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Swinging Shale: Shale Oil, the Global Oil Market, and the Geopolitics of Oil

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Is shale oil "revolutionizing" the global oil market and the geopolitics of oil? If so, how? While two aspects of the shale boom—a new source of supply and a cause for the price collapse in 2014–2015—dominate the conventional wisdom, I argue that the most revolutionary change is the least understood aspect of shale oil—shale oil producers' rise as new swing suppliers due to its unique extraction technique and cost structure. Shale oil producers also differ from traditional swing producers in motives, contexts, and an amount of accessible excess capacity such that while shale oil lowers the medium-term price ceiling, it does not eliminate short-term price volatility. By examining the geopolitics of oil since the advent of shale oil, I analyze how such new market realities have or have not altered the US foreign policy on issues involving possible oil supply disruptions, Saudi Arabia's long-held special status in US grand strategy, rationale for US withdrawal from the Persian Gulf, and the foreign policy of China, the largest oil importer today, and Russia, a major petrostate.

After decades of investment and innovation, shale oil, previously inaccessible, finally made its commercial debut in the early 2010s. On the surface, the causes and consequences of this development appear anything but typical. Shale oil is found in unique geological conditions, trapped—unlike conventional oil—in impermeable rock. To extract it, the industry perfected a noble set of technology—hydraulic fracturing (or "fracking") and horizontal drilling, which according to Daniel Yergin was "the biggest innovation in energy this century" (Yergin 2014). Many speculated that the consequences would be equally groundbreaking, if not more so. Goldman Sachs suggested that a "new oil order" (Goldman Sachs n.d.) was emerging, potentially "the most politically disruptive factor in the global oil market since the formation of OPEC in 1960" (Ed Morse, quoted in Crooks 2015), after which, according to *Financial Times*, "… nothing will ever be the same" (Crooks 2015). The advent of shale oil was labeled a "revolution," and arguably no word better captures the excitement and anxiety surrounding the political economy of the shale boom.

However, despite the revolution shale oil allegedly represents, IR scholarship has been virtually silent on its nature, dynamics, and consequences. Tellingly, a keyword search on "shale" returns no results in leading political science journals.[1] The scarcity of reliable guidance is clearly problematic. No traded commodity is more strategized than oil, and, accordingly, the political economy of oil has been integral, historically, to the US national security calculus; the wealth and security of its allies and rivals; their foreign policy and grand strategy choices; and, by extension, the regional and global security environment (Yergin 2008; Painter 2012). Few doubt that the shale boom will matter in these areas. Equally few, however, know *how* it will matter.[2]

How does shale oil alter the geopolitics of oil? The conventional wisdom tends to center around two inter-related aspects of the shale boom—shale oil as a new source of supply, on the one hand, and as a cause for the price collapse in 2014–2015, on the other hand. While the political ramifications of these factors are real, neither is new in the deeply cyclical oil market. The phenomenon of rising supply and falling prices in response to an extended period of high oil prices merely replicates earlier episodes of boom and bust witnessed throughout the twentieth century (Clayton 2015). Limiting the discussion of the impact of shale oil to the added supply and the price plunge therefore neglects the more important task of distinguishing the shale boom with typical supply shocks. What makes shale oil different from conventional oil? How do the differences matter in the geopolitics of oil?

I argue that the most revolutionary change is the least understood aspects of shale's rise—shale producers' potential to act as swing producers and the fact that their productions are uncoordinated. First of all, in times of price changes, shale oil producers are more able to "swing" the market than conventional oil producers by either pumping additional oil on short notice or leaving the market more promptly. The greater supply responsiveness to price signals emerges due to unique sets of technical specifications and the cost structure of shale production. Unlike conventional oil fields that take years to drill and complete, shale oil wells can be developed in a matter of months, and accordingly, fracking, the technique for extracting shale oil, can be performed at the time of producers' preference. The cost structure is also different from that of conventional oil, in that the upfront sunk cost forms a relatively small portion of total production costs, lowering the barriers to entry and exit. A combination of the technical feasibility of adjusting production volume on short notice and lower barriers to entry and exit creates distinctly permissive conditions for shale producers to respond more swiftly than producers of conventional oil.

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[1] Journals surveyed were *American Journal of Political Science*, *American Political Science Review*, *International Organization*, *International Security*, *International Studies Quarterly*, and *World Politics*.

[2] O'Sullivan (2017) and Van de Graaf and Bradshaw (2018) are notable exceptions.

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The history of oil shows that swing producers, most notably the Texas Railroad Commission (TRC) and Saudi Arabia, have played a critical role as a credible, though imperfect, buffer against price volatility. In particular, swing producers operate the so-called spare production capacity, which, on many occasions, has been used to make up the lost barrels from unanticipated supply disruptions, contributing to market stabilization. This rarely available and valuable function made the location, amount, and reliability of spare capacity a key consideration for US policy in the Persian Gulf and a significant variable in its ability to maintain its prestige as a patron to its allies and a global hegemon overall (Kim 2019).

On the other hand, shale oil producers' swinging capacity operates on different organizational and production logics from the ones of traditional swing producers. Whereas the TRC or Saudi Arabia has generally pursued long-term market stability and political interests, enjoyed a high level of control and cooperation, and drawn from limited existing excess capacity, shale oil producers are short-term profit-driven and uncoordinated, and have access to potentially a larger pool of excess capacity, thanks to the technology and economics involved. New market realities result. In contrast to the TRC and Saudi Arabia, shale oil producers suffer from a lack of centralized authority and a huge intra-industry variation in production conditions, such that prompt and effective intervention cannot be expected in the short term. However, compared to traditional swing producers, shale oil is capable of offering a more durable buffer against medium-term and structural shocks as intra-industry heterogeneity recedes over time and shale producers exploit the unprecedented speed with which wells can be developed. In short, shale oil lowers the medium-term price ceiling but does not eliminate short-term price volatility.

I discuss four strategic implications of the new market realities. First, contrary to popular expectations, the flourishing but uncoordinated domestic shale producers do not create much new latitude for US foreign policy on issues involving possible oil supply disruptions, barring some exceptional circumstances. Second, as the risk of short-term volatility remains, Saudi Arabia's unique market power and strategic value will persist, and shale oil is unlikely to overturn the Saudi Arabia's long-held special status in US foreign policy anytime soon. By examining the latest dynamics of US–Saudi Arabian relations with respect to Iran's nuclear program and the sanctions on Iran in 2012–2019, I show that, today, little has changed. Third, the continued irreplaceability of Saudi Arabia's market power means that one cannot reasonably advocate for US withdrawal from the region based on the shale boom. However, I caution against equating this reasoning with opposition to withdrawal, since the logic behind the argument for withdrawal remains robust based on strategic and military assessments, entirely independent of shale oil. Lastly, I examine how the more resilient and stable medium-term price ceiling affects other great powers, most notably China, the largest oil importer today, and Russia, a major petrostate.

The paper first critically examines the conventional focus on the volume of added supply and the magnitude of the price plunge in 2014–2015. An in-depth analysis follows on the technical specifications and business conditions that incentivize shale oil producers to develop and maintain excess capacity. The last section surveys the historical linkage between spare capacity, the oil market, and the geopolitics of oil, compares the price-swinging effectiveness of traditional swing producers and today's shale oil industry, and discusses what shale oil as swing supply means for US foreign policy and the global geopolitics of oil. I conclude by suggesting directions for future research.

Rising Global Supply, Falling Oil Price, and Beyond

US foreign policy is a fair place to begin inquiries about the impact of shale on international politics. American foreign policy has been full of initiatives to ensure the stability and security of the oil market, which have in turn shaped the politics and security of regions around the globe. Scholars recently outlined how oil matters in US foreign policy (Deutch, Schlesinger, and Victor 2006; Glaser 2013), critically examined its alleged vulnerability to oil coercion (Kelanic 2012; Hughes and Long 2015), and probed the wisdom of the current form and level of military commitment in the Persian Gulf (Gholz and Press 2010; Rovner and Talmadge 2014; Glaser and Kelanic 2016).

Curiously, although this surge of interest in the role of oil in American foreign policy coincided with the shale boom, shale oil itself has gone largely unnoted, usually appearing as a passing note and never as an independent subject of inquiry. This neglect may be partly attributable to general unfamiliarity with the basics of shale oil production, including its actors; industry structure; technical requirements; business operation; and, ultimately, what the new market reality is going to look like. Instead, media commentary and policy analysis dominate the discussion today. I critically examine the two most widely invoked themes—US energy independence and consequences of more oil and lower price on the global politics. Some of these themes merit more attention than others, but none captures what truly makes shale oil unique.

Energy Independence Myth

Since the days of Richard Nixon, achieving energy independence has been considered a "holy grail" in US politics. At a superficial level, the United States appears to be approaching that goal today. Thanks to the shale oil, "the most dramatic sustained rises in output ever seen by individual countries" (IEA 2017b, 70), US crude oil production went above 10 mb/d in 2018 for the first time since 1971, surpassing Saudi Arabia and Russia at the same time to become the world's largest crude oil producer (EIA 2018b). The rapid rise of shale oil also was a key driver behind the historic lift of the forty-year-old ban on crude oil export under the Obama administration in December 2015 (Colgan and Van de Graaf 2017; Downie 2019).

Consequently, US oil import dependence drastically fell from above 40 percent in 2012 down to below 10 percent in late 2018, and in September 2019, the United States made a historic transition to being a net exporter of petroleum (figure 1)[3] for the first time since 1949 (EIA 2019b).[4] The same report expected the United States to be a net petroleum exporter in 2020 on an annual basis for the first time in its recorded history, although it is being complicated by an unanticipated outbreak of Covid-19 and the price war launched between Saudi Arabia and Russia in March 2020, collapsing the oil price and threatening US shale businesses.

Nevertheless, this is an astonishing change, given that the likelihood of the United States becoming a net oil exporter

[3] EIA data. Oil import dependence is a ratio of net import of crude oil and petroleum products by total oil consumption.

[4] Petroleum trade calculates both crude oil and petroleum products. While the United States is net exporter of petroleum products, it remains a net importer of crude oil.

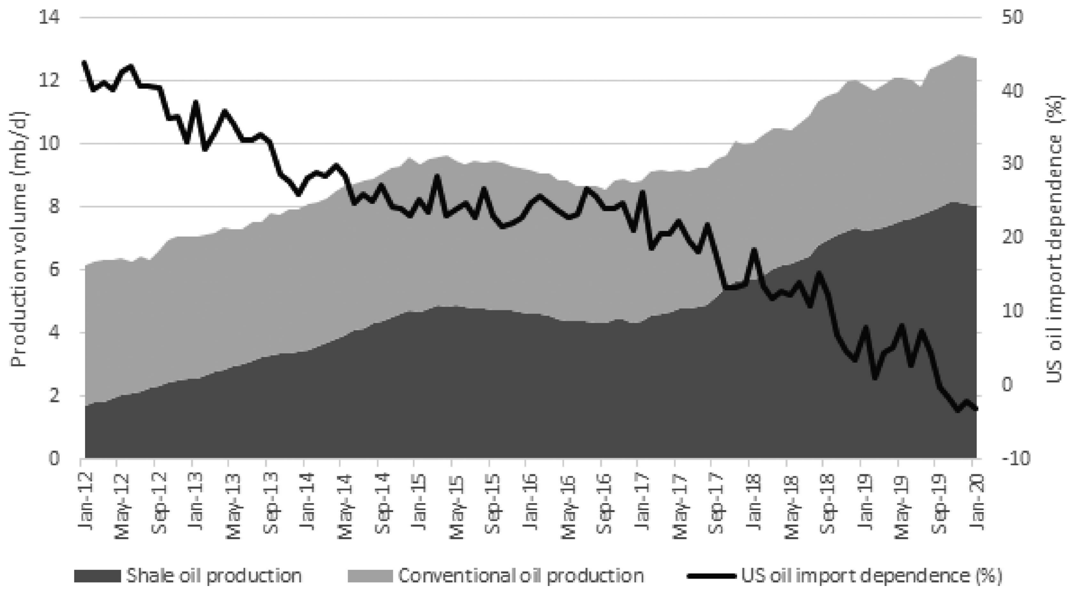

Figure 1. US oil production volume and oil import dependence (January 2012 to May 2019).

had seemed next to none prior to the advent of shale oil. Politicians quickly claimed its geopolitical significance. In 2015, President Obama boasted that the United States was "number one in oil and gas" and therefore finally "free from the grip of foreign oil as we've been in almost 30 years" (The White House 2015). The Trump administration went even further, calling the US oil position "energy dominance," which goes beyond self-reliance and freedom from threats of oil embargo and extends to "increasing [US] global leadership and influence" (The White House 2017).

Equating self-sufficiency with energy independence, let alone dominance, is more illusionary than actual, however (Levi 2013b, 196). Oil is a fungible good, and the world oil market operates more or less as "one great pool" (Adelman 1984, 5). In the globally integrated market, the oil price is determined by an intersection of *global* supply and demand, not bilateral or regional—data show that oil prices across regions are closely co-integrated on the spot market rather than moving independently of one another (Bachmeier and Griffin 2006). The location of oil production sites, therefore, has little bearing on a state's access to oil in the market. By extension, a supply or demand shock in one region is spread equally across the global market and not restricted to the region.

Trading in the globally integrated market, a "self-sufficient" United States would still be exposed to the same foreign supply and demand factors that have long generated a volatile price movement (Glaser and Kelanic 2016, 6). Similarly, the oil export does not fundamentally expand the strategic perimeters of US foreign policy, as oil export itself cannot independently function as a tool for statecraft (Colgan and Van de Graaf 2017, 34). The logic behind the idea of being "free from the grip of foreign oil" is therefore deeply misplaced, if not outright flawed.

Consequences of More Oil and Lower Price: déjà vu?

The benefits of shale oil are subtler and more qualified than what simplistic notions of energy independence and dominance suggest, centering on the dilution of supply and the effects of cheaper oil on the politics of oil around the globe. Neither of these factors, however, characterizes the truly "revolutionary" changes that shale oil entails.

First, adding shale oil into the global supply chain dilutes the level of supply concentration in the Persian Gulf. Shale oil outpaced OPEC in terms of production increase in the past decade—between 2008 and 2018, OPEC added 2.05 mb/d or 17.6 percent of the global supply increase, while the United States supplied 8.53 mb/d of new oil, accounting for 73.2 percent of the increase.[5] Free of geopolitical disruptions, the rising share of US shale oil adds new layers of shielding against the historical sources of price uncertainty and volatility originating from geopolitics in the Persian Gulf. In other words, *ceteris paribus*, the lower supply concentration means that a supply disruption on a similar scale originating from the Persian Gulf, whether from oil coercion or geopolitical events, will have fewer ramifications for the global oil price (Hughes and Long 2015).

The benefits of supply dilution need qualification, however. The OPEC's ability to disrupt the oil market is already questionable at best, because OPEC is neither homogeneous nor harmonious and suffers from declining market power (Colgan 2014). Furthermore, because the addition of shale oil is factored into the global market, any benefits of reinforced stability are not enjoyed exclusively by the United States but shared equally by consumers across the globe and therefore are of a very different nature from what energy independence advocates posit.

Second, the 2014 price shock, which scholars largely attribute to the sudden addition of a large amount of shale oil to the global supply chain, entailed potentially penetrative and transformative effects on the politics of oil globally. It severely disrupted the political economies of oil rentier states, significantly improved the energy security conditions of importers, and therefore altered the strategic balance across these states, all of which affects US management of allies and foes around the globe.

While the price shock represents a substantive pillar in the ongoing shale hype, it is worth remembering that a price collapse of this magnitude is not unprecedented. In

[5]Author's calculation based on figures from British Petroleum Company (2019).

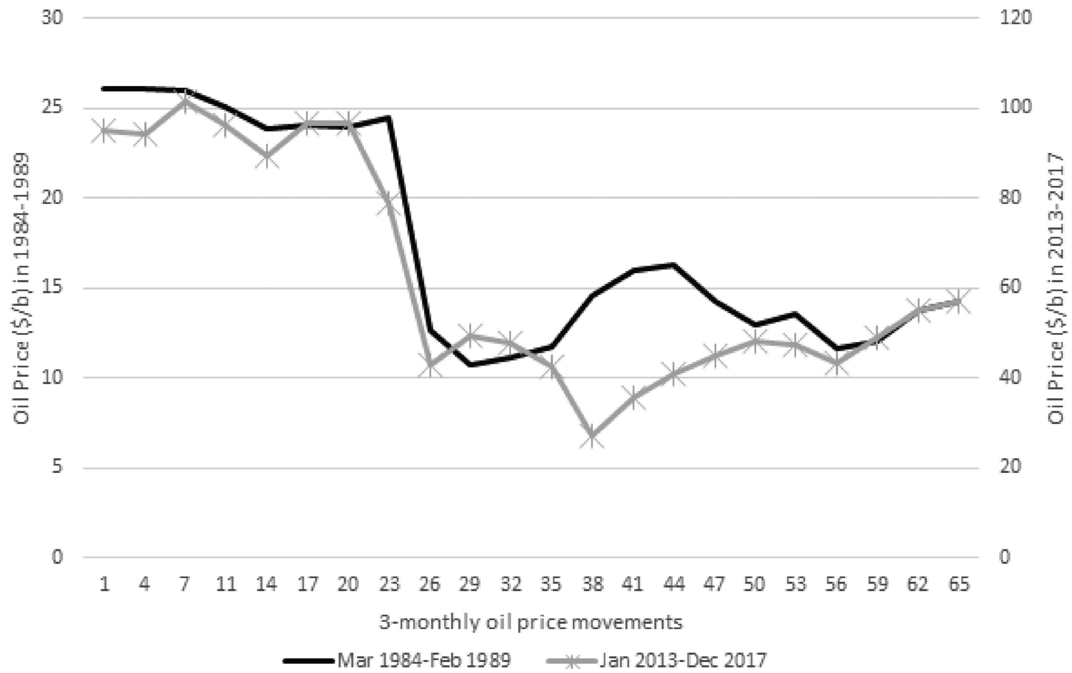

Figure 2. Three-monthly oil price movements in 1984–1989 and 2013–2017.

fact, the causes, contexts, and conditions of the 2014 price shock exhibit a striking similarity to those of the 1985–1986 price collapse, both being typical, supply-driven shocks (figure 2). Both cases were primarily conditioned by a supply glut (powered by new offshore fields in the Gulf of Mexico and the North Sea in the 1980s and US shale oil in the 2010s, both of which had become commercially viable, thanks to prior periods of high oil price). In addition, the two shocks have in common the situation in which Saudi Arabia's decision to "sweat" the market in a bid to protect its market share against new competitors exacerbated the oversupply and created market anticipation of sustained supply glut (Ansari 2017). Both periods also coincided with stagnating demand—absolute decline in demand from major economies in 1979–1983 and unexpectedly lower demand due to weakening of the global economy (Baumeister and Kilian 2016)—which intensified the supply–demand disequilibrium and the downward pressure on oil price.

Without denying the political ramifications of the price shock, we would do well to avoid overstating the uniqueness of the latest sustained price fall. In fact, studies about other historical boom-and-bust cycles in the oil market can equip political science with richer data and insight into the nature of the latest shale oil shock (Clayton 2015, 169–77). More importantly, however, to truly appreciate the impact of shale oil, one must look beyond the movements of rising global supply and falling price. Otherwise, shale oil becomes no different, analytically, from other earlier new sources of supply. To analyze whether and how the shale "revolution" differs, one must start by problematizing the fundamentals that enable and organize the shale boom—how does the shale oil industry function? Who are the actors, what is the market logic, and what does the industry structure look like? How, if at all, do these factors distinguish shale from conventional oil production and the conventional oil industry?

Revolution Is in the (Technical) Detail

As noted by some commentators, what makes shale oil truly different is its high supply responsiveness to price changes (Yergin 2015). In other words, shale producers can act as swing producers who operate some "volume of production that can be brought on within 30 days and sustained at least for 90 days" (EIA 2018a), also known as spare production capacity. This foundational claim about shale oil, however, has not been properly spelled out, leading to confusion about its geopolitical significance. To fill this critical gap, this section elaborates how its unique specification for extraction technique and its particular cost structure create shale's greater responsiveness to price changes relative to conventional oil production.

Technical Feasibility

The technology of shale oil extraction involves two distinct features that are not found in conventional oil extraction, which makes oil production on short notice technically feasible and even desirable. First, shale oil wells can be drilled and completed much more quickly than conventional oil wells. Developing oil wells into production has been traditionally a time- and resource-consuming process, involving field exploration, wells' drilling, and completing installation of production equipment. For conventional oil, such process typically requires three to ten years (Qabazard, Fantini, and Haderer 2013, 35). Extracting oil under more challenging conditions such as deep sea presents much bigger technical difficulties and therefore even longer time and more resources need to be invested before its first drop of oil enters the market.

Development of shale oil wells, in contrast, takes a much shorter time. The Baker Institute, for instance, estimates between 35 and 90 days for total spud-to-sales time, or from the time drilling begins until the first oil is brought to sales (Collins and Medlock III 2017, 2). Energy Information Administration (EIA) similarly estimates that an average time to drill a new well to be less than two months in North Dakota in 2014–2017, where the Bakken field, one of the largest shale oil fields in the United States, is located (EIA 2019a). Actual time lag is likely to be longer, because both estimates exclude pre-drilling phases such as investment and exploration. On average, about one year is required

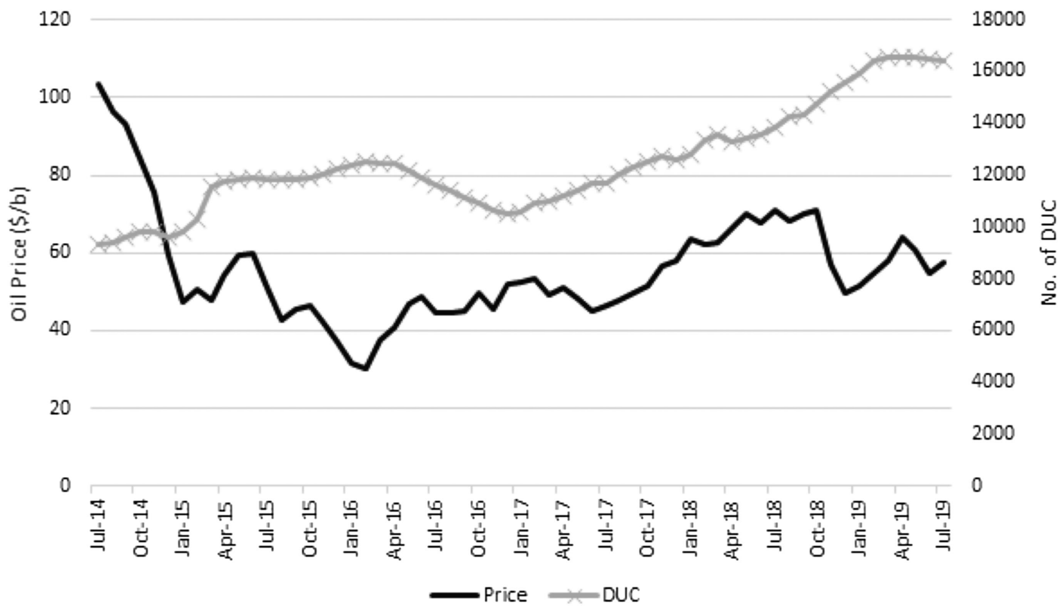

Figure 3. DUC wells and oil price in 2014–2019. *Source*: EIA (2018c).

between investment and the first production (Bornstein, Krusell, and Rebelo 2017, 34).

Second, shale oil production is heavily front-loaded relative to conventional oil such that the shale producers exploit the short time span for well development to respond to price increases promptly. More specifically, as much as 60 and 25 percent of the oil in shale wells is produced in the first and second years, respectively (Kleinberg et al. 2018, 72). Compared to conventional oil wells, whose yearly production volume declines at a slow and steady rate over their life cycle, the production rate for shale oil rapidly declines up to five times faster after initial drilling (Bjornland, Nordvik, and Rohrer 2017, 3). This front-loaded production makes the shale oil production decision highly time-sensitive—shale producers decide whether and when to drill and produce based on short-term price expectations, while conventional oil producers make decisions based on longer term price prospects (Kleinberg et al. 2018, 73).

The quest for short-term profit has led shale oil producers to create and maintain a pool of so-called drilled but uncompleted wells (DUCs) to optimize the timing of well completion (Bjornland, Nordvik, and Rohrer 2017, 3). Technically, DUCs are created when wells are drilled, cased, and cemented, without being completed, which involves perforating, stimulating, and installing production tubing and downhole pumps. These DUCs offer two critical advantages—they do not incur maintenance costs (Kleinberg et al. 2018, 74) and their turnaround time to first production is very short. According to the Baker Institute, well completion takes only ten to fourteen days, with five to six more days required to commence sales (Collins and Medlock III 2017, 1–2). The total duration of fifteen to twenty days falls well within the thirty-day criterion to qualify as excess capacity. From a business standpoint, DUCs are particularly attractive because they allow firms to optimize sales revenue by promptly triggering first production in response to a price increase. Figure 3 shows that the number of DUCs in the United States has steadily increased from around 9,000 to over 16,000 between July 2014 and July 2019, during which period the price of oil gradually recovered from its lowest point of $30/b in February 2016 to $70/b in July 2018. The figure suggests a corresponding increase in production potential or spare capacity from utilizing DUCs.

Overall, due to the differences in well development, extraction, and activation technique, shale oil has a short investment, development, and production cycle than conventional oil. Such technical aspects enable shale production to be highly responsive to price increases.

Lower Sunk Cost

Shale oil production also faces lower barriers to entry to develop spare capacity due to a lower fixed-to-variable cost ratio relative to conventional oil production. Fixed costs are defined as costs that do not vary with the quantity of output produced. In the oil industry, much of the fixed cost occurs during the pre-production period in prospecting the geological conditions, installing equipment, and drilling and setting up extraction sites. Variable costs, on the other hand, are defined as costs that increase with the production volume, and in oil production, labor, transportation, and well servicing form the major variable costs (Kaiser 2012, 318).

The ratio between fixed and variable costs significantly affects investment decisions. When fixed costs make up a large proportion of total production costs, upfront costs and risks are higher, and so, too, is reluctance to commit in the first place. In contrast, when fixed costs are relatively low in relation to variable costs, firms face lower barriers to entry in developing oil fields. For conventional oil production, the fixed-to-variable cost ratio is relatively high, ranging between 40 and 60 percent of total production costs for onshore and offshore production across the globe (Wall Street Journal 2016). Though these data combine oil and gas production, EIA has similarly reported that "finding cost (which falls under the fixed cost) usually have been much larger than lifting costs (which belongs to the variable cost)" for pre–shale era oil production (EIA 2011).

Cost barriers to entry are highest for offshore drilling. In offshore development in the Gulf of Mexico, for instance, above 60 percent of total cost was incurred at the drilling

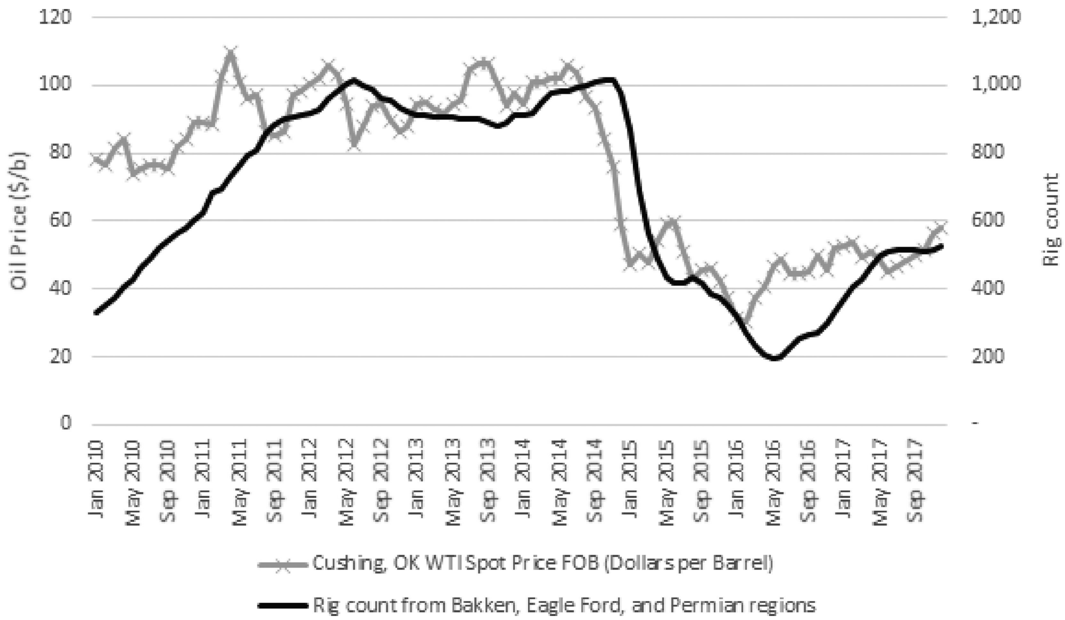

Figure 4. Oil price and rig counts, 2010–2017.

stage only (EIA 2016, 6). The sunk cost is prohibitively high in absolute terms, too. The Jack/St. Malo Project, which built the largest semi-submersible in the Gulf of Mexico in the 2010s, cost $12 billion in infrastructure expenses alone (EIA 2016, 113–14). The high level of uncertainty and risk further complicates the decision. After spending $4.6 billion since 2008, Shell had to abandon exploration and drilling in Alaska's Chukchi Sea only to end up with a meager volume of reserves (Macalister 2015).

The fixed-to-variable cost ratio is the opposite for shale oil production. Kleinberg et al. (2018), for instance, find that out of a full-cycle breakeven price of $60–90/b in 2014, $50–70 is the half-cycle breakeven price that covers a sum of lifting cost, estimated to be below $20/b, and other variable costs such as labor, drilling, and completing and stimulating additional wells in developed fields with the goal of maintaining level production. This leaves "purely fixed cost" to range between approximately $10/b and $20/b, or about 20 percent of the full-cycle breakeven price, to cover "the expenses of geophysical prospecting, exploratory drilling, and measurements of the size and richness of the resource, obtaining legal rights, as well as above-ground infrastructure cost" (Kleinberg et al. 2018, 73–74, 77).

Another way of approximating the fixed-to-variable cost ratio is to compute the cost of building DUCs, which offers a more accurate but ultimately similar argument. Although DUCs are not equal to fixed costs—as wells are left short of completion—the costs of DUCs are essentially the costs of creating excess capacity since they can be turned to production relatively quickly. According to an EIA estimate, approximately 25 percent of total well costs come from drilling and casing, two key components for DUCs (EIA 2016, 2–3). Although the wide geological and geographical variations across shale fields and the fast pace of technological innovation make it difficult to estimate the shale production cost structure with accuracy, available data unequivocally point to the fact that shale oil production, in which upfront investment makes up a smaller proportion of total cost, presents relatively lower barriers to entry than conventional onshore and offshore oil production (Krane and Agerton 2015, 20–21; McNally 2017, 204).

Overall, a mix of technical feasibility to dial up and down and relatively low sunk cost makes shale producers highly responsive to price changes. For instance, figures 4 and 5 show a robust correlation of total rig count from the three main shale oil-producing states for 2010–2017 and a number of shale wells drilled and completed in 2014–2019, respectively, to oil price movement. Though still in their infancy, the latest research that systematically compares price elasticities of supply across oil fields similarly finds that shale producers adjust the production volume more swiftly than conventional oil producers by a significant margin to both simulated and actual price increases (Bjornland, Nordvik, and Rohrer 2017; Newell and Prest 2019).

The swinging action happens in the opposite movement of oil price, too. Studies find that because of the shale oil's higher marginal cost of production, "as the expected price of oil declines, investment by tight (shale) oil producers should cease before conventional oil investment" (Kilian 2017, 16). In the midst of a price crash in March and April 2020, for instance, shale producers were one of the first to halt drilling and cancel investment (Reuters 2020), while US Energy Secretary Dan Brouillette forecast that closures of oil business can cost US production up to 3 mb/d by 2021 (Wang et al. 2020). In the exceptional circumstance of the coronavirus-induced global economic showdown, the resulting drastic reduction in shale oil production is still unlikely to swing the market on its own. Nevertheless, the prompt fall in production and producers' exits from the market show that the shale oil's greater responsiveness to price signals works in both directions. Table 1 summarizes the central tenets regarding the differences between conventional and shale oil.

New Market Realities, Old Geopolitics?

These new market realities—shale producers' potential to swing the market—call for informed judgment about their geopolitical implications. To do so, I first look at the historical links among spare capacity, the oil market, and geopolitics. I find that in addition to the possession of excess

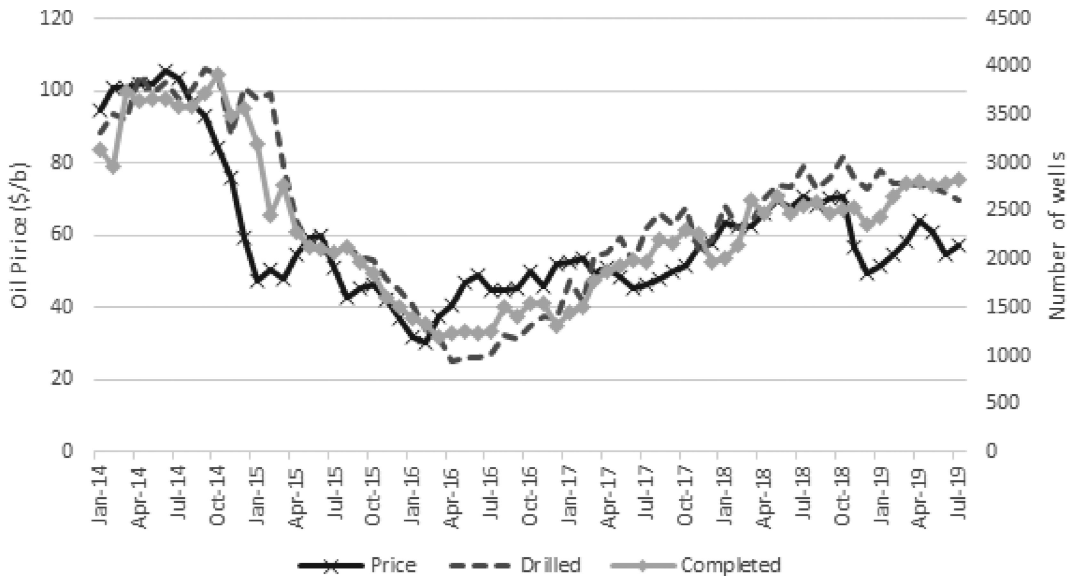

Figure 5. Oil price, shale wells drilled and completed, 2014–2019 (EIA 2018c).

Table 1. Summary of comparison

	Conventional oil	*Shale oil*
Technical feasibility	Three to ten years to build	One year from investment to sales DUCs take less than one month to turn into production wells
Barriers to entry and exit	High (high fixed-to-total-cost ratio)	Relatively low (low fixed-to-total-cost ratio)
Price elasticity of supply	Low	High

capacity, the motives and level of cohesiveness among swing producers also determine the rate at which supply adjustment occurs. In these key contextual aspects, shale producers differ markedly from typical swing producers, and these differences carry particular market and geopolitical implications.

Spare Capacity, Oil Market, and Geopolitics

The techniques and economics involved in conventional oil production have historically set high barriers to the development of excess capacity. However, some conventional producers nevertheless left some oil fields idle and ready for resuming production on short notice, thereby maintaining a pool of spare production capacity. The cost of doing so was considerable. In addition to significant sunk costs, leaving oil fields idle incurred a substantial opportunity cost of not selling oil at maximum capacity. In addition, maintenance allegedly cost Saudi Arabia $100–500 million per year about two decades ago (Bahgat 2001) and it is likely be higher today.

If so costly, why is spare capacity created in the first place? It sometimes emerges by accident rather than design. For instance, many oil fields in such places as Iran, Libya, and Venezuela ceased production at various points due to exogenous events such as sanctions, war, and civil unrest and thus involuntarily became an excess capacity. However, the political contexts limit the accessibility of this excess capacity, meaning it cannot swing the market.

Most excess capacity has been created and run intentionally. A chief purpose of swinging the market with spare capacity is to keep the oil price stable and uncompetitive. The reinforced price stability serves oil producers with a large market share and large proven reserves because it enhances the reliability of oil as a resource commodity, delays the development of alternative energy, and ultimately prolongs the world's dependence on oil. The uncompetitive market ensures an accumulation of huge rents to large oil producers. Unsurprisingly, all historical swing producers were dominant producers who held large shares of proven reserves. The TRC, the first oil cartel consisting of US domestic oil producers, acted as a swing producer from the 1930s to the 1960s by regulating production quotas on oil wells in Texas and Oklahoma, thereby keeping some oil fields idle (McNally 2017). These two states were in control of 55 percent of US domestic production in 1927, while the TRC and the Seven Sisters controlled approximately 95 percent of global crude production and 90 percent of global reserves in 1948 (McNally 2017, 67, 109). Saudi Arabia replaced the TRC as a new swing producer in the 1970s when the latter could no longer meet the soaring domestic demand. Saudi Arabia is similarly a giant oil producer, the largest exporter and holder of the largest proven reserves for the most part since the 1970s.

In addition to a long-term interest in protecting market share, the speed and rate at which production volume is dialed up or down also hinge on the degree of centralization of decision-making. Centralization is built on a combination of factors such as a centralized body that decides the use of excess capacity, norms that regulate member producers, and rules that punish violations. Such cohesiveness is achieved either when a single state or country (like Saudi Arabia) regulates, controls, and owns all relevant excess capacity or when a group of producers agree to create a centralized body, either formal or informal, to make decisions about excess capacity (as in the TRC). The mutually accepted rules and norms, in turn, create shadow of future under which supply quotas are allocated and enforced and cheating practices are discouraged. In short, the existence of an adjustable supply must be accompanied by "supply regulation or cartelization of some form … [to be] effective at imposing the stability" (McNally 2017, 110).

Given that oil is vital to macroeconomic performance and military mobility, the ability to stabilize the price, enabled by the existence of spare capacity run by a cohesive group that commands a large market share, has come, historically, with significant geopolitical leverage in great power politics. When a great power itself possesses spare capacity, it acquires additional room for strategic maneuver over issues and events that involve oil producers. For instance, during the Suez Crisis of 1956, which disrupted delivery routes for Persian Gulf oil, the United States was able to compel Britain and France to withdraw from Egypt partly with its conditional promise of an emergency oil supply program. Once the withdrawal was complete, the TRC, despite some internal opposition, ultimately provided a highly effective "Oil Lift" to relieve Europe of its oil shortage until the Suez Canal was opened again for tanker traffic in March 1957 (Yergin 2008, 473–77). Washington was similarly able to prepare for and absorb a supply shock during the Six-Day War in 1967 when TRC intervention rendered an Arab oil embargo effectively a failure by making up 1.0 mb/d out of the 1.5 mb/d lost by the production cut by Arab producers (Yergin 2008, 536–40). The possibility of a geopolitical crisis triggering an oil shortage was "like a recurring bad dream" to Washington (Yergin 2008, 538). In that regard, spare capacity was a "valuable national security asset" that created more room for statecraft and reduced the economic risks involved (McNally 2017, 100).

Spare capacity located outside great powers, on the other hand, incentivizes the formation of a "petro-alignment," or quid pro quo arrangement, whereby great powers offer security in exchange for oil states' friendly oil policies (Kim 2019). US–Saudi relations epitomize such security-for-spare-capacity relations. This emerged when Saudi Arabia emerged as a replacement swing producer in the early 1970s and Washington increasingly relied on Riyadh's friendly market intervention. The new market realities deepened Riyadh–Washington ties in the following years—Saudi Arabia undertook market stabilization interventions during unanticipated supply disruptions such as the 1979–1980 oil shock, the First Gulf War in 1990–1991, and the 2011 Libya crisis (Gholz and Press 2010; IMF 2013), and the United States reciprocated Saudi Arabia's willingness to bear the costs of running spare capacity and to release it in times of crisis with a variety of forms of security assistance and assurance, effectively amounting to a security guarantee (Kim 2019).

Through the TRC and Saudi Arabia, the oil market has depended on the presence of swing producers of various kinds for most of the twentieth century and continues to do so today. Although spare capacity is far from perfect, friendly spare capacity, domestic or foreign, allows more latitude for US grand strategy by lowering the economic costs and strategic risks of oil supply disruptions. The location, amount, and reliability of spare capacity have been, therefore, closely tied to the implementation of US foreign policy in managing the geopolitics of the Middle East, handling oil-dependent allies in Europe and Asia, and generally reinforcing its global prestige as a hegemon.

Shale Oil and New Market Realities

Historically, swing producers have tended to act upon shared commitments to protect their large market shares and preserve the world's reliance on oil as well as its ability to act in a cooperative manner. Barring political complications, such conditions have made them relatively predictable and reliable.

Shale producers are just the opposite. Representing approximately 8 percent of global daily production volume today, the share of shale producers is nowhere close to that assumed by swing producers in the past. Additionally, their chief business rationale is to optimize the timing with which they activate DUCs and thereby maximize their short-term business returns, not to prolong the world's long-term appetite for oil. Unlike traditional swing producers, shale oil producers lack any authority to enforce cooperation on the use of excess capacity. They are neither organized under a set of rules and norms that regulate their production decisions, as was the TRC, nor dominated by a hegemonic producer such as Saudi Arabia in OPEC. Rather, this new form of spare capacity is operated by a group of uncoordinated, small-sized producers who are driven by short-term profit.

Two market implications can be inferred. First, shale oil producers are unlikely to respond to short-term supply shocks as promptly and effectively as Saudi Arabia and the TRC. Possession of excess capacity is not the same as willingness to release it in times of crisis. Unlike earlier swing producers, shale oil producers are prevented by industry structure and production conditions from undertaking coherent and prompt market interventions. Firms need time to assess the costs and risks involved in turning DUCs to production mode. In the case of sudden supply disruptions, therefore, a release of excess capacity in the immediate term is likely to be undertaken only by those producers that face the lowest cost in resuming production, the most risk-acceptant firms, and those with immediate financial flow needs.

To complicate the matter further, shale oil reservoirs are hardly uniform in terms of geological conditions, the volume of accessible reserves, infrastructural support, and other relevant conditions—a combination that determines cost structures across shale oil reservoirs. The huge amount of heterogeneity across detection, development, extraction, and delivery conditions makes a uniform response even less likely, as the optimal time and amount of excess capacity to release vary across firms.

Lastly, swing producers lack a centralized authority or institution to make decisions regarding the utilization of DUCs or the digging of new wells; instead, production decisions are made at the level of the individual firm. Such challenges are not new. The TRC also initially resembled "a Roman senate of numerous, competing self-interests" (McNally 2017, 73), thanks to the presence of small local producers seeking short-term profits and the variation in production conditions. It was only able to facilitate the control of production volumes by states through the creation of the Interstate Oil Compact Commission in 1935 (McNally 2017, 72–82). No comparable institution is incipient in the shale oil industry today. A swift, sustained, and sizable intervention to neutralize unforeseen supply disruptions is highly unlikely, nor should the market anticipate such action.

Second, shale oil producers provide a more durable buffer against *medium-term and structural shocks* than traditional swing producers. Medium-term and structural shocks usually occur with sustained increases in demand, to which comparable amounts of supply must be injected on a sustained basis. The requirement for sustained supply presents a more daunting challenge than short-term supply shocks, which range from a loss of 1.5 to 2.0 mb/d and last less than six months (Beccue et al. 2018). Accordingly, the release of a relatively small amount of excess supply for a limited period is usually sufficient to offset the shock.

In contrast, against medium-term and structural shifts in demand, conventional excess capacity has been unable to offer a credible and capable buffer. The demise of the TRC's excess capacity in 1971 was a result of the TRC's failure to keep up with decades-long and ongoing demand growth in the Western industrialized economies. More recently, in the context of sustained growth in demand in China and India, which accounts for approximately 50 percent of new demand in the 2000s,[6] Saudi Arabia's excess capacity did little to alleviate the demand, resulting in a steady price increase through the 2000s. Developing fresh spare capacity from undeveloped reservoirs takes years to build and requires large sums of sunk costs. The estimated volume of spare capacity, which is mostly located in idle fields in Saudi Arabia, is relatively modest, standing at around 0.5–2.0 mb/d (Beccue et al. 2018). Its stabilization capacity is, accordingly, limited to short-term crises. As Saudi Energy Minister Khalid Al-Falih acknowledged,

> … history has also demonstrated that [OPEC] intervention in response to structural shifts is largely ineffective … That's why Saudi Arabia does not support OPEC intervening to alleviate the impacts of long-term structural imbalances, as opposed to addressing short-term aberrations … (Reuters 2017)

On the other hand, shale oil is likely capable of sustaining a larger and longer production increase and therefore balancing the market in the medium term (IEA 2017a, 47–48). Its intervention capacity is based on two sources. One is the activation of DUCs, which on average takes less than a month to deliver commercial oil to the market. Wood Mackenzie, an energy consulting firm, forecasted in 2016 that 1,700 DUCs could turn into 250,000 b/d (Garrett 2016). If one applies this calculation mechanically to the number of DUCs today, which in July 2019 stood at over 16,000, spare capacity from DUCs would be approximately just below 2.5 mb/d. This is a conservative estimate, and the actual figure may be higher due to an advancing drilling technique that reaches deeper and wider as well as to the lower cost of shale oil well development (Zeihan 2016, 37–42).

A more important source for medium-term response is likely to come from undrilled shale reserves, estimated in North America alone to hold 117 billion barrels. While it is fair to assume that only a fraction of this reserve can be turned into production mode, it is not unreasonable to expect that the recoverable shale oil and production volume is likely to continue rising in the future. As figure 3 suggests, DUCs are on the rise and, more importantly, rapidly advancing shale technology is reportedly expanding the volume of technically recoverable shale oil reserves. In fact, shale oil production has been rising faster than anticipated. Its production volume was 7 mb/d in November 2018, surpassing the IEA's initial projection of 4.7–5.0 mb/d made only a year before (IEA 2017a, 47). It is now expected to be close to 9 mb/d in September 2019. With the supreme speed in developing wells, shale oil can build up production capacity in larger and more prompt manner compared to conventional oil in times of price increases.

While the intra-industry heterogeneity in shale production conditions makes the swift and sizable short-term response of a cohesive group of producers an unlikely scenario, the intra-industry variation flattens over time and, in the medium term, the shale industry's technical advantages and the lower economic barriers to swift entry become dominant factors in the shale firms' behaviors. Furthermore, a medium-term demand increase is usually not a one-time occurrence but rather a persistent phenomenon stemming from larger trends in the global economy. The longer, though by no means certain, prospect of price increase is more likely to tempt shale oil producers to consider increasing their production volume. Spare capacity, as a result, could develop into a larger and more sustainable buffer in the medium term due to the larger available pool of shale reserves, the technical feasibility of producing more promptly, and a relatively lower proportion of sunk costs.

Overall, shale oil lowers the medium-term price ceiling but does not eliminate short-term price volatility. Together with its large reserves, shale oil introduces a higher level of responsiveness to supply shortages compared with the market dominated by highly inelastic conventional oil. The price volatility problem remains, however, because uncoordinated and heterogeneous shale oil producers take longer to respond to supply shortages than centralized and partly politically motivated Saudi Arabia.

Oil Geopolitics under Shale Oil?

Spare capacity resides in two separate regions today—Saudi Arabia in the Persian Gulf and shale producers in North America. The geographical locations aside, the two also fundamentally differ in terms of the speed, amount, and sustainability of their stabilization capacity. The new market realities paint a nuanced picture of the geopolitics of oil.

First of all, US foreign policy can benefit from shale producers' swinging action but cannot count on their intervention to be timely and sufficient. On the one hand, the shale industry strengthens the US stance against states capable of disrupting the global oil supply chain if the disruption coincides with the shale boom. For instance, the shale boom lent much needed credibility and effectiveness to the 2012 sanctions against Iran, as, almost by sheer serendipity, the newly added shale oil neutralized the loss of Iranian oil. The world's symmetric vulnerability to Iranian oil quickly vanished, affecting the confidence with which Iranian supreme leader Khamenei could initially insist that "continuing these sanctions for a long time is not in the interest of western countries" (Maloney 2014). Shale oil shattered this economic logic and allowed the United States to "put the squeeze on Iran without disrupting the global market or jacking up the price" (Philips 2013). The shale boom turned what was initially a questionable regime of sanctions into a more sustainable, more crushing, and overall more effective act of statecraft, contributing to the conclusion of the Joint Comprehensive Plan of Action in 2015 (Kim and Lee 2019, 105–6).

Available evidence, however, strongly suggests that such intervention occurred by accident, not design. The shale

[6] Author's calculation from British Petroleum Company (2019). Between 2000 and 2010, global demand increased by 10.9 mb/d, of which 5.6 mb was from China and India.

boom of early 2014 was the outcome of a sustained price increase a decade earlier, which first rationalized aggressive research into fracking technology and then made shale oil production commercially viable. Other business conditions contributed, too. Some analysts pointed out that the quick increase in shale oil production in the 2010s was due in part to the preceding shale gas boom in 2004–2008. Shale oil and gas use the same drilling rigs and fracking equipment, and therefore, almost by accident, the interchangeable gas facilities reduced technical and cost barriers to the drilling of shale oil wells (Kleinberg et al. 2018, 77). Overall, the decades-long history of innovation and the inheritance of shale gas facilities account for shale oil's sudden entry and its accelerating increase of volume, and there is no evidence to suggest that the Unites States' 2012 sanctions against Iran were what drove shale oil producers to pump up more oil.

The shale boom quickly making up the lost Iranian barrels, therefore, does not contradict the new market reality in which shale producers are unwilling and incapable short-term price stabilizers. What it means is that shale oil can create a powerful buffer and expand room for US strategic maneuver vis-à-vis oil states only if a next round of increase in shale oil production accidentally coincides with an unanticipated geopolitical disruption. Needless to say, such coincidence can be neither pre-arranged nor reasonably expected. In usual circumstances, therefore, disparate and independent shale producers cannot be factored in to supplement US foreign policy.

Only under exceptional circumstances will the federal government be able to garner sufficient public and industrial support to regulate shale producers and fully utilize their spare capacity. A full-scale war is a possible candidate for such a situation. For instance, in 1942 the United States was able to establish the controversial Petroleum Administration for War (PAW) and forcefully exercised an extensive regulatory power over an unenthusiastic domestic oil industry. In the end, the PAW was instrumental in meeting the skyrocketing wartime oil requirements by increasing domestic oil production from 3.8 mb/d in 1941 to almost 4.7 mb/d by 1945, thereby supplying 6 billion of the 7 billion barrels of oil consumed by the United States and its allies in 1941–1945 (Clayton 2015, 70–3). Oil is still the predominant fuel source for today's military. In the event of a larger or longer war than planned, Washington might be similarly compelled to arrange a measure or an organization comparable to the PAW. In such a rare but crushing event, the ample reserves of shale spare capacity under the Washington's regulation could prove to be of exceptional national security value and could significantly lessen the burden of securing one of the most challenging wartime logistical requirements.

While shale oil producers can dial up the production promptly, they are also one of the first producers to cease productions and leave the market during a price collapse because their variable and production costs run higher than most conventional producers. When the United States was the largest oil importer, its petro-diplomacy objective was to keep the oil price low and stable. Now as a major producer today, it is being compelled to reconfigure its foreign economic policies to keep an oil price high enough to prevent mass closures of shale business to which millions of jobs are attached. For instance, in the midst of the oil price plunge in April 2020, President Trump actively engaged in forging a production cut deal of 10 mb/d between Saudi Arabia and Russia to shore up the oil price and rescue its ailing shale industry (Wang et al. 2020), a new type of petro-diplomacy that was hardly imaginable barely a decade ago.

Second, Saudi Arabia's market power and strategic value is unlikely to diminish to the extent many pundits speculated it would after the advent of shale oil. The new market realities are that Riyadh is still the only producer capable of swiftly releasing sizable spare capacity. The Kingdom of Saud controls a clear chain of command that runs from the Ministry of Petroleum to its national oil company, Saudi Aramco. Saudi Arabian policy regarding whether, when, and how to release its spare capacity is likely to be more or less coherent and consistent with the business and strategic objectives of the government. In contrast, the US federal government has no control over the American oil industry, and the industry's business interests are not necessarily aligned with the President's foreign policy agenda. As a heterogeneous group of price-takers, they lack any ability to aggregate themselves and move markets for any ends, including geopolitical ones (Gross 2018). Shale industry's spare capacity is simply not configured to be a reliable resource for US economic statecraft, and, therefore, Saudi Arabia retains its unique influence on the market. The fundamentals of the decades-long strategic exchange of security and oil with the United States remain undisturbed.

Recent interactions between the United States and Saudi Arabia are broadly consistent with such expectations. On almost all occasions on which the United States faced upward price pressure from the Persian Gulf, President Trump appealed to Saudi Arabia and not the domestic shale oil industry for additional oil. When the United States pulled out from the Iran Nuclear Deal in May 2018, for instance, President Trump openly urged Saudi Arabia to "increase oil production, maybe up to 2,000,000 barrels" (Trump 2018) to make up for the loss of Iranian oil supply. Similarly, in April 2019, the announcement that the sanction waivers given to major importers of Iranian oil would be discontinued was followed by a President Trump's tweet asserting that Saudi Arabia would "more than make up the oil flow difference in our now full sanctions on Iranian oil" (Trump 2019). Equally importantly, no corresponding requests were made to its own domestic shale oil producers during the same period. The non-case evidence is highly suggestive of Washington's inability to induce an increase from the domestic industry and/or of shale oil's unreliability as swing producers.

Saudi Arabia's responses to US calls have been mixed. On the one hand, Saudi Arabia boosted oil production in accordance with the request. In 2018, following the President Trump's urging, Saudi Arabia increased its oil production from 10.1 mb/d in the second quarter to 11.1 mb/d in November 2018 (OPEC 2018, 58), which arguably contributed to the fall of the oil price from $70 in July to $50 by December. However, during the OPEC annual meeting in December, Saudi Arabia changed its course of action by agreeing to join an OPEC effort, together with Russia's participation, to cut production by 1.5 mb/d (Reed 2018). The defiance resulted, apparently, from Riyadh's frustration that the United States allowed major consumers to continue importing oil from Iran.

Saudi reaction since then has been more nuanced. When Washington ended the sanction waivers for importing Iranian oil in April 2019, Saudi Arabia openly denied President Trump's assertion that Saudi Arabia had agreed on a production increase, reportedly citing a concern about oversupplying the market. At other times, it signaled flexibility about "encouraging the OPEC Plus to ease the voluntary limits … and to increase supplies to ensure that there is no unnecessary tightening in the market." (Khalid al-Falih, quoted in Turak 2019).

The friendliness of Riyadh's oil policy is far from guaranteed, and the policy is often limited in its effectiveness to times of short-term supply shocks. Yet it represents one of few credible options available against supply shocks, and shale oil is unlikely to disrupt the historical relations between Washington and Riyadh. The Strategic Petroleum Reserve is another powerful deterrent, but its utilization is often used only as a last resort in order to avoid causing market anxiety (Critchlow 2019). Little has changed today. Saudi Arabia recently announced a major investment initiative to boost its spare capacity (Oxford Business Group 2019), signifying that it is committed to maintaining its historical role as a swing producer and enjoying the power that role entails. The latest attacks on Abqaiq stabilization facility and Khurais oil field in September 2019, which were initially reported to have caused a disruption up to 5.7 mb/d production, similarly showed not only the high sensitivity of oil price to production and spare capacity disruption, actual or potential, originating in Saudi Arabia, but also Saudi Arabia's central role in recovering from the shock by utilizing its own commercial stocks located in Egypt, the Netherlands, and Japan to continue honoring oil export commitments and to stabilize the global market so swiftly (Gupte 2019).

The nature of Washington's commitment to Riyadh remains fundamentally unaltered thus far. Tense moments occasionally erupt, the killing of Jamal Khashoggi in October 2018 or the decision to flood the market with 2.5 mb/d additional supply in March 2020 that hurt the highly prized US shale industry being the latest examples. Such tensions are hardly new in US–Saudi Arabia relations, however, and the fact that the exchange of oil for security still appears robust suggests that the new market realities introduced by the advent of shale oil have yet to overturn the old geopolitics dictated by Saudi's engineering of its excess capacity.

Third, what does the continued importance of Saudi Arabia mean for the US military commitment to the Persian Gulf? Recently, scholars and policymakers began to problematize the historical US objective of defending Persian Gulf oil. There is a contingent in Washington that takes the view that the shale boom is making the United States energy-secure and consequently accelerating an American disengagement from world politics (Zeihan 2016). As noted above, however, the global market logic in which the US shale industry is embedded is such that the United States remains vulnerable to global supply disruptions. Accordingly, others have called for honoring the Carter Doctrine through continuing US military presence in order to keep the region and the global oil market stable (Krane and Medlock 2018, 559–61).

On the surface, my analysis seems to favor a continued US military presence for the market and the geopolitical underpinnings of US–Saudi relations remain unaltered. The argument about the irreplaceability of Saudi Arabia's market power, however, does not and should not imply opposition to US withdrawal. First of all, although the short-term volatility problem endures, shale oil nevertheless offers a new cushion against medium-term market volatility. While only time will tell how much the medium-term cushion matters in US foreign policy, it is not unreasonable to expect that it will lessen the strategic risks and uncertainty that plagued US foreign policy in the pre-shale era, thereby creating some latitude in how the United States handles issues involving the possibility of oil supply disruptions. And if the medium-term price ceiling is believed to be resilient, stable, and relatively easily restorable, the argument for US presence could potentially weaken to such an extent that the new market realities dilute both the substantive and symbolic market power of Saudi Arabia.

More importantly, even if shale's medium-term swinging capacity matters little, what my analysis means at most is that the argument for reducing the US military commitment cannot be based on the shale boom. There are already plenty of lines of logic for reconsidering the US military commitment to the region that do not depend on the prospering domestic oil industry (Glaser and Kelanic 2016), including the idea that security threats are exaggerated (Talmadge 2008; Shifrinson and Priebe 2011); the notion that the oil market has effective adaptive mechanisms to withstand supply shocks (Gholz and Press 2010); the argument that US withdrawal promises cost savings on a larger scale from what is conventionally believed (Gholz 2016); the idea that lower oil prices reduce the likelihood of conflicts (Hendrix 2017); and the suggestion that a scaled-down US military posture could still meet the security requirements (Rovner and Talmadge 2014). That shale oil cannot function as a replacement short-term swing producer does not alter the basis of any of these arguments. Simply put, the debate for and against US military presence in the Persian Gulf would do well not to factor the shale boom as a primary variable in their calculus.

Fourth, US spare capacity from shale oil affects the strategic calculus of other major powers, too.[7] The more resilient medium-term price ceiling benefits oil-importing great powers. China, the largest oil importer, is a case in point. Thanks to a new age of oil abundance and a medium-term stability, China may see energy security as a lesser challenge than it seemed to be when the rising oil price and tightening global supply forced China to engage in its highly controversial and costly "going-out" diplomacy during the 2000s. Oil's greater availability at a cheaper price also generally helps China's economic performance by lowering the input costs for its energy-intensive industry. Moreover, the lower oil price frees huge sums of finance—according to one estimate, the $59 drop in oil price between June 2014 and December 2016 saved China roughly $400 million daily (O'Sullivan 2017, 220).

While shale oil benefits the Chinese economy and finance, its geopolitical impact is more qualified and contingent. On the one hand, the age of oil abundance allows China to rely on market over state intervention to secure oil supply. As a result, in the sense that China is no longer bound by its prior commitment to overly protect oil-rich partners, shale oil arguably unlocks "a greater degree of freedom" for Chinese foreign policy (Downs 2013; O'Sullivan 2017, 212).

Some have speculated about the possibility of China's geopolitical ambitions reaching to the Middle East in the event of US withdrawal from the region (Levi 2013, 78). This possibility, however, is conditional upon actual, complete US withdrawal and China's development of sufficient military power projection capability, neither of which appears imminent. China is also well aware of the costs and risks involved and therefore unlikely to undertake an effort to unseat the United States and fill in the geopolitical gap in the Middle East itself. Under the shale boom, China enjoys the public good of cheaper oil and a thicker cushion against supply disruption but is unlikely to be tempted to expand its geopolitical footprint (Daojiong and Meidan 2015).

Russia, in contrast, faces an opposite situation. As a major petrostate that relies heavily on the oil industry, it is one of

[7] One major actor in the geopolitics of oil that I do not examine is OPEC. For an excellent discussion of the future of OPEC, see Van de Graaf (2017).

the greatest losers in the shale boom, having severely suffered from the price collapse since 2015. To make matters worse, the medium-term price ceiling has been set below the level necessary for Russia to balance its budget. These challenges are severe, and short-term measures to address the impact, such as using up its stabilization fund, allowing the free floating of the exchange rate, or even printing more money, are limited and entail longer term problems. As the oil price collapsed down to $20/b in April 2020, the conditions surrounding state finance and socioeconomic management are likely to continue deteriorating for Moscow who needs $42/b to balance its budget (Griffin 2020).

Furthermore, unlike in China, where oil plays a minor part in the geopolitical calculus, oil is central to Russia's political governance, regime legitimacy, and foreign policy, a typical feature of petrostates. For Russian foreign policy, the US shale boom is turning out to be a liability because the lower medium-term price ceiling and diversification of oil and gas sources enhance the market's tolerance to the consequences of Russia's energy diplomacy. A growing sense of oil abundance reinforced the US and EU sanctions over the 2014 Ukrainian crisis, preventing foreign investment in its upstream sectors, especially the Arctic offshore and shale projects (EIA 2017); the age of energy abundance reduced Russia's oil and gas leverage vis-à-vis China, increased its dependence on the Chinese market, and diminished its influence over Central Asia in light of China's Belt and Road Initiative (O'Sullivan 2017, 201–5). Others see a mixed prospect. In 2016, Russia and Saudi Arabia formed the so-called OPEC Plus, a cooperative arrangement to control their oil production policy. After three years of cooperation, the marriage of convenience fell apart in March 2020 over a disagreement on the size of production cuts, but the two eventually agreed on a combined production cut of 10 mb/d in April to counter the demand collapse. The current fragility certainly casts doubt on the prospect of the OPEC Plus being a cohesive cartel arrangement. Nevertheless, the Moscow's unexpected partnership with Riyadh, if revived, may help reinvigorate Russia's diplomatic engagement with the region.

Overall, careful examination suggests that the effects of shale show that the shale boom alone will be insufficient to disturb the fundamental pillars of the post-1970s geopolitics of oil. This comes as little surprise. Numerous studies show that oil's effects on politics are rarely independent but are, rather, deeply embedded in the complex web of broader energy, political, strategic, and market conditions (Ross 2015; Meierding 2016). Shale oil is no exception. The advent of shale oil may alter but does not revolutionize the geopolitics of oil.

Future Research

Thanks to the recent revival of interest in the politics of oil, our knowledge concerning the causality, conditions, and consequences of the politics of oil has vastly expanded. However, the literature still generally suffers from a lack of in-depth understanding about what really matters in the oil industry—firms' motives, cost structure, industrial structure, market logic, and technical specifications. Instead, relevant information is exogenously given, assumed to remain constant, crudely simplified, or even entirely absent. This paper highlights the importance of repairing this illiteracy and updating the literature in light of shale oil's entry into the market to help navigate how changing market realities will shape the geopolitics of oil in the future.

Admittedly, US foreign policy and grand strategy constitutes only a fraction of the field of interests affected by the shale boom. Furthermore, how the geopolitics of shale oil will unfold also depends heavily on a complex interaction of myriad interdependent issue areas. I highlight two such areas that could be followed up in future research. One is an emerging interest in the development of large-scale shale production outside North America. Despite the many already identified large deposits of shale oil in countries such as China, Russia, and Argentina (EIA 2013), no meaningful shale industry has yet emerged because technical, geological, financial, and infrastructure support is not readily available outside the United States (Levi 2013, 32–3). This is far from given, however, in a rapidly changing shale oil industry. More importantly, the non-US shale oil industry may well operate under different rules of business. For instance, in some places the industry might be directed under state authority, which then could compel prompt production, or the number of shale firms could become so large that the number of producers capable of swift response would be sufficient to neutralize a small-scale supply shock. Future studies can examine how the speed of diffusion, actors, locations, and amount of shale oil extraction outside the United States affect the way the shale boom shapes the geopolitics of oil.

Another is the implications of the continuing replacement of oil and gas by alternative energy sources. Although oil still remains a dominant fuel source, analysts find that development of and cost-saving measures related to renewable energy have made more rapid advances than initially anticipated and that such a trend is irreversible (International Renewable Energy Agency 2019). Environmental concerns about the shale boom due to a continued reliance on hydrocarbon or the use of fracking technology are also of high public and policy relevance and may affect the shale industry. The declining rate at which oil demand is projected to increase, labeled under an idea of peak demand, further complicates the future of the energy market and the politics of oil (Van de Graaf 2017). The interplay of relevant conditions for the ongoing energy transition away from hydrocarbon accordingly promises a fruitful avenue for future research that holds high relevance for both policy and theory related to the deeply intertwined relations between oil and politics.

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