Strategic Petroleum Insights

2019
Q2
Research Note

Research Note:
OPEC and Saudi Arabia's perennial policy dilemma – long term production cuts or market share?

April 2019

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OPEC/Saudi Dilemma

The oil market continues to be oversupplied as it has been since 2014. However, it is currently just balanced due to the loss of some 3 million b/d of production: voluntary OPEC cuts of >1 million b/d, >1 million b/d of production lost in Venezuela, 1 million b/d production of the market due to US sanctions on Iran and 0.36 million b/d of production shut in in Alberta, Canada.

SPI scenario models forecast that this over-supplied market will persist into the late 2020s (Figure 1), supported by continuing growth in production from US LTO production and global deep-water basins, notably US Gulf of Mexico, Brazil and Guyana. The oversupply is likely to be exacerbated by the potential recovery of production from Iran and Venezuela in this period.

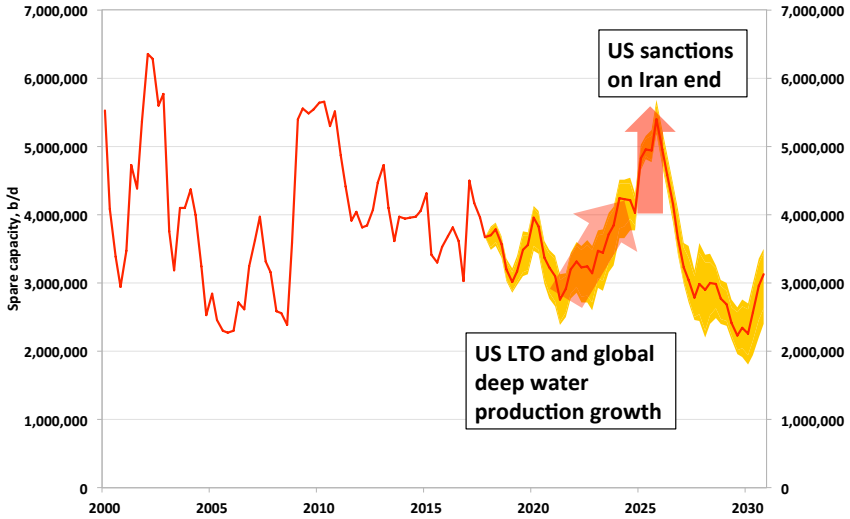

Figure 1: Historical and forecast global spare oil production capacity (colour band = 90% confidence band).

In an oversupplied market, the principal determinant of the oil price is OPEC's (i.e. Saudi Arabia's) policy. The dilemma for Saudi Arabia/OPEC is either: to pursue market share at a lower price in an attempt to squeeze out higher cost oil; or to manage production at a lower level to achieve a price range that maximises oil revenues. What should Saudi Arabia/OPEC's policy objectives be, what are they likely to be, and what can we learn from previous occasions when the market switched from balanced to oversupply, in the 1980s and in 2014?

In the 1980s, oil demand had been reduced by two significant recessions, in 1974/75 and 1985. The oil price had been elevated by the Arab oil embargo in 1974 and the Iranian revolution in 1979. The oil price peaked in 1980 at $39/b ($100/b in 2018 USD). Throughout the early to mid 1980s, Saudi Arabia struggled to secure OPEC compliance with a series of output cut agreements to support the oil price. Between 1980 and 1986, OPEC cut production in half with Saudi Arabia's oil production falling from 9.8 million b/d in 1980 to <3 million b/d in 1985.

In 1986, Saudi Arabia abandoned the price support policy and raised production in the expectation that the oil price would fall with two objectives: stimulate demand and reduce non-OPEC supply growth, mainly from the North Sea. In 1986, the oil price fell from $27/b to below $12/b ($52/b to $23/b in 2018 USD).

Both expectations were misplaced. Oil demand growth did not increase significantly, in fact oil demand for power generation halved in the 1980/90s. Non-OPEC supply adjusted to lower prices, with suppliers and service companies reducing costs and improving efficiency. North Sea production rose from 3 to 6 million b/d between 1986 and 1996.

It would seem production restraint failed due to a lack of compliance among most OPEC members and the "market share" policy failed because of misplaced expectations regarding demand and the resilience of non-OPEC production in the face of a low oil price. The market remained oversupplied until the early 2000s and Saudi Arabia's production did not exceed 8 million b/d until 1991.

The market became oversupplied again through the second half of 2014, due mainly to the expansion of production of high cost non-conventional oil, such as Canadian tar sands and US light tight oil (LTO, shale oil). In November 2014, OPEC members decided not to restrain production to support the price, but to try to hold market share by driving the price lower to try to force high cost non-conventional oil, particularly US LTO, out of the market.

Inexplicably, in March 2015 shortly after King Salman acceded to the throne, Saudi Arabia raised production from 9.5 million b/d to 10.8 million b/d, possibly in a doomed effort to drive US LTO out of business. This gross over production created a record excess stock overhang on the market and prices plunged below $30/b by January 2016 (Figure 2).

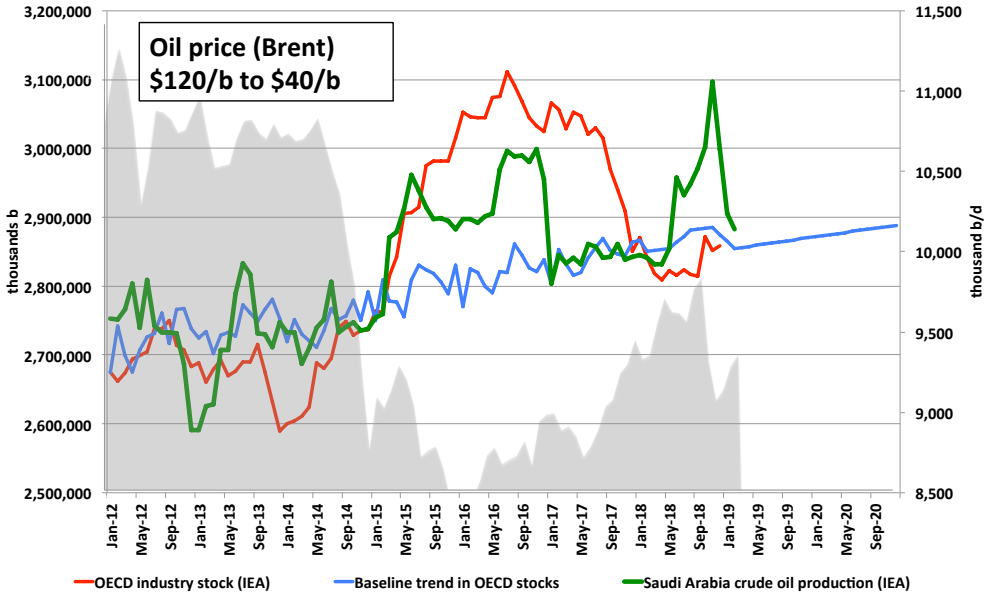

Figure 2: Historical excess OECD industry stocks, baseline trend in OECD industry stocks, Saudi Arabia crude oil production and oil price.

This policy was constructed on a failure to understand the nature of US LTO production. Although US LTO is essentially a price taker, two factors mitigate the full impact of lower prices on production. Firstly, there is a spectrum of cost of supply for US LTO from roughly $40/b to $90/b. Secondly, there are significant time lags between price signal and production response. USA LTO production is not "gated" by valves but by the number of active drilling rigs and frack crews. These take time to demobilise and mobilise. Each well has a relatively low initial rate (generally around 1,000 b/d or less) and a steep decline rate. It takes time to build up meaningful new production.

Whilst the oil price peaked at $110/b in June 2014, US LTO production did not peak until March 2015 at 4.8 million b/d (some 9 months after prices started to fall). US LTO production fell to a low of 4.2 million b/d in October 2016 (9 months after the price low of $28/b in January 2016) – a production drop of only 600,000 b/d over 9 months. The total rig count in US LTO basins peaked in October 2014 at 980 units (5 months after price peak in June 2014) and fell to low of 180 units in May 2016 (5 months after the price low in January 2016). Our LTO model indicates that in 2016, 180 rigs would support a more or less stable plateau production rate of around 4 million b/d. The US LTO rig count has recovered to around 600 units at end 2018 with production of 6 million b/d.

As OPEC revenues fell more sharply than US LTO production, the "market share" policy was clearly not working, just as it had not worked in 1986. We estimate that between 2014 and 2019, the failed policy of "market share" had cost Saudi Arabia $500 billion in lost oil revenues.

At the end of 2016, Saudi Arabia, the rest of OPEC members and some non-OPEC countries, notably Russia, agreed to production cuts to support the price and oil revenues. However, it was not until the end of 2017 and with the help of collapsing production in Venezuela that the excess stocks were eliminated a balanced market returned (Figure 2).

The question is how long will the memory of the 2016-2017 stock glut and $30/b in 2016 oil last in the minds of OPEC policy makers?

Long Term Market Perspectives

Figure 3 shows the principal cause of the oversupplied market – the expansion of non-OPEC supply from unconventional oil (LTO and Canadian tars sands) deep-water and NGLs. Conventional non-OPEC crude oil supply peaked in 2003 at 40 million b/d and has fallen by 10% to 36 million b/d in 2018. However total non-OPEC oil (including OPEC NGLs) has expanded from 50 million b/d in 2003 to nearly 65 million b/d in 2018. We forecast total non-OPEC oil including NGLs production will grow to more than 72 million b/d by 2025.

This expansion of supply (average rate of 1 million b/d per year) has met most of the incremental oil demand in the 2003-2018 period (average 1.3 million b/d per year), with only 0.3 million b/d to be met by OPEC. The expansion of production from Iraq and Iran after sanctions were lifted in 2012 presented Saudi Arabia with the familiar dilemma: restrain production to support the price or market share?

The scenario models forecast a plateau to non-OPEC supply in the 2025-2030 period followed by a steady decline. After 2025, incremental demand growth will have to be met almost entirely by OPEC. After 2030, OPEC production will have to meet incremental demand growth as well as compensate for the decline in non-OPEC supply. We estimate that after 2030 the call on OPEC will grow at an average incremental rate of 2 million b/d per year.

Demand growth is likely to moderate in the late 2020s before declining thereafter (Figure 4), reaching a peak of 107-111 million b/d in the 2030s before declining. The principal driver for peak demand is the market penetration of electric vehicles (EV) displacing internal combustion engine (ICE) vehicles and reducing demand for motor gasoline and motor diesel. At high rates of market penetration of ZEV (zero emissions vehicles – pure battery or fuel cell electric vehicles) peak demand could be in the early 2030s. At lower rates of ZEV market penetration, peak demand is more likely in the late 2030s or early 2040s.

After peak non-OPEC supply in the early 2030s and peak demand in the window 2030-2040, oil supply and oil demand both decline. The scenario models forecast a continuing demand for oil and a robust call on OPEC into the 2040s.

These long term trends suggest that over the next decade, OPEC and Saudi Arabia will be faced with the policy dilemma of pursuing market share or maximising oil revenues and the challenge of maintaining compliance. After 2030, OPEC becomes the only supplier of incremental oil demand. The duration of OPEC market power thereafter depends mostly on the rate of market penetration of ZEVs.

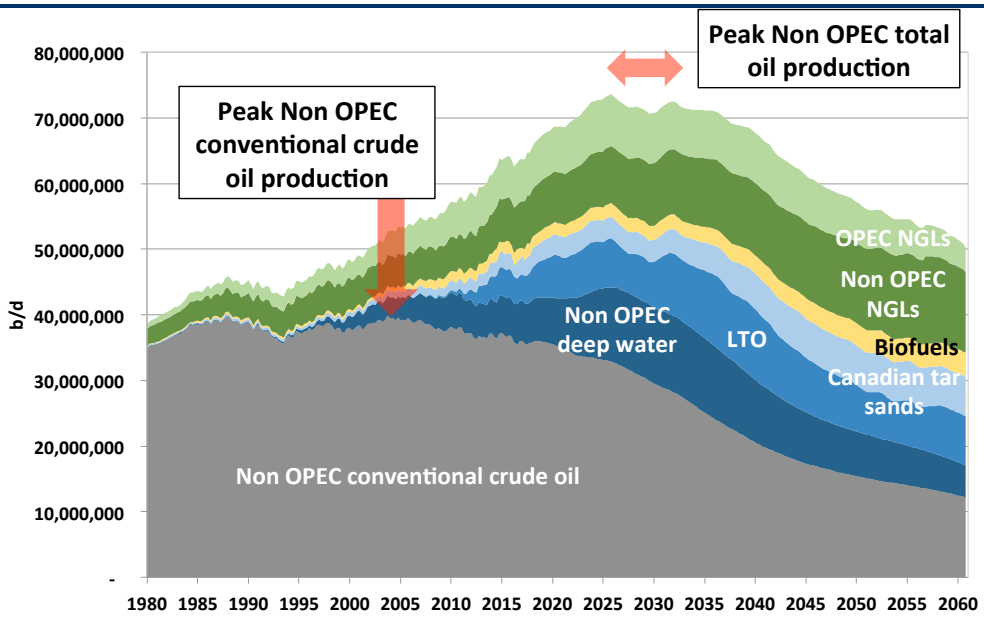

Figure 3: A scenario model outcome for non-OPEC oil supply.

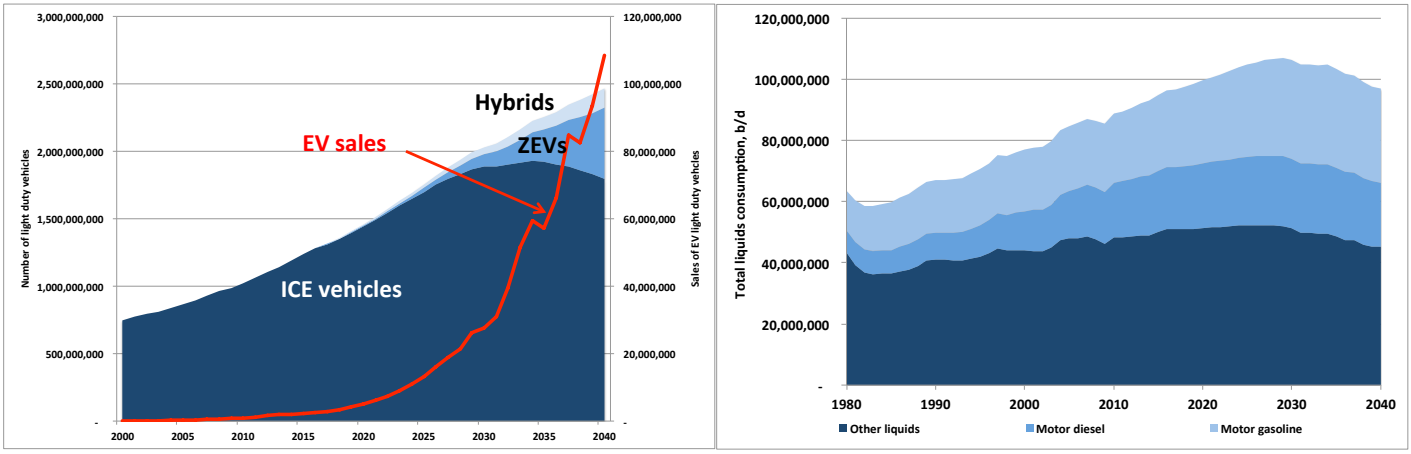

Figure 4: A scenario model outcome for market penetration of EVs in an aggressive case with 80% of new vehicles being EVs by 2040 and 70% of these being ZEVs.

Conclusions: Policy Options and their Outcomes

Saudi Arabia's/OPEC's choice of market share or production management to achieve a desired oil price range over the next decade of oversupply will have a profound impact on the global economy in this period.

Since 2016, OPEC policy has been largely driven by Saudi Arabia, with the support of Kuwait and the UAE. Direct bilateral oil policy negotiations between Saudi Arabia and Russia have undermined the influence of other OPEC states on oil policy. Within OPEC there are a number of issues that will likely make reaching agreement and complying with it more difficult:

- Potential return of Iran to the market if and when unilateral US sanctions are lifted.
- Iraq's production growth.
- The likely recovery of oil production in Venezuela.

- Political instability in Libya.

The timing of the lifting of US sanctions on Iran's oil exports is difficult to judge. It seems highly unlikely to occur prior to the end of Trump's presidency, which could be end 2020 or end 2024 depending on the outcome of the US presidential elections in 2020. The lifting of US sanctions will create tensions within OPEC. To maintain production cuts and accommodate Iran will require Saudi Arabia to further cut production by 1 to 2 million b/d. This seems unlikely given the tensions between the two countries.

In January 2019, Iraq agreed to adhere to OPEC production cuts for 6 months and trimmed output to 4.5 million b/d from a capacity of some 4.8 million b/d. However, with expansion plans in the south and in the Kurdistan autonomous region and the need for revenues for reconstruction, Iraq will find it difficult to sustain this production cut beyond 6-12 months.

Venezuela's oil production has fallen from 2.5 million b/d at the end of 2015 to 0.9 million b/d in March 2019. Over the next decade it seem likely that political stability will be re-established in Venezuela and oil production recover. Once again Saudi Arabia will have to make space for production from a fellow OPEC member.

Political instability in Libya has caused +/- 1 million b/d swings in Libya's oil production in recent years and there is a probability that it will do so again in the coming years.

Scenario modelling shows the implications for the duration and scale of OPEC cuts required to support the oil price over the next decade and the outcomes of different OPEC policy choices for oil revenues. Figure 5 shows the estimated net oil revenues for Saudi Arabia in three illustrative scenarios, highlighting the consequences of different OPEC policy choices:

- "Market share" policy with no production management;
- Several (6 are shown) years of production management followed by a collapse of OPEC agreement following the lifting of US sanctions on Iran;
- Production management for 10-11 years until the oversupplied market condition ends in the late 2020s.

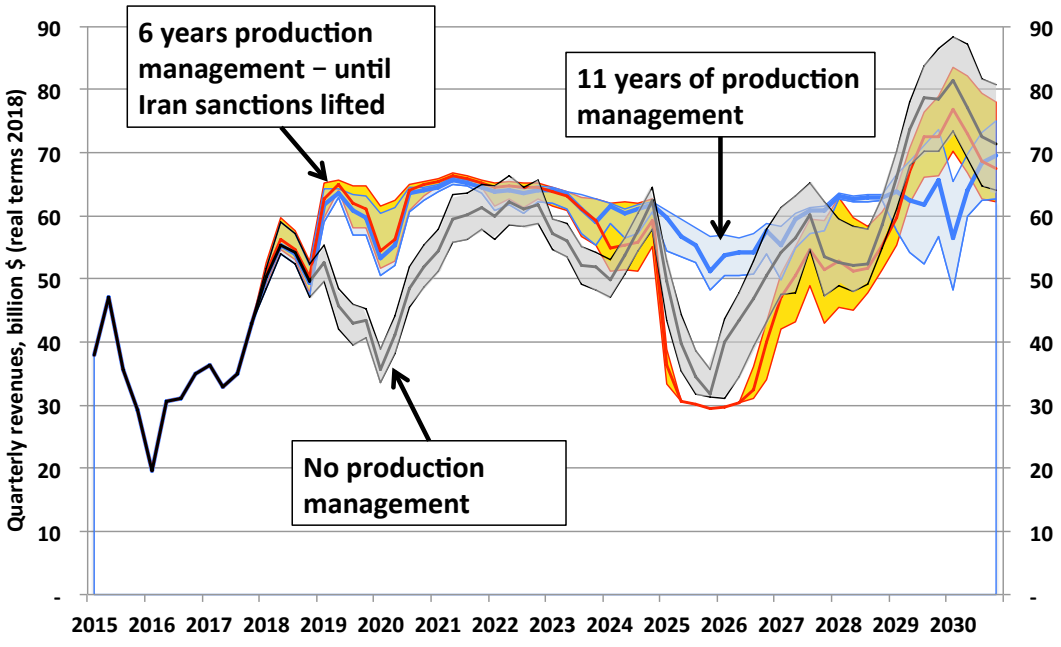

Figure 5: Scenario model outcomes for Saudi Arabia's net oil revenues for three different OPEC policy choices.

Figure 6 shows the scenario models' outcomes for the scale of production cuts required to support the oil price in the $75-80/b range.

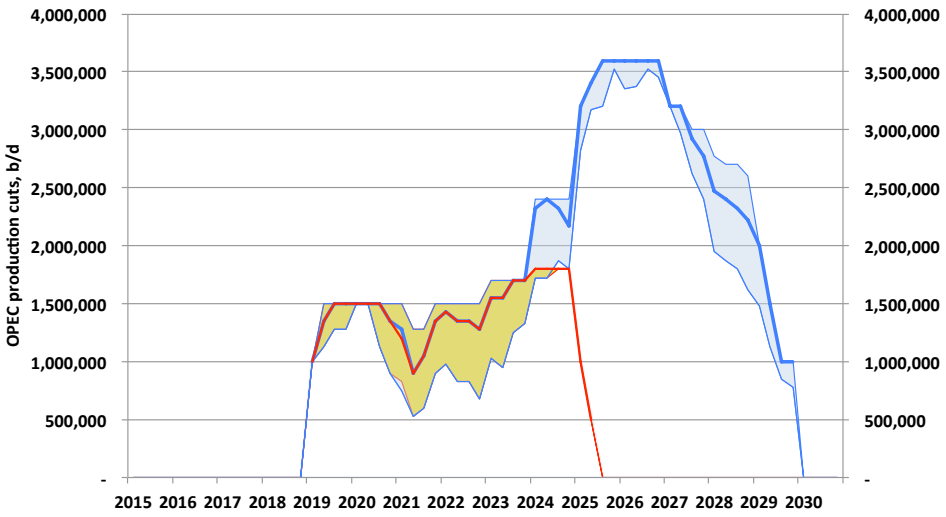

Figure 6: Scenario model outcomes for required OPEC production cuts to achieve oil price in the range $75-80/b.

The following observations are pertinent:

- In the 10-11 year managed price case, US LTO production is high due to the sustained oil price in the $75-80/b range. Consequently, this extends the period of oversupply into the early 2030s. In this case, production cuts of more than 3 million b/d will be required to compensate for additional production from Iran as sanctions are lifted. **However, this is by far the best case for oil revenues for oil producers**. Saudi Arabia's oil production is estimated to fall to less than 9 million b/d in 2025-2027 period, but the higher price ensures revenues are supported.
- The required production cuts to support a $75-80/b price are between 1.0 and 1.8 million b/d until Iran sanctions are lifted. If the production management arrangement collapses at this point the oil price falls rapidly and with it US LTO production 9 months or so later. This brings the oversupply phase to an end in 2028-2029. This case generates $240 billion less revenues for Saudi Arabia in the 2024-2029 period compared with the 11 year managed price case.
- In the market share case, the loss of US LTO production due to low price in the early 2020s, causes the oil price to recover through the mid 2020s. This case generates $350 billion less revenues for Saudi Arabia in the 2019-2029 period than the 10-11 year managed case. Saudi Arabia's oil production is estimated to be between 9.5 and 10 million b/d in this case. Note, that in this case US LTO production is forecast to fall by only 1.4 million b/d from nearly 7 million b/d in the 2020s.

These outcomes reinforce the lessons from the 1980s and 2014-2016. Namely that a pursuit of market share does not eliminate rival non-OPEC supply and jeopardises state finances in the largely non-diversified petro-economies such as Saudi Arabia and most OPEC members. Saudi Arabia, Kuwait and the UAE face a demographic bulge of young people entering the employment market, a bulge that is expected to last into the 2030s. This prolonged period of demographic challenge due to an expanding youth cohort will require extensive state subsidised employment programmes. These demographic issues are likely to put more strain on the Kingdom's finances.

The Saudi budget for 2019 has been set at $295 billion with some 10% of the revenues from non-oil sources. This suggests to balance its budget without excessive borrowing or drawing on the already

much depleted foreign reserves, Saudi Arabia will need to generate slightly more than $250 billion oil revenues per year.

Figure 7 shows the relationship between crude oil production, net annual oil revenues and the oil price for Saudi Arabia. For example, this analysis shows that $200 billion net annual revenues can be generated by producing 12 million b/d at $60/b or 8 million b/d at $80/b.

For the period of market oversupply to 2030, a "sweet spot" centred on an average of 10 million b/d at $80/b average oil price generates net annual revenues of $250 billion. This production level also preserves Saudi Arabia's market power with a spare capacity cushion of 2-2.5 million b/d. The vagaries of supply and demand in the coming decades can be managed for short periods by raising sovereign or state company bonds and adjusting oil production to support an oil price in the $75-80/b range. This strategy has the best revenue outcome compared with the other possible options. Even drastically reducing oil production due to lifting of US sanctions on Iran is a better option than futilely competing for market share at a much lower oil price.

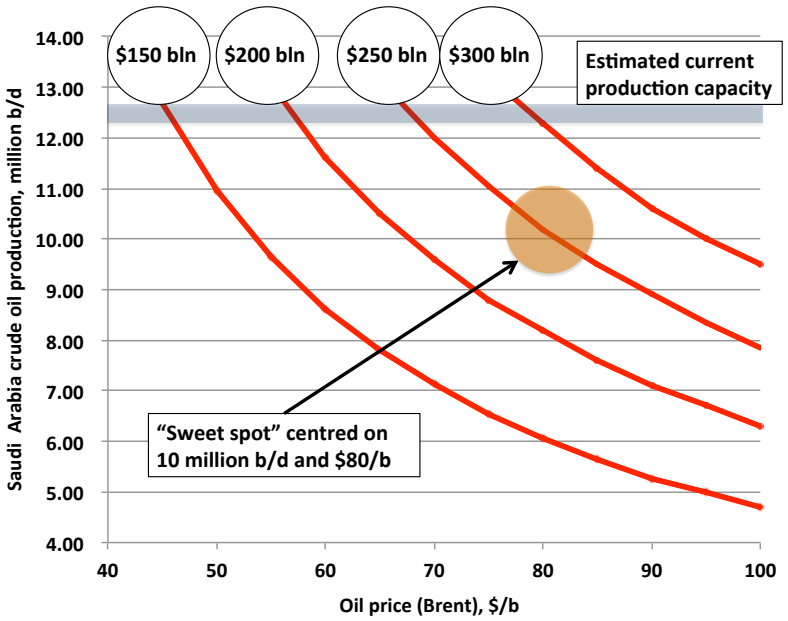

Figure 7: Relationship between Saudi Arabia oil production and net annual revenues and oil price.