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Geopolitics and the Oil Price Cycle— An Introduction

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ABSTRACT

Oil prices experienced record volatility in the spring of 2020 amid two separate, but simultaneous shocks—the largest singular, sudden drop in oil demand in history amid lockdowns across the world to slow the spread of the COVID-19 pandemic and a brief oil price war among the world’s largest oil producers. The gyration was the latest in a series of oil price shocks, both upwards and downwards, experienced in recent years. This EEEP symposium on Geopolitics and the Oil Price Cycle brings together leading scholars from three respected academic energy centers, including researchers from Texas and the Middle East, to address different aspects of the question in light of key strategic geopolitical changes since 2000. The symposium considers three papers on important aspects to geopolitics and oil prices: the end to the U.S. ban on crude oil exports; the Arab Spring and geopolitical risk, and OPEC’s policies regarding its spare production capacity.

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✎ 1. INTRODUCTION ✎

Oil prices experienced record volatility in the spring of 2020 amid two separate, but simultaneous shocks—the largest singular, sudden drop in oil demand in history amid lockdowns across the world to slow the spread of the COVID-19 pandemic and a new oil price war among the world’s largest oil producers, just four years after the Organization of Petroleum Exporting Countries (OPEC) called off its last oil price war. Prices for West Texas Intermediate crude oil (WTI) gyrated violently from \$60 a barrel at the end of 2019 to negative \$37.00 for the May WTI futures contract before started to stabilize around \$30 in mid-May 2020. Annualized 22-day volatility, that is, the statistical measure of standard variance in the commodity price, exceeded 15.0 standard deviation in early 2020, higher than the 1.2 standard deviation in 2009 prior to the financial crisis and the 0.4 standard deviation that commonly reflects markets since the 1980s.

The early 2020 oil price collapse followed a period of oil price fluctuation driven by conflicts in the Persian Gulf. In the summer of 2019, Iranian backed armed proxies attacked shipping near the vital oil transit waterway, the Strait of Hormuz, through which approximately a fifth of world’s oil production must pass. Brent oil benchmark prices rose 4 percent in June in the wake of the attacks, bringing prices up to over \$62 a barrel. By September 2019, oil prices soared again to \$70 a barrel on news that a major Saudi oil field and the country’s key oil processing facilities at Abqaiq had been attacked by a barrage of missiles and drones. Oil’s 2019 price recovery was a welcome relief to U.S. oil producers who suffered losses during an oil price

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war prompted at the end of 2014 by Saudi Arabia, which wanted to drive out competitors by engaging in a battle for market share that eventually dropped Brent prices to \$27 a barrel in 2015. OPEC eventually made an agreement with Russia and other major exporters to cut production to end the price war and restore badly needed government revenues.¹

✎ 2. STATE OF THE LITERATURE ✎

The events of 2014 to 2020 are just the most recent examples of the kinds of intense gyrations that are typical of oil prices. There is an extensive academic literature on oil price fluctuations. One motivation for extensive investigation into the factors that influence the price of oil is the broad negative effects unexpected changes to oil prices can have on the global economy and the stock market (Hamilton, 2009, Ramey and Vine, 2011, Basher et al, 2018, Thorbecke, 2019).

2.1 Oil price cycles ...

It has been well-established that oil prices have tended to follow a boom and bust cycle (Clayton, 2015, McNally, 2017). Additionally, linkages have been demonstrated between oil demand changes and the expansion and contraction of gross domestic product (GDP). It is through this channel of the link between GDP growth and recession that the oil boom and bust cycle has been connected to the global secular business cycle. Since the 1950s, during upswings in the global business cycle, oil demand has generally risen but new supplies of oil are often delayed because under-ground recoverable reserves of oil cannot be quickly brought online (El-Gamal and Jaffe, 2009, Barsky and Kilian 2004).

Historically, the rise in the need for oil has fueled fears that shortages might appear, often stimulating higher prices which in turn incentivizes increased investment in oil exploration and production as well as more spending on improved extraction technologies. Oil producer coalitions have often intervened in oil markets during this cycle, most notably the Organization of Petroleum Exporting Countries (OPEC), founded in 1961. There is an extensive economics literature studying OPEC's intervention in the global oil market over several decades, with varying conclusions about OPEC's effectiveness in influencing oil prices over the long-run (Smith 2005). Recent papers include an investigation in which authors look at evidence on how changes in OPEC production played a role in offsetting global supply shocks prior to 1997 but argue that the producer group moved to a more "market-oriented" strategy thereafter (Ratti and Vespignani, 2015). Other recent investigations suggest OPEC works strategically in the manner of a Stackelberg or dominant firm and that it exercised substantial market power from 1986 to 2016 (Golombek, Irarrazabal, and Ma 2016).

Additionally, several studies have investigated the link between military conflict and oil supply disruptions. Peter Toft studied 39 civil wars in oil producing countries between 1965 and 2007 and found that intrastate conflict led to oil supply disruptions in roughly 50 percent

1. I thank all contributors to this symposium for active exchange and constructive cooperation, as well as several anonymous referees for their work. Ted Temzelides, Mahmoud El-Gamal, and Ken Medlock (Rice University, Houston, Texas) helped in designing an in-person symposium followed by a later virtual session. We thank Dave Williams and IAEE headquarters who were supportive during the entire production period; Christian von Hirschhausen, EEEP Editor-in-Chief, accompanied the entire symposium process. The usual disclaimer applies.

of conflicts in the sample. El-Gamal and Jaffe (2013) found that wars that led to damage to oil production and export infrastructure result in “significant discontinuity” in oil market trends.

The role of geopolitics in promoting the oil price cycle continues to fascinate researchers. Rising oil revenues during oil price booms provides a sudden influx of capital into the treasuries of large petro-states that cannot be easily absorbed into their undiversified rentier economies. Historically, mounting financial surpluses have been heavily invested in arms purchases, aimed to protect ruling classes from perceived internal and external threats, fueling conflict. The end result has been procyclical (Colgan, 2013).

Kilian (2008) posited that fundamentals including an upwards demand shock was behind the 2007 run-up in oil prices. El-Gamal and Jaffe (2009) offered a differing view and posited in their book, *Oil, Dollars, Debt and Crises: The Global Curse of Black Gold*, that geopolitical events were endogenous to the oil price cycle. El-Gamal and Jaffe 2018 further analyzed the possibility that coupled self-perpetuating cycles existed that linked oil prices, boom and bust global business cycles and related financial crises, and geopolitical risk.

Kaufmann and Connelly (2019) found nine oil prices regimes between 1938 and 2018 including four after 2004 where geopolitical factors played a significant role in driving oil price fluctuations. Jose Noguera-Santaella (2016) uses monthly times series data to demonstrate that 32 different military conflicts strongly affected oil price volatility but have less influence on longer run average trends after 2000. Ansari and Kaufmann (2019) linked U.S. oil production and OPEC. Abdel-Latif and El-Gamal (2019a,b) highlighted correlated patterns between oil price movements, financial liquidity, and geopolitical risk, adding more evidence to the thesis that oil prices, financial cycles and geopolitics were intimately linked.

2.2 ... and geopolitics

As the world comes to grips with the recent acceleration in oil price volatility, interest is high to better understand divergences between supply and demand fundamentals that drive oil prices and other potential influential factors such as geopolitical risk. The stunning success of new oil production technologies for unconventional oil and gas reserves in North American shales, especially in the United States, appears to have altered the oil price cycle, also seemingly influencing geopolitical trends (O’Sullivan, 2017). Canada’s production and exports have also increased over the last decade. U.S. exports of crude oil hit 3.4 million b/d in late 2019 and early 2020, a level that rivals the size of exports of most members of the OPEC plus coalition with the exception of Saudi Arabia and Russia. Added together with refinery processing gains, natural gas liquids and condensate output, and domestic biofuels production, the United States total liquids production topped 18 million b/d by the end of 2019, volumetrically in the league of only two other countries, Saudi Arabia and Russia.

The recent experience of rising oil production from U.S. and Canadian unconventional resources comes against a long history of oil markets that include periods where supply “shocks” have emanated exogenously from sudden gains in output from cyclical commercial investment in resources outside the control of OPEC. In turn, there have been periods of time where OPEC itself has endogenously produced supply “shocks” of its own to offset anticipated price movements that threatened its collective goal to maximize oil revenues. In response to the dramatic rise of unconventional oil production from the United States, Canada, and elsewhere, in recent years, OPEC has also broadened its coalition of oil producers to include coordination with ten non-member oil exporting countries, including important oil states such as Russia,

Mexico, and Kazakhstan. This broader coalition became parties to a joint declaration of cooperation in December 2016.

In this new world where the OPEC plus producer coalition is larger than its predecessor cartel and the United States has become a major oil exporter, geopolitical factors have again come to the fore in news headlines related to oil prices. Wars and political violence in the Middle East have dominated the attention of policy makers while pronouncements about oil price and OPEC have become a regular staple of the twitter feed of American President Donald J. Trump. The fate of fragile or failing nations such as Venezuela and imposition of economic sanctions by major powers like the United States also weigh into the mix of geopolitical variables affecting oil supply and demand. Finally, new geopolitical factors such as the Paris Global Climate Agreement, which aims to decarbonize the global economy in light of the threat of climate change, and a horrific pandemic sweeping global populations raise new questions about interventions in oil markets that could impact oil price trends. This wide range of factors that might alter free market dynamics is fertile ground for academic inquiry. Our journal, the *Economics of Energy and Environmental Policy*, has been enhancing its coverage of such topics.

✎ 3. PAPERS IN THIS SYMPOSIUM ✎

This EEEP symposium on Geopolitics and the Oil Price Cycle brings together leading scholars from three respected academic energy centers, including researchers from Texas and the Middle East, to address different aspects of the question in light of key strategic geopolitical changes since 2000. The symposium considers three papers on important aspects to the geopolitics of oil: the end to the U.S. ban on crude oil exports; the Arab Spring and geopolitical risk, and OPEC's policies regarding its spare production capacity.

It is a well-established practice that the papers for EEEP-symposia are presented and discussed at joint sessions, so that interaction and dispute is built into the process right from the beginning.² The first panel was held at the joint IAEE/AEA session at the ASSA meeting, on January 4, 2020, in San Diego (California). This was followed by a virtual symposium on "Brent, Oil Supply and Demand and Geopolitics" hosted by Rice University on March 30, 2020. Papers were presented to a meeting that included economists from academia, banking, and industry. The symposia included paper presenters, selected topical discussants, as well as informal questions and discussion. All papers then went through a peer review process and were reworked and updated by authors for the current publication.

3.1 Kaufmann: A Regionalized or Unified Oil Market: The Price Spread Between Brent and WTI

In his paper entitled, *A Regionalized or Unified Oil Market: Price Divergence between WTI and Brent*, Robert Kaufmann (2020) extends his previous work on oil prices to quantify the factors influencing the prices for two heavily traded benchmarks West Texas Intermediate and U.K. Brent. Should either price stray beyond the level implied by fundamentals, Kaufmann asserts that arbitrage should be able to bring prices back into line, promoting a unified market for crude oil in which prices for different crude oils integrate.

The paper estimates integrating vector auto regression models to investigate whether exchange rates and proxies for local supply and demand for Brent and WTI can account for the

2. After all, does not the Greek word "symposium" implies to „drink and converse together“?

sharp rise in the price spread between Brent and WTI prices in March 2011, the return of a smaller spread in August 2014 and a subsequent rise in the spread in 2016. The study finds that changes in production levels, inventories, and imports from Canada to the United States account for only a small portion of the increased price differential seen between WTI and Brent starting in 2011. By 2014, the price spread between the two crudes narrows because new pipeline capacity creates opportunities to arbitrage price differences between coastal and inland locations for WTI. After 2016, lifting of the U.S. export ban of crude oil is partially responsible for an increase in the observed price spread. The wider spread between the two crudes covers the higher transportation costs to Asia and helps to motivate sales of rising U.S. production. With the increase in the price spread, the study provides evidence that the lifting of the U.S. export ban in effect serves to reduce regionalization of U.S. oil trade and thereby contributes to a more unified global market.

Based on these results, Kaufmann reinterprets the debate about whether the world oil market is regionalized or unified as nuanced and therefore subject to reinterpretation. He argues that neither answer is strictly correct; changes in supply and investment in transportation infrastructure move the world oil market between degrees of regionalization and unity. The expanded CVAR model implies that changes in local supply and demand regionalized WTI prices from 2011 to 2014. This regionalization widens the price spread to Brent, but also creates an opportunity to arbitrage their price differences. These opportunities are realized by investments in new infrastructure, which then bends the world oil market back towards unification.

The study author notes that a return towards a unified market does not necessarily return the market to the previous equilibrium. That's because the permanent changes in pipeline infrastructure and lifting the ban on U.S. exports of crude oil change the point of reference that arbitrageurs use to establish the price spread between the two benchmark crudes. Kaufmann predicts that the opening of new crude oil export terminals at the port of Corpus Christi, Texas, which will allow exporters to load their crude more easily on larger ships, which could lower the equilibrium price between WTI and Brent. Much depends on how the current collapse in oil prices affects the production of oil from U.S. tight onshore formations and the willingness of investors to fund new transportation infrastructure.

3.2 Abdel-Latif, El-Gamal, and Jaffe: The Ephemeral Brent Geopolitical Risk Premium

In their paper “The Ephemeral Brent Geopolitical Risk Premium,” Abdel-Latif, El-Gamal and Jaffe (2020) build on the literature which studies the ongoing relationship between oil price movements and geopolitical risk. The paper takes into consideration new factors that may have influenced oil markets, including the shorter development cycle of shale resources, U.S. sanctions on Iran and the increase in competitive market structure as rising production from outside of the Organization of Petroleum Exporting Countries (OPEC) weighs on the cartel's market power.

The authors utilize wavelet transform analysis to study the persistence of significant epochs or trends and related causal relationships. Using continuous wavelet transform partial coherence and phase-difference estimates, the authors look at the properties of partial coherence, that is correlation between quantities of waves, in the one to three-year period and also in the 6- to 12- month period.

Time horizons of investors in oil futures markets can also vary, with oil exploration and production companies and refiners typically investing for longer periods of time than financial speculators who move in and out of markets on a more short-term basis. In the one to three-year time horizon, the movement of oil prices has consistently led in the same direction of movements in geopolitical risk predating geopolitical events by about two months.

The analysis shows three statistically significant episodes where oil prices and geopolitical risk have been positively correlated: around the 2003 Iraq war; the beginning of the Arab Spring and then an extended period from the end of the Arab Spring to 2019. During the Iraq war and in the period starting from the end of the Arab Spring, oil prices have risen in anticipation of increased geopolitical risk. During the beginning of the Arab Spring, geopolitical risk appears to presaged the rise in oil prices. The authors find evidence that the worsening of the Venezuelan crisis in 2002 fundamentally adjusted market perceptions about the importance of geopolitical risk in oil markets, that supported rising prices.

The authors suggest that the finding that oil price movements presaging same-direction geopolitical risk movements by two months is consistent with the hypothesis that some financial market speculators, such as macro hedge funds and algorithmic traders, may amass long positions in Brent in anticipation of geopolitical threats that might potentially lead to oil disruptions. In a possible anecdotal explanation, one hypothesis is that such traders build long positions based on initial news reports regarding a possible geopolitical event, thus contributing to the advance rise in oil futures prices, and would take profits once the events materialize.

3.3 Pierru, Smith, and Almutairi: OPEC's Pursuit of Market Stability

In the paper "OPEC's Pursuit of Market Stability", Axel Pierru, James L. Smith and Hossa Almutairi (2020) present a refinement of a previous effort to evaluate the success of OPEC's management of spare oil production capacity to stabilize oil prices. The authors create an informative, counter-factual analysis to tease out the value of OPEC's spare capacity to major consumer markets by trying to understand whether OPEC's adjustments to its production rates dampened variations in oil prices that might have otherwise occurred. They note that a simple correlation between changes in OPEC output and oil prices is not statistically significant and thus a different kind of analysis is needed to measure whether OPEC has been able to dampen price variations using its spare capacity. They consider the volatile oil price period from 2014 to present and base their study on the premise that OPEC is seeking to achieve a significant reduction in oil price volatility by offsetting unexpected oil supply and demand disruptions. However, in some cases, OPEC's cutbacks or miscalculation of market trends may have spurred volatility as well.

In surveying the literature, Pierru, Smith and Almutairi note that several studies mention Saudi Arabia's frequent role to utilize its spare capacity to offset supply shocks, but that the Structural Vector Autoregressions (SVAR) methodology often used to model market developments is limited by an overestimation of short-run elasticity of oil demand.

The authors begin their inquiry by identifying the shifts in demand and non-OPEC supply that change the market requirement for OPEC's residual supply, the so-called "call on OPEC oil." Authors identify several periods where global oil demand grew at an exceptional rate at the same time that non-OPEC supply declined. One such infamous period is 1971-1982 when the price of oil rose to unprecedented heights. A similar period of rising demand and falling non-OPEC production came between 1999 and 2013, again with prices trending higher. Between 1981 and 1988, global oil demand shrank but non-OPEC supplies increased

by 58 percent, leading to downward trends in oil prices. Similarly, recent growth in non-OPEC supply due to the development of unconventional resources has lowered the call on OPEC in recent years. The methodology is consistent with Baumeister and Hamilton (2019a) whose study found that supply shocks in 2007-2008 accounted for much of the period's price rise. By contrast, growth in non-OPEC supply in 2014-2016 appears to be the larger factor versus a loss of demand growth during the period.

The authors then proceed to calculate what oil markets might have looked like, had OPEC not opted to employ its spare capacity between 2001 and 2014 to stabilize markets. They find that the oil price volatility between September 2005 to October 2014 would have been substantially higher at above 13.3 percent, as compared to 8.4 percent, assuming demand elasticity of -3 percent, had OPEC not intervened in markets. Authors' modeling verifies that OPEC made no attempt to stabilize prices between November 2014 and December 2016. For the period starting in January of 2017, the new OPEC plus agreement to adopt production cuts brings oil price volatility down to 7 percent, compared to a counterfactual of over 19 percent that might have prevailed without the OPEC plus intervention in markets.

The paper concludes with observations about the value of OPEC's use of spare capacity to stabilize world oil markets to global economic stability. The study finds that OPEC's use of spare capacity successfully dampened oil price volatility between 2001 and 2014 by between 25 percent to 50 percent of what it might otherwise have been, based on various estimates of the price elasticity of global demand and non-OPEC supply. In conclusion, the authors present an estimate that OPEC's intervention to stabilize oil prices contributes as much as an average increment to global GDP equivalent of \$175 billion annually.

✦ 4. CONCLUSIONS ✦

Geopolitics has been a central feature of global oil price formation in recent years. A common thread among the three papers presented in this symposium is the fluid nature of the interface between geopolitical events and oil market fundamentals. Key market participants—whether speculators who make markets and exploit arbitrage opportunities or large nation-state players such as the members of OPEC plus—are readily influenced to take actions that change the course of oil price trends in consideration of geopolitical changes. Their intervention can be seen structurally in shifting average levels of price volatility as well as in the more transparent swings in nominal prices related to news headlines.

The papers presented tap well-versed econometric methodologies to estimate the impact of three major geopolitical features that appeared to intersect with the oil price cycle: the December 2015 lifting of the 40-year old ban on U.S. crude oil exports, the Arab Spring, and direct intervention in oil markets by the OPEC plus producer coalition. These papers contribute to the literature that demonstrates the concrete influence geopolitical events have on the price of oil. The work presented suggests the start of U.S. crude exports to world oil supply has contributed to more globally unified dynamic where arbitrage creates convergence of pricing in different regions of the world. In this globally dynamic marketplace, the policies of the OPEC plus producer group has had a substantial effect on oil price volatility. Oil market participants have tended to anticipate this growing relationship between geopolitical events since the start of the Arab Spring in 2011, shifting oil prices to a leading indicator of rising geopolitical risk, instead of the other way around that was more typical prior to 2000s.

Questions remain whether historical precedents of geopolitical influences will remain as potent, given new variables such as the increasing commercially-competitive supply of alternative energies and government intervention to lower oil use as part of plans to decarbonize economies in light of the threat of climate change. Amidst the outbreak of a global pandemic that suddenly collapsed demand for oil and thereby its pricing, new questions about the appropriate role of governments in intervening in oil markets are emerging. We offer this symposium as a step to assist policy makers.

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Both publications have earned SCIMago Journal Ratings in the top quartile for Economics and Econometrics publications.

IAEE wishes to congratulate and thank all those involved including authors, editors, peer-reviewers, the editorial boards of both publications, and to you, our readers and researchers, for your invaluable contributions in making 2018 a strong year. We count on your continued support and future submission of papers to these leading publications.