The economic security of the United States explicitly depends on the future price and supply of oil. Petroleum distillates comprise the vast majority of US transportation fuel, are a major factor in the production of many goods, and account for 36 percent of all energy consumed in the United States. Today, a number of factors are shaping the global oil market: the rise of ISIS, Sunni-Shia conflict and endemic political unrest in the Middle East threaten Persian Gulf exports; increased oil consumption in Asia may in the future overburden current oil production capabilities; and the US shale oil boom raises the question of whether the power to set oil prices away is shifting away from the countries that have historically played that role. The future of US energy security - defined by the International Energy Agency as "the uninterrupted availability of energy sources at an affordable price" - depends in part on our ability to predict how major oil suppliers and consumers will respond to market pressures and changing market dynamics in the next decade. This article adds to this predictive effort by analyzing key shifts in the Organization of Petroleum Exporting Countries' (OPEC) production strategies and ultimately offering conclusions as to OPEC's most likely future courses of action.

The first historical point of analysis is the Arab Oil Embargo of 1973. In response to US support of Israel during the 1973 Yom Kippur War, a number of Arab members of OPEC quickly retaliated, slashing oil production and banning the export oil to the United States and other pro-Israel states. The production cut, a 5 percent decrease in global oil supply, had an immediate impact, resulting in a four-fold increase in the price of crude oil, from $3/barrel to over $12/barrel. Though the embargo proved OPEC's ability to substantially affect oil prices, and resulted in an enormous transfer of wealth from oil consuming countries to OPEC producers, these positive outcomes were short lived. The embargo's success was largely due to OPEC's then-dominance over oil supply; OPEC was responsible for over half of the world's oil production at the onset of the embargo. This preeminence would soon end, as the United States and other Western countries sought to lessen reliance on OPEC exports and developed domestic energy sources. Additionally, elevated prices led to an expansion of non-OPEC supply, as oil production in Siberia, Alaska, and the Caspian Sea Basin became profitable. Within a decade, OPEC's market share had fallen by 40 percent.

The outcome of the 1973 embargo—the only time OPEC has drastically increased global oil prices—suggests that a further spike in oil prices could dangerously threaten OPEC profitability. Increases in oil prices typically lead to increased investment in alternative energy sources and conservation measures. The price shock of 1973 led to increased investment in nuclear energy infrastructure, reducing the share of oil-based electricity generation from over 20 percent of electricity generation to under ten percent over the next ten years. A similar price shock today would likely again increase investment in competitors to oil. While today petroleum distillates account for just one percent of U.S. electricity production and less than 5 percent of global generation, they are the primary fuel for

transportation around the world. Sustained high prices may thus further incentivize the deployment of non-petroleum transportation fuels and the vehicles that enable their use.

Similarly, increased prices threaten OPEC's remaining market share. In the 1970s, a price increased from $3/barrel to $12/barrel (nominal) made oil production in Siberia profitable; in the 2000s, increases from $40/barrel to $80/barrel made techniques such as hydraulic fracturing cost-effective ways to extract previously unprofitable oil resources. Not only was the 1973 embargo the cause of a substantial loss in market share for OPEC, but it was largely ineffective in causing real political change or ending Western support of Israel, and among some countries, only furthered mistrust of OPEC's supply reliability. The deleterious long-term effects of the 1973 embargo lead us to the first principle of OPEC production: that it is against OPEC's best interests to manipulate production in order to boost prices significantly above the market equilibrium. This principle may be seen clearly throughout the 1990s and 2000s, as OPEC utilized swing production capabilities primarily to keep prices from spiking, rather than artificially inflating prices.

Interestingly, there has been no significant increase in OPEC's production capacity since 1973: overall OPEC production has remained close to 30 million b/d (with temporary drops due to crises) for over forty years. According to OPEC, over 80 percent of the global oil reserves are held by OPEC countries, and many of these reserves (such as Saudi Arabia's) have low development costs. Why, then, has OPEC generally declined to increase oil production capacity? The answer is simple: many OPEC countries are reliant on oil revenues as their primary source of income, with over 80 percent of some OPEC budgets funded by oil monies, according to the IMF. These countries are not unaware that oil is a non-renewable resource, and so are hesitant to accelerate the death of the goose that lays their golden eggs. Increasing production levels would merely hasten the exhaustion of the resources that petrostates rely upon.

While the 1970s had lessons to teach about the price consequences of reducing the supply of oil on the global market, OPEC in the 1980s would face the reverse problem of over production and an oil supply glut. The late 1970s saw increased production of coal, nuclear power, and natural gas leading to a decrease in oil demanded for electrical power generation (the share of petroleum-based electricity production was more than halved within a decade). Additionally, a global recession in 1980 led to sharp decreases in oil demanded for transportation purposes. Meanwhile, as Daniel Yergin notes in *The Prize*, OPEC producers cheated on production quotas, leaving Saudi Arabia, OPEC's swing producer, cutting its own exports to artificially prop up the price of oil. By the summer of 1985,

Saudi Arabia's oil exports were only one-fifth of what they had been five years earlier. Saudi Arabia embarked on a desperate mission to regain lost market share, removing oil price fixtures and allowing oil prices to be set by market demand. Within a year, OPEC production had increased by 25 percent, with half of the increase coming from Saudi Arabia. Oil prices fell from over $30/barrel to $10/barrel. Their combined efforts were too late; OPEC failed to regain market share, and collapsed prices led to vast financial crises for oil-producing countries. Saudi Arabia, one of those hardest hit during the 1980s, absorbed sixteen consecutive years of budget deficits. Several OPEC countries saw 42 percent losses in revenue, and by the end of 1986, OPEC revenue had fallen from its 1980 peak of over $1 billion/day to just over $200 million/day—just slightly higher than its revenues prior to the 1973 oil embargo. As might be expected, long-term excess oil supply and lowered prices cause significant financial hardship for petrostates that rely on oil revenues to balance their budgets. International Monetary Fund (IMF) data suggests that 80 to 90 percent of Saudi Arabia's budget relies on oil revenue. Some petrostates may be able to weather temporary budget shortfalls, yet long-term losses present a serious threat. Saudi Arabia has official reserves of $734.3 billion, yet IMF projections indicate that Saudi Arabia will experience a budget deficit of over $107 billion this year alone. Other OPEC countries may fare even worse, with some requiring oil prices as high as $214/barrel in order to balance their budgets. Financial crises may also present an existential threat to Arab petrostates, the legitimacy of which (at least partly) depends on their government's ability to provide social welfare programs and benefits to citizens. If these programs are threatened by financial cuts, governments may be left vulnerable to challenges from radical factions. From these points, we may infer a second principle: that sustained low prices threaten the economic and political stability of OPEC nations.

By the late 1980s, OPEC officials instituted a new strategy, intending to maintain "a reasonable price" of between $15-$18/barrel, with production quotas totaling 17.3 million barrels/day. This strategy was fairly successful, with most drastic changes in price and production between 1990 and 2004 caused exogenously. Conflict both within and without OPEC, however, caused several price shocks: the Iraqi invasion of Kuwait in August 1990 caused crude oil to nearly double in price, and changes in the global economy moved oil prices beyond OPEC's informal price-band. At the March 2000 summit, OPEC ministers formally installed a mechanism designed to keep oil prices with a range of $22-$28/barrel. The system automatically increased production quotas if prices climbed above $28/barrel for a set period, and reduced quotas if oil prices fell below $22/barrel. This system was extremely effective: a 2002 strike in Venezeula and the US invasion of Iraq in 2003 each removed over 2 million barrels/day of production, yet "…the disruptions had little apparent effect on global oil supplies" writes

University of California, San Diego professor James D. Hamilton. The previous two principles - and the success of price-band production throughout this period - clearly suggest that it is in OPEC's best interests for global oil prices to stabilize with a narrow price band, low enough to both stimulate economic growth (and future oil demand) and preclude investment in energy sources that compete with oil, and high enough to produce critical revenues for producing countries. OPEC is squeezed from both above and below. If prices fall too low, OPEC nations are rendered incapable of balancing their budgets, funding their militaries, or providing goods and services to their citizens. Oil prices that are even a few dollars too low can wreak havoc on a state that depends on oil revenues for 90 percent of its budget. The concept of energy security is important to both consumers and producers, though it holds a different meaning for each: consuming nations rely on the constant flow of affordably priced oil – security of supply; in the same way, producers rely on the constant flow of revenue from oil sales – security of demand. At the same time that OPEC must keep prices from dropping too low, it must also protect its market share and prevent prices from climbing too high. With insufficient volume, prices matter little in raising necessary revenues. There is a firm upper limit to OPEC's optimal pricing range: prices that are too high will increase the profitability of other producers, and spur investment in alternative energy sources. The third principle - and primary conclusion - that we may draw here is that OPEC will be best served in the future by adapting a mechanism designed to stabilize prices close to their optimum level.

The bulk of OPEC's past suggest two other corollaries necessary for meaningful and effective OPEC strategies. The first of these corollary principles is that OPEC must commit itself to mediating and preventing conflict both internal and external to the organization. Throughout the 1980s and 1990s, wars between Iran and Iraq, Iraq and Kuwait, insurgencies in Libya, sectarian conflicts between Sunni and Shiite regimes, and even disagreements between the hawkish and dovish members of OPEC all hampered the ability of OPEC to effectively enact policies. Escalating internal pressures between Iran and Saudi Arabia, as well as the threat of fundamentalist militancy may prevent OPEC from taking successful collective action in the future.

A second corollary principle is that OPEC's market power depends on swing production capabilities. A prime example of this is OPEC's inability to respond to the global financial crisis of 2008. A combination of increased demand, disrupted production, and market speculation caused oil prices to triple, from $50/barrel in early 2007 to a record peak of $147/barrel in July 2008. Earlier increases in demand led OPEC to increase production to its limits, leaving it unable to respond to price increases. The US Energy Information Administration estimates that global surplus crude oil production capacity just before the crisis had fallen from 5.6 million b/d in 2002, to just over 1 million b/d. With little excess production capacity, OPEC was incapable of increasing oil supply to combat higher prices.

The five principles we have discussed do much to explain and inform the events of 2014, which found oil prices collapsing as Saudi Arabia abandoned its historical role as swing producer. Over a five year period beginning in 2008, US domestic oil production increased from 5 million b/d to 7.44 million b/d, with that number climbing to 9.6 million b/d by April 2015. Much of the increased production was the result of technological advancements that enabled the extraction of so-called "tight oil" - oil trapped within small crevices or atypical rock formations such as shale rock. Meanwhile, elevated oil prices from 2009 to 2014 made shale oil production economically feasible - a clear example of how elevated prices may ultimately harm OPEC producers. However, Steve Yetiv writes in
Myths of the Oil Boom,
"The boom will be threatened if the Saudis move away from their historical role of swing producer…in mid- to late 2014, the Saudis decided not to play this role". The Saudi strategy to defend market share was effective, causing oil prices to fall from over $100/barrel in early 2014 to as low as $40/barrel in August 2015 (with prices since stabilizing in the $40-$50/barrel range). Prices in this range are less than optimal for OPEC members, yet some decision makers may be more willing to absorb short term losses to protect market share than others. Specifically, members Iran and Saudi Arabia have disagreed vehemently over whether to decrease oil production. Iran, just released from sanctions restricting its sale of oil while problematically relying on oil revenues for a large percentage of its national budget, is anxious to ramp up production. The Saudis, meanwhile, have billions in savings that can tide them over until oil prices again rise. A recent call from the Saudis for OPEC to temporarily freeze production has been called "a joke" by Iran's Oil Minister. In February, four big producers, Saudi Arabia, Russia, Venezuela, and Qatar, agreed to freeze output; Iran refused, and further accused the Saudis of stealing their market share of exports to China when Saudi shipments of oil there jumped
36 percent
to the highest level in three years. Clearly, geopolitical tensions between the two countries have heightened in this tight oil market as one is more willing than the other to absorb the temporary economic strain of reducing production.

What conclusion may we draw from these points? What strategies will OPEC pursue in the future? In overall terms, the current global oil market resembles that of the early-mid 1980s in many ways. Similarly, markets experienced a period of unrealistically inflated prices, leading to expanded production—today's Bakken shale oil boom is analogous to the North Sea production of the 1980s. In another similarity, Saudi Arabia is leading OPEC in an attempt to defend market share by flooding markets with oil.

By applying the principles of OPEC production to today's market, we can surmise certain things about the future of OPEC strategy. First, OPEC cannot - and will not - suffer low prices forever. Even the wealthiest members of OPEC cannot sustain long-term budget deficits. As soon as OPEC has deemed that it has adequately defended its market share, it will do everything in its power to increase oil prices to a more tenable and financially advantageous equilibrium. OPEC

must also devote itself to maintaining significant levels of swing production capability. Oil prices continue to be volatile, and limited swing production capability leaves OPEC incapable of responding to price shocks, and limits its market power. Further, OPEC must take collective action to ensure the stability of the Middle East, facing the challenges of religious extremism, addressing points of contention between Shiite and Sunni regimes within OPEC, and working to allay conflicts between hawkish and dovish producers.

The historical experience of OPEC points to what must be OPEC's long-term strategy: establishing an effective price-band mechanism to moderate the price of oil. This is similar to OPEC strategy following the last oil glut, for good reason. The price-band mechanism itself did not fail; the oil price spike of 2007-2008 has largely due to exogenous variables, coupled with OPEC's hamstrung ability to respond with increased production. As before, OPEC must establish a price band that is both high enough to provide adequate revenues to petrostates, yet low enough to stymie conservation and fuel diversification. For OPEC oil exports to compete with the bulk of US shale oil production, this price band must be no higher than $55-$60/barrel—the average breakeven production price for most US producers. However, OPEC regimes' fiscal breakeven costs are far above this: prices of $60/barrel will not fund average OPEC budgets. OPEC countries will be forced into budget cuts, beginning with eliminating excess expenditure on social welfare programs and benefits. This would be unpopular, but not impossible: Saudi Arabia balanced its budget with $60/barrel oil only a few years ago. Once OPEC countries have cut spending to a more reasonable level, they will be better able to prosper in the long-term.

Our conclusion, informed by fifty-five years of OPEC history, is this: if OPEC is to survive, it must follow this course of action for the future. First, they must enact a production mechanism to keep prices close to $60/barrel. Second, OPEC countries must drastically cut government spending. Third, OPEC must invest in, and maintain, significant swing production capability, enabling it to effectively maintain its price band. Lastly, OPEC must concern itself with mediating and preventing conflict both within and without the cartel. OPEC's long and turbulent past tells us that these points are crucial to OPEC's survival in the oil market of the future: common sense tells us that OPEC ministers will implement policies in accordance with these principles.

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