

Saudi Aramco: Just How Big should the World's Largest IPO be?

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Introduction

The oil crisis of 1973 marked a turning point in Middle East relations with the rest of the world. Angered by American support for Israel during the Yom Kippur War, Saudi Arabia and its allies in OPEC decided to dramatically curtail production of oil as well as raise prices on the global market. Nearly overnight, this decision caused economic havoc among the developed world and brought the United States to the negotiating table. To this day, oil diplomacy remains a potent tool in the arsenal of Saudi diplomacy.

However, the power of Saudi Aramco, the national oil company, has not aged well over the decades. Although an unthinkable prospect even five years ago, a confluence of economic and political factors have brought to life the possibility of an Initial Public Offering (IPO) to global capital markets. If carried through, such an occurrence could very well become the largest financial transaction in the history of the world.

What events have led to this monumental decision, and what valuation should be assigned to this secretive company? This paper will begin with a brief discussion of the geopolitical and economic factors at play, followed by an analysis on where we see the oil market headed and finish with an initial valuation for Saudi Aramco.

Political Factors

Historically, Saudi Arabia has always relied upon its strong alliance with the United States for protection and influence. However, recent events such as the Iran deal, Asia Pivot by the Obama administration and diminishing foreign oil dependency have fostered the perception that America's commitments to its Middle East allies are weakening. Consequently, some have argued that a Saudi Aramco IPO would provide the U.S and other significant financial countries with vested interests in the preservation of the monarchy/political stability.

Additionally, Saudi Arabia has taken an unusually assertive role in regional geopolitics. Due to its ongoing involvement in the Yemen civil war, the country has dramatically stepped up its purchasing of military hardware, requiring funds that an IPO could provide. However, these actions must also be understood among the wider context of the ongoing royal succession.

As the current monarch, King Salman bin Abdulaziz, grows older, jockeying has begun among the immense royal family for his successor. The presumptive next monarch, the Deputy Crown Prince Mohammad bin Salman al Saud, has attempted to cultivate a public image of himself as a daring and innovative public leader. He is widely seen as the primary architect behind Saudi Arabia's involvement in Yemen.

In addition, Salman has also pushed for diversifying the economy away from oil in a plan he dubbed 'Vision 2030' and could use the proceeds from the IPO to accomplish this goal. The financial windfall from offering a stake in Saudi Aramco would dovetail with a political windfall for the Deputy Crown Prince.

Economic Context

The oil market itself has fundamentally changed in recent years. Advances in hydraulic fracturing (fracking) methods have ballooned the amount of recoverable oil in North America, causing a shifting dynamic for the supply side of oil – with the US as the new marginal producer. This is the result of several competitive advantages for U.S. rigs in reacting to price changes in the oil markets.

- 1) **Government Regulation:** Many of the traditional titans of oil production were government-controlled entities, whose output levels were dictated by a wide variety of factors. In stark contrast to this, individual US drillers are generally private economic actors and can therefore start or stop production with much more sensitivity to the price of oil.
- 2) **Versatility:** These rigs can be set up, taken down, and assembled much more easily. Some are even moved on the backs of 18 wheelers to quickly relocate, conferring a portability advantage in comparison to their rivals.
- 3) **Directional Drilling:** The assets don't have to be moved to extract different pockets of oil if that oil is reachable from its initial location.

A key distinction to note, however, is that not all strains of oil are the same: differences exist in the refinery technology needed and derivable end products. The oil extracted in the U.S. contributes to WTI Crude, that from the North Sea is Brent Crude and from the Middle East is the OPEC reference basket. While these prices tend to move together, the spreads can change quite significantly. The OPEC reference basket price is usually discounted a few dollars as the oil drilled in that region tends to require the most refining as it is heavier and less sweet than either Brent or WTI crude.

To combat shale, Saudi Arabia flooded the market in late 2014 – collapsing oil prices from over \$100/barrel to just under \$30/barrel by early 2016. This bankrupted many shale oil drillers, whose breakeven price (i.e. the price at which it is profitable for them to drill) for production at the time was substantially higher than Saudi Aramco, Iraq, and Iran's (~\$55 vs. ~\$10 per barrel). However, as oil prices (both WTI and Brent) climbed back above \$50 per barrel and technological advances substantially cut the breakeven production price for shale drillers (which is now averaging \$35 per barrel) – US production made a substantial comeback as seen in Figure 1:

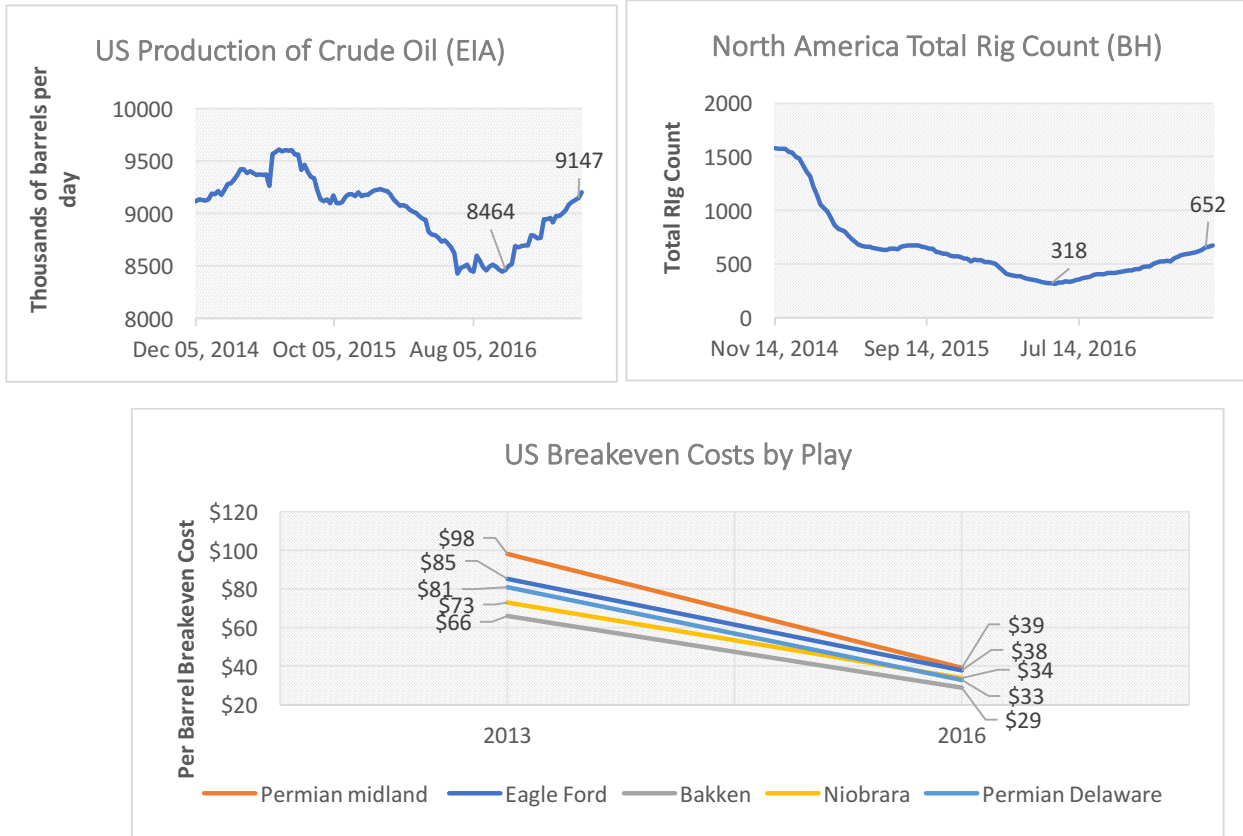


Figure 1: Charts of US production growth, 2014-2016 due to decline in break-even costs.

Current State of Oil Markets

Now that Saudi Arabia is looking to move away from their oil dependency through this IPO, the country has a vested interest in propping up the price of oil to get the highest valuation possible. As the country continues to lose the ability to push U.S. shale producers out of the market, it is forced to push OPEC member states and certain allies to curb their crude outputs.

This resulted in a November 30th, 2016 deal to curb oil output. Ostensibly, due to the deal, OPEC countries would reduce oil by 1.2 million bpd and non-OPEC members would curb output by 600,000 bpd with Russia making up 50% of this. This 1.8 million bpd cut represents ~2% of the total output of oil in the world. Since the deal was struck however, Saudi Arabia has had to bear most of the cuts to keep it on track, as seen in Figure 2.

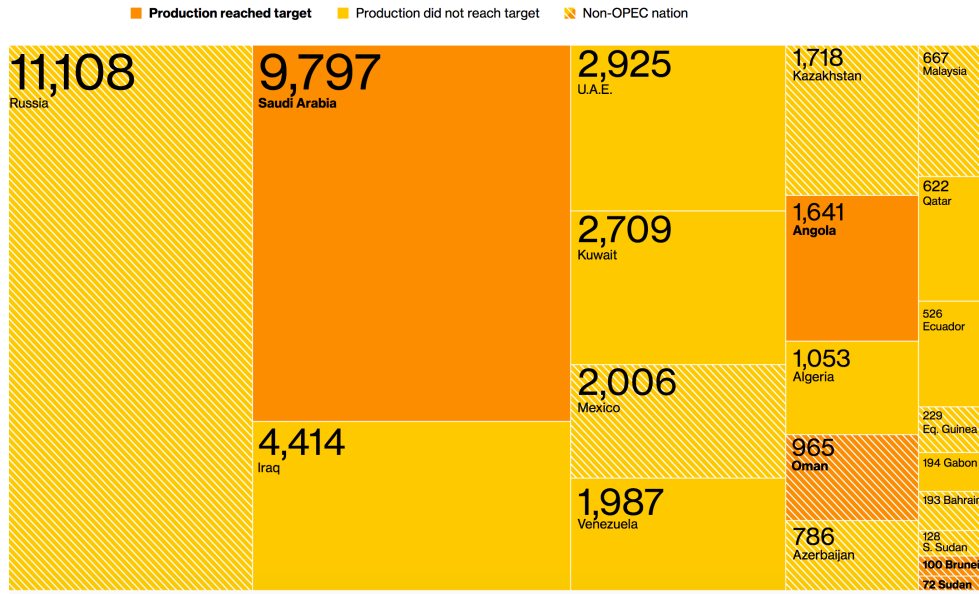


Figure 2: Oil production levels of deal signatories in thousands of barrels since January 2017. Note that only Saudi Arabia and Angola successfully met production targets.

Since the November 30th deal, however, the US has already ramped up production levels by around 500,000 bpd, offsetting much of the OPEC cuts. This situation is untenable, as it is only a matter of time before OPEC nations decide to stop allowing American companies to reap the benefit of their cuts. Additionally, while Saudi Arabia had cut far more than it had pledged in January, its February output levels ticked back up to 10.011 million bpd – a number that, while below their pledged amount (10.058 bpd), does not signal the same commitment to cuts that it had put forth before.

Update: Since this article was written, OPEC extended production cuts at the current level for another 9 months. This, interestingly, resulted in a sharp decline in oil prices as the announcement was weaker than expected. If prices do not start to rise, allied countries may began cheating on the deal as they see the US drillers stealing economic profit as they take on continued revenue losses with no increases in margins.

Analyzing the Futures Curve

The cuts themselves also had an unintended effect that created downward pressure on oil prices. With any commodity, there are two relevant types of prices– the spot and the future price. The spot price is the price that you can buy or sell that good today, while the future price is a price that you can lock in today to buy or sell that same good at some point in the future.

One graph that people often look at to understand the expectations for a commodity's price is the futures curve, which shows the price of futures contracts for that commodity over various time horizons. When spot prices of oil were extremely low but futures prices were very high, this curve was extremely steep. As a result, many people stored oil in cargo ships offshore near

Singapore, even going so far as to debt-fund their storage costs. They did this on the expectations that oil's price appreciation would be greater than the cost of debt (interest rates were quite low). Consequently, by buying oil today at the spot price while selling futures contracts of oil at a substantially higher price, they could hold that oil to expiration of the contract and reap the profits minus their storage costs. This was a direct result of the steepness of the futures curve – called a contango curve.

The OPEC production cuts applied upward pressure on the spot price of oil, and US drillers saw an opportunity to lock in profitable oil sales to profit even after debt payments. As a result, American producers began selling futures contracts, which placed downward pressure on later dated futures contracts, thus flattening the futures curve. This diminished the profitability of holding oil offshore, resulting in a flood of oil supply coming back online which helped to offset much of the production cut. Figure 3 shows the immense flattening of both the WTI and Brent futures curves and now oil is trading within a relatively tight window for the foreseeable future.

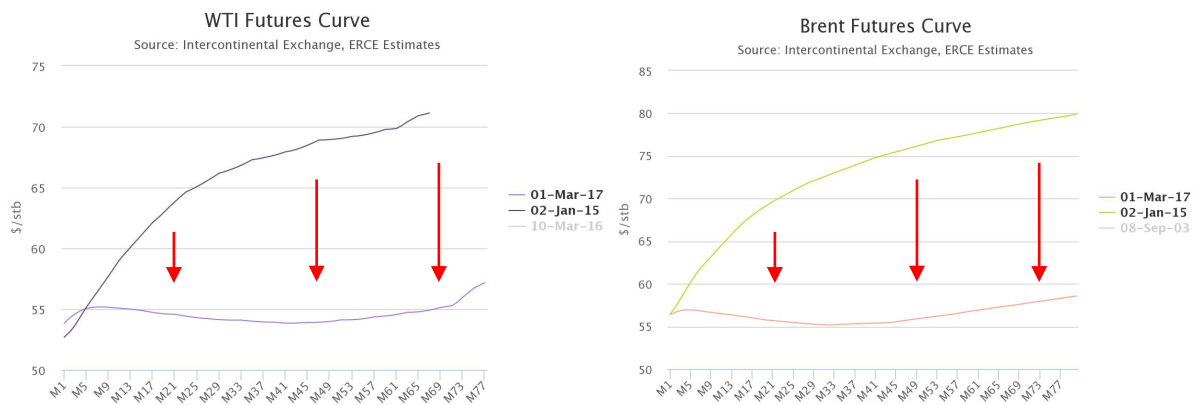


Figure 3: Futures curve for both WTI and Brent, January 2015-March 2016.

Update: Since this article was initially written, the spot prices of both WTI and Brent have fallen ~8%. We still believe there is room to fall. Interestingly, however, this fall did not shift the curve down in parallel, but only seems to be reflected in the nearer dated futures – thus steepening the futures curve.

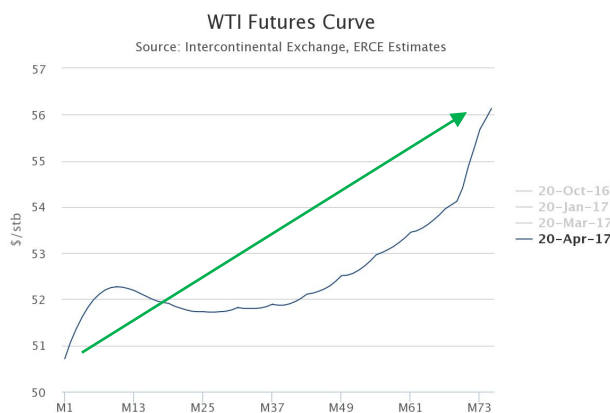


Figure 4: WTI Futures curve, March 2017-April 2017.

Because of these factors, we are bearish on oil prices and see the fair value of oil in the low \$40s per barrel. This matters significantly for Saudi Aramco, as it very directly impacts their profitability.

Saudi Aramco Valuation

Saudi Aramco's IPO is historic for a variety of reasons. In addition to the changes that it represents for Saudi Arabia's future, it will probably be the largest IPO ever. The current holder of that record is Alibaba which raised \$25 billion in 2014. In comparison, Saudi Aramco's IPO is expected to be in the range of \$50-\$200 billion USD. Given this, there has been a lot of scrutiny into how much the company is actually worth. On the low end, Wood Mackenzie valued Saudi Aramco at \$400 billion and on the high end, the crown prince valued the company at \$2 trillion.

The traditional way to value an oil company like Exxon is based on multiples of reserves (the amount of oil they could potentially drill). However, while Saudi Aramco was initially a part of Exxon, normal valuation methods break down quickly due to Aramco's structure as a national oil company. For example, the company pays 20% of all its revenue in royalties to the Saudi Arabian government, its corporate tax rate will be 50% and it has both sizeable upstream and downstream (drilling and refining) businesses.

Given all of this, we decided to use a free cash flow valuation, which should allow us to break down the various factors at play in the value of this company. Additionally, instead of coming up with an individual valuation we looked at the sensitivity of our valuation estimate to 2 factors: oil prices and our estimated WAAC as seen in Figure 5. While we have a directional view on oil prices, this type of a valuation provides a more holistic way of trying to determine whether the IPO is at a fair valuation and using some probability analysis we can determine if that value falls within a certain confidence level for the range in which we assume prices will be.

		Oil Price that Aramco sells at					
		\$40	\$45	\$50	\$55	\$60	\$65
WACC	7%	\$709	\$813	\$916	\$1,020	\$1,124	\$1,228
	8%	621	712	803	894	984	1,075
	9%	552	633	714	795	875	956
	10%	497	570	642	715	788	861

Figure 5: Dollar Values in millions USD. Sensitivity table of possible Aramco valuations based on estimates for the weighted average cost of capital (shown in the left column) as well as oil prices denominated in dollars (shown along the top row). Note that almost no valuation reaches the \$2 trillion-mark set by the Crown Prince. List of financial and Saudi specific assumptions in the appendix (page 10).

However, this analysis is somewhat incomplete, as it is possible to weigh potential oil prices based on their likelihood. Due to our analysis above, we concluded that it was rather unlikely that prices would rise above \$55 in the near future, and so derived a probability distribution based on our research, shown in Figure 6. From these estimates, we derived confidence intervals for Saudi Aramco valuations using different estimated WACC levels, which can be seen in Figure 7.

Oil Prices	Estimated Likelihood
\$40	15%
\$45	30%
\$50	25%
\$55	15%
\$60	10%
\$65	5%

WACC	Low Bound (\$mm)	High Bound (\$mm)
7%	\$194	\$906
8%	\$170	\$793
9%	\$151	\$706
10%	\$136	\$635

Figure 6: Probability estimates for future oil prices- note weighting towards lower end of the distribution, and 95% confidence interval (df = 5). Numbers in millions.

Saudi Aramco Upstream vs. Downstream

Large oil companies such as Exxon-Mobil and Saudi Arabia usually divide their operations into two key components: upstream and downstream. Upstream refers to the actual process involved in finding and extracting hydrocarbon resources: this includes steps such as prospecting and constructing actual oil wells. In contrast, downstream refers to the refinement

process by which crude hydrocarbons are converted into refined petroleum products for export or sale to domestic consumers.

The upstream business is much more profitable as compared the downstream. This is due to reduced profit margins associated with the refining process. While the details are not confirmed, CEO Amin Nasser stated that Saudi Aramco plans on selling 5% of the entire company, including both upstream and downstream. Till now as a private company, secrecy on reserves and profitability numbers have been beneficial for business. Although the IPO will force the company to release certain information, company transparency will likely be comparatively low.

Conclusion

As the IPO approaches its stated Q2 2018 estimate, Saudi Aramco will try various means to prop up oil prices to increase its valuation. Using oil price estimates between \$40-\$60, our valuation estimates rarely break the \$1 trillion mark, far from the \$2 trillion targeted estimates by Deputy Crown Prince bin Salman. A low valuation will possibly strain the prince's "Vision 2030" diversification efforts along with funding for the Yemen civil war intervention. Looking forward, the IPO valuation is largely contingent upon not only OPEC and Russia's production, but also largely U.S. production, which, despite OPEC pleas for limits, shows signs of continued production hikes into 2017. Beyond this, analysis of the futures curves indicates that there are much higher expectations for forward oil prices, which encourage storing supply for later release. Such a contango market situation creates excess supply flooding markets, lowering the price. Our estimated oil outlook of mid-\$40s is largely due to these factors.

Given a valuation of Saudi Aramco that rests around less than \$1 trillion, we must now consider how much of the company might initially be sold off. As mentioned above, the Crown Prince's goal to gain more funds for his planned reforms of the Saudi economy might require a higher valuation than is currently feasible. Most analysts forecast an initial offering of around 5% of the downstream operations, which given our analysis, would likely be a good gauge of overall market reaction towards Saudi Aramco. However, as mentioned previously, CEO Amin Nasser has nonetheless stated his intentions of selling both upstream and downstream.

While certain information does suggest that oil demand will outpace supply soon, our analysis consisted of a supply-based analysis due to a few key presumptions. First, U.S. production continues to increase and shows no sign of decline. The lack of a governing pact such as OPEC in the U.S. prevents any possibility of a unified production cut. Second, while OPEC has implemented production cuts, many non-OPEC countries such as Russia are still producing at much higher than stated numbers. High production volume and economic profitability seen by U.S. producers compels these countries to produce more than expected. These supply-side concerns motivated our decision to focus on supply over demand and serve as the basis for our argument that supply will outpace demand.

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Appendix

Assumptions in our valuation model – oil price was variable as explained in the model itself.

Financial Assumptions		S.A. Reserves	
Oil Price	\$50.00	Crude oil	261,000,000,000
Reserves	2.60E+11	Gas reserves	297,600,000,000,000
Tax Rate	50.00%	NGL	474,400,000
Royalties	20.00%	Refined product exports	232,000,000
Barrels per year	10011000	Refined products produced	641,000,000
Nat Gas Prices	\$5.60	Refined products domestically used	409,000,000
BTU per barrel of NGL	4,200,000	Refining capacity	1,131,500,000
Average cost per Barrel (Exxon Comp)	\$18.99	Barrels per Oil Produced	10640000
Crack Spread* (as of April 2, 2017)	\$19.76	Breakeven Cost per Barrel	10
Demand per Year	331,200,000		

Next page shows an example valuation

Example valuation based on 8% WAAC and \$50 OPEC reference basket price:

<u>Downstream</u>		Summary	
		Total Sales	\$169,510,496,000
LNG		Royalties	\$33,902,099,200
Natural Gas Price (MMBtu)	\$5.60	SG&A	\$8,475,524,800
BTU per barrel of NGL	4,200,000	Per year profit before tax	\$127,132,872,000
Revenue per barrel	\$23.52	Profit after tax	\$63,566,436,000
Cost per Barrel	\$18.99	Cash flow	
Profit per Barrel	\$4.53	Discount rate (WACC)	8.0%
Total Profit	\$1,500,336,000	Time to termination	96
		PV Multiplier	12.49226911
Refined Products		PV	\$794,089,024,884
Total Produced	641,000,000		
Crack Spread*	\$19.76		
Total Annual Sales	\$12,666,160,000.00		

Total Downstream	\$14,166,496,000
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Upstream

Total Barrels Produced per yr	3883600000
Breakeven	\$10
Oil Price per Barrel	\$50
Total Profit	\$155,344,000,000

Total Upstream	\$155,344,000,000
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