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RESEARCH PAPER

Energy Geopolitics: How Iran Conflicts Affect Global Oil Markets

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ABSTRACT

This paper offers a comprehensive and analytical analysis of how the behavior of the global oil markets and Iranian geopolitical instability are linked, from an interdisciplinary perspective. Based on the principles of energy economics, international relations theory, and empirical analysis of price-shocks between 1979 and 2025, we conclude that Iran's role in the global petroleum system is structurally different and increases its likelihood of contributing much more than its current output of petroleum to petroleum system shocks. The Islamic Republic is also located on the thronged Strait of Hormuz through which some 20 percent of oil shipped around the world passes every day; it holds the world's fourth-largest proven crude oil reserves; and plays a key role in the deliberations of the OPEC+ cartel. Iranian conflict episodes pass through four main channels to oil market flows supply disruptions, Hormuz chokepoint, sanctions-related reductions, and speculative risk premia in futures markets and these effects are analyzed. Historical case studies such as the Islamic Revolution (1979), the Iran-Iraq War (1980-88), the introduction of the maximum pressure sanctions by the United States in 2018, and the assassination of Soleimani in January 2020 are used to track and capture these mechanisms. We also deep-dive into OPEC+'s compensatory ability, strategic petroleum reserves and the increasing complexity of an energy transition. We have established that Iran related risk events cause statistically significant, and sometimes highly durable, price increases and that there are currently levels of price protection which are not sufficient enough against a severe scenario of closure in the Hormuz.

KEYWORDS Energy Geopolitics, Iran Sanctions, Strait of Hormuz, Oil Price Shocks, Opec+, Geopolitical Risk Premium, Petroleum Security, Middle East Conflict

Introduction

Geopolitics and energy markets have been focal points of the analysis of international political economy for a long time. No commodity plays so many roles as oil, that is, as a strategic resource, a diplomatic tool, a source of fiscal strength for sovereign states, and an indicator of the international appetite of risk. Such a convergence is more consequential and more under-researched structurally wherever, but especially in the Islamic Republic of Iran.

Iran's engagement with international oil markets is not just a large producer in danger of being geopolitically disrupted, but also a major consumer of the petro-products of the world. It, instead, represents a fundamental component of the international petrol system. Iran has already proven itself to be able to change market dynamics when it deems it necessary, both through action and inaction: the deliberate disruption of oil supplies, for instance, and in 1951 removal by nationalization of the Anglo-Iranian Oil Company, and in 1979 killings of the Shah and his immediate family, and then again in the 1980s through the

closure or credible threat of closure of the Strait of Hormuz, and the imposition of external sanctions which remove between 1.5 and 2.5mb/d of oil from accessible global supply at various points (Muzaffar, et. al., 2017).

The purpose of this article is not to discuss conflicting versions of events one by one, but to develop a systematic analytical framework to explain how and why Iranian conflict episodes lead to oil price volatility. The structural geography of Iranian energy influence is analyzed, the empirical history of price breaks is reviewed for various crises, and the effectiveness and sufficiency of various so-far available compensatory mechanisms (OPEC+ spare capacity, strategic petroleum reserve drawdowns and demand side measures) in dealing with the effects on the markets of energy interruptions of Iranian origin are evaluated.

This inquiry has an added urgency in this conjuncture. By 2025 Iran has developed a nuclear program to the point where it can have enough enriched uranium for several weapons-grade warheads only a few weeks away from a political call to go nuclear. At the same time, Saudi-Israeli diplomatic normalization process underway under U.S. mediation, structural shift of Iran's oil export to China, and continuous erosion of the JCPOA framework have formed a more volatile geopolitical environment than ever since 2003 Iraq war. It is, therefore imperatively relevant to policy, rather than academic, to understand the implications of this environment for the oil market.

Literature Review

Iran's role in the global energy markets starts with its unrivalled subsurface endowment. Iran has proven crude oil reserves of about 208.6 billion barrels, which are about 12.9% of proven world crude oil reserves, and it ranks 4th in the world after Venezuela, Saudi Arabia, and Canada according to BP's Statistical Review of World Energy 2025. In addition to its natural gas reserves, estimated at 34 trillion cubic meters, is the world's second largest, resulting in another strategic element of energy depth (Yaseen, et. al., 2023; Muzaffar, et al., 2017)**.**

Under maximum production potential, it is able to produce between 3.8 and 4.0 mb/d, an output it almost matched after implementing the first phase of the JCPOA in 2016-2017. When maximum pressure sanctions were implemented in 2018, production fell to a level of around 1.9 mb/d in 2019-2020, only to pick up again, largely by sanctions evasion and Chinese absorption, to reach around 3.2 mb/d by the end of 2024. It is a range between well under full production and full sanction suppression that represents the swing variable which the market must continually price.

Iran's reserve base is the value-added (latent) part of the equation, whilst the Strait of Hormuz is the active systemic part of the equation. The Strait is the world's most critical energy chokepoint by far, given that it is a narrow passage between the Omani coast and the Iranian crisscrossing land which has a combined width of just about 33 nautical miles at its narrowest part.

The U.S. Energy Information Administration estimates that approximately 20.5 million barrels per day of oil and petroleum products transited the Strait of Hormuz in 2023, representing roughly 20 percent of total global petroleum liquids consumption and approximately one-third of all seaborne oil trade.

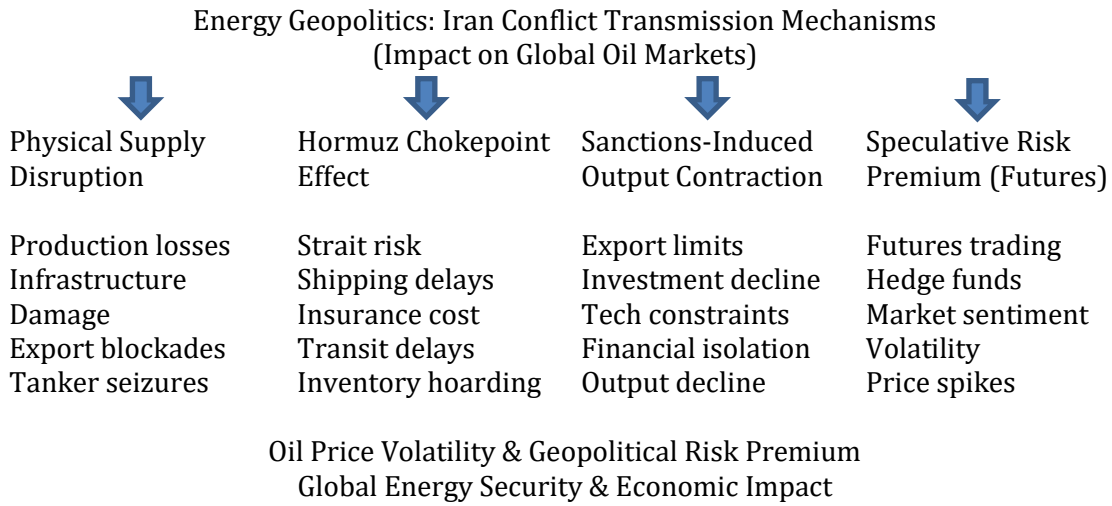
Exporters whose revenues rely on the passage of Hormuz are crucial to their oil and gas business, such as Saudi Arabia (around 6.5 mb/d), UAE (some 2.5 mb/d), Kuwait (some 1.8 mb/d), Iraq (some 3.5 mb/d) and Qatar (the world's biggest LNG exporter). Much of the amount of volume displaced is not met by existing bypass infrastructure: Saudi Arabia's

East-West Pipeline (Petroline – 5 mb/d), and the UAE's Abu Dhabi Crude Oil Pipeline (1.5 mb/d).

Time and again, Iran has shown its determination and capability to threaten or partially commit Hormuz interference. The Iranian Revolutionary Guard Corps (IRGC) Navy argues that swarm tactics, anti-ship missiles, sea mines and drone swarms comprise a navy doctrine that would strengthen its ability to challenge America's naval dominance in small-area, littoral environments. The attacks against oil rigs and the seizure of foreign flagged tankers in the Gulf of Oman in 2019 were a clear example of the fact that this type of military strategy is "real" (Yaseen, et. al., 2023).

Iran's position in OPEC is strange from both the institutional and political standpoints. Iran keeps full membership and takes part in the deliberations of the ministerial membership. But as Iran has been limited by sanctions, not by choosing to adhere to OPEC+ production agreements, it remains officially reeducated from the OPEC+ deals since 2018. This exemption allows a structural imbalance to occur, which is Iran getting benefits from Saudis and Russians' price reductions without imposing any of the output loss.

This agreement has led to ongoing conflict. OPEC as the de facto decision maker in Saudi Arabia has repeatedly stated that a full resumption of Iranian production, either as a result of sanctions being lifted or being circumvented, will require a corresponding increase in Saudi production to avoid oversupplying the market. Taking Iran back into the global pool of oil is not just a bilateral U.S.-Iran effort; it also entails a multilateral rebalancing in the OPEC+ group that will impact all big oil suppliers in the Gulf on their revenue stakes.



Historical Case Studies

The revolution of Mohammad Reza Shah Pahlavi in Februar 1979 and the creation of the Islamic Republic is the historic "first" in the history of the Iranian energy geopolitics. (Muzaffar, et al., 2018). Before the revolution, Iran's production rate was about 5.8 mb/d with nearly 4.5 mb/d exported accounting for the fourth-largest production and the second largest export volume in OPEC.

The revolution caused Iranian output to plummet to some 1.5 mb/d by early 1979, taking more than 4 mb/d from global supply in little more than a few weeks. The partial attempt to make up for the losses from the increase in output only led to the Second Oil Shock as the oil market was running near capacity, resulting in a net reduction of around 2 mb/d. From 1978 to 1980, prices for both types of crude oil nearly doubled reaching $35

per barrel (or more than $130 today) and helping spark an era of 'stagflation' for Western economies in the early 1980s.

The Iraq invasion of Iran in September 1980 sparked an eight-year war and had heavy repercussions for the oil industry of both nations. The "Tanker War" phase (1984-1988) witnessed a greater than 400 merchant ships being attacked in the Persian Gulf; the United States reflagged Kuwaiti tankers under American hood and launched its naval escorts (Operation Earnest Will).

The impact of the conflict on the oil market was less severe than the impact of the 1979 shock, for two main reasons. The first one is that demand for oil was falling precipitously after the shock of 1979, so that there was significant excess capacity in other areas. Second, the large surge in Saudi production in 1985-1986 was a part of the move to impose some discipline on OPEC cheaters, driving prices sharply down. This was a lesson in a market property the Iran-Iraq War was able to illustrate: extreme conflict in the Gulf can lead to devastating outcome if demand properties and compensatory supply capacity remains conservative.

The bust-up of the JCPOA by the Trump administration and the reimposition of comprehensive sanctions against Iran in May 2018 was the most significant sanctions episode since the early 2012 EU oil embargo. While the administration's stated aim of curbing Iranian oil exports to “zero” was not achieved, the impact on Iranian oil production was large and significant.

Iranian crude exports fell by around 2.3 mb/d during the past year, between May 2018 and May 2019. However, the impact of this withdrawal was significant, but ultimately manageable, rising Brent from some $74 per barrel when the withdrawal was announced to $86 in October 2018 before dropping precipitously in Q4 2018, as Saudi Arabia over-compensated with a rise in output and a widespread slowdown in demand began to kick in. Both coordinated U.S.-Gulf ally efforts to reduce disruption impacts and the problems of the “zero exports” aspiration were highlighted in the episode, with Iran constructing a complex sanctions-evasion network based on an active ship-to-ship routing system and on-province vessels that change ownership and are bought by Chinese state-owned entities.

On Sunday, 3 January 2020, the killing of Major General Qasem Soleimani the commander of Iran's al-Quds force by the U.S. in Baghdad International Airport near the Iraqi capital was a detailed study in geopolitical risk pricing. It took no time, came from nowhere, and it had a clear strategic impact – the removal of Iran's most influential military commander and the designer of its regional power projection strategy.

The markets in both London and New York reacted immediately and with drama, causing the price of Brent crude to rise by some 4.5 per cent in the first trading day after the strike, settling at $70.74 a barrel, and pushing WTI to $64.72 a barrel. Together with the rise of Options implied volatility (measured by the index of Options Volatility - OVX) increased significantly. But the prices have started to reverse in under 96 hours since markets absorbed Iran's measured military moves, aimed at ‘showing no fear' but deliberately not engaged in outright war with the U.S., and led to the conclusion this would not be a full-blown war. In other words, the episode has established that geopolitical risk premas in oil markets are hostage to the perception of escalation pathways and can quickly disappear as signs of their de-escalation.

OPEC+ Compensatory Capacity and Its Limits

Saudi Arabia's ability to rapidly ramp up or ramp down production has, in the past, been the middleman in the market in the event of supply disruptions from Iran. Saudi Aramco is equipped to continue producing around 12 mb/d, and the IEA estimated that its

effective spare capacity (defined as production capacity that can be brought on in a 90-day period) is 1.5–2.5 mb/d in 2025 as production volumes ramp up.

This resource slack exists at a geographical and technical level of light to medium crude grades from Ghawar, Safaniya and Khurais. As experience has shown in the shock of 1979, the Gulf War in 1991, and the Libyan civil war in 2011, its fast response has helped to mitigate the impact of acute shortages on prices. But a number of embryonic structural variables are undermining the trustworthiness of this compensative mechanism.

In addition, Saudi Arabia has been operating near its own maximum sustainable power during times of high demand, which has reduced its capacity to spare from levels that would be enough to cover a significant Iranian failure. Secondly, not only does Iran produce medium-sour crude grades that Asian refiners need but Saudi spare crude is predominantly light sweet crude, meaning a lengthy regime of reconfiguration is required months rather than weeks in order for some of those barrels to be suitable for Asian refiners (Shah, et. al., 2020; Muzaffar, et. al., 2018).

Third and most important, in a full closure scenario, the export of Saudi Arabia in any case would be prevented to enter the global market since its main routes pass through the Strait of Hormuz. The resolution is provided by the 5 mb/d East-West Pipeline, whose end is in the port city of Yanbu at the Red Sea, but which is frequently hit in the Yemen conflict by Houthi drone and missile strikes.

International Energy Agency (IEA) works as a coordinator for the system of Strategic Petroleum Reserves (SPRs) among 31 member countries, which contain about 4.1 billion barrels of public and industry petroleum reserves as of 2025. The largest national reserve is the United States Strategic Petroleum Reserve (STR) which holds around 714 million barrels, but current fill levels are about 360 million barrels after the drawdown in 2022.

SPR releases have occurred since the first Gulf war in 1990-91 due to Iranian-related supply interruptions, and more recently due to price increases in general in 2011 in the wake of the Libya crisis and in 2022 during the Ukraine conflict. SPR drawdowns, however, are subject to political strings, are time-consuming in getting to markets and crucially have limits. To reach a similar conclusion, one should consider the effectiveness that SPR has as a buffer in the event of a lengthy Hormuz closure (20+ mb/d for the extreme case).

Energy Transition Dynamics and Iranian Geopolitical Risk

The shift to clean energy is a novel and challenging aspect in oil market Iran-related risk. Looking at demand, high-growth in transport electrification in China and Europe may help delay the move to a plateau and decline of oil demand growth. But the IEA's Net Zero Emissions scenario sees oil demand peaking before 2030, and forecasts from OPEC and the EIA are even more conservative, with scenarios needing to level out by the mid-2030s.

This demand curve has uncertain geopolitical risk meaning for Iran. The deflationary view is that reducing world demand lessens the global oil market constraint and consequently the price effect of a given supply shock. On another, it creates further urgency for oil dependent sovereign states, such as Iran, to monetize oil reserves before the window of opportunity for structural demand disappears, which could lead to greater competition and geopolitical pressure amidst the transition decade (Youns & Muzaffar, 2025).

The energy shift is also changing the Middle East geopolitics in a more significant way that gives rise to new ways for Iran to influence and new potential for instability. Saudi Arabia's Vision 2030 is an example of oil dependency reduction, and will only be successful if oil revenues keep up until the transition is over. Regime stability risks are far more extreme than concerns related to the oil market because the fiscal base of any important

Iranian disruption to oil exports affecting Gulf oil comes with a range of other security implications.

Moreover, Iran itself has short-term budget deficits, as its government would have to pay $70-$80 per barrel for oil to break even, and if there is sustained denominator driven oil price decline, there would be a heightened risk of Iran's domestic political being distracted by provocative geopolitical gambits and a deeper growing pressure on the challenged regime.

Forward Scenario Analysis

In a managed escalation scenario, Iran and the United States agree on a partial agreement, which is either a limited revival of the JCPOA or a tacit non-confrontation agreement, permitting Iran to keep exporting at around 2.5-3.0 mb/d without implementing further sanctions. This case, the least harmful for market stability, would likely result in a price effect of $3 - $8 per barrel as Iranian barrels return to accessible supplies and OPEC+ output is adjusted.

By harassment, blowing up to pose threats to Gulf energy infrastructure, nuclear advance, and periodic hijacking of tankers, Iran is continuing its present policy of ‘maximum pressure', yet going so far as not to face direct military provocation in the region. Episodic spikes in the fundamental price of oil would lead to a $5 to $15 premium over fundamental levels for oil markets, due to occasional surges in oil prices and persistent uncertainty. This is the current baseline scenario which is likely to continue if there is no big diplomatic development or escalation of the military situation (Khan, et al., 2019).

The number one worst case scenario should Israel strike Iranian nuclear sites directly, either alone or in conjunction with the United States, in this climate. Escalation with IRGC vessels in the Gulf, Hezbollah's use of rockets to target Israel's energy infrastructure, Houthi "upstream" disruptions in Red Sea shipping lanes and, crucially, demonstrating Hormuz closure capability, using sea mines, anti-ship missiles, and swarms of drones against tanker traffic, could all be Iranian options.

As has been modeled by the Oxford Institute for Energy Studies and the Center for Strategic and International Studies, a closed-through Hormuz is likely to send oil prices skyrocketing to $140-$200 per barrel, and start an economic slowdown of a size akin to the 2008 recession. Calculating through options markets, even a 30 percent chance of closure for 30 days or more would add a $30 to $50 a barrel risk premium to the price of Brent crude.

Conclusion

This paper has suggested that Iran's role in the global oil architecture is distinctively asymmetric both in terms of its importance and the extent to which it is measured by the level of its production. All four combined – its fourth-largest proven reserves, control of the world's most vital energy choke point, a known history of using its oil as a geopolitical weapon, and a nuclear program in the ‘weapons proximity' stage – make Iran the one exogenous variable with the greatest stakes in the risk analysis of the world's oil market.

These four mechanisms of transmission that we have identified act through different channels but they work synergistically on one another when the crisis is severe.All of these work through different channels, but they reinforce each other in times of acute crisis. Historical examples have shown that all such mechanisms create notional statistical and even often lasting price impact, while the existing compensatory mechanisms, such as OPEC+ spare capacity, drawdowns on the SPR, demand elasticity remain too small to completely compensate a severe situation.

The future is uncertain given the ongoing Iranian nuclear progress, the reduced value of diplomatic ties, the partial realignment of the region as well as the changes passengers will see in energy systems across the globe. The first are ways to hedge against it that do not revolve around military posture or diplomacy – although these are important – but around the structural elimination of the global economy's reliance on petroleum. In such a structurally bad and acute geopolitical Iran risk landscape, energy markets and policy makers will keep flying blind until such a shift takes place.

Policy Implications

The above analysis has a number of policy implications for the key oil importing countries. First, the current volume of the SPR is not sufficient to offset a major disturbance in the Hormuz, in particular after the drawdown in the United States in 2022, which calls for greater urgent SPR rebuilding to statutory levels. Secondly, Diversification of reserve grade with medium sour grades is advocated in light of the quality mismatch problem.

Third and most structurally pivotal, the energy transition process is the best long run hedge against Iranian geopolitical risk in every percentage point that oil demand loses to electrification or energy efficiency, or alternative fuels, the macroeconomic sensitivity to the interruption of the Gulf supply of oil erodes. From an energy security perspective, the transition is a geopolitical mover and a policy that has to be accelerated.

There is a double challenge for producers in the GCC. Preserving and if feasible building back up additional production capacity and around the bypass infrastructure surrounding Hormuz diminishes the sway heavy production outages have on market prices, and enhances Iran's negotiating position. The Saudi-Israeli normalization process, if successfully realized, holds promise of a regional security framework which would limit Iran's adventurism and shorten and dampen escalation cycles in the medium term.

The IEA's emergency response tools were created in an oil market era gone by. The days of coordinated IEA responses to SPR have been diluted as the markets for oil are becoming more financialized, with the arrival of new producers beyond the IEA circle and China increasingly playing the dual part of major oil importer and a de facto Iranian oil market. The overhauling of the international emergency response architecture to integrate with China and India as key importers outside the IEA is an essential institutional reform goal.

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