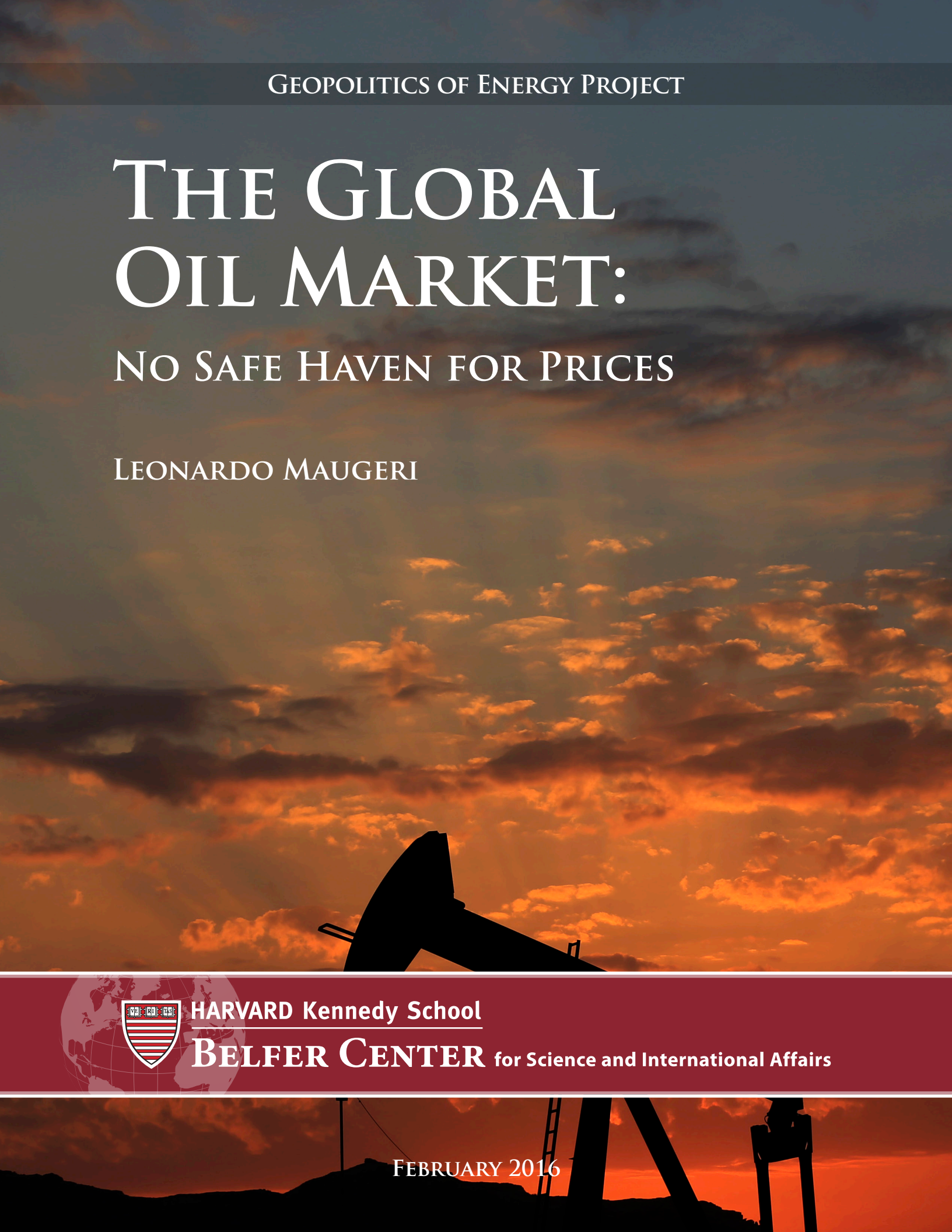

Geopolitics of Energy Project

The Global Oil Market:

No Safe Haven for Prices

Leonardo Maugeri

HARVARD Kennedy School
Belfer Center for Science and International Affairs

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The sun sets behind an oil pump in the desert oil fields of Sakhir, Bahrain.
(Hasan Jamali, AP File)

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One of the world's foremost experts on oil, gas, and energy, Maugeri has been one of the most distinguished top managers of Eni, the largest Italian company, which is also ranked number 6 among the largest international oil companies. At Eni, he held the position of Senior Executive Vice President of Strategies and Development (2000–2010) and eventually became Executive Chairman of Polimeri Europa, Eni's petrochemical branch (March 2010–June 2011). In 2008, Maugeri promoted the strategic alliance between Eni and the Massachusetts Institute of Technology (MIT), which—among other outcomes—led to the establishment of the Eni-MIT Solar Frontiers Center in 2010.

Maugeri is recognized worldwide for his books and seminal articles about energy, as well as for his part-time activity as a lecturer in some of the most prestigious universities and think-tanks. Since the early 2000s, he was among the few who affirmed that the world's oil was neither running out nor approaching its "peak-production." He was also among the few who predicted the revolution of shale-gas and tight oil.

About the Geopolitics of Energy Project

The Geopolitics of Energy Project explores the intersection of energy, security, and international politics. The project, launched in 2011, aims to improve our understanding of how energy demand and supplyshape international politics—and vice versa. It also endeavors to inform policymakers and students about major challenges to global energy security and, where possible, to propose new ways of thinking about and addressing these issues. The project focuses both on conventional and alternative energies, as both will influence and be influenced by geopolitical realities.

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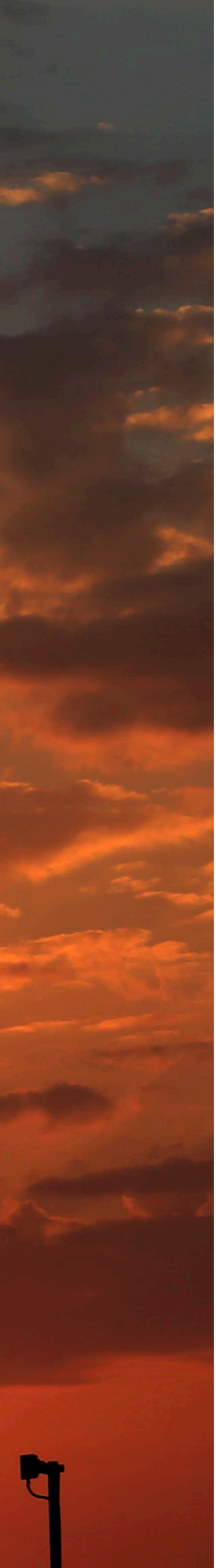

1. Introduction

In 2012, evidence suggested that a collapse in oil prices by 2015 was quite possible and that the duration of such a collapse would depend essentially on how quickly the massive worldwide investment in new production capacity could be stopped.[1] For multiple reasons, halting ongoing investments in the oil industry is particularly difficult.[2] After a decade (2005-2014), the investment super-cycle of 2010-2014 started bringing online new production capacity and slowed the rate of decline of mature oil fields. Almost all big oil producers registered significant output growth, with the United States and Iraq leading the way, whereas demand growth was insufficient to absorb the increase of production. From July 2014 on, oil prices reflected this imbalance as they started to decline constantly after staying higher than USD 100 per barrel for several years. Finally, in November 2014, they collapsed when Saudi Arabia essentially imposed a policy of no production cutbacks on the Organization of Petroleum Exporting Countries (OPEC).

In 2015, prices fell by more than 50 percent, and the collapse continued in early 2016. In the third week of January 2016, oil prices fell below USD 27 per barrel, the lowest level in 13 years.

Despite the decline in price, actual production of oil seemed to defy the laws of gravity and economics as it continued to grow. Once again, the main reason for this apparent contradiction is that while many companies and countries announced cuts to their spending budgets, very few actually halted investments already under way in the upstream sector. Many are just beginning to register production from recently completed investments, while others are completing their investments, after having spent the bulk of their capital budgets. The result: production capacity and the supply of oil will continue to grow.

Oil producers hope that in 2016, the demand for "black gold" will rise enough to clear at least some of the excess that has been created. This seems unlikely. Consumption will almost certainly increase, but not realistically to the levels necessary to eliminate excess production, which has reached almost three million barrels per day (mbd)—mostly swelling stockpiles worldwide. Overall,

global production capacity—which includes both voluntary and non-voluntary spare capacity—is now greater than actual consumption by more than seven million mbd.

In this framework, the only possibility for oil prices to recover substantially seems to be an effective agreement among oil producers to cut production. Such a hypothesis gained momentum by the end of January, and contributed to a mini-rally of oil prices. However, a formal agreement to cut production and—above all—the execution of such an agreement by the countries that sign up to it, is far more difficult than it may appear.

This brief offers an initial analysis of the forces at work in the world of oil, to be followed by a more extensive analysis later in 2016.

2. Cost decreases & investments are still pushing up oil supply

According to my preliminary estimates, at the end of 2015, world oil production stood at about 98.5 mbd (including crude oil and other liquids, according to international statistical conventions), while consumption had slightly exceeded 95 mbd. The difference—more than 3 mbd—went to stockpiles. Global production capacity, however, is still higher than actual production.

Worldwide, there is at least 2.5 mbd of voluntary, unused production capacity (or "spare capacity"), mostly concentrated in Saudi Arabia (including the Saudi 50 percent share of the Neutral Zone). In addition, there are almost two mbd of involuntary spare capacity, distributed among several countries that are unable to produce to their potential due to political crises or technical challenges. Meanwhile, the average price for Brent crude oil has plummeted from more than USD 99 per barrel in 2014 to USD 53.60 in 2015, touching lows of less than USD 37 per barrel in December 2015 (See Fig. 1) and falling even further in January 2016 at around USD 27 per barrel.

Two factors cause this apparent contradiction between collapsing oil prices and ever-growing production. First, past heavy investment is creating significant ripple effects, and will continue to do so throughout 2016, and perhaps for most of 2017. True, both the industry and the producing countries have announced major cost cuts to both capital and operating expenditures (or CAPEX and OPEX) in the upstream sector, and the latter

probably totals more than USD 150 billion according to estimates in 2015 (See Fig. 1). But by looking carefully into the announced cuts, one notes that they mainly involve exploration and development projects that were not yet approved, or other sectors of the industry itself (natural gas, petrochemicals, downstream oil, etc.).

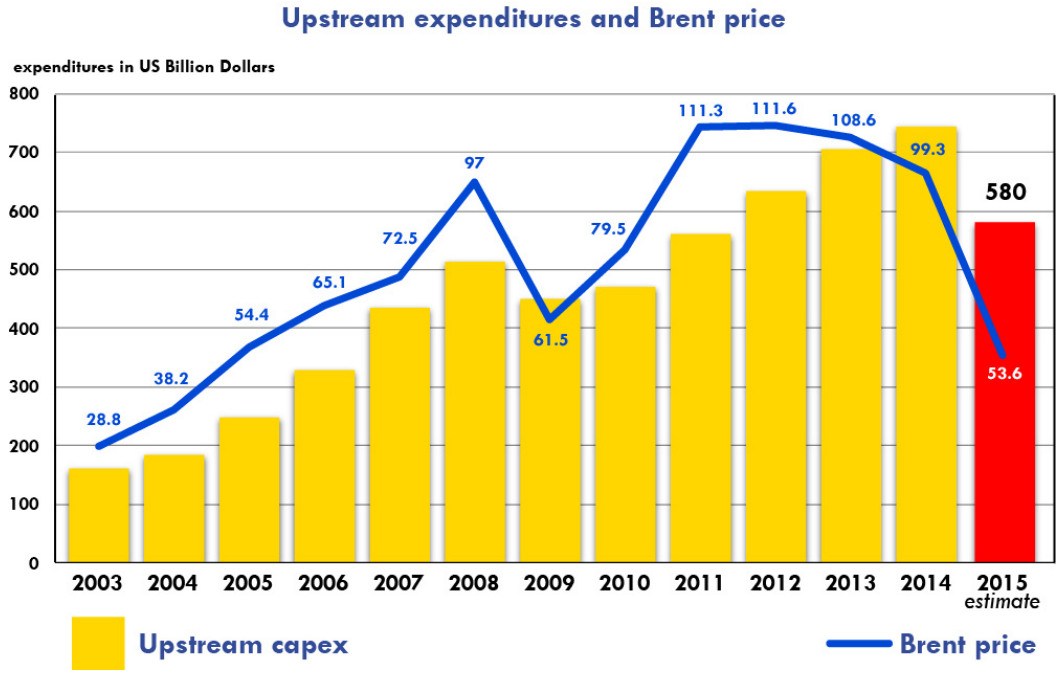

Fig. 1: **Upstream expenditures and Brent price, 2003-2015**

On the other hand, except for American shale oil companies (See Section 3.g), no one is cutting capital expenditures committed to projects that are close to completion and that have already spent a significant portion of the original budget. The residual share of these investments, which is approximately USD 250 billion (and may be lower, because costs are decreasing), has momentum that is unstoppable, because oil companies need to respect three conditions: 1) recover the money that has been spent as quickly as possible, 2) respect the contract conditions imposed by the producing countries, and 3) replace reserves, particularly oil. The latter has become an obsession, especially for the international oil companies (IOCs), who have been largely unsuccessful in replacing oil reserves in the last decade.

As for the big producing countries that directly control their national oil companies (NOCs), it is worth noting that so far all Persian Gulf NOCs have confirmed their previous investment plans and production targets out to 2020 (with the exception of Iraq,

which has revised downward its original, unrealistic production targets—see Section 3.c). This policy reflects a continued effort to show the world that they can weather the storm, replace their reserves, and preserve or improve their market share globally.

Second, while it is true that prices have fallen, the costs of exploration and production are falling too. Expenses are lower, and therefore the break-even point of many development projects tends to fall rapidly, making it less painful to live with low prices.

3. A BRIEF LOOK INTO THE KEY PRODUCING COUNTRIES/AREAS

Worldwide crude oil production is growing across the board, starting with the world's leading producers. What follows is a brief review of what is happening and what might happen in the major oil-producing areas of the world. They are listed in alphabetical order, independent of geopolitical factors, for which there is a section below.

3.a Canada

During 2015, Canada passed the symbolic milestone of production of 4 mbd. Much of this production was linked to rapid development of oil sands, which reached 2.3 mbd during 2015, up almost four-fold from Canada's 600,000 barrels per day (bd) output in 2000. Some oil sands projects have the highest marginal costs in the world, a fact that has caused many to doubt Canada's ability to maintain its current pace of development. However, Canadian resilience can be explained by at least two factors that have medium-term impact.

First, many investments to develop new projects have already been completed. In the near future, it will likely be necessary to only make incremental investments in those projects, which will involve smaller capital outlays. Second, the costs of investing in oil sands are decreasing rapidly. From 2000 through 2014, a concentration of investments in the oil sector led to cost inflation of between 70 percent and 130 percent (depending on the source of the analysis). The completion of many investments and the freezing of new projects will collapse costs, yielding a lower break-even point for many Canadian oil sands production projects. According to the industry information company, IHS, operating costs decreased by 20 percent in 2015, but this estimate appears conservative.[3]

Much of the infrastructure needed to process and transport new production has also been completed. Therefore, it seems reasonable to expect that in the coming years, Canadian production of crude oil will continue to grow, albeit at reduced rates, fueled by projects already completed.

3.b Iran

While the world discussed the timing and scope of production development in Iran, the country silently started down a growth path in 2015 by exploiting its existing production capacity.

There are actually two stages in Iran's oil production growth. The first is already under way, and does not require either significant participation by international oil companies or a major investment effort. It will lead to a production capacity of around 4.1-4.2 mbd in 2016, which is what Iran had in 2011, before the latest round of international sanctions. The key factor is Iran's pre-existing production capacity. Although doubted by many, the latter seems to be the main reason behind a rapid production growth of Iran in 2015 and early 2016.

At the beginning of 2015, Iran was producing about 2.5 mbd of crude oil, plus about 400,000 bd of other liquids. By the end of 2015, Iran was producing 3 mbd of crude oil, in addition to about 500,000 bd of other liquids, for a total oil production of 3.5 mbd.

To achieve a production capacity above 4 mbd, Iran must restore the full capacity of its existing oilfields and find new international outlets for its oil. This is possible within the first half of 2016. Prudently, Iran has based its new government budget on an oil price of USD 35 per barrel (although much of its exports are already selling well below that price),[4] showing its determination to seize the moment and fight for global market share, even if this implies hardships for future government spending capability.

The second stage of growth, which could build up a production capacity of 5.5 mbd, will take longer, and is more difficult to achieve, because it requires the development or redevelopment of several Iranian oilfields, some of which were discovered after 1998 and never developed. Consequently, this stage will require large investments, as well as the adoption of more advanced techniques of reservoir management and advanced recovery methods, which may limit the decline of mature fields and increase the recovery rate of other

deposits. (Today, Iran can extract only 20 percent of the oil "trapped" in its deposits, even though official sources cite 25 percent. This is less than the 35 percent worldwide average and much less than the 55 percent achieved in the United States.) For these reasons, the cooperation of international oil companies is essential, both financially and technically, because Iran has neither the economic resources nor the technical capabilities to exploit its potential. Tehran has announced its intention to offer foreign companies a new oil contract with formulas presumably more attractive than the current ones. But that will address only part of the problem. Indeed, Tehran will need to simplify the Byzantine bureaucratic processes that have previously made it extremely difficult for many companies to operate in the country and to be paid for their work. Without such changes, more ambitious production targets may be significantly delayed.

3.c Iraq

For some years now, the production growth forecasts for Iraq have been shrouded in pessimism (with the exception of those made by the Iraqi government, which appear far too optimistic).

There is no doubt that the Iraqi potential is enormous, but the financial problems of the central government, the non-payment of the companies operating in the country, and the lack of infrastructure crucial for the handling, transport, and export of oil, year after year, have led most analysts to renew their negative views of the possibility of increasing production capacity in Iraq. However, while falling far short of the unrealistic goals set by Baghdad years ago, Iraqi production has continued to grow, contradicting analyst predictions.

At the beginning of 2015, Iraq was producing about 3.4 million barrels per day of crude oil. At the end of the year, production of the country ranged from 4.5-4.6 mbd. The lion's share of the production continues to take place in the south of the country, but the northern Kurdish-controlled areas also recorded unexpected levels, mainly by restoring facilities that were once seized by the Islamic State (IS).

Between November and the first few weeks of December 2015, Iraq was exporting about 3.4 million barrels per day from Basra. The country's own refineries accounted for about 450,000 bd, while crude oil burned directly for power generation amounted to about 180,000 bd. The Kurdish Regional Government controlled approximately 600,000 bd of

crude oil production— production that is beyond the control of the Iraqi central government. A fraction of this (about 80,000 bd) is included in the data of oil consumed by Iraqi refineries.

It is true that Iraqi production is subject to significant variations in the course of a year, but the basic trend is that the country has reached a production capacity of five mbd, while some of its large deposits are still waiting to be developed. During the next two years, many political, financial, and infrastructure snags may limit further growth in production.

3.d North Sea

Perhaps the most striking example of oil production resilience has been the North Sea—particularly its U.K. section. A declining oil production region since the late 1990s, the U.K. section of the North Sea witnessed a liquid output growth (+10 percent) in 2015 for the first time in more than 15 years. As a whole, the North Sea (including the Norwegian section) liquid production grew by almost 150,000 bd.

It is improbable that such a level of growth can be maintained for a long period, although medium-term factors are likely to support output resilience. In particular, the UK output—the most critical— "was attributed to producers becoming more efficient and having invested more than USD 50 billion during the last four years, which resulted in new fields coming on stream."[5]

Norway registered higher spending and more important discoveries than the U.K. This means that new production buildup (which typically requires three to four years to achieve its peak) will also continue to partially offset the decline of mature fields over the next few years. Coupled with the decreasing costs of services and the huge efforts of the industry to further increase its efficiency, the North Sea might continue to hold some surprises.

3.e Russia

Since the early 2000s, most analysts have predicted that Russia was doomed to an irreversible decline of its overall oil production, mainly due to the accelerated decline of its mature fields. Year after year, they have repeated this gloomy forecast, but it has never

materialized. On the contrary, Russian production has jumped from less than 8 mbd in 2000 to a new post-Soviet record of 10.8 mbd in November 2015. This took place in spite of a situation that many depicted as desperate. Russia was facing international sanctions and weaker prices for oil and natural gas, while oil and gas revenue accounted for 52 percent of the government budget.

Even more surprising is that most Russian oil production continues to originate in West Siberia, notably from the Priobskoye and Samotlor fields, which have been producing oil for decades. Adopting advanced technology not only forestalled the expected production decline, but also in several cases reversed it. In spite of progress made increasing the recovery rate of currently producing oilfields, Russia's current recovery rate is still no higher than 25 percent. This means that mature oilfields could sustain current output for some years if advanced technology were applied, even without developing new reserves.

Production costs in Russia average USD 15-16 per barrel, a level that is highly competitive with most areas of the world. Under the current Russian taxation system, the State gets the lion's share of revenues when prices are high, but reduces its take when prices tumble. It's worth noting that it is going to be extremely hard for Russia to preserve this system, given Moscow's serious budgetary woes. However, there are no signs of revisions being planned for the current year.

So far, Moscow has based its 2016 State budget on a price of USD 50 per barrel for Urals crude oil (the Russian oil benchmark). This implies a deficit of about USD 32 billion, or about 15 percent of the entire budget. The government has also set contingency plans that prepare for a possible price of USD 40.[8] In both cases, deficits will require drawing on the country's ruble reserves, cutting spending, and selling off State holdings. While these actions will probably entail some erosion of Vladimir Putin's popularity, in the short term they do not seem capable of significantly affecting the oil sector, whose production may stagnate or decrease slightly (no more than 200,000 bd).

3.f Saudi Arabia

Another big question mark for the oil market concerns Saudi Arabia. How long will the country with the largest oil production capacity in the world (about 12.3 mbd—including the Kingdom's portion of the Neutral Zone, which it shares with Kuwait) be able to sustain a policy of super-production aimed at ensuring its market share in the world, but that also helps depress prices?

During 2015, with Brent crude trading at below USD 50 per barrel, Riyadh was forced to drain more than USD 10 billion per month from its foreign reserves to maintain spending levels already planned by the government. Nevertheless, the Saudi logic goes something like this: "We suffer, but others are suffering and will suffer more than we do, and they will have to yield. Their production will drop. At that point, the market will go down the road toward rebalancing." This is a risky stance, but one without likely alternatives.

In a world in which all of the major oil producers are increasing their production, it would be unthinkable for Saudi Arabia to even suggest that it restrict production, especially at a moment in which it is the only country in the world capable of maintaining unused production capacity of almost two mbd.

Decreasing production would be a gift to large non-OPEC producers, mainly Russia and the United States. But it would also be a gift to other OPEC producers—most notably Iran—who are calling on all the other countries to make production cuts, but for some legitimate reasons are unwilling to make cuts themselves. In other words, for Riyadh to cut its production would be to rerun the script of the 1980s, when the Saudi Kingdom continually cut production while all other countries of the world increased theirs. At that time, Saudi Arabia became the oil-producing country that paid the highest price for global overproduction.

Conscious of these constraints, the country seems to have taken a different path. Already in November, Prince Mohammed bin Salman, who has become a key figure in piloting the new course for Saudi Arabia, announced the government's intention to reduce the state budget in 2016 by cutting operating expenses and increasing some taxes.[6] In late December, the government announced heavy cuts in subsidies on all petroleum products and natural gas, providing a budget for 2016 which appears to assume an oil price of USD 26 per barrel and a reduction of expenses of about USD 40 billion (from USD 262 billion in 2015 to USD 220 billion in 2016). This move suggests that Riyadh is keen to maintain its oil policy in the near future.

In the longer term, however, Saudi Arabia needs a multipronged approach to confronting low oil prices, and has taken some steps in this direction. Prince Mohammed has announced the government's intention to make Saudi Arabia less dependent on oil revenues, particularly by developing the non-oil manufacturing sector. In January 2016, Prince Mohammed floated the idea of partially privatizing Saudi Aramco through an initial public offering (IPO) of its shares.[7] But some skepticism remains.

In the last 30 years, Riyadh has announced several times its will to develop sectors other than oil, and its attempts have yielded limited success. Moreover, a partial privatization of Aramco will represent a major blow to the country's system of power and to the internal equilibrium of the Royal family. In sum, both targets will represent a radical change for Saudi Arabia. The months ahead will probably offer some more hints about the sustainability of such radical shifts.

3.g United States

Most experts thought that U.S. shale oil production would evaporate with oil prices lower than USD 75 per barrel. Yet, even with an average WTI price of USD 47.7 per barrel in 2015, in April the U.S. crude oil production reached 9.7 mbd, according to the U.S. Energy Information Administration (EIA), marking the highest monthly volume since the same month of 1971.[9]

Production did eventually decline, settling at around 9.3 mbd on a monthly basis by the end of 2015. That drop was modest, considering not only that prices have collapsed below USD 40 per barrel but also that U.S. shale companies have so far been the only ones in the world to significantly cut investments in ongoing projects.

At its core, this resilience is the result of a continuous advancement in both knowledge of shale formations and the technology used to develop them. Those factors have allowed shale costs to decrease by more than 30 percent between 2011 and 2014. In 2015, both CAPEX and OPEX fell substantially—probably by 30 percent more —as a result of the financial crisis in the sector. As an example of this dramatic decline, in mid-2014, the average daily rate for a horizontal drilling rig was about USD 26,000-28,000, but now it is usually less than USD 13,000.

Better knowledge and technology have also dramatically increased per-well productivity and efficiency. As a rule of thumb, in the same area of a shale formation, a well drilled today produces four to five times what it did five years ago. What's more, the time needed to drill and complete a new well has been drastically reduced, while the growing adoption of multi-well pad drilling (MWPD, drilling multiple wells from a single surface station) is reducing time and cost even more.

Together, these factors mean that even with fewer active drilling rigs, shale oil production

shows a much smaller decline than expected. This is in spite of the collapse of the U.S. oil "rig count" in 2015. According to oilfield services provider Baker Hughes, there were only 536 rigs drilling for oil in the U.S. during the week ended on December 31, 2015, down nearly 950 compared with the same week a year ago. (The largest decline, however, took place during the first four months of 2015, when the number of oil-drilling rigs fell below 700; after that, the progression of decline was much slower). Despite this decline, production did not suffer dramatically.

At the same time, shale producers are testing closer proximity between wells or, in oil jargon, "down-spacing." This will facilitate more intense exploitation of the shale areas and further reduce costs. Another option currently being tested is "re-fracking" (fracking old wells again), which may increase production from existing shale wells at a much lower cost.

In 2016, the best American shale oil producers can weather the low-price storm by aggressively concentrating their operations on their most productive shale formations (their core areas) and by postponing growth into more expensive and less productive areas. The consequence of this concentration is often ignored, because most analysts tend to focus on misleading average and marginal cost figures without checking them against actual productivity. For example, four counties of the Bakken formation delivered almost 90 percent of the formation output in December 2015, or almost 1.1 mbd. The break-even point for those four areas was less than USD 40 per barrel. Similarly, six core areas—counties of the Eagle Ford Shale—accounted for 85 percent of the whole output of the formation, with a break-even point below USD 36 per barrel.

Some highly indebted shale companies with negative cash flow will be squeezed financially by continued low prices, so 2016 will bring a new wave of bankruptcies (there were more than 40 in the shale sector in 2015). Yet this will not necessarily have a big impact on U.S. shale oil production, either because the insolvent companies are not currently making a significant contribution to overall shale production, or because their worthwhile assets will simply change hands to companies with a stronger balance sheet.

Because of these dynamic factors, US shale oil production will continue to show more resilience than expected. It will decline further, perhaps by 400,000-500,000 bd, but not enough to precipitate a drawing down of the excess oil supply.

In addition to the countries listed above, other major oil producers are resisting the storm.

Despite civil instabilities that are critical for several reasons, Nigeria has increased its production by more than 300,000 bd, while Venezuela, Brazil, and Mexico have recorded modest declines. Countries that have suffered the most are Angola and China, with production losses of 200,000 bd and 100,000 bd, respectively.

However, for many of the countries that recorded losses, 2016 could bring positive surprises because of the awaited start of new production or advanced recovery methods applied to mature fields.

4. Could oil demand help producers?

Under current conditions, the prospect of a strong rebound in prices rests on the hope of a substantial recovery in demand in 2016 and beyond. Because too many uncertainties weigh on the growth rate of the future demand for oil, a meaningful recovery is far from certain.

First of all, considering the size of the excess supply and oil production capacity, it seems that many tend to underestimate the size of the increase in demand needed to rebalance the world market. To achieve a substantial balance, demand should grow by more than 2.5 mbd in 2016 and by more than two mbd in 2017. Compare this with an average annual growth of less than 900,000 mbd in the first half of this decade, and an estimate of 1.7 mbd demand growth in 2015 as a result of low prices (unfortunately, data on global demand are always more uncertain than data on production, due to the statistical pitfalls and lack of transparency). Anything is possible, but what could spark and sustain such a recovery?

In the industrialized countries, the consumption of oil has been dropping since the mid-1990s. Since 2006, even the United States has joined this trend, not only because of high crude oil prices, but also because of efficiency, environmental policies, and a gradual change in consumer habits, especially among the young. Although U.S. oil demand recovered significantly in 2015 as a result of low prices, it was still more than two mbd less than at its peak in 2005-2006. What's more, part of that consisted of growing exports, which registered historical records across the year, outpacing 4.5 mbd—mostly made up of refined products.

Global demand was also impacted by the uncertain performance of both advanced and developing economies. China, the mainstay of world consumption for years, is going through a phase of economic uncertainty. Throughout 2015, analyses and controversial data supported conflicting stories of the actual performance of Chinese demand for oil. Some claim the country is already in crisis, while others claim its oil consumption is rising more than expected. The dramatic fall of the Shanghai stock exchange at the beginning of 2016 has cast doubt on the possibility that the country can contribute to an increase of global oil demand.

The discrepancy between demand and consumption by the Asian giant can be explained largely by the issue of stockpiles. Throughout 2015, Chinese agencies disseminated information that appears accurate, at least with regard to the strategic storage (while the data concerning commercial storage remains somewhat vague), which increased considerably, reaching almost 190 million barrels. This was an increase of approximately 100 million barrels from the year before. During the first half of 2015, at least 500,000 bd of Chinese crude oil demand growth was attributable to storage. By the middle of 2015, Chinese strategic storage facilities were already saturated, according to the National Bureau of Statistics of China.[10]

Between 2016 and 2017, another 140 million barrels of new storage capacity is planned. This will allow China to achieve a strategic storage capacity of 330 million barrels. Its long-term objective is to reach a capacity of 435 million barrels.[11] This should provide support to the country's oil demand, which could be partially offset by the shutdown of many inefficient refineries (due to new environmental legislation) and by the possible slowdown of the Chinese economy's rate of growth. In any case, even if Chinese oil demand continues to grow at a pace equal to the last few years, this will not affect the excess supply.

Many analyses of demand also look at India, which, along with China, has accounted for about two- thirds of the net growth in global demand for oil over the last five years. Before exploring India's potential, we should bear some numbers in mind. In October of 2015 (the most recent data available), India imported 3.68 mbd and produced 745,000 bd of crude oil. It exported about one mbd of oil products, thus returning what it had imported as crude back into the international market in the form of products.[12] Indian net consumption touched 3.6 mbd.

The Modi government embraces the ambitious goal of replacing China as the manufacturing center of the world. This goal is pegged to target oil consumption growth rates of

at least 15 percent per year, meaning an increase of approximately 500,000 bd in 2016 and 750,000 in 2017. A portion of this increase would return to the international market in the form of products.

This is a credible scenario, but in the short- to medium-term, it would not be not sufficient to eat significantly into the excess supply worldwide, since many developing countries that previously made significant contributions to the growth of global demand are currently experiencing serious economic problems. Some are cutting the massive subsidies that were once used to support the consumption of oil products, thereby dampening the effect that lower prices for "black gold" could have had on consumption. Due to the uncertainty concerning data on global demand, it's still difficult to assess how much these factors may affect the rate of consumption in 2016, but it would be unwise not to take them into account and just looking at the theoretical effect of prices on demand.

Another problem "crowding out" oil demand could come from the strengthening of the U.S. dollar (the currency of oil exchange) vis-á-vis the currencies of many oil-consuming countries, following the decision by the U.S. Federal Reserve Bank to begin gradually raising interest rates, starting in December 2015.

There are also longer-term unknowns. What will be the impact of new energy efficiency efforts and environmental legislation around the world, especially given the strong impact these factors have had in industrialized countries? And what will be the effects of policies to limit greenhouse gases that come as a result of the COP21 meeting in Paris in December 2015? In any scenario, one can see it will have negative implications for crude oil consumption.

In spite of these doubts, most economists insist that demand is price sensitive and that sooner or later it will rebound. While this may be true, let us not forget lessons from the past. Historically, after any price boom and bust, demand recovered, but the new growth rate was much lower. For example, between the 1940s and the 1970s, world oil demand almost doubled every decade — implying a compounded annual growth rate (CAGR) of more than seven percent per year. After the collapse of oil prices in 1986, demand never fully recovered. Both in the 1990s and in the 2000s its CAGR was about 1.4 percent. The main driver of this phenomenon is the fact that during periods of high oil prices, consuming countries tend to adopt legislation on energy efficiency and support a shift to alternative fuels that cap the future growth of oil demand. Our age is no exception to this rule, with even more emphasis on environmental impacts and greenhouse emissions than before.

5. Hoping for geopolitical turmoil or a production-cut agreement?

There are just two remaining factors that might change the bleak outlook for oil producers that this brief has outlined: one is geopolitics, and the other is a major production cut by the producers themselves.

The impact of geopolitics on the oil market faced a new test at the beginning of 2016, after the execution of the Shiite leader Nimr al-Nimr by Saudi authorities. It is certainly not the only one. To date, neither the Libyan crisis (which is reducing the country's production to less than 400,000 bd, keeping about 1.2 mbd of its potential off the market), nor the fear caused by the Islamic State, nor fears about the difficult internal situation in Venezuela, have significantly affected the underlying psychology of the market.

This can be explained by an unwritten law, relevant at each stage of a collapse of oil prices: geopolitical crises tend to have a reduced effect—or no effect at all—when world oil production capacity far exceeds demand, especially when there is sufficient spare capacity to compensate for any disruption in crude supplies from the countries in crisis.

Initial reactions to a sudden worsening of the confrontation between Riyadh and Tehran seem to affirm this law; oil prices went up for just one day at the beginning of 2016, but they soon dropped again as China's stock exchange problems propagated across the world, casting new shadows on the possibility for oil demand to significantly recover.

Given the interests at stake in the Saudi-Iranian confrontation, few believe that the latter will put the oil sector of the two countries—vital for both—at risk. Furthermore, in the event that a psychological effect should push prices up substantially, Saudi Arabia could always play its ace: it could put some of its spare capacity on the market, thereby keeping pressure on Iran while simultaneously stabilizing the market. Geopolitical turmoil in the Middle East—and particularly in the Persian Gulf Region—could have a major impact on prices. But so long as this remains a theoretical option, fundamentals will prevail.

In this framework, the possibility of a coordinated production cut by OPEC and non-OPEC producers gained momentum at the end of January, particularly after Russia's

energy minister declared that his country could enter a negotiation with OPEC to explore that option. In spite of the optimism that surrounds this option at the time of the writing of this brief, there are several factors that suggest a more skeptical stance.

First of all, who in OPEC could make significant cuts in production? Saudi Arabia is already working harder than anyone else not to flood the world with petroleum, holding back production of almost two mbd. The second and third OPEC producers—respectively Iraq and Iran—are re-emerging now as great protagonists of the oil market after decades of hardships and lack of oil development. Iran in particular—with some legitimacy—could call itself out of a production cut by observing that due to its past sacrifice, other OPEC producers have more room to sell their output.

Libya is producing almost 1.2 mbd less than its pre-crisis level because of the state of civil war existing in the country. Venezuela has suffered for years from poor political management of its own petroleum industry, and it's already far from producing the levels it achieved in the past. The United Arab Emirates are in an arm-wrestling contest with the foreign companies to renegotiate the terms for developing or redeveloping the country's deposits, which has frustrated UAE objectives for production growth. Nigeria and Angola cut their own production in the context of an agreement, but it would not be substantial. The other members of OPEC do not have sufficient maneuvering margin to make significant cuts.

Beyond OPEC, the only country that could actually make important production cuts is Russia. Moscow could be interested in temporarily joining OPEC in such a move, because its revenues are being devastated by the oil (and natural gas) price collapse. Unlike OPEC countries, however, the Russian government has no direct control of the country's oil production, which will make it harder for Moscow to ensure a production cut.

Further, Moscow is distrustful of Saudi Arabia and other Arab countries, and believes that the current oil price collapse is the result of a secret agreement between Riyadh and Washington. What's more, Russia and Saudi Arabia are clashing on the methods to reduce the Islamic State influence in some Arab countries, starting with Libya. By the same token, the mistrust between Iran and Saudi Arabia has reached new highs after the execution of Nimr al-Nimr, and both countries are still fighting for global market share.

Finally, even if a formal agreement within OPEC is achieved, it remains to be seen if that will be actually implemented. The history of OPEC is dotted with formal production-cut

agreements that went wrong just because several OPEC producers cheated on their quotas and sold oil "under the table."

Conclusions

The coming months will bring some clarity to all aspects of the global oil market summarized in this paper.

Volatility will remain a key feature of the market. In particular, as we approach the spring seasons— e.g., the beginning of higher consumption for transportation—refinery runs will grow across the world, sending the signal that more robust demand recovery is occurring. Also, the signals of lower production from the United States and other producers, such as Venezuela, might convince the market that the worst is behind them.

In turn, this sort of complacency may act as a brake for more decisive actions by oil producers, who may convince themselves that the market is finally working and there is no need to search for a difficult agreement for cutting production.

But unless demand growth actually explodes—which seems unlikely—the fundamentals remain the same: in spite of some erosion of production here and there, global oil output, production capacity, and inventories will remain too high versus the level of consumption growth. This implies that the downward pressure on oil prices will remain the dominant force in 2016, with the first real inflection point for the market, which could probably materialize only in 2017.

This outcome might be accelerated only if prices should reach new lows (USD 25 per barrel or less) for a significant period of time (at least one month), so as to dissipate in big producers' mindset the perception that the market is finally working the right way, and really convince them that a production-cut agreement—as difficult as it is—will be the only way to avoid additional suffering.

Notes

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