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Research Article

The Role of the United States in the Relation between Iran and China as Two Key Members of the Asian Global Supply Chain

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With the birth of Fordism and the expansion of the markets beyond the states' borders, national supply chains have evolved into international and global supply chains. Some countries fared much better than others in becoming an irreplaceable part of the said chain. For instance, one could mention Iran due to its rich oil reserves and geopolitical position on the globe, China with its cheap human capital and high-profit margins, and the US with its massive reach all around the world. This study examines the US's mediatory effect on Iran-China's relations. Consequently, a derivative of the gravity model has been devised to test the said hypothesis. The dependent variables to test this hypothesis are China's imports from Iran and China's exports to Iran. The model controls the two states' currency value, their inflation rate, and the price of crude oil. Furthermore, the signing of the Joint Comprehensive Plan of Action in 2015 and the US's Maximum Pressure Policy in 2017 are the main variables of interest in the model in form of two dummy variables. The study employs a novel multidisciplinary approach both on the methodology front by introducing an abstract conception of distance and on the epistemology front by combining international economics literature with that of the international relations. According to the results, the US's foreign policy has a significant buffering effect on the trade between Iran and China. In other words, the United States acts as a distancing factor between the two states of Iran and China. This distancing effect, however, is stronger for China's imports from Iran in comparison to China's exports to Iran.

1. Introduction

The interconnected relations between the three states of Iran, China, and the United States cannot be fully explained by the two contemporary dominant schools of international relations, that is, neorealism and neoliberalism. For the past forty years, Iran has been challenging the US's role in the Middle East as the dominant ruler. Therefore, it seems to be a competition for control rather than for power which defies the main argument of the neorealists. Furthermore, the huge economic, political, and social costs that both sides have intestinally paid, over the course of the past four decades, suggest their lack of interest in absolute gains. In other words, neoliberalism seems to be unable to fully explain their relations as well. The same argument holds for the relations between China and the two other states.

When looked more closely, one could see that these intertwined relations are more of a social construct rather than anything else. For instance, the United States has used labels such as rouge state or supporter of terrorism to be able to exert its power onto Iran. On the other hand, the way the two states interact at the moment can only be fully grasped if looked at through history. What these two states mean to each other is actually the product of four decades of hostility. Even the presence of China in Iran as an ally, is a by-product of the two states common animosity

towards the United States. Otherwise, China could gain much more from siding with the world's number one superpower.

For years, China has been trying to enter the Middle East, which is literally the center of the world, via different means. In 2015, it furthered its efforts to enter the region by introducing the Belt and Road Initiative; a massive infrastructural project which connects China to Europe via a land road and a maritime one, both of which go through the Middle East. For the project to succeed, China needs reliable allies in the region. Since Saudi Arabia is leaning towards the United States, Iran seems to be the best choice available. This option is more fortified given the severe sanctions the United States has directly and indirectly posed on Iran.

Given the interconnectedness of the relations between the three states, a close study of their relations is of utmost importance. That is exactly what this study hopes to achieve. These three states have a complicated and intertwined common history which makes their current interactions ever so interesting for scholars as well as policymakers. Since the financial crisis in 2007, China has deepened its footholds in the world economy as one of the economic superpowers of the century. It has also come under the United States' radar as a potential threat in terms of power (economic or otherwise). To continue on this path, China requires resources such as natural oil and gas. Iran having an abundance of natural resources plus its animosity with the United States makes it the best candidate for China's efforts to deepen its footholds in the Middle East.

Since becoming a rising superpower and a trading partner without alternatives, trade relations between China and other states in the international marketplace have become a hot topic of study in different disciplines such as marketing [1–4], economics [5–8], international relations [9–12], and even sociology and anthropology [13–15].

However, the said studies lack a multidisciplinary aspect. They each follow a single epistemological approach unique to their field of study [5, 6]. Moreover, the existing body of literature is either focused on China alone, or has a dichotomous point of view with China on one side and one or a bundle of states on the other [15], that fails to account for the supercomplex structure of the international system of states in the 21st century. Therefore, there is still a room for an interdisciplinary and multifaceted study of China's foreign trade relations. This study is endeavoring to take the first step on this road by studying the intermediary role of US foreign policies in the nature of China's trade relations with Iran. The evolution of the literature and its gap which the present study intends to fill is apparent in Table 1.

The present study wishes to evaluate the depths of China's footholds in Iran.

In order to do so, we have the following:

(i) Using the data on trade of goods and services between the two countries, it gives a chronological account of events which correlates with the trade between Iran and China as well as China and the United States

(ii) It will also give a brief description of the hostile relation which was built between Iran and the United States over the past four decades

(iii) Afterwards, using a derivative of the gravity model the role of the United States in the depth of the relation between Iran and China is examined

(iv) Furthermore, three scenarios are compared, as is, without the JCPOA, and without the MPP

(v) Finally, the concluding remarks are made

2. The Truel between Iran, China, and the US

This section provides a conceptual assessment of the triangular relationship between Iran, China, and the United States based on the concept of Truel. It was first introduced to the literature through a novel by Fredrick Marryat, Mr. Midshipman Easy. In simplest terms, it refers to a three-way duel where three shooters are aiming at each other and either one could fire at any of the other two. Whether the shot is successful or not is dependent on the shooter's accuracy, the number of available bullets, and the order of shooters. In a popular culture, the most common reference to the concept is a scene from the movie " The Good, The Bad, and The Ugly" where the three main characters of the movie face off, followed by a considerable suspension in which the three shooters decide on the right course of action in order to survive.

The concept entered the game theory literature through the work of Martin Shubik (1964, 43), "Game theory and related approaches to social behaviour," and the work of Richard Epstein (1967, 343), "Theory of Gambling and Statistical Logic." D. Marc Kilgour was among the first scholars who conducted extensive studies on different variations of Truel [16–19]. Following the earlier works on the subject, a Truel consists of at least three players, a sequence of shooting, and a probability of success which together form each player's strategy for survival. The common strategies are missing on purpose, or shooting to kill, and they depend on several factors such as each shooter's accuracy as well as their intention towards each other.

For the purpose of this study, the three countries of Iran, China, and the United States are considered as the three shooters. The model's assumptions are based on the cultures of anarchy introduced in Alexander Wendt's Social Theory of International Politics (1999, 254). Absent an authoritative body in the international arena of states define each pair of states that could be defined as an alliance, a rivalry, or an animosity. Allies are states which never resort to violence for resolving their differences. Moreover, whenever one ally is under attack by a third party, the other allies will go to its aid. Rivals are states which respect each other's right to sovereignty. However, the military conflict is not an impossibility when having disagreements. Finally, there are enemies who simply ignore, neglect, or outright deny each other's right to sovereignty.

The NATO members could be considered as an example of the first group; US-China relations could be considered as an example of rivalry; and the conflictual and violent

Table 1: Key previous studies.

Author(s)	Title	Epistemological approach	Year
Weisan	China's foreign trade marketing strategy: problems and prospects	Marketing	1987
Yu	Capital investment, international trade, and economic growth in China: evidence in the 1980–1990s	Economics	1998
Roy	China's foreign relations	International relations	1998
Shambaugh	China's international relations think tanks: evolving structure and process	International relations	2002
Liu et al.	The vegetable industry in China; developments in policies, production, marketing, and international trade	Economics	2004
Chan	A Chinese political sociology in our times	Sociology	2009
Sun and Heshmati	International trade and its effects on economic growth in China	Economics	2010
Fordham and Kleinberg	International trade and US relations with China	Economics	2011
Sutter	Chinese foreign relations: power and policy since the cold war	International relations	2012
Jiménez-Asenjo and Filipescu	Cheers in China! international marketing strategies of Spanish wine exporters	Marketing	2019
Santasombat	The sociology of Chinese capitalism in Southeast Asia	Sociology	2019
Gong and Nagayoshi	Japanese attitudes toward China and the United States: a sociological analysis	Sociology	2019
Karamoko et al.	International online shopping: countries' development level matter in marketing Chinese brands?	Marketing	2022
Shen et al.	Interaction between international trade and logistics carbon emissions	Economics	2022
Zhang et al.	How do the industrial structure and international trade affect electricity consumption? New evidence from China	Economics	2022
Liu and Faez	The role of the United States in the relation between Iran and China as two key members of the Asian global supply chain	International political economy	2023

relations between Iran and Israel, or China and Taiwan can be categorized as enmity. The said dichotomies could have three degrees of internalization; by force, by benefit, and by intrinsic belief. The first degree of internalization indicates that such a relationship is crucial for each side's survival; the second degree of internalization indicates that such a relationship is quite beneficial for each side; and the third degree indicates that such a relationship is intrinsically ingrained in the state's internal structure and culture. This is better shown in Figure 1.

Regardless of their relation, the states are all in pursuit of survival. However, the expected survival of each state is a combination of its relative power, the other states' relative power, as well as the nature of the relation between each duo. For an international system consisting of three states, this can be stated in the form of the following equation:

$$E(S_i) = P_i + \sum_{j=1}^{n-1} sgn_{ij} P_j - \sum_{j,k=1}^{n-1} sgn_{jk}\left(P_j + P_k\right), \quad (1)$$

where $E(S_i)$ is the expected chance of survival for the state i, P_i is the state i's relative power, indicated as the probability of hitting the target, P_j and P_k are the state j's and state k's relative power, sgn_{ij} is the sign function which indicates the nature of the relation between the states i and j, and sgn_{jk} is the relation between the states j and k. The sign function takes three values of −1 for animosity and +1 for the alliance.

According to the equation system, each state's survival is a function of its relative power plus the other two states' relative powers weighted by the sign function which defines their relation with the main state, minus the combined relative power of the other two states weighted by the sign function which defines the relation structure of the other two states. Figure 2 is a schematic depiction of the abovementioned system for an international system consisting of three states with different relative power levels, two of which are allies and the third one is an enemy to the other two. Figure 2 shows a schematic representation of the abovementioned equation for a three-state case.

The figure includes three triangles for the three states of A, B, and C. The horizontal axis indicates the sign function of each duo's relation. The vertical axis is an indication of each state's relative power. The system consists of three triangular relations depicted in three different colors. Neither being one's own ally nor being one's enemy suggests that, for each triangle, the main state would be in the middle. Enemies would be positioned on the left side and the allies would be positioned on the right side of the figure. Based on the abovementioned figure and equation, each state's survival is the positive function of its relative power, a function of the other states' relative powers weighted by their relation structure with the main state, and a negative function of the combined relative power of the other states weighted by their relation structure. In the case of the three-state example, state A's survival is its relative power plus the relative power of its allies minus the combined relative power of the other two states. If the two are enemies, then their animosity will result in them distributing their resources to their rival and away from the rivalry with state A.

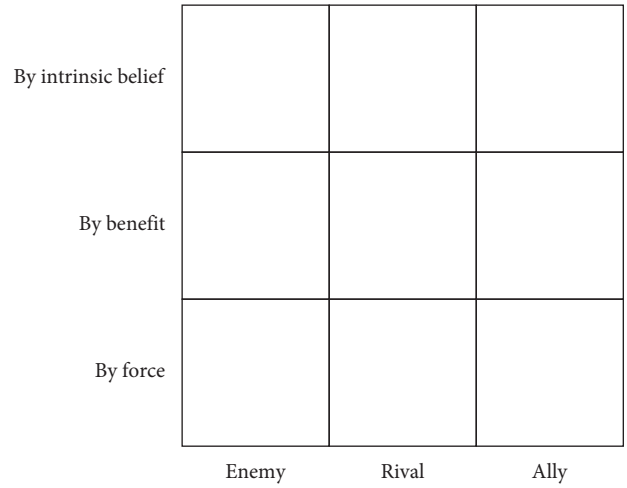

Figure 1: The cultures of anarchy ([20], 254).

3. Data

The data used for this study are extracted from the World Development Indicators [21]. The database is published by the World Bank and updated annually. The variables used for the study include the United States' GDP, China's GDP, Iran's GDP, their import of goods and services, and their export of goods and services. The time period of the study is 1979–2019. The reason for choosing this period, as explained in the following sections, is because the date is quite crucial for both China and Iran. The former got its global recognition after becoming the People's Republic of China and Iran became a democracy after 2500 years of the aristocracy.

Since the data used in this study constitute a time series, the first step would be to test the data for the existence of stationarity. The common way of doing so is by applying the augmented Dicky–Fuller unit root test [22]. Table 2 shows the result of the aforementioned test. As shown in the table, the key variables, natural logarithms of GDPs, exports, and imports, become stationary at the same level (one level of difference). Therefore, they can be used in an equation at the same level of difference. However, as it is indicated in Figures 3(a) and 3(b), the two dependent variables in this study (LEXPIRN and LIMPIRN) both exhibit a 1st autoregressive behaviour. Therefore, including an AR (1) coefficient in the model would improve its efficiency. Table 2 shows the results of the augmented Dicky–Fuller unit root test. Furthermore, the ACs and PACs for the study's dependent variables are shown in Figure 3.

4. Iran-China-US

In this section, the relations between the three states of Iran, China, and the United States will be evaluated in detail.

4.1. Iran and China. The time period of the study in this paper begins in the year 1979. There are two reasons for choosing this starting point. First, Iran's regime in this year changed from an aristocratic dictatorship to an Islamic republic through a people's revolution. Such a change came

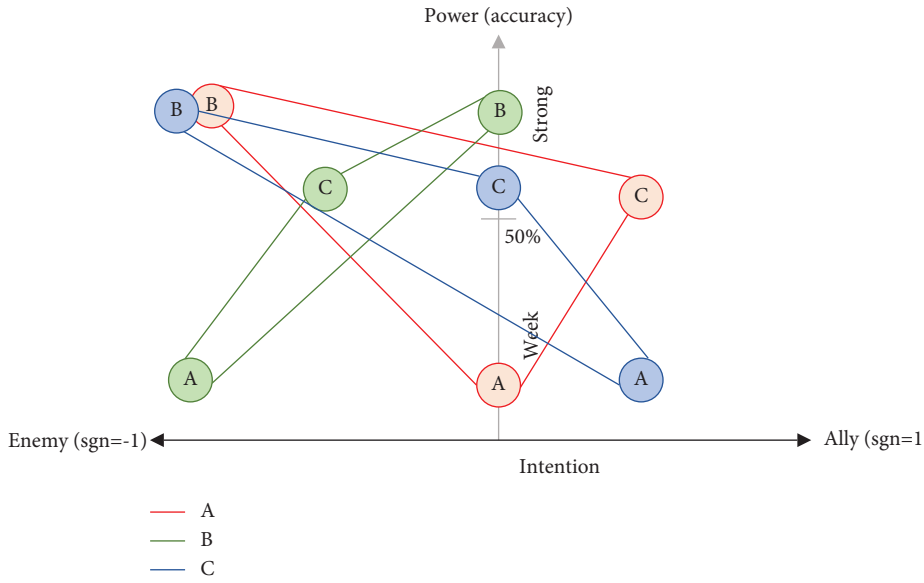

Figure 2: Schematic depiction of a Truel between the three states with three different relative power statuses.

Table 2: Augmented Dicky–Fuller unit root test.

Variables	The *t*-student				Trend and intercept	Difference level
	Augmented Dicky–Fuller	1%	5%	10%		
GDPCHN	−6.31	−4.23	−3.54	−3.20	Trend and intercept	2
LEXPIRN	−2.93	−2.63	−1.95	−1.61	None	1
LIMPIRN	−4.76	−4.24	−3.54	−3.20	Trend and intercept	1
LGDPIRN	−6.83	−4.22	−3.53	−3.20	Trend and intercept	1
LGDPCHN	−4.74	−4.22	−3.53	−3.20	Trend and intercept	1

Source: estimations based on the data extracted from the World Development Indicators (2020).

with massive national and international complications for Iran. Internally, the newly found regime had to face several separatists revolting against it, combined with the numerous difficulties of reorganizing the bits and pieces of the previous regime. Internationally, while facing sanctions from the United States, Iraq invaded Iran, just one year after the 1979 revolution, a forced war which lasted till 1988 [24].

Second, China which is the other aspect of this study was internationally recognized after the communist party changed it from an aristocratic dictatorship to a communist country [25]. Consequently, as a new player in the international realm, China gained ever-increasing importance. The newly found regime, the People's Republic of China, had nothing in common with the previous regime which meant redefining every key institution anew [26]. This was difficult, especially since the international society took nearly six years to accept the new regime. In other words, 1979 was a key milestone for both Iran and China.

Having a common enemy made Iran and China perfect partners, their shared hatred for the United States pushed them towards one another. Therefore, as chart 1 depicts, over the past 40 years, Iran's share of the trade with China had an upward overall trend. However, if looked closely, this upward trend had numerous ups and downs. Moreover, these fluctuations are not the same for imports in comparison with exports. For the better part of the first period (1979–2000), Iran's imports from China in its total import surpassed Iran's export to China in its total export. The opposite seems to be true for the second period (2001–2019) [27].

According to section (a) in chart 1 until 1988, Iran was more of an importer from China rather than an exporter to it. This was most likely because during the eight-year war between Iran and Iraq, China was one of the few countries which was willing to support Iran's wartime needs. While the western states refused to partner up with Iran, China, having animosity with the West world, saw Iran as a suitable ally to stand up against the Imperialistic West. On the other hand, Iran, in deep need of support, began trading its oil with China's supplies for weaponry [28]. In 1979, Iran's import from China was less than 1 percent of its total imports. Till 1988, the figure went up to 1.3 percent. On the other hand, Iran's share of export to China in its total exports never surpassed 0.5 percent during this time. This was partly because the main exporting item was crude oil and during the wartime, its transportation faced many obstacles.

After the war between Iraq and Iran ended in 1988, there came the time for the restoration of all that was lost during the war. Many cities were heavily damaged and many people were misplaced. The constructions had to be restored and the people had to be relocated [29]. To do so, Iran required

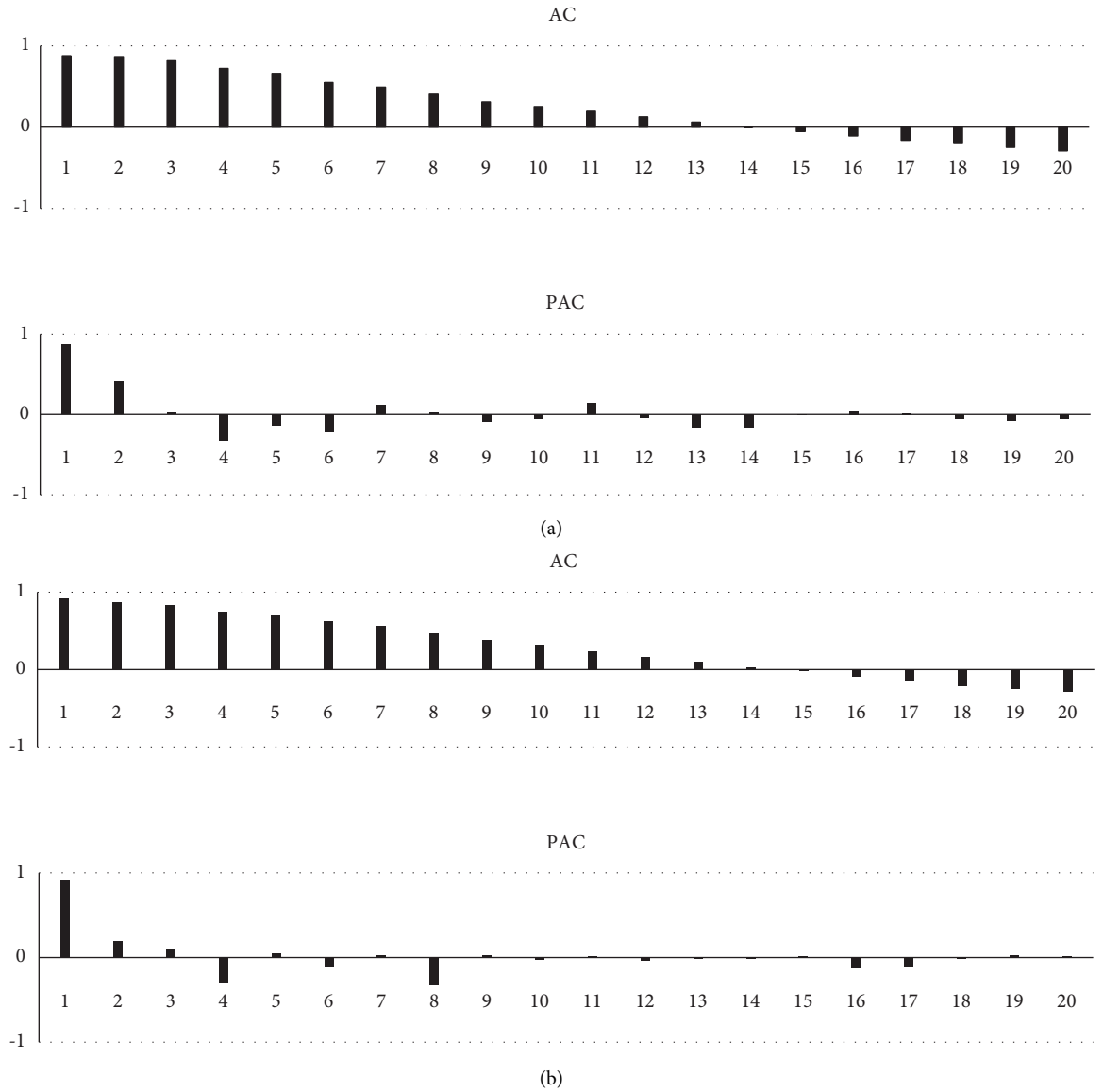

Figure 3: Correlogram of LIMPIRN and LEXPIRN with 20 lags at the level. Source: estimations based on the data extracted from the IMF direction of trade statistics [23]. (a) Natural logarithm of China's import from Iran (LIMPIRN). (b) Natural logarithm of China's export to Iran (LEXPIRN).

resources, many of which it did not have. Therefore, Iran's trade with foreign states increased. Consequently, so did its trade with China. This is one of the main reasons for the considerable increase in Iran's share of trade with China after 1988. Iran needed many items and only had oil to sell. This could be the reason for its import from China surpassing its export to China. However, with the end of the restoration phase in Iran, the time for Iran's modernization has come. China grasped the opportunity by partnering with Iran in constructing Iran's first subway line in Tehran [30].

According to chart 1, in 1999 Iran's share of export to China in its total export considerably surpassed its share of imports from China in Iran's total imports. In this year and henceforth, China's partnership with Iran evolved. Besides exporting various items to Iran, China began investing heavily in Iran's different sectors. As it seems, Iran paid for these investments with its endowment of oil. Little by little, due to severe international sanctions, Iran lost its other customers in the oil market. Therefore, China's share in Iran's export began increasing more or less constantly. While being a little under the share of export, Iran's imports from China followed the same trend. It seems as if Iran's relationship with China is similar to a barter economy in which Iran pays for its needs from China with its oil [31].

Since 1979 Iran has been under various severe sanctions; most of which were initiated by the United States and its allies. The main supporters of these sanctions were the western states. During the same time, China considered the West as its enemy and hence Iran as its ally. However, the signing of the JCPOA by the world's superpowers and Iran, expanded Iran's trading options [32]. Consequently, its share of export (import) to (from) China has decreased

considerably since 2015. In the year 2017, however, President Trump left the JCPOA and introduced several new sanctions against Iran. This in turn, limited Iran's options for trade which again increased the share of Iran's trade with China and pushed it up to more than 40 percent in 2019 [33]. Figure 4 shows the trend in Iran's trade with China as the share of Iran's total trade for the period of 1979–2019.

4.2. Iran and US. While the two states of Iran and the US have considerable economic interactions with China, their relationship with one another is more political than economic. The first considerable interaction between the United States and Iran could be traced back to the final years of the Second World War. In 1941, with the help of its allies, the United States forced the reigning king of Iran (Reza Shah) out of his seat and gave the power to his son, Mohammad Reza Pahlavi [34]. His reign lasted until the revolution of 1979 which turned the 2500-year-old monarchy into a newly born democracy. During this time, Iran acted more like a colony for the United States. For nearly 30 years, the United States exploited Iran's natural resources, as well as its geopolitical position in the Middle East. Until in 1951, Iran's Prime Minister (Mohammad Mosaddegh) began the first steps of rebellion against the US by commencing the process of Iran's oil industry nationalization [35].

Since the efforts of Mosaddegh in preventing the US from exploiting Iran's endowments, the relationship between the states began to deteriorate. However, the first real hit to the relations between Iran and the United States was when through a people's revolution in 1979 [36], Iran's political structure went under massive modifications. In that year, Iran became the first Islamic democracy in the world and officially revolted against the hegemony of the United States in the region. The first act of animosity towards the United States was to take the American workers at the embassy hostage for 444 days [37]. It was the first time that the American officials (POTUS) put the stamp of Terrorism on Iran by calling the hostages "victims of terrorism and anarchy" [38].

Since the very first day of the Islamic republic of Iran's birth, the Iran-US relations have been deteriorating day after day. During the war with Iraq, Iran faced the first rounds of sanctions from the West [39]. It was accused of defying human rights in the name of war. As time passed the sanctions against Iran piled up and each had a different reason. For the past forty years, Iran has been accused of supporting terrorism, defying human rights, and pursuing nuclear weaponry. While none of these accusations have been proven, Iran has gone under several economic sanctions for each and every one of them.

The well-known animosity between the two states is also quite obvious in the two countries' media. Over the past forty years, both the countries have held massive rallies against each other; they have also made several movies and TV shows which depicts the other side's intentions as negatively as possible. Furthermore, the two states' news outlets as well as their scientific circles describe the other side with words such as cheater, dangerous, and terrorist [40–42]. In sum, the relationship between the two states is anything but not friendly and it has been so for the past forty years. It seems that the two states have entered a game of power competition to gain the position of strength inside the Middle East. The winner of the game is yet to be determined. Its casualties, however, are quite considerable.

4.3. US and China. The relationship between the United States and the People's Republic of China since 1979 and up to twenty years before has been quite rocky. In the beginning years of the foundation of the People's Republic of China (1949–1971), their relationship was more or less hostile. This was partly because the US commenced the cold war with the USSR which was a communist state; the same as the PRC [43]. However, the USSR and the PRC soon parted ways and the US became the enemy of the China's enemy. This in China's mind is similar to a friend. In 1968, ending the Vietnam War, in which China and the US were foes, became the second milestone for a friendly relationship between the two countries. Finally, on 15 December 1978, the US officials announced the commencement of relations on 01 January 1979 [44]. However, given their twenty-year history of conflict, their friendship did face several challenges.

As the two sections of chart 2 depicts, the main period of volatility seems to last until the year 2000. Afterwards, China's trade with the United States followed a more or less smooth upward trend. In other words, it took around two decades for China and the United States to build a somewhat stable economic relationship. However, their political relationship, which can be traced on the news media, was much rockier. Its effects can also be traced in the development of trade between China and the US.

Up to the year 1979, the United States did not officially recognize the People's Republic of China. Therefore, the very little share of trade between the two states, as is shown in chart 2, seems reasonable. However, in 1979, the United States officially recognized the PRC; which explains the sharp rise in trade between the two states. It is worth mentioning that until 1989, China seemed to have little to offer to the United States. Therefore, imports from China were considerably less than exports to it. Also, they had little fluctuations, while export to China seems to have fluctuated heavily over the span of twenty years.

The trade between China and the United States seems to be more dependent on the political factors rather than the economic needs [45]. Almost every fluctuation in the US export to China seems to be parallel to a critical political event. For instance, the same year China and the United States disagreed on the US's arms sales to Taiwan, the US export to China dropped heavily (1982). On the other hand, as the US officials classified the PRC as a "friendly developing nation" in 1983, China began to buy more goods from the United States. In 1985, the share of the US export to China in its total export dropped considerably. Interestingly enough, it was parallel to the US's new protectionist legislations against China. The next big fall in the US export to

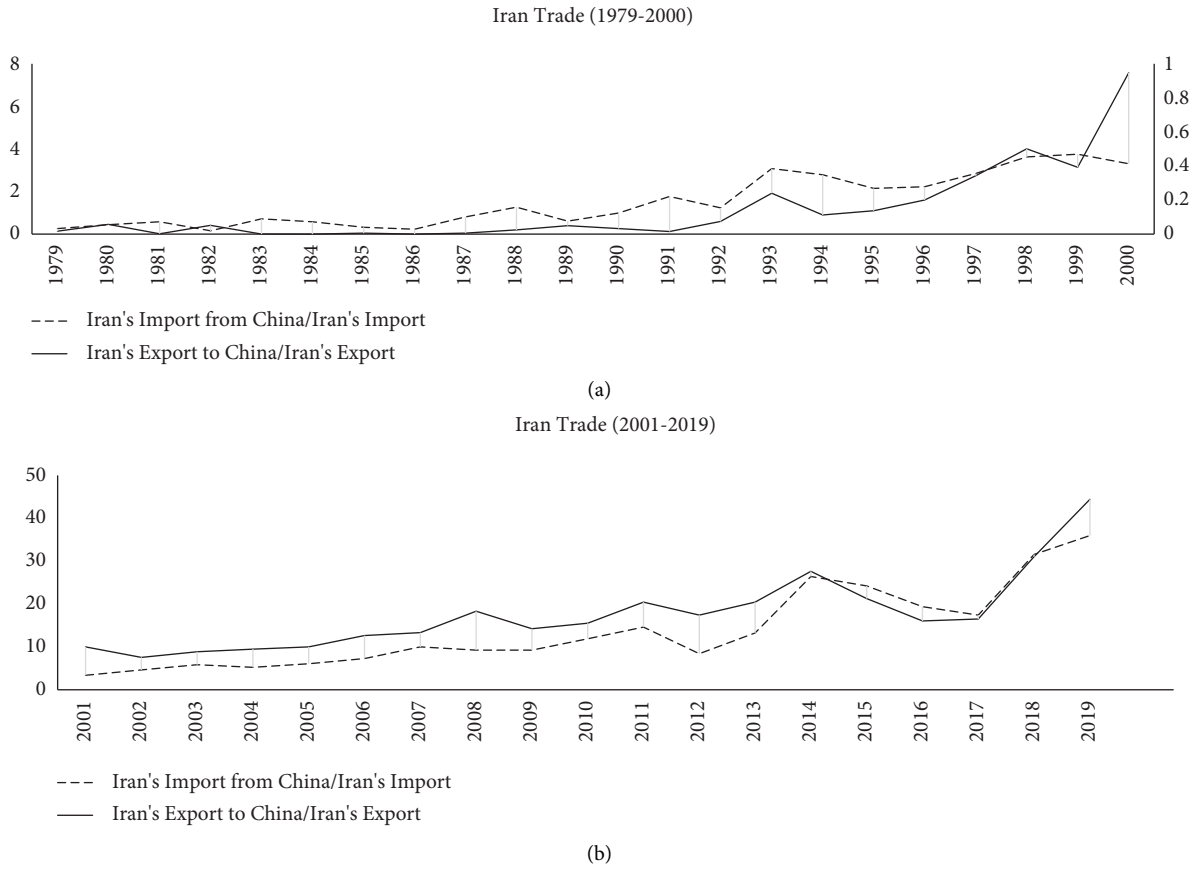

Figure 4: Share of Iran's trade with China in Iran's total trade (1979–2019). Source: the IMF direction of trade statistics [23]. (a) 1979–2000. (b) 2001–2019.

China was in 1989; the very same year the communist party massacred many students in Tiananmen. According to the data depicted in chart 2, the US punishing China for humanitarian crimes does not last more than a year. One year after each fall in the US export to China, the direction either changed or its intensity dropped considerably.

As is depicted in chart 2, the US import from China does not follow the same behaviour as the US export to China. Up to the year 1992, China was more or less a mere customer of American products. In 1992, however, the tides changed. Little by little, China accumulated capital and improved its industry. In 1992, as it shows in the chart, Chinese products did reach the level of international export. Therefore, the US imports from China jumped considerably and followed a much-sharped increasing trend. In just one year (from 1992 to 1993) the share of the US imports from China in its total imports, nearly doubled from 1.5 percent to 2.8 percent.

Since 1992–1993, China has become one of the key economic superpowers of the modern world [46]. As a result, its trade figures with the other superpower (United States) face less volatility since then. Even in 2007 and after the global financial crisis, the US trade with China did not drop. After a year or two, it even jumped up. The only considerable drop in the trade between the two states happened in 2015 which was the same year the JCPOA was signed and in 2018, which marks the beginning of the trade war between China and the US. Figure 5 shows the trend of the US's trade with China as a share of its total trade for the period of 1979–2019.

4.4. US-China Trade War. In 2018, the United States began imposing high levels of tariff on goods and services which were imported from China. The Trump administration accused China of conducting unfair trade practices and also not respecting the intellectual property rights of others. The United States objective for imposing such harsh policies against trade with China was twofold; on the one side, the Trump administration sought a reduction in the United States' trade deficit with China. Since Deng Xiaoping's reforms in 1992, the US's imports from China superseded its export to this newly found superpower. The trade deficit has been considerably negative ever since. Figure 6 shows the trend of China's total trade with the US for the period of 1979–2019.

This erratic behaviour of the Trump administration had many spill-over effects. For one, this full-on trade war with China hit the US consumers and farmers drastically. They were faced with financial hardships and higher prices due to this tit-for-tat policy. China also took considerable hits as well. Both its economy and industry lost the record high speed of growth they had for several years. To China, the United States was, is, and probably will be a huge customer.

Figure 5: Share of the United States' trade with China in the United States' total trade (1979–2019). Source: the IMF direction of trade statistics [23]. (a) 1979–2000. (b) 2001–2019.

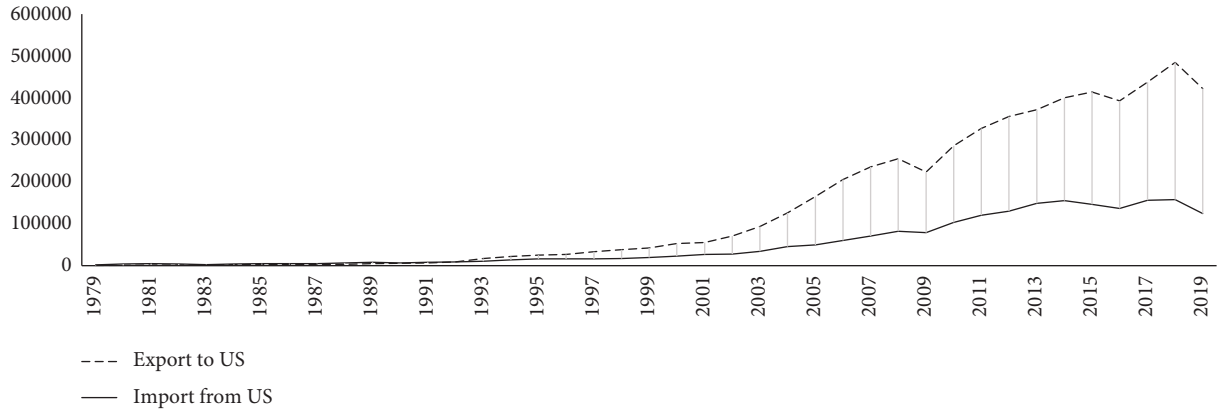

Figure 6: China's trade with the United States (1979–2019). Source: the IMF direction of trade statistics [23].

In other words, the sharp decline in trade with China in 2018 was a huge hit on both sides.

The trade war between China and the United States is not anything new. Despite many criticisms, this is not the first time the advocates of the free market and liberalism use tariffs and duties to exert their power and will onto other states. While probably not correct any more, there is ample evidence that in its infancy the western industrialization was built on the bricks of high tariffs and disrespect for intellectual property rights [47]. Indeed, those states that are preaching, such radical liberalist policies, got where they are now by doing the exact opposite. The United States is not an exception. The Smoot–Hawley act of 1930s is a good example of such behaviour.

During the late 1920s and early 1930s the Republican Party wanted to uphold its commitment to the agricultural sector in order to win more votes. Therefore, it supported increasing the average tariffs on dutiable imports from 38% to 45%. This action which only covered 1/3 of the US imports and merely amounted for 1.4% of the US GDP [48]

was not a significant factor in pushing the US into the great depression [49]. It, however, was and is a good point of reference as a benchmark for bad state behaviour since 1930. It also showed some pull during the financial crisis in 2008.

The so-called Sino-US trade war since the 2018 followed three phases from the US side. On 22 January 2018, the US put global safeguard duties on imported solar panels and washing machines from China. It amounted to a USD of 10.3 billion [50]. Furthermore, on 01 March 2018, duties of 25% for steel and 10% for aluminium were introduced [50]. The excuse for doing so was to protect national security. Finally, on 06 July 2018, the USD of 34 billion imports from China faced 25% tariffs. The same amount was imposed on the USD of 16 billion goods and services on 22 August 2018. On 24 September 2018, the USD of 200 billion worth goods and services from China faced a 10% tariff which was increased to 25% by 10 May 2019 [50]. The excuse for such harsh treatment was China's violation of intellectual property rights.

China did not idly stand by while the US did whatever it wanted. The Chinese government paid back the American favors in full. China threatened to increase the duties on sorghum exports up to 178.6%. On 02 April 2018, China imposed duties on the USD of 2.4 billion worth of goods including aluminium waste, fruits, nuts, and pork. Later on, the USD of 34, 16- and 60-dollars' worth of imports went under 25% tariffs. On 01 September 2019, another USD of 75 billion went under the shadow of heavy tariffs. It included different brands of American cars and experienced a hefty rise in tariffs from 12.6% to 42.6%. This tit-for-tat behaviour in trade and tariffs continued until the WTO initiated some trade talks between the two states. As a result, China excluded the USD of 2 billion of goods from the tariffs; and the United States delayed the 5% increase in the USD of 250 billion goods from 01 October 2019 for 15 days. Figure 7 shows the share of the Sino-US trade war in the two states' bilateral trade since its commencement in 2018.

Overall, the Sino-US trade war cost the citizens of the two countries, USD 6.9 billion worth of welfare loss [51]. However, not everyone paid for the two superpowers fighting. For some countries this trade war was somewhat beneficial. The neighbor countries had less CO_2 emissions thanks to the reduced atmospheric transboundary transport. Furthermore, the war made other states more interesting as trading partners for China and the United States. As a result, many countries in the developing regions as well as in the Western Europe and Latin America experienced higher GDP growths after the war began [52].

5. The Empirical Model

5.1. Model. The model applied in this study is a derivative of the gravity model. It was extracted from the theory of gravity, by Sir Isaac Newton, from the school of physics. In physics, the gravity model indicates that the force between the two masses is directly proportional to their mass and inversely proportional to their distance. In other words, the closest the two masses are, or the heavier they are, the stronger the force between the two will be. In 1931, this way of thinking entered the realm of economics as the law of retail gravitation [53]. Later on, in 1962, according to Anderson and Van Wincoop [54], the concept was redefined and the use of the gravity model in the trade began. The basic depiction of the model is as follows:

$$F_{ij} = \frac{M_i^{\alpha} M_j^{\beta}}{D_{ij}^{\theta}}, \tag{2}$$

where F_{ij} is the force between the two objects, M is the size of objects i and j, D is the distance between the two objects, and α, β, and θ are the factorial components. The model has been used and devised in numerous studies to analyze the different issues. For instance, Alexander and Merkert [55] used this model to study the air traffic market in Australia. In doing so, they introduced attractions and impedance as the factors affecting the distance between the two points. While Alexander and Merkert [56] have used the gravity model to evaluate the dynamics of the aviation industry; others have used the model to evaluate other markets as well.

For instance, Natale et al. [57] have applied the same model to study the seafood trade. They have based their model on the idea that trade flows are proportional to the product of the economies of the exporters and the importers and inversely proportional to their geographical distance. While they used GDP as the factor for defining the size of each economy, others such as Matsumoto and Domae [58] augmented their models by including population and GDP per capita in theirs.

The variable for distance has also been modified based on the subject of the study. While many studies have taken geographical distance as the representative of distance in their models; some have taken a much more different path. For instance, Kuik et al. [59] have included the existence of a common tongue, past colonial relationships, regional trade agreements, and common borders as representatives of distance as well. They have taken into account the simple fact that due to the improvements in the transportation industries, geographical distance does not hold the weight it used to.

In this study, a new derivative of the model used by Porto [60] has been devised. The following table shows the variables used in this study as well as their unit of measurement. Table 3 provides an introduction of the variables used in this study.

The initial estimated equation is as follows:

$$TRADE_{CHN,IRN,t} = \frac{GDPIRN_t^{\alpha}.GDPCHN_t^{\beta}}{D_{CHN,IRN,t}^{\theta}}, \tag{3}$$

where TRADE is the amount of trade between China and Iran over a time span of t, GDPIRN is Iran's GDP over a time span of t, GDPCHN is China's GDP over a time span of t, and D is the distance between the two states of Iran and China over a time span of t. In order to be able to estimate a linear equation, the logarithm of the abovementioned equation must be taken. The result is as follows:

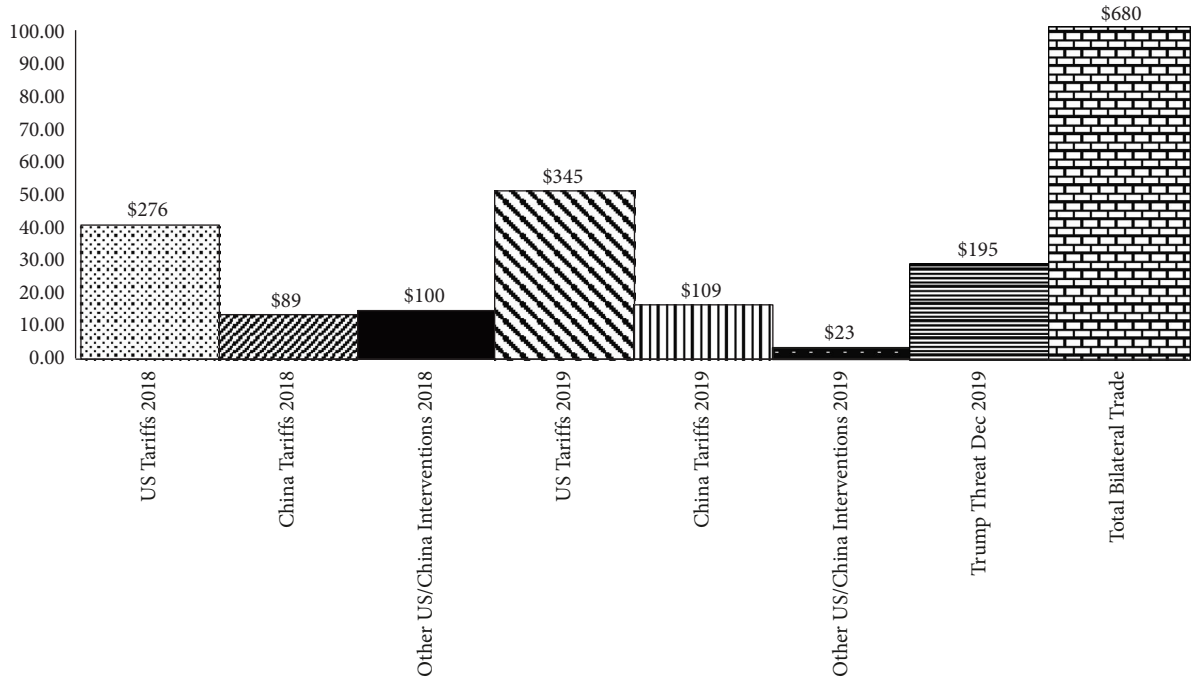

Figure 7: Share of the Sino-US trade war in total bilateral trade. Source: Evenette [49].

Table 3: The variables used in the model.

Variables	Explanation	Unit of measurement
Year	Year	Discrete
EXPIRN	China's export to Iran	Constant 2010 USD
LEXPIRN	Natural logarithm of China's export to Iran	Continuous
IMPIRN	China's imports from Iran	Constant 2010 USD
LIMPIRN	Natural logarithm of China's import from Iran	Continuous
GDPIRN	GDP of Iran	Constant 2015 USD
LGDPIRN	Natural logarithm of GDP of Iran	Continuous
GDPCHN	GDP of China	Constant 2015 USD
LGDPCHN	Natural logarithm of GDP of China	Continuous
JCPOA	The signature of the JCPOA (0 for before 2015 and 1 for after)	Dummy
MPP	The US leaving the JCPOA (0 for before 2017 and 1 for after)	Dummy
INFIRN	Inflation rate in Iran	Continuous
INFCHN	Inflation rate in China	Continuous
RIALUSD	Value of one Iranian Rial in USDs	USDs
YUANUSD	Value of one Chinese Yuan in USDs	USDs
OILPRICE	The price of each barrel of oil from Iran	USDs

$$LTRADE_{CHN,IRN,t} = \theta LD_{CHN,IRN,t} + \alpha LGDPIRN_t + \beta LGDPCHN_t. \quad (4)$$

The geographical distance between the two states in the study is in fact constant over time. However, as argued earlier, the distance between the two states has an intangible side. The purpose of this study is to assess the effect of the United States' foreign policy towards Iran on the said intangible side of the distance between Iran and China. Therefore, signing the JCPOA and the maximum pressure policy [61] are included in the model. The former represents a favorable policy (hence, lengthening the distance) and the latter represents a hostile one (hence shortening the distance). The result is as follows:

$$LTRADE_{CHN,IRN,t} = \theta LD_{CHN,IRN,t} + \alpha LGDPIRN_t + \beta LGDPCHN_t + \gamma JCPOA + \delta MPP, \quad (5)$$

where JCPOA is a dummy variable which takes 1 after 2015 when the deal was signed and 0 before the signing date; and MPP is a dummy variable which takes 1 after the US decided on leaving the deal in 2017 and 0 before the said date. The main dependent variables (China's export to Iran and China's import from Iran) which following the previous section has an AR structure. Furthermore, the two states'

inflation rate and their currency value in USD are included as control variables. Moreover, considering the fact that Iran's main source of foreign currency is its export of crude oil and its products [62], the price of oil is also added to the model. Therefore, the final model is as follows:

$$\begin{aligned} LTRADE_{CHN,IRN,t} = {} & \theta LD_{CHN,IRN,t} + \alpha LGDPIRN_t \\ & + \beta LGDPCHN_t + \gamma JCPOA + \delta MPP \\ & + \varphi_1 INFIRN_t + \omega_1 RIALUSD_t \\ & + \varphi_2 INFCHN_t + \omega_2 YUANUSD_t \\ & + \rho OILPRICE_t + AR(1) + \varepsilon_t, \end{aligned} \tag{6}$$

where $\theta LD_{CHN,IRN,t}$ is the intercept, $\alpha LGDPIRN_t + \beta LGDPCHN_t$ is the effect part of the equation, $\gamma JCPOA + \delta MPP$ is the explanatory part of the equation, $\omega_1 RIALU\ SD_t + \varphi_2 INFCHN_t + \omega_2 YUANUSD_t + \rho OILPRICE_t$ is the control part of the equation, $AR(1)$ is an indicator of an autoregressive process (level 1), and ε_t is an error term with a constant variance and mean zero.

The main hypothesis in this study is the following:

H_0: the United States' foreign policy towards Iran has a significant effect on the trade between Iran and China

5.2. Results. In this section, the results from the estimation of the gravity model for the trade between Iran and China is discussed. The trade between any two states has two key aspects, that is, import and export. Thus, for the purpose of the research study, two different indicators were used as the dependent variable; China's imports from Iran and China's export to Iran. For each dependent variable three equations were estimated; one without including any indicator for the US's foreign policy towards Iran (EQ1); one with the signing of the Joint Comprehensive Plan of Action (JCPOA) as an indicator for the US's foreign policy in favor of Iran (EQ2); and another with the US's maximum pressure policy (MPP) as an indicator of the US's foreign policy against Iran. After the estimations, each equation was tested for the normal assumptions of regressions in terms of normality, heteroskedasticity, serial correlation, and autocorrelation. If any of them were not satisfied, the results were modified accordingly.

When using China's export to Iran as the dependent variable for controlling the two states' currency value, their respective inflation rate, and the price of oil, the first thing that comes to mind is the much higher influence of Iran's GDP on the dependent variable in comparison with China's GDP. A 1 unit of increase in Iran's GDP growth rate would result in 2.1 units of increase in China's export to Iran. That is while 1 unit of increase in China's GDP growth would result in a mere increase of 1.01 units of increase in its export to Iran. In other words, the bigger Iran's economy, the more China will export to it.

On the other hand, when considering China's imports from Iran which mainly consists of crude oil, the argument becomes reversed. 1 unit of increase in Iran's GDP causes 0.193 units of increase in China's imports from Iran. However, the coefficient is not statistically significant. On the other hand, the estimates suggest that 1 unit of increase in China's GDP causes 1.725 units of increase in China's import from Iran. In other words, China's import from Iran is significantly affected by the China's economy's size while not exhibiting any significant effects from the Iran's economy's size. One other point worth making here is that Iran's share in China's trade notwithstanding, is that it is not the only supplier of China's need for crude oil in the Middle East; nor is it the main one.

Economic sanctions are considered to be a less violent substitute for the war between states in which the imposing state isolates the target state by limiting the trade opportunities it could have [63]. In the current globalized economy, the only way sanctions could work is with an unshakable solidarity [64]. In other words, the imposing state needs support from other states, or at least those that matter, to be able to succeed in its policies toward the target country. Otherwise, the target state would simply find other trade partners. In other words, while sanctions limit the receiver's options, in the presence of what the literature labels as black knights [61], the extent of the sanctions' intended effect could be limited. The estimated coefficients for JCPOA and MPP act as an evidence for the said argument.

According to the results in Table 3, the signing of the JCPOA exhibits a significant decreasing effect on the trade between the two states in the study. The estimates suggest that the effect of the deal was considerably stronger in decreasing the growth rate of China's imports from Iran than China's export to Iran. Evidently, signing the JCPOA provided Iran with more options in terms of trade partners. However, the numbers suggest that Iran is more dependent on Chinese exportable goods and services than China is dependent on Iranian exportable goods and services. Consequently, Iran was able to find better costumers for its exportable goods and services.

The other aspect of the estimates, namely, the US leaving the deal which is popularly known as the maximum pressure policy (henceforth indicated as MPP), does not exhibit a significant direct effect on China's trade with Iran, either in the form of import or in the form of export. However, it seems to have had an indirect effect on Iran's trade with China through the effect of oil prices which is Iran's main source of foreign currency and international trade. In other words, while the initial estimates suggest no apparent effect for MPP on China's trade with Iran, further inspection suggests that MPP has affected Iran-China's trade relations through the change in oil prices. The output of the estimated equations is shown in Table 4.

5.2.1. Competing Scenarios. Given the statistical direct and indirect significance of the two main variables in the study, JCPOA and MPP, this section is dedicated to discussing three different scenarios; as is, without JCPOA, and without MPP. In other words, by using the estimated model three forecasts have been made for China's export to Iran and its import from Iran; the actual value, the value if the JCPOA

Table 4: The results of the gravity model.

Variables	LEXP						LIMP					
	1		2		3		1		2		3	
	Coef	S.E.	Coef	S.E.	Coef	S.E.	Coef	S.E.	Coef	S.E.	Coef	S.E
Constant	−76.802***	16.369	−93.223***	13.952	−76.520***	11.217	−51.352*	26.673	−88.037***	27.503	−50.870*	26.046
LGDPIRN	2.111**	0.941	2.284**	0.750	2.010**	0.681	0.193	1.299	0.496	1.109	0.084	1.277
LGDPCHN	1.011***	0.334	1.461***	0.336	1.096**	0.312	1.725***	0.510	2.809***	0.494	1.810**	0.544
INFIRN	−0.015	0.009	−0.012	0.007	−0.012	0.009	−0.038*	0.020	−0.034**	0.016	−0.036*	0.020
INFCHN	0.004	0.010	0.007	0.009	0.003	0.009	0.026	0.018	0.038**	0.014	0.025	0.018
RIALUSD	$-2.46E-06$	$3.53E-06$	$-3.20E-06$	$6.65E-06$	$-8.21E-07$	$5.16E-06$	$-3.61E-07$	$7.72E-06$	$-1.17E-06$	$9.90E-06$	$6.42E-07$	$1.28E-05$
YUANUSD	−0.092**	0.040	−0.194**	0.052	−0.104**	0.033	0.477***	0.094	0.253**	0.103	0.468***	0.093
OILPRICE	0.009**	0.003	−0.001	0.005	0.008**	0.003	0.027**	0.010	0.004	0.011	0.026**	0.010
JCPOA			**−0.664** **	**0.259**					**−1.621** **	**0.632**		
MPP					**−0.469**	**0.359**					**−0.336**	**1.202**
AR (1)	−0.069	0.160	−0.215	0.149	−0.211	0.149	−0.081	0.265	−0.236	0.218	−0.075	0.262
SIGMASQ	0.035	0.010	0.028	0.010	0.029	0.009	0.168	0.042	0.125	0.036	0.165	0.041
R-squared	98.80%		99.04%		99.03%		97.30%		98.00%		97.36%	
F-statistic	220.396		238.011		234.905		96.193		112.690		84.705	
Prob (F-statistic)	0.000		0.000		0.000		0.000		0.000		0.000	

***99%, **95%, and *90% degree of confidence. Source: research estimations based on the IMF data on the direction of trade [23] and the World Development Indicators [21].

Figure 8: China's export to Iran under different scenarios (1988–2019). Source: research estimations based on the IMF data on the direction of trade [23] and the World Development Indicators [21].

Figure 9: China's imports from Iran under different scenarios (1988–2019). Source: research estimations based on the IMF data on the direction of trade [23] and the World Development Indicators [21].

has not been signed, and the value if MPP has not been implemented. Charts 5 and 6 show the three scenarios for the period of 1988–2020.

According to chart 5, if the JCPOA has not been signed and the trend before 2015 has been continued, China's export would have increased considerably. However, as it is evident in the chart, the actuality of it is that China's export to Iran declined after the signing of the JCPOA. Furthermore, the MPP seems to be a policy which pushes China's export to Iran down; while in the scenario where the US does not leave the deal, China would export more to Iran.

On the other hand, according to chart 6, not signing the JCPOA would act as a considerable shock to China's import from Iran; making China one of the few viable customers for crude oil which is Iran's main exportable good. However, as the chart suggests, this shock is not sustainable and the value returns to the prior trend starting in 2017 and reaching the prior trend in 2019. Furthermore, the US not leaving the deal (MPP) does not seem to create a considerable change in the trend of China's import from Iran. In other words, as the results suggest, China kept a constant share of imports from Iran, regardless of the international political environment. Figures 8 and 9 show the simulated trend of China's export and import to and from Iran, respectively, for the period of 1979–2019.

6. Conclusion

6.1. Discussion. This paper is an attempt to shed some light on the role of the United States and its sanctions on the relation between Iran and China. The three states are the key figures in the current international supply chain. Therefore, the study of the three states' relations could prove fruitful in better achievement of the sustainable global supply chains [65]. In order to do so, the trade of goods and services between Iran and China was analyzed using a derivative of

the gravity model. The signing of the JCPOA in 2015 and the US officially leaving the deal in 2017, popularly known as the maximum pressure policy (MPP) were introduced in the model as indicators of the US's foreign policy towards Iran; the former being a favorable one and the latter being a hostile one. The main hypothesis of this study was that the United States' foreign policy towards Iran has a significant effect on the relation between the two states of Iran and China.

Before estimating the main equation, a chronological account of the trade between Iran and China as well as between China and the US was given. According to the data on the trade between Iran and China, whenever the relations between Iran and the West were hazy, Iran and China increased their trade. This was more obvious when the US left the JCPOA in 2017. This may also be among the main reasons for the signing of a 25 year MOU between Iran and China in 2021. In the literature of international sanctions, they only succeed if there are no black knights to help the receiver evade the sanctions. The data clearly shows China to be such a knight for Iran.

The data on the trade between China and the United States bared some interesting fruits as well. While Iran seemed to have a somewhat balanced trade with China, the United States' share of imports from China, especially in the recent years, have surpassed its export to the country of dragons considerably. In other words, while Iran seemed to have bartered its oil for Chinese products; the United States evidently has failed in selling its products to China while being ever more increasingly dependent upon Chinese products.

The results of the gravity model clearly supported the research study's main hypothesis. According to the figures, the signing of the JCPOA had a significant buffering role with respect to the trade between Iran and China. Its negative effect seemed to be much stronger on China's imports from Iran in comparison to China's export to Iran. However, the US leaving the deal in 2017 seemed statistically insignificant in affecting China's trade with Iran. This notwithstanding, introduction of the MPP into the model showed an indirect effect on trade through changes in oil prices. The said results are summarized in the following list:

(i) While Iran seemed to have a somewhat balanced trade with China, the United States' share of imports from China, especially in the recent years, have surpassed its export to the country of dragons considerably

(ii) The signing of the JCPOA had a significant buffering role with respect to the trade between Iran and China

(iii) Its negative effect seemed to be much stronger on China's imports from Iran in comparison to China's export to Iran

(iv) The US leaving the deal in 2017 seemed statistically insignificant in affecting China's trade with Iran

(v) Introduction of the MPP into the model showed an indirect effect on the trade through changes in oil prices

In conclusion, this study has endeavored to evaluate and assess the relations between Iran and China and the role of the United States in the said relation over the past forty years. In order to do so, a chronological account of trade between the three states as well as a derivative of the gravity model was devised. Given the results, China has played the role of the black knight for Iran and helped it to stay above the water during the massive waves of sanctions. The US, however has had a significant buffering effect on China's relations with Iran.

6.2. Implications. The findings of the present study provide several implications both on the scholarly front as well as the policy front. To begin with, as far as the author's knowledge and search affords, this is the first application of the Truel game in this manner for such a topic. This could become the beginning of a new line of scientific inquiry in the fields of international relations as well as international economics. Moreover, the present study applies the gravity model in a different way than the previous studies. In here, the distance between the states is being treated as an intrinsic and abstract concept instead of a mere physical distance. This could also provide a new line of argument for evolving the gravity model.

On the other hand, the present study possesses explicit practical implications. In terms of policy formation, the findings provide evidence of how crucial sanctions-busting behaviors are in sanctions effectiveness. Therefore, while designing sanctions policies, the senders ought to take that into consideration. Using secondary sanctions could act effectively as buffers against such black knights. Furthermore, the targets which receive the threat of sanctions, could seek third-party supporters to mitigate the negative effects of the said threats on their economy, if they were to become realities.

6.3. Limitations and Suggestions for Future Studies. Although the authors tried their best to conduct a comprehensive study of the interactions between the three states of US, China, and Iran, there are aspects of the study which could benefit from further studies. First, this study applied a novel application of the gravity model. Since the data's nature is of the time series and given the substantial differences in the internal structures of the three states under study, it can be complemented with the application of a multifaceted time series model such as the structural vector autoregressive models (SVAR) or global vector autoregressive models (GVAR). Moreover, there is still a room to delve deeper into the game theoretical analysis of the three-player game (the Truel). The equation introduced here is still rudimentary and can indeed evolve into a more comprehensive equation if given enough due in future studies.

Data Availability

The data used in this study are extracted from the IMF direction of trade, World Bank's World Development Indicators, and Iran's national accounts. The complete references are available in the text under each relative table and figure.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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