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IICEC ENERGY AND CLIMATE RESEARCH PAPER



**THE RETURN OF
BOOM-BUST OIL
PRICE CYCLES**

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Oil is, and for the foreseeable future will remain, the world's dominant transportation fuel, and as such is nothing less than the lifeblood of modernization. Beyond personal transportation, oil powers our trade, agriculture, and security. Patterns and disruptions in the global oil market anywhere are therefore of the utmost importance to broad swaths of every country's business, consumer, and government sectors. While countries vary widely in their oil production, demand, and imports (as well as their taxation and regulation of oil and oil products), they all face a price for crude oil which derives from a single, global market.

The global oil market, this paper shall contend, has undergone a seismic structural shift the likes of which have not been seen in at least 50 (and more appropriately 80) years. Today's market is structurally unbalanced and lacking a swing producer. Given oil supply and demand's extreme inelasticity (or unresponsiveness to price), this yields price swings of a magnitude best characterized as boom and bust. Multi-year episodes of relative calm, such as the last two years when prices ranged around \$50, or between 2010 and 2013 when they hovered around \$100, may spawn expectations of long-term price stability. But it is more likely that relatively calm periods will give way to new boom and bust phases as supply and demand imbalances persist, and are indeed intensified by prior booms and busts, while the absence of a capable, proactive supply manager or swing producer remains painfully evident.

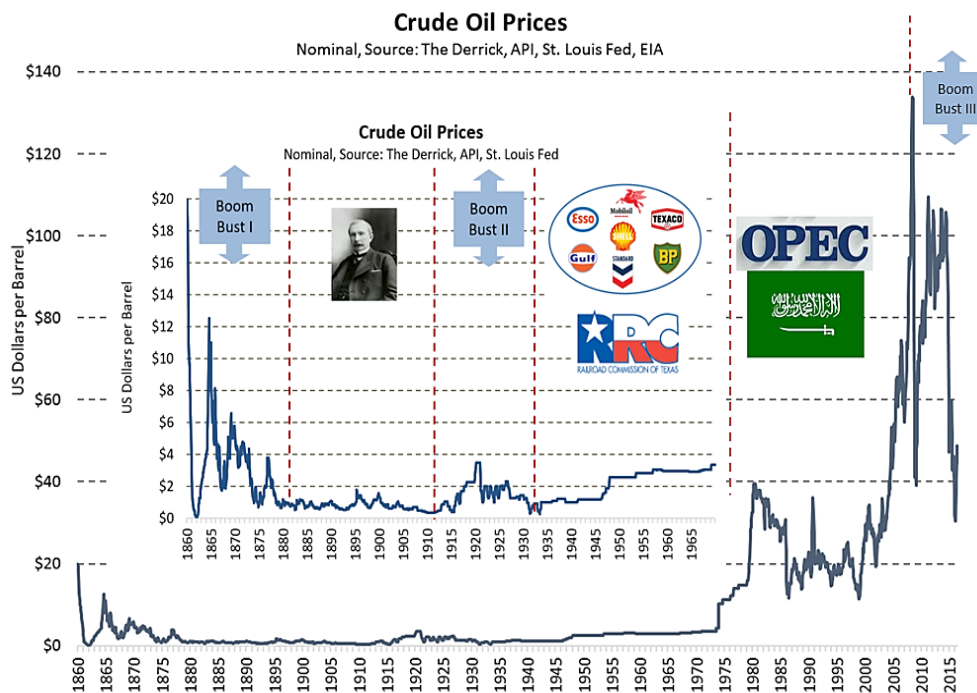
Turkey has a stake in anticipating the factors that will drive oil price levels. Turkey, like all industrialized countries, depends on oil to fuel its vehicles and its economy. Only 25% of all energy demand is met by domestic production,ⁱ making it a net energy importer by a large margin. Turkey imports more than 90% of its liquid fuels. Regarding crude and condensate, Turkish domestic production accounts for 11% while imports, mostly from Iraq (41%), Iran (20%), and Russia (11%) account for the rest.ⁱⁱ Depressed oil prices post-2014 have spurred the economies of oil importers such as Turkey, but OPEC's diminished ability to stabilize prices will continue to pose a threat.

The history and future of oil price volatility

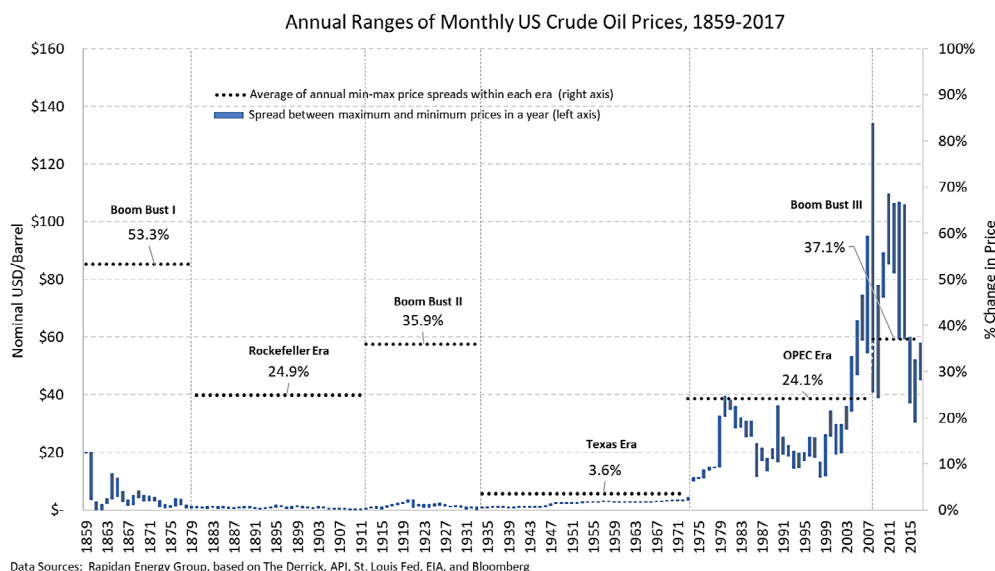
Oil's chronic tendency toward wildly unstable prices has vexed the oil industry since its earliest days in 1859. After oil graduated from illumination to strategic transportation fuel over 100 years ago, governments began to care about and pursue oil price stability. Oil is naturally prone toward wild price swings because supply and demand are inelastic or unresponsive to price changes in the short run. Petroleum fuels are must-have commodities for which there are no short-term substitutes, while on the supply side, oil exploration, production, transportation, and refining have relatively low operating costs once sizeable up-front capital expenditures are made. Consequently, when the market is unbalanced, wide price swings are needed to incentivize changes in producer/consumer behavior. Storage can help smooth supply and demand imbalances, but storage capacity is costly and limited.

Oil's proneness to instability emerged in the earliest days after Edwin Drake's well ignited the modern oil era in August 1859. Producers drilled more oil than the market could handle, producing price busts which in turn wiped out investment. With demand rising briskly, prices recovered from busts and soared, attracting more investment, overproduction, and another price bust. These price busts (the first occurring in November 1861) often triggered ad hoc attempts by producers to form cartels and collectively reduce production. While these efforts sometimes enjoyed temporary success, they invariably failed due to fast-rising production outside the cartel and cheating within. These early ad hoc cartels, as we shall see, bear more than passing similarity to today's efforts by some OPEC and non-OPEC countries to collectively restrain production.

History shows only a firm and dominant hand on the oil spigot was able to impose lasting oil price stability. The first successful supply manager was oil magnate John D. Rockefeller and his Standard Oil Trust. Rockefeller started as a grocer in Cleveland but moved into refining oil during the Pennsylvania oil boom. He was appalled by price instability due to uncontrolled drilling in western Pennsylvania, then the center of the global oil market. So, he devised and implemented a grand plan, first to monopolize refining, then integrate with key transportation sectors (railroads and later pipelines), and finally dictate prices to an unruly host of drillers. Through his actions, Rockefeller brought relative stability to crude prices (see below) as well as the primary refined product at the time, kerosene. Even Rockefeller's detractors applauded the order and stability he brought to burgeoning oil markets. However, he and his corporate empire became deeply unpopular at the turn of the century, and Standard Oil was broken up by the U.S. Supreme Court in 1911. With the stabilizing hand gone, oil prices reverted to wild instability.



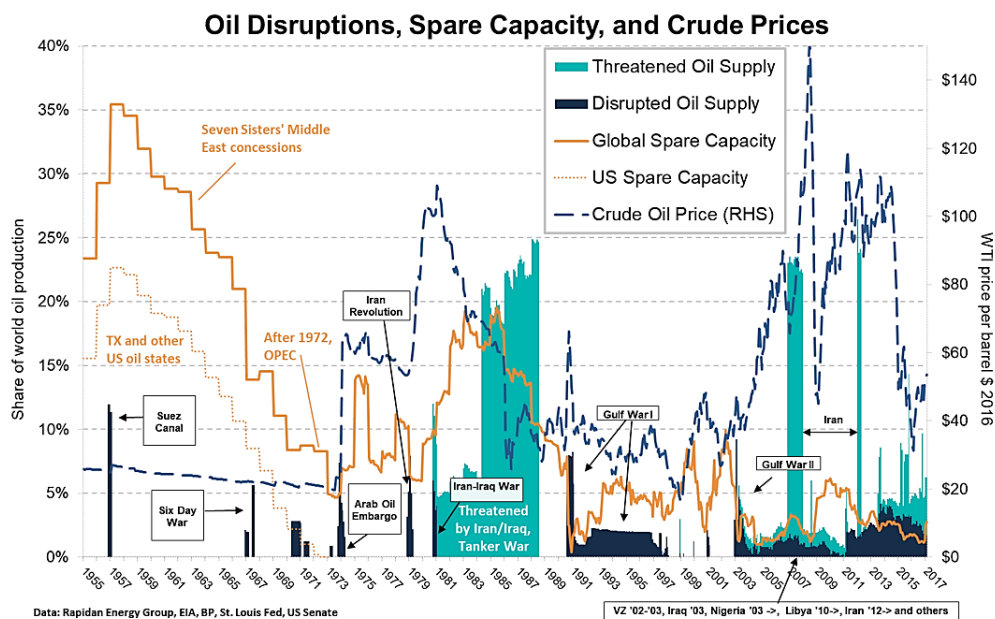
The twenty years of boom-bust oil prices that followed Standard Oil’s breakup disrupted not only the oil industry but the broader economic and public sectors, including governments. The reason was oil’s primary use had shifted from a relatively unimportant illuminant to a strategic transportation fuel. The oil price boom after World War I enraged new motorists, spawned government investigations, and prompted widespread fears that we were running out of oil (this came to be known as “peak oil,” a prediction that would continue to emerge periodically into the 21st century). But prices collapsed later in the decade that lasted through the early 1930s as new fields were discovered and came on stream, especially in Oklahoma and Texas. Low prices caused oil state officials to begin regulating supply. The Texas Railroad Commission (TRC) and the Oklahoma Corporation Commission (OCC) acted as the regulators of the oil industries in their states, which combined accounted for 55 percent of U.S. production in 1927.ⁱⁱⁱ Starting in the 1930s, and for the next forty years, oil state regulators imposed strict quotas on drillers to keep oil prices high and stable. U.S. oil state regulators cooperated informally but tightly with the major international oil companies - the “Seven Sisters” - that collectively controlled the foreign assets through concessions with foreign governments and pricing power. U.S. oil state quotas effectively created a global benchmark price in the U.S. Gulf Coast which the Seven Sisters used to base prices in global markets.





A notable development during this forty year period of oil price stability - the “Texas Era” which lasted from 1932 to 1972 - was the buildup of enormous spare production capacity in the 1950s. Spare capacity is wellhead production held off the market in periods of excess supply by a regulator or cartel members’ with the aim of stabilizing oil prices. In the mid-1950s, large new Middle Eastern fields began producing, but the big wave of transportation demand was still ten years in the future, in the 1960s. With massive new Middle East discoveries threatening to overwhelm supply and cause destructive price busts, oil state regulators and the Seven Sisters were obliged to order at times swinging cutbacks in their production. As shown in the chart below, in the mid-1950s some two-thirds of global oil production was held off the market by U.S. regulators and the Seven Sisters. Oil drillers forced to accept these mandatory production cutbacks were very displeased, but regulators and major oil companies saw little alternative to prevent destructive price busts.

One side benefit of having sizeable spare production capacity was a cushion when substantial geopolitical disruptions occurred. The 1956-1957 Suez Crisis and 1967 Arab-Israeli War disrupted large amounts of crude oil. In fact, the Suez Crisis saw the largest ever oil market disruption in percentage terms. However, U.S. oil states - primarily Texas - responded by increasing production from ample spare capacity, preventing a significant oil price spike. The Arab oil embargo in October 1973, by contrast, caused a major price spike because the year before, the U.S. had run out of spare production capacity and ceased playing the role of global oil price stabilizer.



Enter OPEC

OPEC was founded by Venezuelan and Middle East oil policy officials who admired and intended to emulate the Texas Railroad Commission’s quota systems. However, OPEC producers have never been as unified as the U.S. oil states and the Seven Sisters. While OPEC countries wrested control of revenues, and then ownership of concessions, from major oil companies, in only one instance did they live up to the role of their predecessors in terms of stabilizing oil prices. High oil prices during most of the 1970s, due to firm supply and demand and geopolitical risk and disruptions, obviated any need for OPEC to coordinate output, much less agree how to share the burden of production cuts. But in the early 1980s, oil markets weakened sharply due to the start-up of major new fields, fuel switching and efficiency, and a deep economic recession. Saudi Arabia stepped up and played the “swing producer” role, cutting its production from 10 to below 3 million barrels per day between 1982 and 1985, while other OPEC producers implemented trivial cuts of little significance. Saudi Arabia’s big supply cuts staved off an oil price collapse, but Riyadh alone suffered a huge loss of revenue and market share. When Saudi Arabia ramped up production in 1986 by adopting netback pricing, oil prices collapsed.



Since 1986, Saudi Arabia and OPEC have adjusted quotas based upon global events, such as an increase in production after the September 11th attacks or a production cut after the 2008 financial crisis, but these adjustments do not constitute a resumption of the swing producer role. Some 14 years ago, oil prices began a historic boom, nearly quintupling between 2003 and 2008. In addition to the largest boom in modern times, it was the only one not caused by a war in the Middle East and supply disruption. This boom happened because demand, fueled by 6% global GDP growth and soaring Chinese demand, especially for distillate in electricity - outstripped supply (non-OPEC supply failed to rise appreciably). Saudi Arabia threw all its barrels into the market, and spare capacity vanished - precisely what happened in the 1960s and early 1970s when the U.S. ran out of spare capacity in peacetime amidst a demand boom and supply plateau.

Oil prices crashed as the Great Recession began in late 2008 but recovered quickly, stabilizing for a few years around \$100. After 2008, prices recovered and stabilized around \$80 and then, in 2011, another price shock pushed oil up as high as \$110 largely on unplanned outages. Soaring US shale oil production prevented oil prices from reaching recent highs. But by late 2014, surging shale oil production, along with new supplies from Brazil, Canada, and other producers, threatened to flood the market. This danger became apparent by the November 2014 OPEC meeting, and market participants expected OPEC would respond by "doing its job" - curtailing supply. But in practice, only Saudi Arabia has been willing to cut supply in the face of a surplus. Riyadh's refusal to cut alone in 2014 shocked the market and sent oil prices hurtling down to \$45 by January 2015, 60% below their level just six months prior. Despite periodic oil price rallies since 2015, oil prices remained under downward pressure due to an inventory glut. After oil prices crashed to \$26 in February 2016, producers took fright. Saudi Arabia and Russia, which had contributed to the excess by each ramping production to record levels by October 2016, spearheaded a new effort to organize collective cuts among leading oil producers.

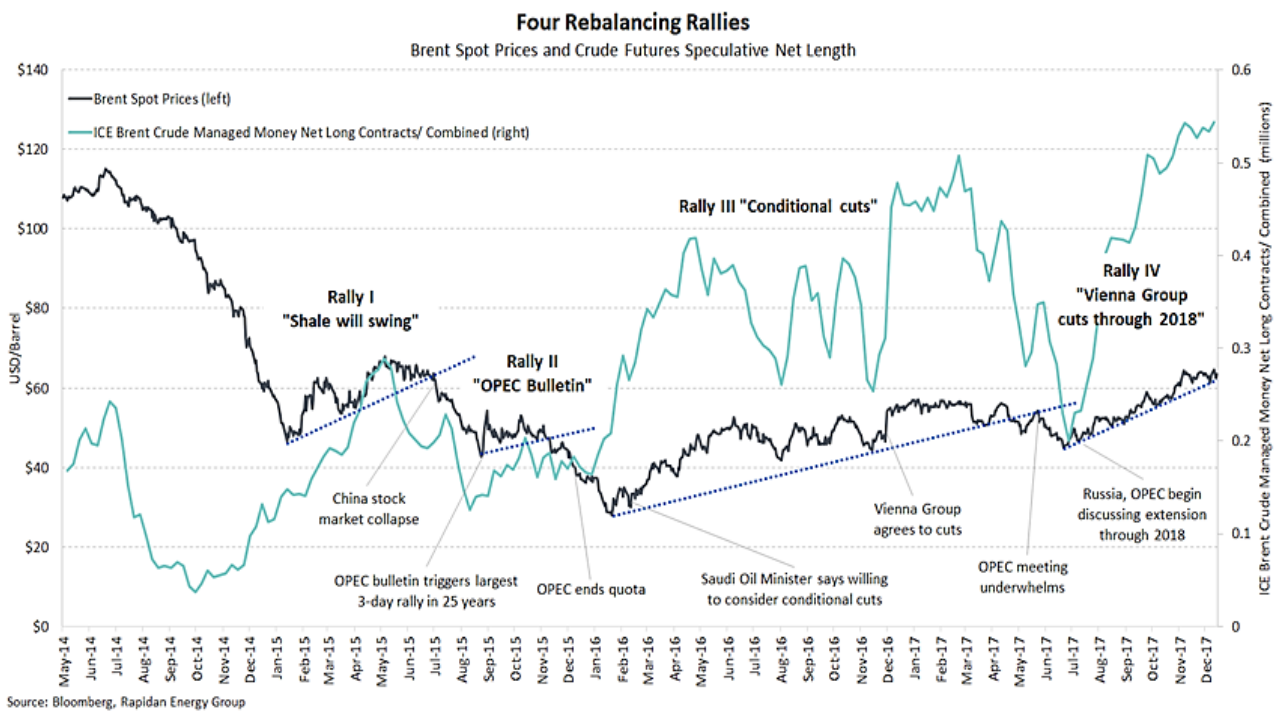
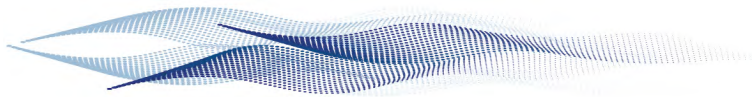
Meeting in Vienna at the end of 2016, 24 OPEC and Non-OPEC producers¹ - henceforth referred to as the "Vienna Group" - agreed to trim their production by 1.8 mb/d from October 2016 levels. However, Libya and Nigeria obtained exemptions and Iran secured a production increase. While Saudi Arabia's compliance has been strong, the compliance of most other Vienna Group producers compliance has been weak, tardy, or compelled by unintended outages. For the first half of 2017, the new Vienna Group struggled to keep oil prices from falling as rising production from exempted OPEC producers Libya and Nigeria offset the voluntary cuts. But in the second half of 2017, a spate of significant supply outages due to storms in the U.S. and geopolitical tensions or disruptions in Iraq, Venezuela, Iran, and the UK provided more support to the Vienna Group's efforts to prevent another price bust.

The media and many analysts credit OPEC with restoring a semblance of stability to oil prices over the last year, but they overstate the case. History shows that when markets are unbalanced, long-term oil price stability requires a swing producer willing and able to adjust supply proactively, by significant amounts if necessary and for an extended period. Terrified after oil swooned to \$26 in February 2016, Vienna Group producers succeeded in agreeing to historic cuts where past attempts to cooperate, primarily by Saudi Arabia and Russia, had failed. Indeed, we have seen other instances in the past when a price bust has caused temporary, ad-hoc producer agreements to form and limit production. The first was called the Oil Creek Association, created by disparate western Pennsylvania drillers rattled by history's first oil price bust in August 1861. It lasted a few months but fell apart due to new supply outside the group and cheating by the Associations' members. Some later ad hoc cartels lasted longer and enjoyed some success, but all eventually disintegrated for the same reasons.

Where we go from here

Today's Vienna Group resembles more this ad hoc, temporary alliance reacting to price busts than a permanent, swing producer acting proactively to prevent supply-demand imbalances and keep oil prices stable. The inventory glut has lasted much longer than Vienna Group producers expected when they agreed to cut in late 2016. They initially hoped the excess would disappear within six months, but now reckon the battle will last two years. Compliance is uneven and in many cases inadvertent. Saudi Arabia is bearing the bulk of the voluntary cuts. The Vienna Group has enjoyed much higher success in influencing investors and traders to buy crude futures, spawning four rallies by my count since the bust in 2014. The first three of these "rebalancing" rallies reversed. The jury is out on the current, fourth rally, though as shown below speculators have never bet so heavily on prices going up.

¹ Azerbaijan, Bahrain, Brunei, Kazakhstan, Malaysia, Mexico, Sultanate of Oman, the Russian Federation, Republic of Sudan, Republic of South Sudan

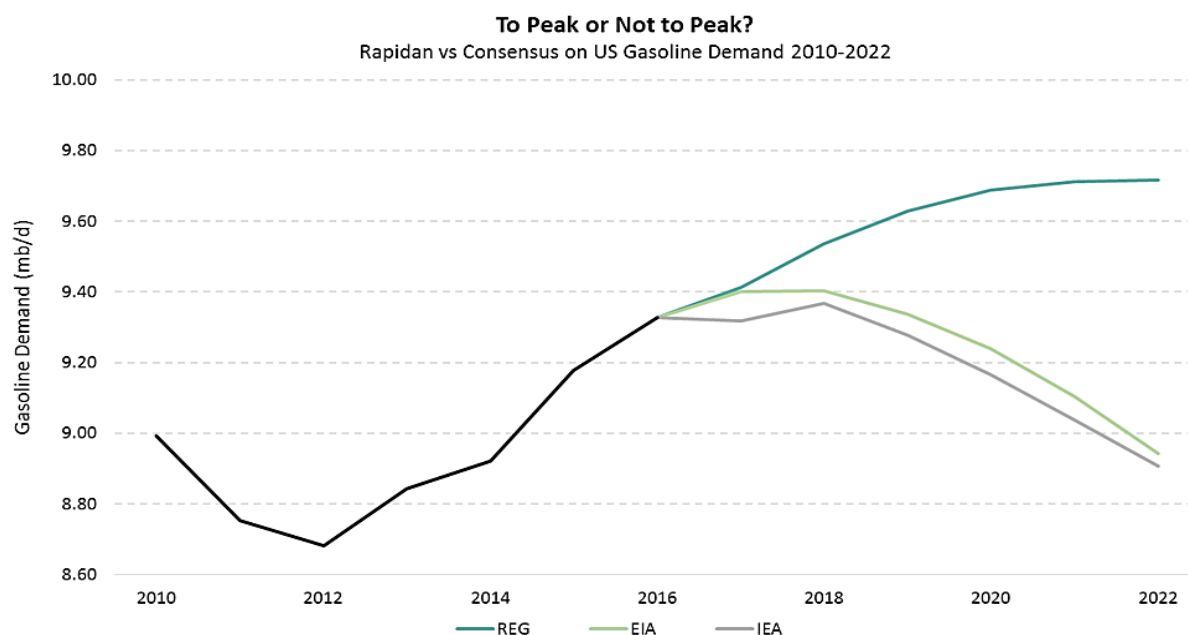


Analysts are divided about the trajectory of crude prices short term. Consensus holds that the risk of a significant oil price drop has faded as OECD inventories will remain in a downward trend and should approach normal levels in the middle of 2018. A minority, to which I belong, see considerable risk of a substantial crude price drop due to an expected plateau or even rise in oil inventories next year. As noted above, as 2017 ended, speculators held record high bets that oil prices would increase. If the pace of inventory declines disappoints this year - as the minority expects - then these speculators could lift their bets en masse, sending crude prices much lower. Whether or not oil prices have seen the last of the big swoons since 2014, the question for the medium to longer term is whether oil prices will remain stable or revert to the triple digits seen just ten years ago.

Medium term, the consensus appears to be that oil prices will remain in a \$40 to \$60 range. Even after inventories normalize, the risk of another price boom is deemed by the consensus to be low, partly due to shale oil's ability to ramp up quickly and partly due to widespread expectations that a large scale-up of electric vehicles and fuel efficiency policies will crimp future demand for oil in transportation. I disagree with the consensus view that shale oil and electric cars will prevent a return to triple-digit crude oil prices. More likely, an oil price boom will follow the bust. The main reason is consensus assumptions about policy-driven efficiency gains in transportation are optimistic.^{iv}

These expectations that are nowhere more visible than in official forecasts for U.S. gasoline demand. The U.S. Energy Information Administration forecasts gasoline demand will shortly enter an abrupt and permanent decline, driven by tighter federal fuel efficiency standards and California's electric vehicle mandate. My colleagues and I at Rapidan Energy Group have thoroughly analyzed the history and outlook for these policy drivers and concluded they are too weak to cause demand to peak.^v Whether or not U.S. gasoline demand peaks in the coming years will resonate globally. The U.S. gasoline demand market is massive - accounting for nearly one in ten barrels per day consumed on the planet - and enjoys symbolic importance among leading energy media, forecasters, and analysts.

The next boom phase in oil prices is likely to arise due to faster-than-expected demand, both because policies will turn out weaker than expected and because this period of low oil prices will have encouraged more consumption, requiring more oil than can be supplied given the bust phase's hit to investment in new oil fields and production facilities. Once inventories normalize, robust price increases will be required to enforce the iron law of economics that you cannot consume what you cannot produce. Oil demand remains insensitive to price increases in the short run, so the price increases will be significant. And with spare production capacity wafer thin, geopolitical disruption risks will result in further oil price spikes.



Note: REG data from Medium Term Oil Outlook (November 2017)
Source: EIA, IEA, Rapidan Energy Group

Turkey and boom-bust oil prices

Turkey, a member of the G20, is an open market economy and oil import-dependent country. Turkey is negatively impacted by oil price booms and Turkey naturally fares better during bust phases, such as the one we entered in late 2014. The IMF has noted that the beneficial impact of current low oil prices has softened the blow from reduced tourism inflows.^{vi} The story for Turkey was entirely different just ten years ago when surging oil prices slowed economic growth and pushed inflation above official targets.^{vii} Analysts estimate a doubling in oil prices cuts Turkish economic output by 14%, and these deleterious consequences of higher oil prices usually appear as early as the second quarter after an oil shock.^{viii}

Turkey's value-added tax and special consumption tax on motor fuels account for a substantial share of final consumer prices and thus limit the pass-through of global crude oil prices to domestic fuel prices.^{ix} Nevertheless, as noted earlier, boom and bust cycles create substantial and unexpected costs for the economy. Turkey's domestic inflation volatility is driven mainly by food and energy (primarily oil) prices.^x And gyrating oil prices can impact the Turkish Lira's exchange rate, affecting the cost of energy imports and reverberating to broader financial and real sectors of the economy as well as policymaking.^{xi} However, oil's impact on inflation can be offset by monetary policy.^{xii}

Just like any other open market economy, Turkey cannot escape exposure to a volatile oil market, but some recent trends at least point to options to mitigate the risk. One is reducing the role of oil and gas imports in the economy. Another is to intensify work within the International Energy Agency and other official fora to encourage broader strategic and coordinated stock building and use as well as to improve the quantity, quality, and transparency of global oil market data. Economic experts encourage Turkey to continue deregulating oil and energy markets, enabling international price increases to pass through to consumers and thereby mitigating impacts on inflation and financial stability. The electricity law of 2001 liberalized electricity prices and generated markedly greater elasticity between 2004-2014 than in decades prior.^{xiii} Such actions to increase elasticity will change consumer behavior to moderate price swings.

Boom and bust oil price cycles also pose a geopolitical risk by destabilizing Turkey's already unstable neighborhood in the Middle East. Price busts can catalyze efforts by producers to cooperate by restricting output, as we have seen over the past year between some OPEC and Non-OPEC producers led by Russia. But they can also contribute to regional conflict, as Saddam Hussein's decision to attack Kuwait in August 1990 was partly due to Iraq's financial distress in the wake of the 1986 oil price collapse. More recently, the post-2014 oil price bust has intensified stress on Iraq, Saudi Arabia, and other oil revenue-dependent regional powers.



Turkey's investment into hydrocarbon transportation will provide stable revenue in periods of abundance while positioning the country for easy access to supply in times of scarcity. Liberal economic policies will allow residents to change their consumption behavior so that the economy becomes safely adaptable to changing prices. Most importantly, a growing and diversified economy will reduce the effects of oil swings in the sense of proportion and allow for the absorption of oil price hits.

Note:

Robert McNally is based in Washington, DC and has over 25 years of government and market experience as an international energy consultant, senior White House policy official, and hedge fund strategist. His expertise spans government, economic, security, and environmental sectors. He is the author of the acclaimed book *Crude Volatility: The History and the Future of Boom-Bust Oil Prices* (Columbia University Press, 2017). He wishes to thank Rapidan Energy Group colleagues Richard Sigman, Fareed Mohamedi, Campbell Palfrey and Fernando Ferreira for their help researching and editing this paper.

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