of the rest of OPEC members for production cuts to prop up the collapsing price of crude oil.¹³

On Monday before the OPEC meeting, the price of oil was 75 dollars per barrel. By the Friday following the meeting, the price had fallen to 65 \$/b. For the first (and so far only) time since the drop began in June the price fell by 10 dollars in 5 days.

Figure 8 | Saudi Arabia and Kuwait vs. Other OPEC Crude Oil Production Changes Since 2011



Source: International Energy Agency

¹² Ali Al-Naimi, "Address at the German-Arab Friendship Association in Berlin," 4 March 2015, Royal Embassy of Saudi Arabia (Washington). Available here: <https://www.saudiembassy.net/announcement/announcement03041501.aspx>

¹³ Rapti Gupta, "Opec Will Not Cut Oil Output – Saudi Arabia Breaks Silence," International Business Times, 27 November 2014. Available here: <http://www.ibtimes.co.in/opec-will-not-cut-oil-produce-saudi-arabia-breaks-silence-615296>

By March 2015, output in Libya began to show recovery signs by adding 200,000 barrels per day, buoyed by the UN-sponsored peace talks that led to a partial ceasefire in January 2015, even though oil prices had fallen to half their level a year prior.

This increment marked the first time output in Libya had grown since September 2014 and it proved short lived as output once again declined between February and April 2015 by about 500 thousand b/d. The production increase, however, does show that Libya's production can ramp up quickly and that the country would take any price offered on the market.

The increase in Libyan production was not been accompanied by a decrease in output from Saudi Arabia and other GCC states, they had done in the previous re-incorporation of Libyan production in 2012.

Indeed, Gulf Cooperation Council states have advised that the price of oil at lower levels is irrelevant to them and that maintaining share is the main objective of their market strategy.¹⁴

This strategy was reaffirmed on 5 June 2015 when all OPEC members agreed – to maintain output at their current levels, despite objections from within the group from certain members.¹⁵

Instead, Saudi Arabia has boosted production very significantly over the first months of 2015. Between January and April 2015, Saudi Arabia production grew by 530 thousand b/d – with the bulk of the increment occurring in March 2015 in the range of 390 thousand b/d.

OPEC producers have had no other choice but to follow the Saudi lead and have already agreed twice – in November 2014 and June 2015 – to maintain production levels, instead of reducing output and propping up the price of crude oil. Indeed, under the current situation, the re-entry to the market of Libyan and Iranian crude would occur at whatever price is offered.

Indeed, as Figure 8 shows, led by Iraq, OPEC producers outside of Saudi Arabia and Kuwait are also increasing output. Between February and April 2015, OPEC countries have added 600,000 b/d to the market, despite the low price environment and clearly showing their drive towards acquiring market share.

The reason for this significant change in OPEC dynamics is found in the booming North American oil market that was largely responsible for the collapse in prices, as described next.

New supply from the US

A hike in production in the United States from previously dismissed reserves in shale rock formations (found mostly in Texas and North Dakota) has led to world oversupply, which has ultimately led to the halving of crude oil prices over six months.

The introduction to the market of crude oil from formations considered economically and technically challenging occurred thanks to the coalescing of two technologies that had been used for decades in the oil industry: horizontal drilling (first used in 1929

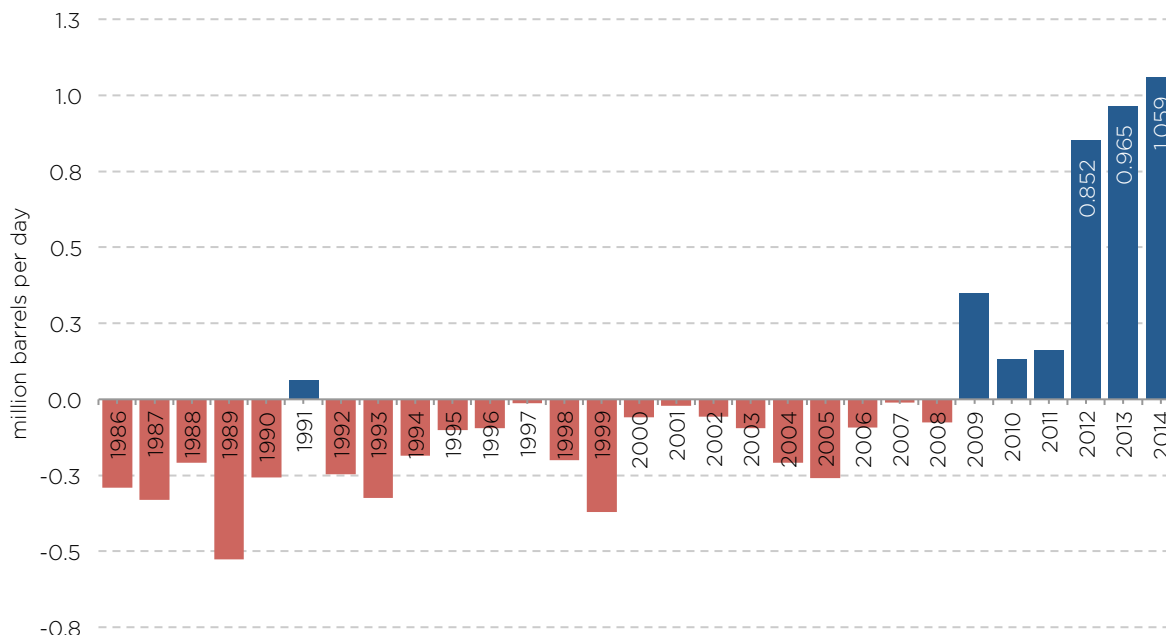
¹⁴ Jane Merriman, "Saudi's Naimi says OPEC will not cut output however far oil falls: MEES," Reuters, 22 December 2014. Available here: <http://www.reuters.com/article/2014/12/22/us-saudi-opec-idUSKBNOK012K20141222>

¹⁵ Summer Said, Bill Spindle, and Benoît Faucon, "OPEC Keeps Output Unchanged," Wall Street Journal, 5 June 2015. Available here: <http://www.wsj.com/articles/opee-keeps-output-unchanged-1433504610>

and developed commercially in the early 1980s¹⁶) and hydraulic fracturing (developed in its current form in 1947 by Stanolind¹⁷).

The combined use of these two technologies began during the 1990s in the Barnett formation of Texas, mainly in the extraction of natural gas, and on a larger scale (first for gas and later for oil) during the early 2000s in Texas, North Dakota and other states in the US.¹⁸

Figure 9 | United States Year-on-Year Crude Oil Production Changes



Source: International Energy Agency

Mostly stemming from these technological innovations applied to previously undeveloped reservoirs, for the first time in the past 30 years, crude oil production in the United State has increased for more than two consecutive years, as shown in Figure 9. Since 1986, oil production in the United States had declined every year (except for 1991) but since 2009 output has increased steadily, adding 850 thousand b/d in 2012, another 965 thousand b/d in 2013 and a further 1.06 million b/d in 2014.

US and North American crude oil balances

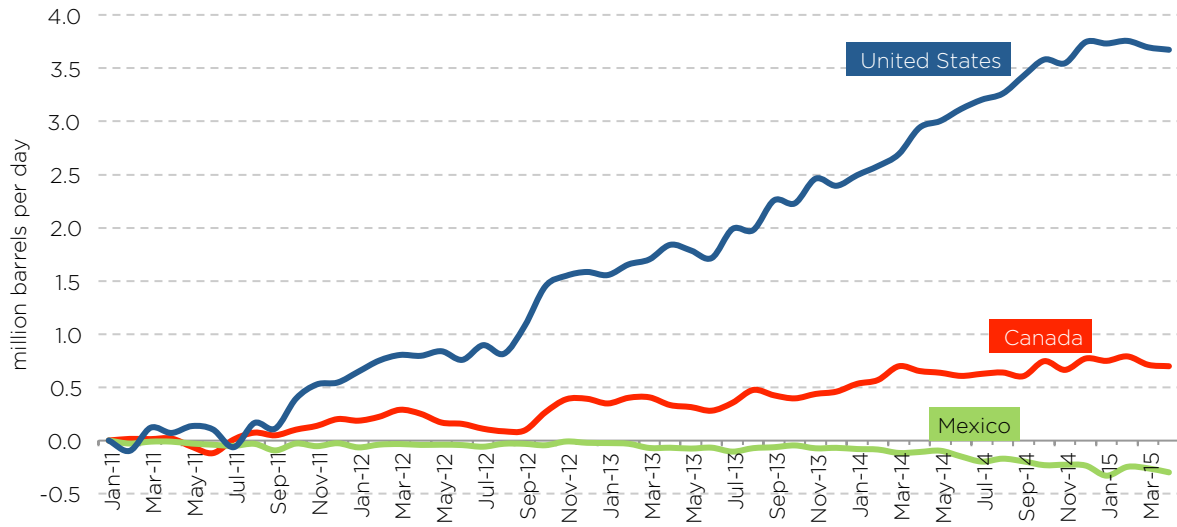
Along with the increase in US production, it is important to note that the whole North American region has improved its production outlook. As shown in Figure 10, since 2011 Canada has increased production by more than 700 thousand b/d - mainly from its oil sands reserves in the province of Alberta. At the same time, Mexico finally stabilized the collapsing output from its offshore fields in the Gulf of Campeche.

¹⁶ U.S. Energy Information Administration (Office of Oil & Gas), "Drilling Sideways - A Review of Horizontal Well Technology and Its Domestic Application," April 1993. Available here: http://www.eia.gov/pub/oil_gas/natural_gas/analysis_publications/drilling_sideways_well_technology/pdf/tr0565.pdf

¹⁷ Carl T. Montgomery and Michael B. Smith, "Hydraulic Fracturing: History of an Enduring Technology," Journal of Petroleum Technology (Society of Petroleum Engineers), December 2010:26-41. Available here: <http://www.spe.org/jpt/print/archives/?via=2010/12/10Hydraulic.pdf>

¹⁸ Kalyani Robbins, "Awakening the Slumbering Giant: How horizontal drilling technology brought the endangered species act to bear on hydraulic fracturing," Case Western Reserve Law Review. Volume 63. Issue 4. 2013. Available here: <http://law.case.edu/journals/LawReview/Documents/63CaseWResLRev4.6.Article.Robbins.pdf>

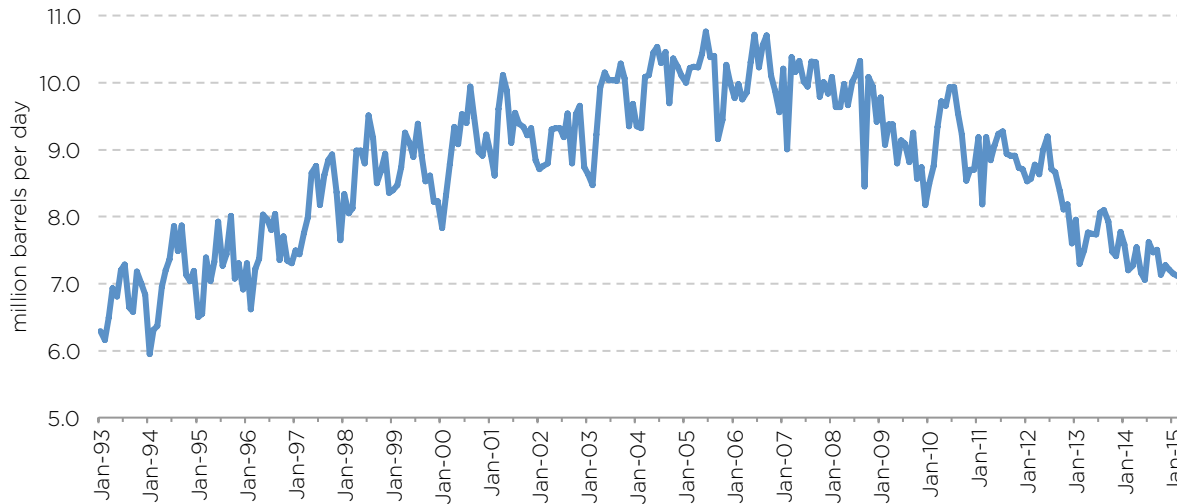
Figure 10 | Crude oil production changes since 2011 for Mexico, Canada, and the United States



Source: International Energy Agency

The combinations of these three production trends has led the United States to reduce its imports of crude oil -from 9.2 mbd in February 2011 to 6.5 mbd in the first week of May, a level not seen for the US since the mid-1990s, as Figure 11 shows. In addition, these imports are increasingly sourced from non-OPEC countries, namely Canada.

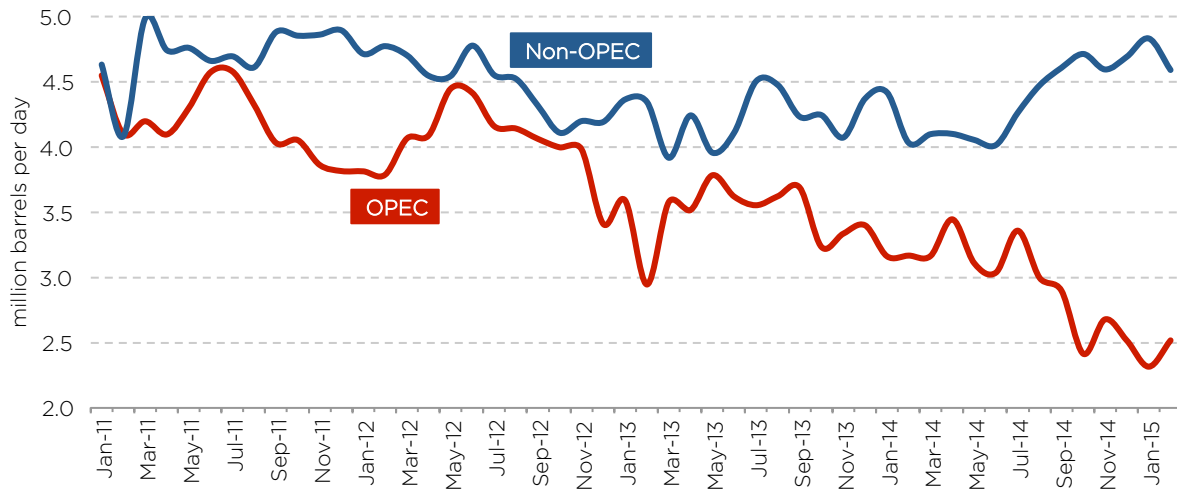
Figure 11 | United States Crude Oil Imports



Source: Energy Information Administration

Quite tellingly, as recently as January 2011, the United States split its 9 million barrels per day of imported crude oil evenly between OPEC and non-OPEC countries. Today, the 7 million b/d it imports is heavily tilted towards non-OPEC countries, which supply around 65%, as shown in Figure 12. Canada alone supplies 45% of total imports and Mexico provides another 10%. Within the share supplied by OPEC nations, Saudi Arabia holds 13% of the total and Venezuela 10%.

Figure 12 | United States Crude Oil Imports from OPEC and Non-OPEC



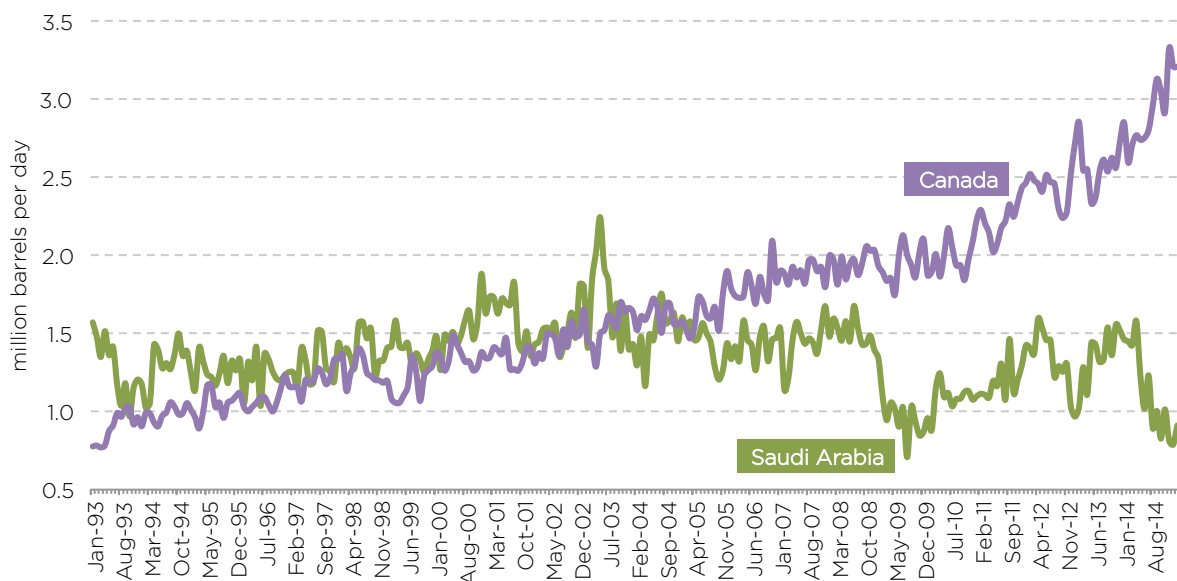
Source: Energy Information Administration

Canada’s participation in the US oil market has clearly been increasing over the past two decades but this trend intensified since the mid-2000s when the price increase caused by increased demand from China led to the development on a much larger scale of the Alberta oil sands reservoir (as they became more economical.)

Since then, Canada has boosted oil exports to the US by 1 million b/d while the previous largest supplier, Saudi Arabia, has decreased exports to the American market by 0.7 million b/d. These relationships are illustrated in Figure 13.

It remains to be seen how the new price level affects Canada’s oil sands production. If, as it seems, new investment is brought to a halt, production stops growing, exports to the US fall over time and shale US production is also halted. Saudi Arabia stands a good chance of recovering market share in North America, which seems to be one of its implicit policy priorities.

Figure 13 | United States Crude Oil Imports from Canada and Saudi Arabia

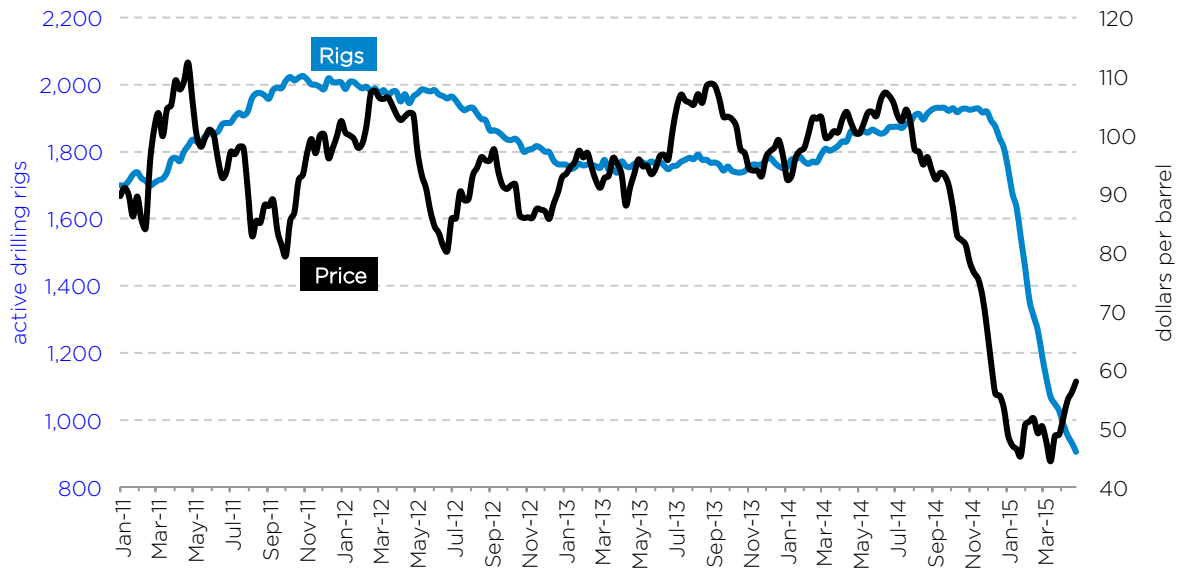


Source: Energy Information Administration

A new equilibrium

As the traditional swing producers maintain and more recently increase their output, the shale producers in the United States have begun to feel the intended effect of the GCC objective of allowing prices to find their own floor.

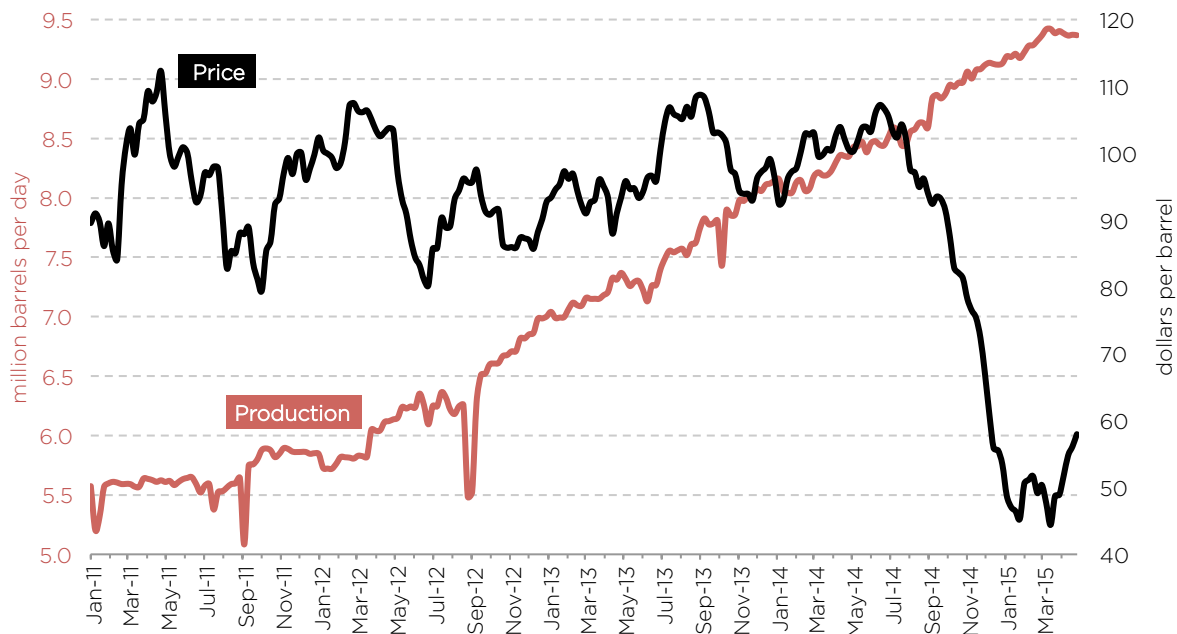
Figure 14 | United States Active Drilling Rigs and WTI Price



Source: Baker Hughes and Energy Information Administration

This is made evident by the decline in the number of active drilling rigs in the United States from around 1,900 in October 2014 to 900 by the end of April 2015, as shown in Figure 14, with a particularly strong drop in horizontal active drilling rigs, used to drill for tight oil in shale formations.

Figure 15 | United States Crude Oil Production and WTI Price



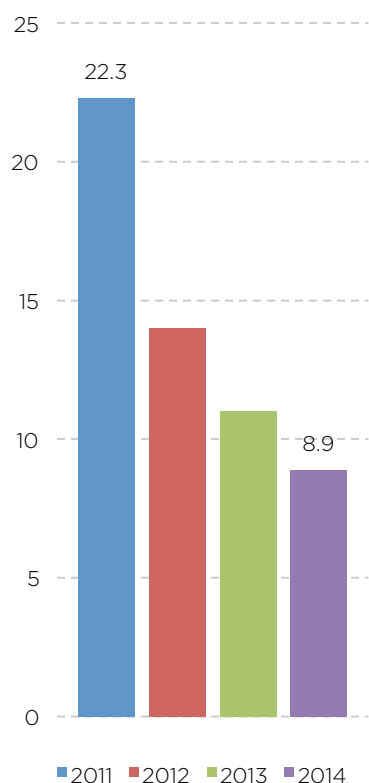
Source: Energy Information Administration

However, the declining number of active drilling rigs did not immediately result in lessened production. United States production showed first signs of leveling off in March 2015, as shown in Figure 15. Since the price decline began in June 2014, US production continued to increase every month except in November 2014 – which was followed by the second largest monthly increase of 2014 of 200 thousand b/d – and February 2015.

Preliminary weekly figures from the Energy Information Administration show that production remained stable during March and April 2015 relative to their February 2015 level.

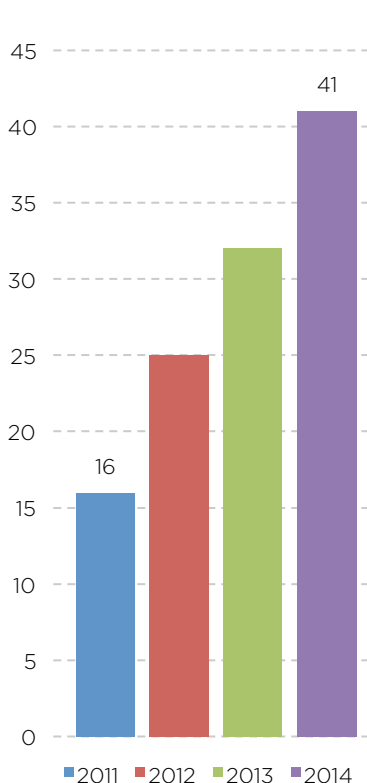
Continued growth in US output despite the decline in the number of active rigs is partly explained by increases in productivity by tight oil producers. Figure 16, figure 17 and Figure 18 show how, since 2011, producers in the Eagle Ford basin in Texas – one of the most important shale regions in the United States – have been cutting down the number of days needed to drill an oil-bearing well from 22 to 9 days, increasing the number of wells drilled per rig in a year, and developing better fracturing techniques which increased initial production per well by around 50%.

Figure 16 | Eagle Ford Productivity (Drill time in days)



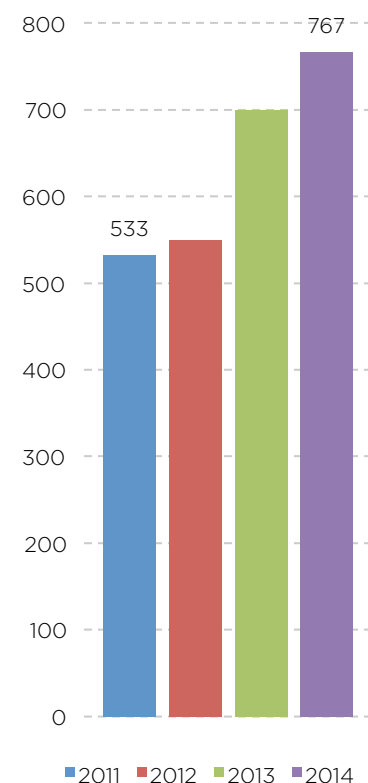
Source: RBN Energy

Figure 17 | Eagle Ford Productivity (Wells per rig)



Source: RBN Energy

Figure 18 | 30 Day Avg. Initial Rate (Barrels per day)



Source: RBN Energy

It is important to note that these improvements in productivity were being made before the collapse in the price of crude oil. The incentives to further improve rig and well productivity are much higher now that the margins on each of these tight oil plays have fallen tremendously.

If the Saudi strategy is to halt growth in US production in order to defend its global market share, the evolution of productivity and marginal costs of production in

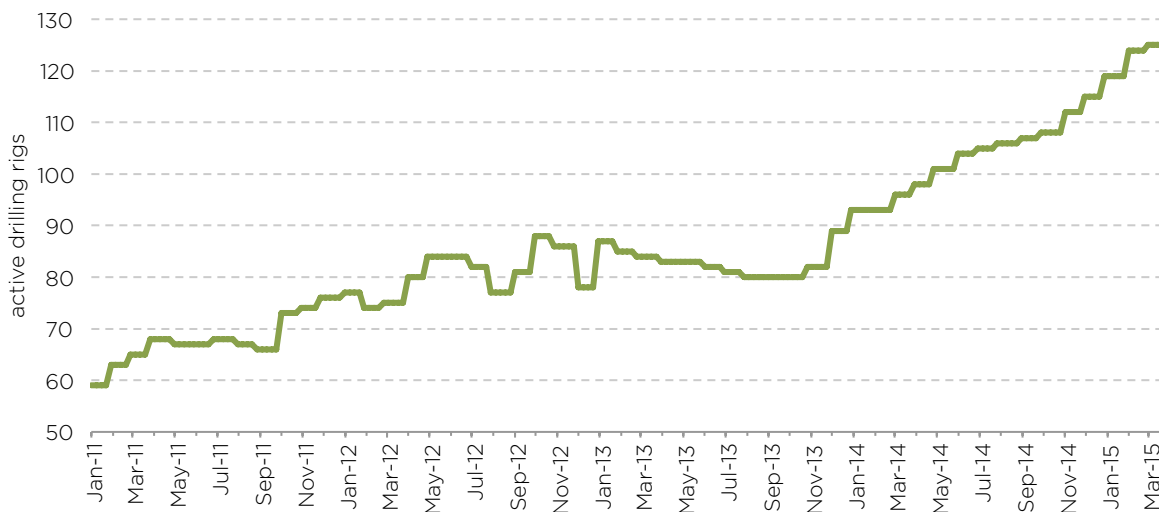
American shale formations where tight oil is produced will determine the equilibrium price of petroleum for a number of years to come.

As shale producers in the United States gain in productivity, lower their drilling activity, and maintain the level of output reached at the end of 2014 at around 9.3 million barrels per day, Saudi Arabia and Kuwait – two producers that generally coordinate their market strategies – have reacted very differently to the important change in the price schedule.

More on the GCC strategy

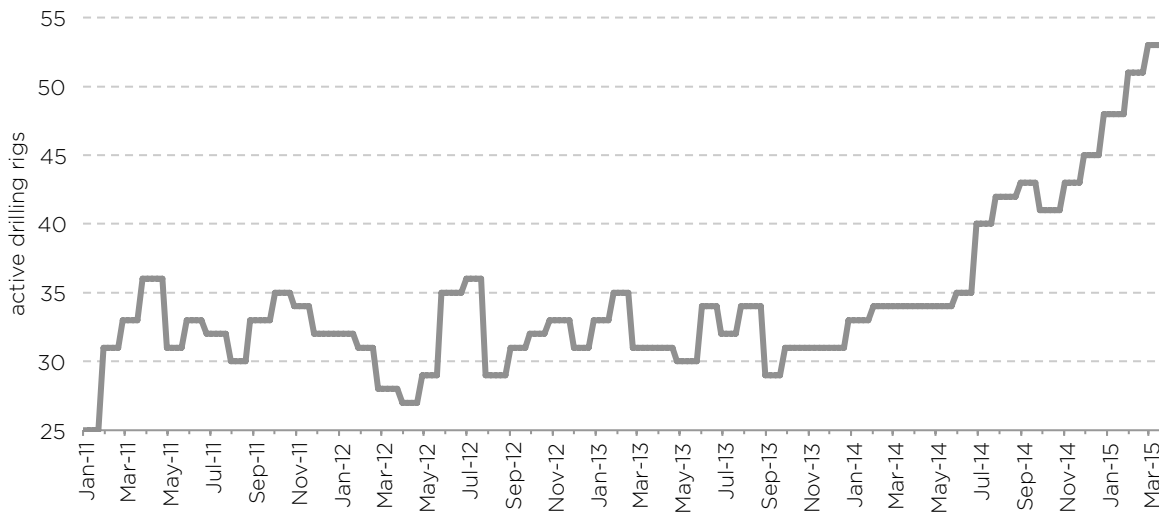
At the end of 2013, as Figures 19 and 20 show, there were 89 active drilling rigs in Saudi Arabia and 31 in Kuwait. These figures were on par with their activity during 2011, 2012 and 2013. Over the first half of 2014, Saudi Arabia increased the amount of rigs drilling for oil to 104 by June, while Kuwait remained close to their 2011-2014 average with 35 rigs.

Figure 19 | Active drilling rigs in Saudi Arabia, January 2011 to March 2015



Source: Baker Hughes

Figure 20 | Active drilling rigs in Kuwait, January 2011 to March 2015



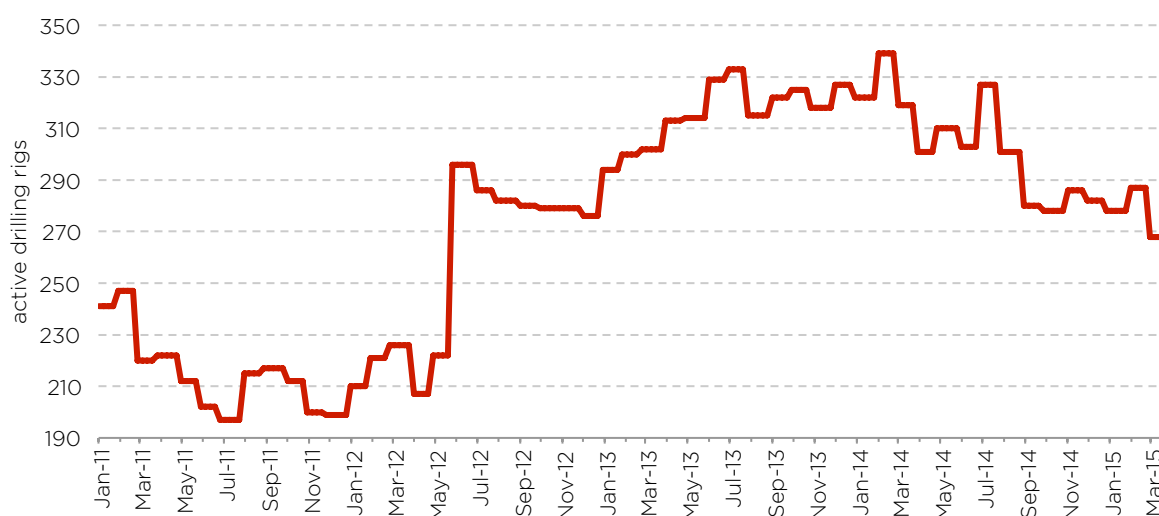
Source: Baker Hughes

Over the second half of 2014 (as the price of oil was collapsing) and over the first quarter of 2015, Saudi Arabia and Kuwait have both dramatically and rapidly increased their drilling activity.

By the end of March 2015, there were 125 rigs actively drilling for oil in Saudi Arabia – 40% more than a year earlier – and 53 active rigs in Kuwait – 71% more than at the start of 2014. This means that as the price of oil has fallen, these two Middle East powers have been investing to increase production capacity to gain market control.¹⁹

The rest of OPEC countries taken together have behaved as would be expected from producers small enough to be price takers: they have reduced drilling activity according to lower cash flow. Figure 21 shows the evolution of this activity by month since 2011 for OPEC.

Figure 21 | Active drilling rigs in OPEC, January 2011 to March 2015



Source: Baker Hughes

The Saudi-Kuwaiti strategy to increase production capacity while it falls in the rest of the world can be read as preparation to re-assert their dominance on the evolution of the world petroleum market by increasing their market share. With demand constant, every increase in GCC production will translate in the shutting down of additional marginal production.

Closing thoughts and perspectives

In this sense, given that the price of oil is now trading again with other commodities, the market may have found a balanced price for crude oil set by the marginal producer. However, as this marginal price setting mechanism is only developing recently, there remain external factors that can affect the price of crude oil outside the forces of supply and demand.

Built from the assumption that the price is mostly being set by market fundamentals, it is possible to develop a scenario for low prices (55 to 65 \$/b) and one for high prices (85 to 95 \$/b) over the next few years.

¹⁹ We thank Juan Szabo for this insight, as it was his keen nose that suspected the Gulf Cooperation Council would take use the fall in price to increase production capacity to maintain and increase market control.

The more likely scenario is that prices remain on a relatively stable level between 55 and 66 dollars per barrel given that any of the following events would bring more supply to the market, offsetting persistently increasing demand.

- A full peace accord is reached in Libya and 1.5 million barrels per day of Libyan crude oil come back into the market. Evidence of increased Libyan production – thanks to the preliminary UN peace accord – is already emerging.
- Negotiations over Iran’s nuclear program are successful and sanctions on its oil sector are lifted to a certain extent, allowing for around 0.5 million b/d to be added to the global supply. This event is as likely as the Libyan peace accord and its impact would be limited given the smaller amounts of crude that would be re-introduced from Iran.
- Saudi Arabia and Kuwait continue increasing output, from existing and newly installed production capacity. This is a likely occurrence given the important increase in drilling rigs carried out by both countries over the past year. Saudi Arabia added 600,000 b/d in production during March 2015.
- Tight oil producers continue to make productivity gains as they have done over the past three years and at constant prices, drilling activity in the US stops declining and production stabilizes at its current level.
- World economic growth remains at lower levels and demand does not respond to the stimulus produced by lower energy costs. The demand side effect is tougher to quantify and will be analyzed in subsequent work.

A less likely scenario is one where the price of oil increases to a level around 85 to 95 dollars per barrel. Such a scenario would occur if any of the following events takes place, *ceteris paribus*:

- Marginal producers in the United States and other high-price oil bearing provinces leave the market due to financial pressures stemming from the collapse in the price of oil thus dampening supply.
- A portion of Iraqi production is threatened or taken over by Daesh (also known as ISIS) rebels and thus removed from the global market.
- Other unforeseen climatological or geopolitical events in the Arabian Peninsula that damage, limit, or hinder transport infrastructure or production capacity.

References

- Al-Naimi, Ali. "Address at the German-Arab Friendship Association in Berlin." *Royal Embassy of Saudi Arabia (Washington)*. 4 March 2015.
- Al-Naimi, Ali. "The priority is ending energy poverty." *International Energy Agency*. 25 October 2012.
- Al-Naimi, Ali. "An Enduring Legacy." *Center for Strategic & International Studies*. 30 April 2013.
- Bawden, Tom. "Long years of oil price stability are at risk, BP's top economist warns." *The Independent (UK)*. 16 June 2014.
- Broder, John M. and Clifford Kraus. "Global Oil Reserves Tapped in Effort to Cut Cost at Pump." *The New York Times*. 23 June 2011.
- Fassihi, Farnaz and John M. Biers. "EU Bans Imports of Iran's Oil, Raising Pressure on Tehran." *The Wall Street Journal*. 24 January 2012.
- Gupta, Rapti. "Opec Will Not Cut Oil Output - Saudi Arabia Breaks Silence." *International Business Times*. 27 November 2014.
- International Energy Agency. "Monthly Oil Data Service." *International Energy Agency*. June 2015.
- International Monetary Fund. "World Economic Outlook: Legacies, Clouds, Uncertainties." *International Monetary Fund*. October 2014.
- Krauss, Clifford and Christine Hauser. "Oil Soars as Libyan Furor Shakes Markets." *The New York Times*. 22 February 2011.
- Merriman, Jane. "Saudi's Naimi says OPEC will not cut output however far oil falls: MEES." *Reuters*. 22 December 2014.
- Montgomery, Carl T. and Michael B. Smith. "Hydraulic Fracturing: History of an Enduring Technology." *Journal of Petroleum Technology (Society of Petroleum Engineers)*. December 2010:26-41.
- RBN Energy. "Crude Oil and Natural Gas Markets After the Crash." *Center for Strategic and International Studies*. 28 January 2015.
- Rice, Xan. "Commodity producers face second year of falling prices." *The Financial Times*. 30 January 2014.
- Robbins, Kalyani. "Awakening the Slumbering Giant: How horizontal drilling technology brought the endangered species act to bear on hydraulic fracturing." *Case Western Reserve Law Review*. Volume 63. Issue 4. 2013.
- Said, Summer Bill Spindle, and Benoît Faucon. "OPEC Keeps Output Unchanged." *The Wall Street Journal*. 65 June 2015.
- Szabo, Juan. Personal Interview. April 2015.
- The Economist Intelligence Unit. "Oil Sanctions on Iran: Cracking under pressure?" *The Economist*. 18 December 2018.
- The Economist. "Oil and Trouble." *The Economist*. 4 October 2014.

U.S. Department of State. "Fact Sheet: Energy-related sanctions under Executive Order (E.O.) 13590." *U.S. Department of State*. 25 November 2011.

U.S. Energy Information Administration. "World Oil Transit Chokepoints." 10 November 2014.

U.S. Energy Information Administration. "Annual Energy Overview." May 2014.

U.S. Energy Information Administration (Office of Oil & Gas). "Drilling Sideways – A Review of Horizontal Well Technology and Its Domestic Application." April 1993.

Webb, Tim and Tom Bawden. "Libya uprising forces oil price to highest point since 2008." *The Guardian*. 21 February 2011.

World Bank. "Most Commodity Prices Expected to Continue Declining in 2015, in Rare Occurrence, Says WB Report." *World Bank*. 22 January 2015.

World Bank. World Development Indicators Database. June 2015