

Iran Sanctions: Implications for the Oil Market

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Executive Summary

On Apr. 22, 2019, United States (U.S.) Secretary of State Mike Pompeo announced that the U.S. would not be renewing the sanction waivers that had previously allowed eight economies (China, Japan, South Korea, Taiwan, India, Turkey, Greece and Italy) to trade energy — which in practice means the purchase of crude oil and condensates — with Iran. Some economies that had been granted waivers, such as Italy and Taiwan, have already complied fully with the sanctions. However, economies that fail to comply with the sanctions and continue to buy oil from Iran after May 2 will be subject to full U.S. economic penalties (if the U.S. enforces the non-compliance). In response to the Apr. 22 announcement, benchmark Brent crude oil prices rose by more than 3%, to \$70.71/ per barrel (bbl), that same day, eventually reaching a peak of \$74.51/bbl — the highest price reported in the last six months. Crude oil exports constitute one-third of the Iranian government's revenues and almost half of the country's total exports.

A recent S&P Global Platts (2019) survey put Saudi Arabian crude oil production for March 2019 at 9.87 million barrels per day (MMbbl/d), the Kingdom's lowest output since February 2017. Should the need arise, as a result of the expiring Iran waivers, Saudi Arabia (perhaps in coordination with the United Arab Emirates [UAE]) has the spare production capacity to step in and stabilize the global oil market by increasing output. However, it is not yet clear whether this will be necessary.

Three sources of uncertainty have unsettled global oil markets since Secretary Pompeo made his announcement: to what extent will these eight waiver economies, and other economies and/or actors that trade petroleum and petroleum products with Iran, comply with U.S. sanctions?; how aggressively and rapidly will the U.S. attempt to enforce these sanctions (and how long will such efforts persist)?; and, in turn, how will global oil markets react?

Based on KAPSARC modeling of the political decision-making process using the KAPSARC Toolkit for Behavioral Analysis (KTAB), we find that the international community, and indeed some of the waiver economies, will at best partially comply with renewed U.S. sanctions on Iranian crude oil and condensates. Our modeling also suggests that, in particular, China, India and Turkey are unlikely to comply fully with the U.S. sanctions strategy and will maintain much of their current oil trade with Iran. Greece, Italy and perhaps a few other countries may cautiously maintain a reduced level of trade with Iran while continuing to oppose the U.S. sanctions and lobby against them. There are many mechanisms that can enable oil trade with Iran to continue, some of which will be explored in this paper. Our modeling also suggests that there remains a high risk of U.S. capitulation in the face of international pressure to extend or reissue waivers, or to replace them with some equivalent mechanism.

Based on simulations from the KAPSARC Global Energy Macroeconometric Model (KGEMM) and the Oxford Economics Global Economic Model, we assess the oil price implications of lifting the waivers in four scenarios. The first scenario assumes that the tightened U.S. sanctions are completely ineffective; the second assumes a 40%-45% reduction in Iranian crude exports, in line with expectations derived from the KTAB simulations regarding the degree of anticipated compliance; the third assumes that sanctions are completely effective and eliminate Iranian crude exports; and the fourth assumes that Saudi Arabia offsets a complete elimination of Iranian crude exports by ramping up its spare oil production capacity, in order

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to reduce volatility in oil prices and stabilize the global oil market. We find that the greater the reduction in Iranian crude oil available for export as a result of increasingly effective sanctions, the higher the price of oil, so long as Saudi Arabia does not offset the loss of Iranian crude exports by drawing on its spare production capacity. However, in the extreme case — where the tightened U.S. sanctions are completely effective in eliminating Iranian crude exports and Saudi Arabia fully replaces those barrels — then the traded price of oil will be effectively unchanged. Moreover, because of the non-linear relationship between oil production and global oil prices, any Saudi stabilization of the market should prove to be a net benefit to the world oil market.

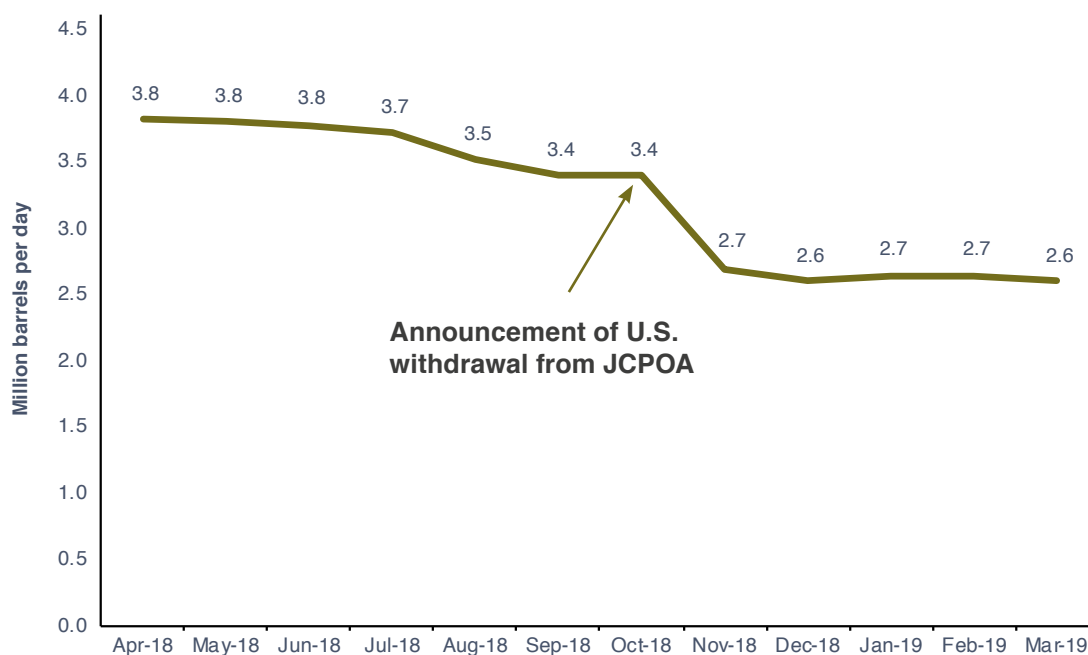
Even if no notable physical compliance with U.S. oil sanctions occurs, we still expect Iran to suffer financially. The U.S. Treasury's global enforcement of separate financial sanctions, both against Iran and any entity that trades with Iran, will push transaction costs and risk premiums for Iran higher when dealing with the U.S. financial system, and add stress to the country's already precarious balance of payments and banking system, as was the case during the wider 2011 U.S.-European Union (EU) economic sanctions. This will provide a disincentive for any entity to trade with Iran above and beyond oil sanctions.

Background

After lengthy negotiations, the United Nations Security Council's 'P5+1' group (comprising the U.S., Russia, France, United Kingdom [U.K.] and China, plus Germany) and the EU agreed to the Joint Comprehensive Plan of Action (JCPOA) with Iran in July 2015. Under this agreement, Iran committed to limit its enrichment of uranium in exchange for the lifting of ongoing economic sanctions by the West. On May 8, 2018, U.S. President Donald Trump announced that the U.S. would unilaterally withdraw from the treaty. On Nov. 5, 2018, the U.S. reinstated wide-ranging sanctions against Iran, pushing Brent crude oil prices to \$73.17/bbl. The U.S. Treasury called this move “the toughest U.S. sanctions ever imposed on Iran,” geared to “target critical sectors of Iran's economy, such as energy, shipping and shipbuilding” (White House Fact Sheet 2019). Soon after this announcement, the U.S. granted renewable six-month waivers on the purchase of Iranian crude oil and condensate to eight economies: China, Japan, South Korea, Taiwan, India, Turkey, Greece and Italy. Iraq received a 90-day waiver in March 2019, allowing it to continue buying energy from Iran, with the stated intention of mitigating Iraqi electricity shortages ahead of the peak load summer months.

The eight economies granted waivers received more than 75% of Iran's registered crude oil and condensate exports in 2017 (authors' own calculations from EIA data). After the U.S. move, five of the eight economies — loosely defined as U.S. allies — significantly reduced or even halted their oil imports from Iran; China, India and Turkey did not. As a result of the renewed U.S. sanctions, Iranian oil production fell steadily from 3.8 MMbbl/d in May 2018 to 2.7 MMbbl/d in December 2018 (see Figure 1) — a near 30% drop — and has remained relatively stable since then. The BBC (2019) recently reported that Iranian oil exports are currently running at slightly less than 1 MMbbl/d, down from 2.5 MMbbl/d before the U.S. sanctions announcement in May 2018.

Figure 1: Iran monthly crude oil production (Apr 18-Mar 19).



Source: EIA.

Background

U.S. Secretary of State Mike Pompeo announced that the U.S. would not renew the waivers for the original eight economies, and that the sanctions would come into effect full-force on May 2, 2019 (the disposition of the Iraqi waiver is not yet clear, since it is a special case). A White House statement the same day reiterated the U.S.'s commitment to slashing Iranian oil exports, stating that the administration's aim was to "bring Iran's oil exports [down] to zero, denying the regime its principal source of revenue" (White House Fact Sheet 2019). The announcement took markets by surprise and the price of Brent rose by more than 2% to \$74.51/bbl the same day, marking its highest price since November 2018 (Kelly 2019). Despite the U.S. administration's strong rhetoric against Iran, markets are uncertain as to how the removal of waivers and the re-imposition of sanctions will proceed.

We base our analysis in this paper on two models: the KAPSARC Toolkit for Behavioral Analysis (KTAB) and the KAPSARC Global Energy Macroeconometric Model (KGEMM). KTAB is an open source modeling platform that facilitates the systematic and rigorous analysis of collective decision-making processes (for replication purposes, all documentation, source code, and papers can be found at <http://www.ktab.software>). KGEMM is a policy analysis tool for examining the impacts of national-level decisions and their interaction with the global economy, including energy markets and the macroeconomic energy environment of Saudi Arabia. The model provides a holistic view of the Kingdom's energy-macroeconomic environment (Hasanov, Joutz and Mikayilov 2019). More details on KGEMM can be found at <https://www.kapsarc.org/research/projects/the-kapsarc-global-energy-macroeconometric-model-kgemm/>

Level of Compliance: A KTAB Simulation Analysis

KTAB simulates the collective decision-making process that encompasses the domestic and international politics of the U.S., Iran, Iranian oil importers and other influencers (referred to as ‘the actors’) that will shape national decisions to comply with sanctions and the evolving commitment to maintain sanctions over time. The model simulates the actors’ changing views on the appropriate level of compliance with U.S.-led sanctions on Iran that focus on crude oil and condensates, based on the evolving political pressures from various interests and centers of political power.

Since the May 2018 U.S. announcement that its sanctions against Iranian energy would be renewed, leading up to and beyond the announcement of waivers in November 2018, there has been broad disagreement across the international community about whether to comply (and to what extent) with the U.S. sanctions on the purchase of any Iranian crude and/or condensates. East Asian allies of the U.S., such as South Korea, Taiwan and Japan, were publicly much more supportive of the sanctions than many other nations (although they would have preferred to avoid sanctions altogether, and quietly lobbied the U.S. government to reconsider its approach). In contrast, China, India and Turkey made it clear they were not willing to fully comply with the renewed sanctions and were initially willing to provide only token compliance with U.S. objectives.

Using the KTAB model, we conducted a simulation in November 2018 of the geopolitical process of decision-making regarding the sanctions (Efird 2018). We began this process before the waivers were announced and completed the analytic work just after the waivers were formally announced. The KTAB simulations imply at least partial U.S. capitulation on the issue of uniform compliance with the sanctions. Based on this finding, an alternative explanation for the waivers to that typically presented by U.S. officials and much of the Western media is that U.S. decision-makers recognized that they could not gain consensus support in favor of sanctions, which would severely undermine their effectiveness. Rather than proceed with the expectation of failure, the waivers were a face-saving effort by the U.S., in the hope that the passage of time would change the underlying geopolitical conditions.

Following Secretary Pompeo’s announcement on the end of the waivers, we updated our analysis in late April 2019. The results of our new simulations are not substantially different from those produced by the model in November 2018. We find once more that the majority of actors, both importers of Iranian crude and interested third parties (e.g., Russia and the European Union [EU]), all support at most partial compliance with sanctions. This reinforces the Chinese, Indian and Turkish desire to maintain a meaningful level of Iranian crude imports. We thus expect these three countries in particular to continue trading, whether through hidden or illicit channels, openly or through third parties. There is a recognition among these actors that some appeasement of the U.S. is required, which we interpret as a willingness to cut back on Iranian imports, but there is not sufficient support among the three for ending their imports of Iranian crude.

A number of Iran’s traditional energy customers have expressed their opposition to U.S. policy and a preference for continued trade with Iran — although if the energy sanctions are fully enforced by the

Level of Compliance: A KTAB simulation Analysis

U.S., it will become much costlier for these actors to trade with Iran. Recent reports indicate that China is not positively disposed to the notion of complying with U.S. sanctions. For Turkey, buying Iranian oil at a discount, as it has done for the last year or so, is an attractive option for Ankara, as Turkey is currently experiencing an economic recession. The EU has openly expressed its preference to continue trading with Iran with a view toward keeping Tehran's commitment to the P5+1 nuclear deal alive. Indian policy toward Iran sanctions has recently become somewhat more aligned with that of the U.S.; the November 2018 waivers effectively halved India's oil imports from Iran, with only state-owned refineries in India permitted to buy Iranian oil (Verma 2019). Nonetheless, full compliance with U.S. sanctions would be too costly for India, and is thus not a desirable option for the country.

Our April 2019 KTAB simulations also point once more to U.S. acquiescence on this issue, though the model is not precise enough to anticipate how the details of this may unfold. This suggests that full enforcement and punitive measures against economies that do not comply with U.S. sanctions may not be uniformly applied. Additionally, there are several other potential mechanisms that could reflect the U.S. backing-off a hardline stance of full compliance with its sanctions. It could be that waivers are reinstated in some form, perhaps repackaged and renamed for political effect. U.S. law also provides guidelines for a progressive implementation of sanctions. With only two weeks' notice, it would be difficult for most economies to fully implement U.S. sanction requirements. The significant reduction exception (SRE) allows for a 180-day grace period if the country in question shows a good faith effort to begin complying with sanctions (Nephew 2019). This 180-day grace period is renewable. Or, it could be that non-compliance with sanctions is simply ignored, and a public narrative of success by U.S. policymakers is used to distract from the actual behavior.

Regardless of the mechanics of how any sanctions' non-compliance will play out, the results of the KTAB simulations point to a 40%-45% reduction in Iranian crude oil and condensate exports after the waivers are lifted and the sanctions are fully in effect. Based on this finding, we consider this the most likely outcome but will explore three alternative scenarios for comparison in the rest of this paper.

Scenario Analysis With KGEMM

Though the KTAB simulation results suggest that a 40%-45% reduction in Iranian crude oil exports is the most likely outcome, we have evaluated a range of alternative scenarios to provide a comparison of different possible reactions to the lifting of the waivers. We used KGEMM and the Oxford Economics Global Economic Model to simulate four scenarios after the removal of waivers and full implementation of the U.S. sanctions:

1. No change in Iranian crude oil exports
2. A 42% reduction of Iranian crude oil exports (0.5 MMbbl/d)
3. Complete cessation of Iranian crude oil exports (1.2 MMbbl/d) without any change in Saudi production
4. End of Iranian crude oil exports (1.2 MMbbl/d) completely offset by increased Saudi production (i.e., an increase of 1.2 MMbbl/d) to stabilize the global oil market

The first scenario can be considered a reference case. It assumes that Iranian exports continue, unaffected by the end of waivers, and is based on a projection derived from April 2019 data. In the second and third scenarios, Iranian crude oil exports drop, while the supply from all other global oil exporters remains unchanged. For scenario 2, this results in a shortage of 0.5 MMbbl/d. This scenario incorporates the uncertainty about the effectiveness of the sanctions on Iranian exports, and is in line with the expected level of compliance derived in the KTAB analysis. For scenario 3, we assume full compliance with sanctions, which would produce a shortage of 1.2 MMbbl/d. This scenario defines the upper limit for any price increase. For scenarios 2 and 3, we expect a higher global crude oil price as compared to the price under scenario 1.

In the fourth scenario, Iranian crude oil exports drop by 1.2 MMbbl/d between Q3 of 2019 and Q4 of 2020, but are wholly offset by additional output from Saudi Arabia. This is made possible by Saudi Arabia's spare production capacity, which amounted to 2.2 MMbbl/d in March 2019, according to the International Energy Agency (IEA). This results in no change to the modeled oil price and higher export revenues for Saudi Arabia, as it ramps up its crude oil exports by an average of 1.2 MMbbl/d — thus demonstrating the Kingdom's ability to stabilize the market in the face of a major supply disruption.

All scenarios keep Saudi Arabia's and Iran's domestic oil use unchanged so that any adjustments in either country's production are reflected in their oil exports. We compare the results of these different scenarios in Table 1, which differentiates the impact on the oil price based on scenarios 1, 2 and 3. We will treat scenario 4 separately.

The oil price increases in the third scenario, from \$63/bbl in Q3 of 2019 to \$82.44/bbl in Q4 of 2020. In scenario 2, the oil price increases by around \$6/bbl (or about 9.6%) more with respect to the scenario 1 reference case, in which no sanctions are applied to post-April 2019 Iranian oil production. On average, the oil price in the third scenario increases by around \$17/bbl (or about 26%) more than in scenario 1, the reference case.

Scenario Analysis With KGEMM

Table 1. Comparison of results from scenarios 1, 2 and 3.

Oil price patterns for scenarios 1-3

| Quarter | Oil price, \$/bbl in scenario 1 | Oil price, \$/bbl in scenario 2 | Oil price, \$/bbl in scenario 3 | % change deviation of scenario 2 from scenario 1 | % change deviation of scenario 3 from scenario 1 |
|---------|---------------------------------|---------------------------------|---------------------------------|--------------------------------------------------|--------------------------------------------------|
| 2019 Q3 | 63.00 | 63.00 | 63.00 | 0.00 | 0.00 |
| 2019 Q4 | 63.90 | 67.50 | 72.93 | 5.63 | 14.13 |
| 2020 Q1 | 63.90 | 70.14 | 80.00 | 9.76 | 25.20 |
| 2020 Q2 | 64.79 | 72.39 | 85.04 | 11.74 | 31.26 |
| 2020 Q3 | 64.88 | 72.11 | 85.06 | 11.15 | 31.11 |
| 2020 Q4 | 64.97 | 71.25 | 82.44 | 9.67 | 26.89 |

Source: KAPSARC KGEMM analysis.

The price increase in scenario 3 compared to scenario 2 is about three times higher, while the quantity reduction in scenario 2 compared to scenario 3 is only about 42% lower with respect to the first scenario (recall that the 42% reduction is based on the KTAB simulation results). Thus, the scenario analysis anticipates that any reduction in Iranian oil exports will raise the price of oil no later than Q4 of 2019. The price differential for scenario 2 compared to that in scenario 1 (i.e., the reference case) increases over time, reaches its maximum in Q2 of 2020 and then decreases. This is potentially caused by the persistency in the oil prices, the lagged effects of supply and demand-side factors, and the influences of political and economic shocks.

All scenarios keep Saudi Arabia's and Iran's domestic oil use unchanged so that any changes in either country's production are reflected in their oil exports.

As previously mentioned, scenario 4 provides a view of Saudi oil export revenues if Saudi Arabia is to fully replace the loss of Iranian crude oil exports. As this offset in supply will result in no net impact on supply in the global oil market, the simulations indicate that prices will remain effectively the same as in scenario 1. Table 2 provides the results of the simulations for the fourth scenario.

Saudi Arabia has long been a reliable source of oil and maintains significant spare capacity. In the event that Iranian crude oil exports are eliminated from the market after the waivers are lifted, then Saudi Arabia could easily make up for the 1.2 MMbbl/d shortfall. As expected, the simulations indicate that the oil price in scenario 4 remains effectively unchanged. Recall that the price increase in scenario 3 is about three times higher than that seen in scenario 2, while the quantity reduction in scenario 2 compared to scenario 3 is only about 42% lower than seen in the first scenario. Thus, the price effect from the oil production cut is non-linear. As a result, the benefit of the Saudi Arabian offset strategy is beneficial for the world oil market (in terms of stabilizing the market) in this scenario.

Table 2. Scenario 4 results for Saudi Arabia's oil export revenues.**Scenario 4: Iran crude exports cut by 1.2 MMbbl/d and offset by an increase in Saudi Arabian production of 1.2 MMbbl/d**

| Year | Saudi Arabian (KSA) oil export revenues, million Saudi riyals (SAR) in scenario 1 | KSA oil export revenues, million SAR in scenario 2 | Absolute difference from scenario 1 | % change from scenario 1 |
|------|-----------------------------------------------------------------------------------|----------------------------------------------------|-------------------------------------|--------------------------|
| 2019 | 571,922 | 611,258 | 39,336 | 6.88 |
| 2020 | 602,192 | 684,393 | 82,201 | 13.65 |

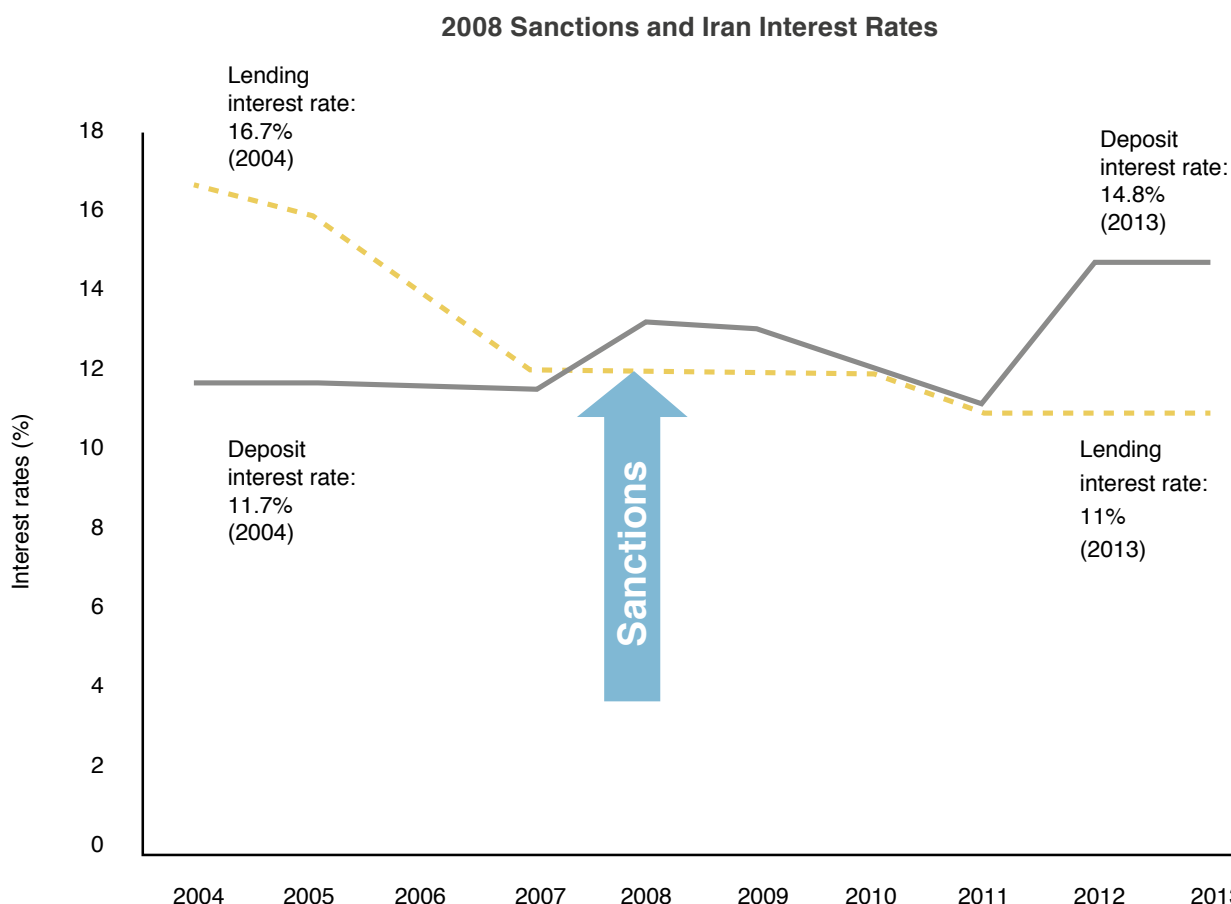
Source: KAPSARC KGEMM analysis.

Saudi Arabian oil production increases in scenario 4 on average by about 10% during the period under consideration. As a result, the country's oil export revenues increase in line with its oil export volumes, as shown in Table 2. Moreover, Saudi oil export revenues grow by about 7% in 2019 and about 14% in 2020. Note that the increase in revenue also includes refined products, so the increase in monetary revenue is higher than the quantity increase. The larger benefit, for both Saudi Arabia and the rest of the global economy, is the expected reduction in price volatility and overall market stabilization.

What Happens Next?

Our analysis suggests that little will change in the near term as the Iranian regime remains unwilling to respond to U.S. demands regarding its nuclear power program. Currently, most Iranians regard the country's faltering economy and unemployment as their country's main problems. More economic sanctions of any sort will clearly add to the country's economic woes. However, Iran has experienced similar conditions before (though perhaps not to the degree that may be prompted by the newly tightened U.S. sanctions, assuming the international community fully complies with those sanctions). The enactment of the 2008 Iran and Libya Sanctions Act, for instance, created a peculiar situation: official bank lending interest rates fell below deposit interest rates just before the official enactment of the sanctions. This negative 'spread' officially continued for many years (see Figure 2). The Iranian government employed various fiscal and monetary policies to keep its financial markets functioning. These included further controls on capital mobility and brief closures of banks to evade consumer panic. The new U.S. sanctions are likely to bring about similar challenges to Iran's economy. In this respect, the willingness of some big buyers of Iranian crude oil to (at least partially) continue trading oil with Iran could provide the authorities in Tehran with some room to maneuver. If the KTAB simulations are correct, and we can expect a 40%-45% reduction in Iranian crude exports fairly soon, then the domestic political situation in Iran may become threatening, if not fatal, to the current regime.

Figure 2: Announcement of 2008 sanctions and Iran interest rates.



Source: World Bank, TIES Dataset.

It is noteworthy that the Iranian public does not view sanctions as the main reason for their country's poor economic situation. A December 2018 survey conducted by IranPoll found that while 71% of respondents thought the economy was performing badly, only 36% ascribed this economic mismanagement to sanctions (Farmanesh 2019). The majority of respondents (59%) said Iran's economic woes were due to the government's domestic mismanagement of the economy. Recent data on Iran public opinion also shows the public may not hold the regime culpable for all of Iran's economic problems. A January 2018 poll conducted in Iran by the U.S. University of Maryland indicated the Iranian public's support for the JCPOA has substantially decreased, with many respondents citing "benefits not accruing to Iran's economy following this agreement" as their main reason for their withdrawal of support for the nuclear treaty (Mohseni, Gallagher and Ramsay 2018). The Iranian public also perceives the U.S. as an active obstacle to peace. These perceptions allow the Iranian authorities to rally people around the flag and divert attention from their economic mismanagement. Without public sentiment holding the Iranian government responsible for economic hardship as a result of its foreign policy, the opposition will struggle to leverage the U.S. energy sanctions to effectively challenge the current regime in Iran.

Given the surprise granting of waivers in November 2018, we would expect any Saudi decision to step up production again to be conditional on the Saudi government's understanding of the strength of U.S. resolve with respect to ending all sanctions waivers, as well as Riyadh's assessment of the actual reduction in Iranian oil exports and production as a result of the sanctions. Indeed, the Saudi Oil Minister, H.E. Khalid Al-Falih has stated that the Kingdom would not increase oil production "preemptively" as the market was "well-supplied," despite the U.S. sanctions (Financial Times 2019).

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