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The Economic Effects of the Re-Imposed United States Sanctions on Iran and Its Spillover on MENA, the PRC, Russia and Turkey

By

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I. The Imposition of US Sanctions on Iran

While Iran has faced US sanctions since 1979, the form, impact, and enforcement of these sanctions has varied. In 1996 the US passed the Iran Sanctions Act, which penalized oil and gas industry foreign investment in Iran, however the sanctions were not implemented for over a decade later due to European opposition. While 1996-97 marked the general prohibition of all US exports to Iran and Iranian imports to the US, 2007-2008 marked the initiation of heightened international sanctions on Iran imposed by the UN Security Council in reaction to Iran's nuclear program.

These sanctions were tightened in 2010, when the UN Security Council, the US Congress, and the European Union all implemented separate sets of sanctions targeting either the Iranian nuclear program or the energy and banking sectors. The effects of heightened sanctions in terms of trade data (particularly in oil) appears from 2010-11 through 2013. [1]

The Joint Plan of Action (JPOA) was signed in late 2013 and within months the United States and the EU took steps to waive specific sanctions. It was in 2015 when the Joint Comprehensive Plan of Action (JCPOA) was signed, which lifted nuclear-related sanctions by the UN, EU and US. Nonetheless, sanctions prohibiting most commercial activity between the US and Iran remained in place, with some exceptions for passenger planes and foreign subsidiaries of US multinational companies. A ten-year extension of the JCPOA was signed in December 2016.

President Trump on May 8, 2018 announced the US withdrawal from the Joint Comprehensive Plan of Action (JCPOA) and directed federal agencies to begin to take steps to re-impose the sanctions established under U.S. law that were lifted or waived in order for the United States to meet its commitments in the JCPOA.

On November 5, 2018, all pre-JCPOA - U.S. sanctions on foreign firms that conduct transactions in all of Iran's core economic sectors, including energy, banking, shipping, and manufacturing, went back into effect. These include sanctions on "petroleum-related transactions" and transactions by foreign banks with Iran's Central Bank. In addition,700 Iranian and third country entities have again been designated by the United States as sanctioned entities, meaning that foreign firms that transact business with these entities could face virtual exclusion from the U.S. economy. [CRS, Nov 8, 2018]

The EU, who abided by the 2012 sanctions against Iran, has not agreed to the Trump Administration's withdrawal from JCPOA and in June2018, updated a 1996 "blocking regulation" that seeks to shield EU firms from potential U.S. sanctions penalties by allowing EU firms to recover damages that arise from noncompliance. It is unclear if the EU action will be able to

[1] For the purposes of defining a heightened sanctions period through which we can analyze subsequent trade and investment effects, we use the date range of 2008-2013. We also use the year 2012 to define a snapshot point in that time frame.

resolve the investment uncertainty connected to violating sanctions created by the US withdrawal. [CRS, Nov 8, 2018]

In June 2018, the European Commission updated the EIB's external lending mandate of the European Investment Bank (EIB) to make Iran potentially eligible for EIB investments. Additionally, to help support Iran's economy, the European Commission adopted an €18 million package in August 2018 for "projects supporting sustainable economic and social development." This includes €8 million in assistance to the private sector, such as support for "high-potential" Iranian SMEs and technical assistance to Iran's Trade Promotion Organization. Further EU efforts may center on incentivizing small and medium-sized enterprises (SMEs) with less financial ties or exposure to the U.S. market to expand business ties. [CRS, Nov 8, 2018]

The EU has been working to develop a payment mechanism that would allow its firms to avoid U.S. sanctions. While the details of this proposed Special Purpose Vehicle (SPV)are yet to be finalized, the SPV would act as a middleman in processing transactions, thereby allowing EU firms to avoid direct payments to and from Iran. [CRS, Nov 8, 2018]

It is not clear that European firms that transact business with Iran through this vehicle would avoid U.S. sanctions, which penalize even indirect forms of trade with Iran. On November 5, 2018, Italy and Greece received U.S. sanctions exceptions for "significant reductions" in oil purchases (SRE)and can import Iranian oil for six months without U.S. penalty. China and India, Iran's two largest oil customers, were also granted a six-month SRE. [CRS, Nov 8, 2018]

Monthly trade data for 2018 suggests the Asian buyers are beginning to absorb Iran's oil export volumes as other countries scale back. If China and India were to continue current levels of Iranian oil imports, it is possible that these two countries alone may keep Iran's exports high enough to help the country avoid a severe recession, even if other buyers, including Japan and Korea, reduce their imports dramatically. The shifts in Iran's oil export patterns might further increase Iran's reliance on China, which is already a top trading partner and source of financing and investments in infrastructure in Iran. [CRS, Nov 8, 2018]

The PRC, unlike the EU does not have a problem with directing its firms, to continue transacting business with Iran despite U.S. sanctions. India and Iran have reportedly agreed to use India's currency, the rupee, as a means of maintaining economic ties. In addition, the Indian government announced it would permit state refiners to continue to import Iranian oil. Chinese state oil traders have also shifted to using Iran-operated tankers to deliver oil. [CRS, Nov 8, 2018].

The purpose of this paper is to assess the spillover effects which can be expected to result from the re-imposition of Iran sanctions on relevant MENA countries. The paper will also look at the potential changes in trade, including energy, and in finance by other countries with influence in the region such as China, Turkey and Russia in response to reduced Iranian trade and finance in the region. It will do so principally by examining the trade displacement and diversion effects that could emanate from the re-imposition of sanctions in the areas of economic activity specified above.

In doing so the paper focuses on the current trade relationships between each of these economies and Iran; as well as their relationships with other trading countries/blocs that are associated with the re-imposition of sanctions on Iran. We will also look at the potential economic displacement and diversion impact of sanctions on the energy sector in the region and consequences of reductions in Iran's energy exports.

An optimally effective approach to policy making with respect to the reinstallation of prior sanctions on Iran requires consideration of the following important questions. (i) Under what circumstances, is it possible to use sanctions to impose significant economic costs on Iran? (ii) Under what conditions will sanctions be effective in achieving their ultimate foreign policy, military or strategic objectives? These questions are further analyzed in Section II.

The potential economic effectiveness of US sanctions on Iran depends on the ability of the US-affiliated exporters to restrict sales and raise prices - that is, their oligopoly power. Since the effective use of sanctions often requires explicit coordination and control of several exporters and importers, we must first address the ability of the US to create an export cartel.

II. Economic Arguments for Sanctions and Its Effectiveness

Historically, most sanctions imposed by Western countries have sought to induce a change in another country's behavior by inflicting economic damage. The US sanctions on Iran since their 1979 revolution is a perfect example. Another objective of sanctions is to reduce or slow development of an adversary's military or strategic capabilities by raising the economic cost of acquiring imports or import substitutes. A third rationale for sanctions is to send a symbolic message of displeasure with another country's behavior. Instituting sanctions may demonstrate willingness and ability to impose economic costs on an adversary and incur domestic costs in support of a principle, even though there is little expectation that the sanctions will affect the objectionable behavior.

Both economic and political factors can constrain the effective use of sanctions. Countries that impose sanctions incur economic costs which include losses in output, employment and economic rents and - particularly in the case of multilateral sanctions - the costs of organizing, policing and enforcing a coalition of exporters. The ability of the countries wielding sanctions to bear these costs is a major constraint on their potential effectiveness. General economic and political conditions such as high aggregate or sectoral unemployment and proximity to elections may also act as constraints on the ability to bear costs in pursuit of national policy objectives. The distributional effects of prospective sanctions, both within a country and among members of a coalition imposing sanctions, are a related potential constraint since they determine in part the probability of internal political opposition to sanctions as well as of conflicts among the allies.

If sanctions are to be used for other than symbolic purposes, policy makers need a strong assurance that there is, at least potentially, some level of economic damage which - if sustained over time - would force the targeted countries to change their objectionable behavior or slow down

development of their military or strategic capabilities. Without this basic agreement there is no point in considering sanctions except as a symbolic gesture.

The economic costs for the US of re-imposing earlier sanctions on exports and investment against Iran are (i) the short-run transitional costs of adjusting to a potential loss of US production and employment opportunities plus (ii) the costs of administering the sanctions less (iii) any gains associated with higher US export prices in cases where exports are restricted but are not completely embargoed. The economic 'benefits' for the US are the costs inflicted on Iran, which include having to pay more for certain imports, having to reallocate domestic resources to produce more expensive import substitutes and having to increase their expenditures for industrial espionage and the illegal acquisition of controlled goods. The imposition of these costs is simply a means to an end.

The potential economic effectiveness of sanctions depends on the ability of the US exporters to restrict sales and raise prices - that is, their oligopoly power. Since the effective use of sanctions often requires explicit coordination and control of a number of exporters and importers, we must first asses the ability to create an export cartel.

A US led "cartel's" potential ability to impose economic costs on Iran depends on the ease with which the "cartel" can raise import prices by collectively restricting exports. The responsiveness, or elasticity, of import demand facing the "cartel" is a measure of the importers' dependence on exports from the "cartel" and a useful summary indicator of the "cartel's" ability to increase prices. The more inelastic the demand for "cartel" exports, the less responsive are the purchases of Iran importers to an increase in prices and the greater is their dependence on the "cartel."

The responsiveness of Iran's demand for imports from the US "cartel" is determined by several factors: (i) the total elasticity of demand by targeted countries for the good, regardless of the source of supply, (ii) the responsiveness of non-cartel supply to a change in price, (iii) the possibilities for substituting between cartel and non-cartel output and (iv) the cartel's share of total exports of the commodity to Iran.

The responsiveness of Iran's demand for imports of a specific commodity from all sources is determined by a number of factors. In cases where imported and domestically-produced goods are perfect substitutes, the demand for imported goods is the difference between the quantity demanded by domestic buyers and the amount supplied by domestic producers at any given price. The less responsive are domestic supply and demand, the less elastic total demand for imports will be.

The short-run elasticity of domestic demand reflects both lags in the adjustment of buyers to a price increase and the availability of substitutes. The longer it takes buyers to adjust their purchases to a price increase and the fewer the close substitutes available, the more unresponsive domestic demand will be. The short run elasticity of domestic supply reflects the ease and expense with which resources can be transferred among competing production processes and, in addition, the availability of domestic stockpiles of the good. Domestic supply is more unresponsive, the more specialized and scarce the resources required for production and the smaller the amount of the good available in inventories or stockpiles. The extent of a country's import dependence is directly

related to the magnitude of the gap between domestic production and consumption and the degree of difficulty in changing consumption and production patterns in response to a price increase. Import demand is usually more inflexible in the short run than in the longer run because it takes time to adjust to price shocks. Consequently, the US cartel's oligopoly power will tend to erode over time.

The US cartel-induced price increase will create incentives for countries that are not party to the cartel to increase their exports to Iran. The responsiveness of non-cartel suppliers (e.g. China, Korea and India) to a price increase also depends on the ease and expense of shifting resources to increased production and on the existence of stockpiles of the good.

Trans-shipment of controlled goods may significantly weaken the US cartel's effectiveness. In this context, the US cartel's effectiveness is not appropriately measured in terms of the ability to deny targeted importers access to certain goods or technology, although this may be a legitimate goal of export controls. Rather, effectiveness is measured as the ability to raise the price (or resource cost) paid by Iranian importers. Effective control of prices requires either a uniform restriction of exports to both targeted and non-targeted importers or a system of discriminatory export controls and prices that is combined with effective control of the ability of non-targeted countries to trans-ship to Iran.

In the first case, with effective uniform restrictions in total cartel exports to both targeted and non-targeted importers, trans-shipments are not really an issue because the cartel has raised the cost of imports to Iran whether it acquires them directly from the cartel or through trans-shipments. In the case of discriminatory restrictions on targeted and non-targeted importers, however, trans-shipment is a critical issue. There may be a number of reasons for the cartel to maintain a two-tiered discriminatory pricing system for targeted and non-targeted importers. But the cartel will have little control over prices and will cause minimal damage to targeted importers if it simultaneously allows non-targeted importers uncontrolled access to cartel exports and lacks control over trans-shipments from these countries to Iran. In this case, targeted and non-targeted importers have an incentive to collude to divert cartel goods to Iran, at prices intermediate between those established for targeted and non-targeted markets. The lower the substitutability between "cartel" and "non-cartel" goods, the less responsive import demand in Iran will be.

The US "cartel's" potential oligopoly power also depends on its share of total exports of the commodity. The larger the shares of total world exports and of exports to Iran, the more unresponsive the demand for "cartel" exports will be.

At one extreme, if demand by targeted importers is perfectly elastic, the "cartel" would be unable to impose any economic damage on Iran but could itself incur substantial displacement costs if it attempted to restrict exports. At the other extreme, totally inflexible import demand in Iran would allow the "cartel" to inflict potentially large short-run economic costs on targeted importers, without itself experiencing any displacement of productive resources. Between these two extremes, the "cartel's" scope for restricting trade will depend on a variety of factors, including the elasticity of demand for imports, the willingness of US led "cartel" members to bear

displacement costs as well as other factors affecting the group's cohesiveness in implementing sanctions.

Although the problems of implementing multilateral sanctions are interrelated, and frequently must be resolved simultaneously, they can be broken down conceptually as follows: (i) determining the desired level of export restrictions for the various commodities controlled by the cartel; (ii) allocating reduced exports among the cartel members and sharing the costs and benefits; (iii) detecting violators of the agreement; (iv) enforcing the agreement against violators; (v) controlling non-cartel exports, trans-shipments and the development of substitutes and alternative technologies; and (vi) responding to Iranian retaliation.

We now turn to an examination of Iran's trade with MENA, Russia and China.

III. Iran's Trade with the World and MENA

Iran's Exports

Iran's trade with MENA countries must be viewed in the context of its trade footprint in the World. Despite the turbulent trade environment Iran faced over the past two decades, Iranian total exports grew at a compound growth rate of 8.1 percent over the 2001-2018 period. The primary category dominating Iran's trade footprint is its oil exports (HS 27) which grew at 6.8 percent over the same period. Table 1 demonstrates Iran's diversification of its trade exports away from primary oil exports (HS 27) to processed polymer products contained in plastics (HS 39) and organic chemicals (HS 29). Exports of these products grew at 23.9 and 17.9 percent respectively over the 2001-2018 period. The other leading exports included Iron and Steel (HS 72), Ores, slag and ash (HS 26) and Edible fruit and nuts (HS 08). (Pelzman, 2018)

Table 1
Top Iranian Exports to the World by HS 2 Digits
Million US Dollar

HS	Product label	2001	2011	2012	2013	2014	2015	2016	2017	2018	Growth
'27	Mineral fuels, mineral oils and prod	20,368	112,101	105,996	66,083	61,254	34,705	51,323	61,111	66,367	6.8%
'39	Plastics and articles thereof	117	3,380	3,643	4,320	5,075	4,744	4,940	6,043	5,551	23.9%
'29	Organic chemicals	214	3,770	3,432	3,483	4,398	3,622	3,688	3,955	4,106	17.9%
'72	Iron and steel	207	986	1,067	1,326	2,048	2,297	2,492	3,438	3,906	17.7%
'08	Edible fruit and nuts; peel of citrus f	513	2,204	2,482	2,048	2,779	2,168	2,257	2,260	1,719	7.0%
'26	Ores, slag and ash	73	1,035	1,169	1,749	1,287	727	1,103	1,843	1,138	16.5%
'07	Edible vegetables and certain roots	94	653	733	490	818	748	615	634	1,075	14.5%
'31	Fertilisers	0	1,065	1,117	932	763	807	790	770	844	64.6%
'25	Salt; sulphur; earths and stone; plas	102	939	1,288	1,384	1,219	955	809	861	785	12.0%
'TOTAL	All products	23,904	137,421	132,713	92,123	90,328	60,041	78,267	91,737	96,618	8.1%

Source: COMTRADE, Iran reporter.

The 1990s saw a significant shift in MENA trade policy. Since 1993, Tunisia, Morocco, Israel and Jordan signed bilateral Free Trade Agreements with the EU in the form of Euro-Med Partnership Agreements (EMAs). Algeria, Egypt, Lebanon and Syria are involved in similar negotiations. At the intra-regional level, Arab MENA countries revived, in 1997, the almost defunct 1981 Executive Program for Arab Free Trade for the creation of a Greater Arab Free Trade Area (GAFTA). (Pelzman, 2018)[2]

Iran's non-oil exports to the MENA countries have generally been concentrated in agricultural goods. In large part, because the post 1979 regime in Iran attempted to refocus its trade towards Asia, (China, Korea and India), international trading relationships with most MENA countries was downplayed. The exports of Iran to all 19 members of MENA is a small fraction of Iran's total world exports. In 2017 it represented less than 20 percent of its total exports to the World. The only MENA countries that have a sizeable trade relationship with Iran include the UAE, Iraq, and Turkey. These three countries together make up 90 percent of Iranian exports to the MENA region. Having said that, imports from Iran relative to each MENA country's imports from the world is less than one percent, except for Turkey. (Pelzman, 2018).

The period of sanctions by the US and Europe, further led to a refocusing of Iran's trade away from MENA. As part of Iran's development program, the focus was placed on developing sectors other than oil. The primary investor that approached Iran was China. That resulted in greater Iran-China trade but not Iran – MENA trade. (Pelzman, 2018).

Iran's Imports

Despite the turbulent trade environment Iran faced over the past two decades, Iranian total imports from the World, presented in Table 2, grew at a compound growth rate of 5.3 percent over the 2001-2018 period. The primary category dominating 19 percent of Iran's imports in 2018 was HS 84 - Machinery, mechanical appliances, nuclear reactors, boilers; parts thereof, which grew at 4.1 percent over the same period. Table 2 demonstrates Iran's diversification of its imports in the manufacturing area and foodstuffs. The second largest import category was HS 10 – Cereals, which represented 11 percent of its 2018 imports. The other major 2-digit HS categories included HS 85 - Electrical machinery and equipment and parts thereof; HS 87 - Vehicles other than railway or tramway rolling stock, and parts and accessories thereof; HS 72 - Iron and steel; .HS 39 - Plastics and articles thereof; HS 90 - Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical; HS 30 - Pharmaceutical

[2] To date, the member states of the Arab League that signed the Arab FTA Agreement include Bahrain, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia and the UAE. Algeria has expressed an intention to ratify the Agreement at a later stage. Djibouti, Mauritania, Sudan and Yemen are in the process of ratifying it. Overall, intra-MENA trade is trivial. (Pelzman, 2018)

products; HS 12 - Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal; and HS 29 - Organic chemicals.

Table 2
Top Iranian Imports from the World by HS 2 Digits
Million US Dollar

HS	Product label	2001	2011	2012	2013	2014	2015	2016	2017	2018	Growth
'84	Machinery, mechanical	3,731	11,480	8,696	7,925	9,594	7,625	7,562	8,849	7,687	4.1%
'10	Cereals	1,445	2,980	6,363	5,551	6,217	3,449	2,788	3,407	4,350	6.3%
'85	Electrical machinery and	1,339	3,901	3,633	4,233	4,427	3,226	4,538	4,939	3,658	5.7%
'99	Commodities not elsewl	0	2,828	1,410	673	1,528	1,324	1,989	4,124	2,730	1.9%
'30	Pharmaceutical product	393	1,410	1,468	1,824	1,535	1,444	1,456	1,569	1,577	8.0%
'87	Vehicles other than railv	1,183	2,807	2,245	2,545	3,828	2,253	3,094	3,294	1,531	1.4%
'12	Oil seeds and oleaginou	140	467	254	449	565	1,132	1,397	1,471	1,511	14.1%
'90	Optical, photographic, c	439	1,410	1,087	1,167	1,149	1,172	1,295	1,739	1,406	6.7%
'29	Organic chemicals	384	1,235	1,276	1,358	1,316	1,057	1,038	1,351	1,386	7.4%
'39	Plastics and articles ther	527	2,682	2,171	1,915	1,909	1,604	1,579	1,792	1,284	5.1%
'72	Iron and steel	1,527	7,652	5,292	3,028	3,493	2,600	1,875	2,090	1,210	-1.3%
'15	Animal or vegetable fats	396	1,649	2,059	1,867	1,477	1,006	895	1,222	1,067	5.7%
'TOTAL	All products	16,173	57,488	51,458	48,432	52,250	40,043	42,702	51,612	41,236	5.3%

Source: COMTRADE, Iran reporter.

MENA country exports to Iran are generally trivial. The exception is the multi-billion-dollar trading relationship with the UAE and Turkey which constitute the major MENA exporters to Iran. For both countries, Iran as a source of their world exports ranges, on average, from 2 to 5 percent over the 2001-2018 period.

IV. IRAN'S TRADE WITH CHINA, INDIA, KOREA AND RUSSIA

Given the very limited trading participation with most MENA countries, we review Iran's trade relationships with India, Korea, China and Russia. These are the countries where Iran largely diverted its commercial relationships after the sanctions in 2012 as well as its policy shift towards Asia that was declared in 2005 and 2006. The emergence of these trading relationships needs to be taken into consideration when evaluating the effectiveness of re-imposing US sanctions.

The Leading 2-digit HS categories in Iran's exports to China are presented in Table 3. Apart from the high concentration in these limited HS categories that represent 95 percent of Iran's exports to China one is struck by the overall growth rate of 24.7 percent for total Iranian exports to China despite the sanctions.

Table 3											
Top Iranian Exports to China by HS 2 Digits											
Million US Dollar											
HS	Product label	2001	2011	2012	2013	2014	2015	2016	2017	2018	Growth
'39	Plastics and articles ther	35	1,118	1,543	2,098	2,353	2,156	2,479	2,705	2,852	27.6%
'27	Mineral fuels, mineral oi	23	646	229	1,037	2,898	1,862	2,311	2,000	2,364	29.2%
'29	Organic chemicals	39	2,487	2,160	2,176	2,542	2,078	1,873	1,929	2,219	25.2%
'26	Ores, slag and ash	7	968	1,128	1,714	1,260	664	1,074	1,768	1,050	32.6%
'25	Salt; sulphur; earths and	5	126	148	139	149	138	197	237	246	24.6%
'TOTAL	All products	174	5,557	5,513	7,458	9,389	7,230	8,370	9,065	9,218	24.7%
Source: COMTRADE, Iran reporter.											

The Leading 2-digit HS categories in Iran's imports from China are presented in Table 4. Apart from the concentration in these limited HS categories that represent 73 percent of Iran's imports from China one is struck by the overall growth rate of 15.9 percent for total Iranian imports from China despite the sanctions.

Table 4											
Top Iranian Imports from China by HS 2 Digits											
Million US Dollar											
HS	Product label	2001	2011	2012	2013	2014	2015	2016	2017	2018	Growth
'84	Machinery, mechanical	258	1,868	1,870	2,178	3,468	3,082	2,650	2,852	2,412	13.2%
'99	Commodities not elsewi	0	374	413	432	1,071	741	1,031	1,964	1,673	33.2%
'85	Electrical machinery and	79	918	1,105	1,653	1,906	1,509	1,755	2,297	1,650	18.4%
'87	Vehicles other than railv	26	593	381	477	649	452	528	698	673	19.7%
'29	Organic chemicals	27	220	372	374	375	302	334	406	396	16.2%
'72	Iron and steel	24	259	596	643	863	755	466	526	331	15.6%
'39	Plastics and articles ther	8	374	453	545	473	413	389	436	316	23.1%
'TOTAL	All products	720	7,437	8,175	9,772	12,719	10,473	10,696	13,115	10,249	15.9%
Source: COMTRADE, Iran reporter.											

The Leading 2-digit HS categories in Iran's exports to India are presented in Table 5. Apart from the concentration in these limited HS categories that represent 92 percent of Iran's exports to India, it is worth noting the overall growth rate of 14.4 percent for total Iranian exports to India despite the sanctions.

Table 5											
Top Iranian Exports to India by HS 2 Digits											
Million US Dollar											
HS	Product label	2001	2011	2012	2013	2014	2015	2016	2017	2018	Growth
'29	Organic chemicals	34	409	626	520	715	595	569	650	599	17.4%
'31	Fertilisers	0	852	753	698	253	521	394	476	351	24.6%
'27	Mineral fuels, mineral oi	39	609	418	266	416	474	962	520	319	12.4%
'28	Inorganic chemicals; org	29	350	241	269	393	284	248	238	187	11.0%
'08	Edible fruit and nuts; pe	23	82	82	71	99	92	144	148	162	11.4%
'39	Plastics and articles ther	0	122	90	81	207	200	162	295	112	41.6%
'72	Iron and steel	6	49	127	205	53	20	36	79	90	16.0%
'25	Salt; sulphur; earths and	3	15	15	9	41	17	40	55	45	16.6%
'TOTAL	All products	180	2,754	2,624	2,443	2,533	2,497	2,791	2,735	2,043	14.4%
Source: COMTRADE, Iran reporter.											

The Leading 2-digit HS categories in Iran's imports from India are presented in Table 6. Apart from the concentration in these limited HS categories that represent 73 percent of Iran's imports from India, we note the overall growth rate of 10.1 percent for total Iranian imports from India despite the sanctions.

Table 6											
Top Iranian Imports from India by HS 2 Digits											
Million US Dollar											
HS	Product label	2001	2011	2012	2013	2014	2015	2016	2017	2018	Growth
'10	Cereals	0	398	991	1,765	1,231	466	453	837	1,316	30.2%
'29	Organic chemicals	29	80	108	188	219	179	133	140	174	5.9%
'09	Coffee, tea, maté and sp	12	46	67	131	115	130	128	138	161	15.3%
'72	Iron and steel	46	74	79	201	517	353	182	138	121	5.5%
'85	Electrical machinery and	24	86	101	230	116	57	73	60	105	8.7%
'84	Machinery, mechanical	11	86	82	100	190	152	167	130	70	11.0%
'TOTAL	All products	470	1,180	2,047	4,309	3,783	2,295	1,955	2,255	2,650	10.1%
Source: COMTRADE, Iran reporter.											

The Leading 2-digit HS category in Iran's exports to Korea is presented in Table 7. It is worth noting that the overall growth rate for total Iranian exports to Korea in the sanction period was a robust 23. percent, exclusively in HS 27 – fuel.

Table 7											
Top Iranian Exports to Korea by HS 2 Digits											
Million US Dollar											
HS	Product label	2001	2011	2012	2013	2014	2015	2016	2017	2018	Growth
'27	Mineral fuels, mineral oi	48	1,169	747	182	203	26	2,530	4,003	2,460	24.5%
'TOTAL	All products	62	1,387	916	335	426	134	2,877	4,380	2,568	23.0%
Source: COMTRADE, Iran reporter.											

The Leading 2-digit HS categories in Iran's imports from Korea are presented in Table 8. Apart from the concentration in these limited HS categories that represent 84 percent of Iran's imports from Korea, it is again worth underscoring the overall growth rate of 5.6 percent for total Iranian imports from Korea in the sanction period.

Table 8											
Top Iranian Imports from Korea by HS 2 Digits											
Million US Dollar											
HS	Product label	2001	2011	2012	2013	2014	2015	2016	2017	2018	Growth
'39	Plastics and articles ther	92	632	760	500	595	499	490	511	324	7.2%
'84	Machinery, mechanical	148	574	943	734	907	622	646	644	298	4.0%
'99	Commodities not elsew	0	134	19	2	46	86	147	403	277	7.2%
'72	Iron and steel	48	1,763	1,008	612	578	513	305	413	210	8.5%
'87	Vehicles other than railv	138	542	412	148	196	313	432	362	207	2.3%
'90	Optical, photographic,	12	83	91	90	125	141	146	220	146	14.7%
'85	Electrical machinery and	162	194	629	788	956	678	537	388	137	-0.9%
'48	Paper and paperboard;	34	217	274	444	238	204	201	203	114	7.0%
'TOTAL	All products	772	4,750	4,826	3,942	4,417	3,679	3,460	3,682	2,049	5.6%
Source: COMTRADE, Iran reporter.											

In 2018 Iran's exports to Russia equaled $281 million. The Leading 2-digit HS categories in Iran's exports to Russia are presented in Table 9. Apart from the concentration in these 8 limited HS categories that represent 86 percent of Iran's exports, it warrants emphasis that total Iranian exports to Russia increased by 8.9 percent annually over the entire 2001-2018 period. The 2012 sanctions seem to have had no impact on Iran's exports to Russia, nor in this regard should it be expected under a new round of sanctions. The primary 2-digit HS categories that represent Iran's major exports to Russia are HS 08 and HS 07 - Edible fruit and nuts; peel of citrus fruit or melons and Edible vegetables and certain roots and tubers. These two categories represented 67 percent of Iran's exports to Russia.

Table 9											
Top Iranian Exports to Russia by HS 2 Digits											
Million US Dollar											
HS	Product label	2001	2011	2012	2013	2014	2015	2016	2017	2018	Growth
'08	Edible fruit and nuts; pe	29	201	212	80	65	46	81	100	120	8.2%
'07	Edible vegetables and c	0	87	104	76	73	46	52	57	68	35.9%
'20	Preparations of vegetab	10	23	34	31	28	15	15	16	16	2.7%
'39	Plastics and articles ther	2	10	14	11	20	16	13	17	14	12.9%
'30	Pharmaceutical product	0	0	12	15	29	1	18	19	7	31.9%
'04	Dairy produce; birds' eg	0	0	0	0	0	0	5	9	6	37.5%
'55	Man-made staple fibres	0	0	0	0	0	0	0	0	6	22.0%
'87	Vehicles other than railv	1	12	5	7	6	4	3	4	5	9.4%
'TOTAL	All products	60	371	500	318	286	173	219	286	281	8.9%
Source: COMTRADE, Iran reporter.											

The Leading 2-digit HS categories in Iran's imports from Russia are presented in Table 10. In 2018 Iran's imports from Russia equaled $1.3 billion. The leading category in Iran's imports from Russia is HS 84 - Machinery, mechanical appliances, nuclear reactors, boilers. Apart from the concentration in these 9 limited HS categories that represent 94 percent of Iran's imports from Russia, it is worth noting the overall 'slow-growth' scenario for Iran's imports from Russia over the entire 2001-2018 period. The 2012 sanctions had no impact on Iran's imports from Russia, nor by extension should it be expected to have a dampening effect in the new round of sanctions. The primary 2-digit HS category apart from HS 84 noted above that represent Iran's major imports from Russia are HS 10, HS 15, HS 44 and HS 85. These represent 64 percent of Iran's imports from Russia.

Table 10											
Top Iranian Imports from Russia by HS 2 Digits											
Million US Dollar											
HS	Product label	2001	2011	2012	2013	2014	2015	2016	2017	2018	Growth
'84	Machinery, mechanical	80	27	50	16	19	18	29	40	403	9.4%
'10	Cereals	8	109	586	290	249	313	261	166	345	23.3%
'15	Animal or vegetable fats	0	0	8	8	71	32	44	103	221	13.0%
'44	Wood and articles of w	33	121	136	118	106	75	75	98	88	5.6%
'02	Meat and edible meat o	0	0	10	1	0	0	0	10	69	11.0%
'85	Electrical machinery and	8	22	40	72	45	19	904	45	57	11.7%
'86	Railway or tramway loc	5	1	4	5	2	1	13	8	31	10.6%
'48	Paper and paperboard;	77	59	45	19	7	22	19	21	29	-5.4%
'07	Edible vegetables and c	0	1	3	1	0	1	4	11	15	20.9%
'TOTAL	All products	806	774	1,639	747	647	577	1,544	704	1,343	2.9%
Source: COMTRADE, Iran reporter.											

V. MEASURING THE EFFECTIVENESS OF THE US REIMPOSED SANCTIONS AGAINST IRAN AND THE SPILLOVER EFFECTS

Apart from Iran that is affected by the re-imposition of US sanctions, other countries most affected by the re-imposition of the Iran sanctions, in terms of international trade, will be a small number of MENA countries who maintain a long-term trading relationship with Iran. This includes Iran's major MENA trade partners Turkey and the UAE. In general, the other MENA countries' exposure and reliance on Iran is far more limited and will not be negatively affected by the re-imposition of US sanctions. Outside MENA there are questions about the spillover effects on China, Russia, India and Korea.

In order to measure the spillover effects of the re-imposed sanctions we do a two-part test. First, we measure substitutability using the Finger-Kreinin (1979) index of export similarity for all world economies with a proven trade record by specific commodities. All these estimates are based on 6-digit HS categories for the key MENA and non-MENA countries. The supply side assumption made throughout is that alternative suppliers would have perfectly elastic supply curves. That is, as they substitute for sanction affected Iranian exports their prices would not rise.

Second, in order to explore further the substitutability potential of Iran sanction displacement we estimate both own and cross-price elasticities across the same categories over the entire 2001-2017 time period. These estimates are partial equilibrium import demand equations estimates by HS6. The cross-price elasticities are calculated within an import demand equation estimated bilaterally. That is, for a given HS6 category where Iran sanction displacement is possible, we test if the bilateral relationship between country A and B in that category can be identified as a potential substitute supplier.

The Similarity Index

Finger and Kreinin (I979) developed the following index of the similarity of export patterns from two countries (a and b) to a third market (c):

$$S = \sum_{i} \min\left(S_{i,t_{ac}} S_{i,t_{bc}}\right) 100 \qquad (1)$$

where $S_{i,t_{ac}}$ is the share of commodity *i* at time *t* in *a*'s exports to *c* and similarly for $S_{i,t_{bc}}$. Ths index of the similarity of two countries' export bundles resembles the Grubel-Lloyd (1975) intra-trade index, which measures the similarity of one country's export and import bundles as amended by Aquino (1978) and Pelzman (1978).

The structural equivalence between S and IITA (the Grubel-Lloyd intra-industry trade index as amended by Aquino (1978) and Pelzman (1978)) is easily demonstrated –

$$S = \sum_i \min\left(S_{i,t_{ac}} S_{i,t_{bc}}\right) = 1 - \frac{1}{2}\sum_i \left| \frac{X_{i,t_{ac}}}{X_{t_{ac}}} - \frac{X_{i,t_{bc}}}{X_{t_{bc}}} \right|$$

and

$$IIT = 1 - \frac{1}{2}\sum_i \left| \frac{X_{i,t}}{X} - \frac{M_{i,t}}{M} \right|$$

where $X_{i,t_{ac}}$ is *a*'s exports of the *i*th good at time *t* to market c, X_{ac} is a's total exports to c ($X_{i,t_{bc}}$ and X_{bc} are similarly defined), $X_{i,t}$ and $M_{i,t}$ are a country's global exports and imports of the *i*th good, and X and M are the country's total exports and imports.

These indices are open to the aggregation bias criticisms. That is, with progressive disaggregation the value of S will tend to decrease. However, given the present context of our investigation and the fact that the, non-oil, Iran-MENA trade as well as the Iran non-MENA trade appears meaningful in a select 6-digit HS level, we are only interested in the ordinal properties of Iran's trade partners' similarity indices.

Import Demand Elasticities

In order to expand beyond the first approximation that the similarity index allows, we shift to estimating own and cross-price elasticities for each of the commodities. A cross-price elasticity is one of the most commonly used constructs in theoretical and empirical economics in the areas of pricing and market structure. A higher cross-price elasticity between two products means that they are more substitutable and is often suggested as an indication of products that are more similar to each other.

The economic literature has supported the use of cross-price elasticities in empirical work. For example, Hausman et al. (1991, p. 893) state that cross-price elasticity gives a ''natural measure'' of similarity among products, and that products that are more homogeneous will have a higher cross-price elasticity. Other micro based literature that use cross-price calculation can be found in (Werden and Froeb 1994; Werden, 1997 and Hausman and Leonard 2005) where we define cross price elasticity as "the responsiveness of demand to changes in the price of another product."

Following these standard models in microeconomics and international trade the long-run import demand model estimated in this report takes the following form:

$$ln(M_{ij}) = \alpha_1 \ln \frac{P_{ij}^m}{P_d} + \alpha_2 \ln \frac{P_{ik}^m}{P_{ij}^m} + \alpha_3 \ln y + \varepsilon$$

where, $\ln(M_{ij})$ is the log of imports demand of good *i* from country *j*; $\ln \frac{P_{ij}^m}{P_d}$ is the log of the relative price variable, calculated as a ratio of the index on import unit values from country *i* relative to the domestic price index (here, domestic prices are proxied by the consumer price index); $\ln \frac{P_{ik}^m}{P_{ij}^m}$ is the log of the substitute relative price variable, calculated as a ratio of the index on import unit values from country *k* relative to the country *j*; and $\ln y$ is the log of the real gross domestic product and ε is the error term. It is expected that $\alpha_1 < 0; \alpha_2 > 0; \alpha_3 > 0$.

VI. EMPIRICAL RESULTS

Iran - Iraq

In Table 11 we present the similarity indices for substitutes for Iran's exports to Iraq for MENA countries, by the lead HS categories.

Table 11 - Similarity index for Exports to Iraq - Iran vs MENA Competition

HS		UAE	Turkey
392190	Plates, sheets, film, foil and strip, of plastics	0.007	0.003
392690	Articles of plastics and articles	0.014	0.008
392490	Household articles and toilet articles	0.016	0.015
847960	Evaporative air coolers	0.030	0.028
210500	Ice cream	0.018	0.017
392410	Tableware and kitchenware, of plastics	0.007	0.007

In the bilateral trade between Iran and Iraq, the similarity index suggests that curtailment of exports from Iran can be substituted by Turkey and the UAE.

For the non-MENA countries our similarity estimates are presented in Table 12.

Table 12 - Similarity index for Exports to Iraq - Iran vs Non-MENA Competition						
	HS Categories					
	392190	392690	392490	847960	392410	
Substitute Countries	Plates, sheets, film, foil and strip, of plastics	Articles of plastics and articles	Household articles and toilet articles	Evaporative air coolers	Tableware and kitchenware, of plastics	
Germany	0.003	0.008	0.016		0.008	
China	0.003	0.005	0.015	0.025	0.005	
Korea	0.004					
UK		0.008				
Italy			0.017		0.009	
India				0.028		

The similarity indexes point to China and Germany as potential substitute countries for the major Iraq imports from Iran.

The elasticity estimates for trade substitution for the Iran-Iraq trade presented in Table 13 point to a positive substitution effect for only a limited number of 6 digit HS categories and to one competitor Outside of MENA – China and one inside MENA – UAE.

Table 13										
Subsitution Possibilities for Iraq - Iran Trade based on Elasticity Measures for MENA and non-MENA Countries										
HS	MENA Countries					Non-MENA Countries				
392690						GDP	Own Price Elasticity	Cross Price Elasticity - China	Adj R-squared	
						-0.70795	-2.76372	3.132903	0.94	
t Statistic						-6.04	-4.37	3.38		
392490	GDP	Own Price Elasticity	Cross Price Elasticity - UAE	Adj R-squared						
	-0.1258	-1.5763	0.4249	0.98						
t Statistic	-1.13	-1.66	2.03							
847960	GDP	Own Price Elasticity	Cross Price Elasticity - UAE	Adj R-squared		GDP	Own Price Elasticity	Cross Price Elasticity - China	Adj R-squared	
	0.01398	-0.959	0.24503	0.98		0.01305	-0.9295	0.32189	0.98	
t Statistic	1.98	-7.67	2.24			1.89	-7.44	2.49		
	GDP	Own Price Elasticity	Cross Price Elasticity - UAE	Adj R-squared						
210500	0.29295	2.70628	1.79609	0.86						
t Statistic	2.03	2.21	5.07							

Iran – Turkey

In Table 14 we summarize the similarity indices for substitutes for Iran's exports to Turkey for MENA countries, by the lead HS categories.

Table 14 - Similarity index for Exports to Turkey - Iran vs MENA Competition								
HS				Qatar	UAE	Saudi Arabia	Oman	Bahrain	Qatar
271111	Natural gas, liquefied			0.298					
390120	Polyethylene			0.120	0.710	0.132			
'790112	Unwrought zinc, not alloyed				0.059				
760110	Aluminium, not alloyed, unwrought				0.057	0.026	0.483	0.202	
390110	Polyethylene				0.030	0.077			0.048
390210	Polypropylene, in primary forms				0.048	0.178			

Turkey's imports from Iran are predominantly concentrated in a single HS 6 category, natural gas, liquefied (HS 271111) where Qatar could potentially represent a substitute source for Iran's exports. This category represents 60 percent of Turkey's imports from Iran. Iran began exporting natural gas to Turkey in 2016, which was a major departure from its norm which was to use natural gas primarily for its internal market. The other commodities that have recently appeared in Turkey's imports from Iran are detailed in the similarity table.

For the non-MENA countries Table 15 presents our similarity estimates. For HS 27111 the probable Non-MENA substitute suppliers for natural gas to Turkey would come from Norway and Nigeria. For polyethylene (HS 390120) the non-MENA suppliers would probably come from Korea, Belgium, Germany and Italy. For unwrought zinc (HS 790112) the non-MENA suppliers would probably come from Bulgaria. For aluminum, not alloyed, unwrought (HS 760110) the non-MENA suppliers would probably come from India and Russia. For polyethylene (HS 390110) the non-MENA suppliers would probably come from Korea, Belgium and Germany. For polypropylene (HS 390210) the non-MENA suppliers would probably come from Korea, India and Israel.

Table 15 - Similarity index for Exports to Turkey - Iran vs Non-MENA Competition								
	HS Categories							
	271111	**390120**	**790112**	**760110**	**390110**	**390210**		
Substitute	Natural gas, liquefied	Polyethylene	Unwrought zinc, not alloyed	Aluminium, not alloyed, unwrought	Polyethylene	Polypropylene, in primary forms		
Nigeria	0.218							
Norway	0.147							
Korea		0.039			0.015	0.028		
Belgium		0.043			0.015			
Germany		0.047			0.016			
Italy		0.046						
Bulgaria			0.030					
India				0.019		0.026		
Russia				0.022				
Israel						0.045		

The results presented in Table 16 are the estimated income, own and cross price elasticities the major HS categories for both MENA and non-MENA country substitution possibilities. Within MENA the econometric results point to the fact that for HS 390120 the UAE is a substitute for Iran's exports to Turkey. The cross-price elasticity points to the UAE as the only MENA country which would be a significant substitute for Iran in HS 790112.

For HS 760110 the cross-price elasticity points to the UAE and Bahrain as being a substitute supplier for Iran's exports to Turkey. For the non-MENA countries that were considered as substitute suppliers by the similarity index, both India and Russia had estimated cross-price elasticities that point to the fact that they both could be substitutes for Iran's exports of HS 760110 to Turkey.

Table 16

Subsitution Possibilities for Turkey - Iran Trade based on Elasticity Measures for MENA and non-MENA Countries

HS	MENA Countries						Non-MENA Countries				
	GDP	Own Price Elasticity	Cross Price Elasticity - UAE	Cons	Adj R-squared						
390120	5.93118	1.10963	0.83708	-65.398	0.87						
t Statistic	2.43	0.82	3.01	-2.45							
	GDP	Own Price Elasticity	Cross Price Elasticity - UAE		Adj R-squared						
790112	0.02487	-2.1813	0.24021		0.87						
t Statistic	1.28	-12.06	2.44								
	GDP	Own Price Elasticity	Cross Price Elasticity - UAE	Cons	Adj R-squared		GDP	Own Price Elasticity	Cross Price Elasticity - India	Cons	Adj R-squared
760110	0.01099	-1.5248	0.55683		0.87		8.88296	0.82317	1.63262	-105.26	0.92
t Statistic	0.43	-5.24	3.78				3.5	0.48	1.64	-3.48	
	GDP	Own Price Elasticity	Cross Price Elasticity - Bahrain	Cons	Adj R-squared		GDP	Own Price Elasticity	Cross Price Elasticity - Russia	Cons	Adj R-squared
760110	9.97819	1.94524	2.27938	-118.41	0.93		9.45531	1.58604	2.16574	-112.17	0.93
t Statistic	4.42	1.2	2.41	-4.4			4.51	1.05	2.37	-4.48	

VII. CONCLUDING OBSERVATIONS

In our review of the potential spillover effects of the re-imposed sanctions on Iran we analyzed the trade relationship of nineteen countries across MENA. We found that export trade with MENA represented less than 20 percent of Iran's total exports to the World in 2017. Top trading partners in the region include the UAE, Iraq, and Turkey, which all have multi-billion-dollar level of imports from Iran. The remaining MENA countries all import less than 500 million dollars of Iranian goods annually.

MENA country exports to Iran are equally trivial except for Turkey. Renewed sanctions on Iran will have limited spillover effects on MENA, except Iraq, Turkey and the UAE. This outcome goes a long way in explaining why Turkey, Iraq and the UAE have no financial interest in complying with the renewed US sanctions on Iran.

In addition to these three MENA countries, it is important to remember that the commodity concentration of Russian and Chinese products to MENA create possible substitution effects for US trade with the region. The limited trading participation of the majority of MENA countries with Iran occurred as Iran's trade relationships with India, Korea, China and Russia flourished, possibly in part as an un-intended consequence of the heightened sanctions period, which ran in effective implementation terms from roughly 2010-2013. At the same time, it appears that Iran's internal policy shift – again designed to divert its commercial relationships towards Asia and way from the USA and Europe - didn't necessarily evolve initially as a direct response after the imposition of the heightened sanctions. Rather it seems to reflect an internal Iranian policy shift as early as 2005 and 2006, which may describe a longer-term and guided re-orientation of the Iranian economy in anticipation of faltering relations with Western economies.

Russia's overall trade participation with MENA has been limited. However, with the re-imposition of sanctions Russia could benefit by expanding its exports to MENA of mineral fuels and bituminous substances, iron and steel, and cereals, all of which would potentially substitute for Iranian exports to MENA. In terms of MENA exports to Russia as a result of the re-imposition of sanctions (and possible related MENA country diversion of their exports from Iran to Russia), Russian exports of machinery, mechanical appliances, vehicles, and electrical equipment will benefit.

If China and India were to continue current levels of Iranian oil imports, it is possible that these two countries alone might keep Iran's exports high enough to help the country avoid a severe recession, even if other buyers, including Japan and Korea, were to reduce their imports dramatically. The shifts in Iran's oil export patterns might further increase Iran's reliance on China, which is already a top trading partner, and a major source of financing and investments in infrastructure in Iran.

The PRC does not appear to face a significant political issue directing its firms to continue transacting business with Iran, despite U.S. sanctions. India and Iran have reportedly agreed to use India's currency, the rupee, as a means of maintaining economic ties. In addition, the Indian government announced it would permit state refiners to continue to import Iranian oil. Chinese state oil traders have also shifted to using Iran-operated tankers to deliver oil.

Given the involvement of the PRC in Iran's oil industry, it appears highly likely that Iran will attempt to circumvent the sanctions by selling its oil to the PRC, via a transfer pricing mechanism that would avoid normal trade accounting. Oil sales to Turkey, Korea, the UAE and India may in this regard resort to gold sales and countertrade as well. Both options are viable mechanisms for renewed Iranian efforts at circumvention of the new sanctions, and will need to be taken into account as sanctions enforcement strategies continue to evolve.

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