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An Estimation Of The Impact of Economic Sanctions And Oil Price Shocks On Iran-Russian trade: Evidence from a Gravity- VEC approach

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Abstract

This article is an empirical attempt to explore the relationship between sanctions (financial and non-financial), oil price shocks and Iran-Russian bilateral trade flows over the period 1991–2014. In contrast to earlier studies in which a gravity model has been estimated through a panel data approach, in this paper the authors apply a gravity model for only two countries and do the estimations using the vector error correction approach. The overall estimation results indicate that financial sanctions, non-financial sanctions and oil price shocks negatively impact the Iran-Russian trade. Furthermore, financial sanctions had the greatest negative impact on Iran-Russian trade rather than non-financial sanctions and sharp oil price shocks.

Keywords: Iran-Russian Bilateral Trade, Sanctions, Oil Price Shocks, Gravity Model, Vector Error Correction Approach.
JEL Classification: F42, F51, C13.

1. Introduction

It is widely believed that trade between two countries depends on a range of various factors. Although theoretically, the amount of capital, labor, technology, and even energy can be defined as the main production inputs affecting the power and capability of a country in foreign trade, there are a vast number of factors such as a financial crisis (Allen & Giovannetti, 2011), trade liberalization (Santos-Paulino, 2001), sanctions (Newnham, 2015; Rasoulinezhad, 2016), war (Anderton, 2001), natural disasters (Felbermayr & Grosch, 2013), which can make harsh changes in trade between nations.

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In the case of bilateral trade between Iran and Russia, one major factor that influences the trade flow is global oil price shock (Maui & Uleukaev, 2015; Idrisov et al., 2015; Taghizadeh Hesary et al., 2013; Farzanegan & Raeisian Parvari, 2014; Ito, 2009; Farzanegan, M.R. Markwardt, 2009; Rykunova, 1995; Nasre Esfahani & Rasoulinezhad, 2016; Taghizadeh Hesary et al., 2015, Taghizadeh et al., 2016). Sharp changes in oil prices (Based on the World Bank definition, ±30% oil price fluctuation compared to the previous year can be theoretically defined as a sharp oil price change) can immensely affect the economy of these two countries through the foreign exchange system and public budget. It is widely discussed that without an appropriate state control, a positive shock of oil prices can decrease economic growth, leads to a higher inflation and creates disproportions in bilateral trade flow (Takatsuka et al., 2015; Idrisov et al., 2015; Beine et al., 2012; Sachs & Warner, 2001; Fardmanesh, 1991; Fardmanesh, 1990; Krugman, 1987). Conversely, with a negative jump in oil prices, there is inevitable collapse in foreign exchange earnings leading to a critical shortage of foreign currency, which eventually causes trade deficit in oil-exporting countries (Malikov, 2016; Rati & Vespignani, 2015; Oxenstierna, 2015; Essers, 2013).

Another important factor affecting foreign trade flow is restriction against a country hindering its exports and imports (Rasoulinzhad, 2012 ; Jabalameli and Rasoulinezhad, 2012). Sanctions are the most common types of restrictions in world economy. A brief glimpse at some cases of sanctions reveals that they can push a country to decrease its exports and imports or introduce retaliatory sanctions prohibiting trade with other nations (Trofimova, 2015; Neuenkirch & Neumeier, 2015; Bazooabandi, 2015; Cheraghali, 2013; Tian & Whalley, 2010; Denant-Boemont et al., 2007; Barret, 1997; Von Furstenberg, 1991; Lam, 1990; Blumenfeld, 1987). Since Iran’s nationalization of oil industry in 1951, its economy has received negative impacts from various types of long-term sanctions (Maugeri, 2006), including unprecedented nuclear program sanctions imposed by the United Nations and Western countries in 2006. Most sanctions have targeted Iran’s energy sector and financial activities. Thus they have had a critical impact on the Iran's economy due to such harsh measures as disconnection from the SWIFT (Society for Worldwide

Interbank Financial Telecommunications) payment system, freezing foreign assets of the Iran's Central Bank and the introduction of an embargo on its oil exports.

The main objective of this study is to find out how the sanctions and oil price shocks can influence on bilateral trade flow between Iran and Russia. To this end, we combine the physico-economic gravity trade model as a popular international trade theory with the VECM (Vector Error Correction Model) method and estimate our model over the period of 1991 to 2014. The choice of these two countries in this study is motivated by the fact that Iran and Russia are strategic allies in the region and many common interests have brought these two countries together. Therefore, analyzing the bilateral trade pattern of them would provide useful results for academics and policy makers.

The remainder of this paper is structured as follows: Section 2 provides a brief description of bilateral trade between Iran and Russia. Section 3 represents a brief literature review, while data and methodology are discussed in Section 4. Section 5 presents the research results and, Section 6 concludes with a discussion and directions for further research.

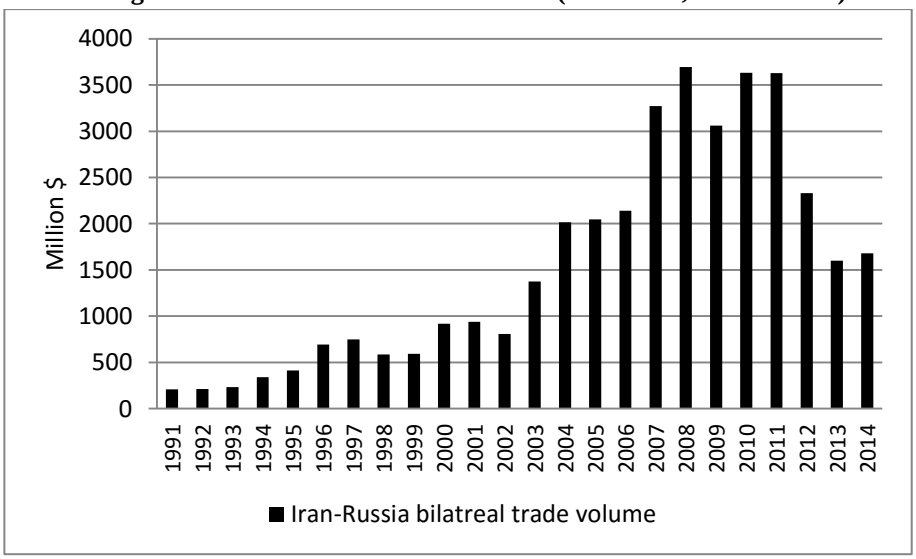
2. Major Trends in Iran-Russian Bilateral Trade

Since the end of the Iran-Iraq war of 1990 and the dissolution of the Soviet Union in the following year, economic relations between Iran and Russia have improved dramatically. The first major attempt of these two countries to improve bilateral trade and accelerate economic integration was establishing of a Joint Economic Commission in 1996 (Karimi, 2010). This effort was mainly made in response to the imposition of sanctions against Iran by the USA in 1996 (The Iran and Libya Sanctions Act of 1996 (ILSA))[1]. As a result of oil price shock of 1998 and under the pressure of the USA on Russia to put constraints on its exports to Iran (Gore-Chernomyrdin Agreement over Iran in 1999 (Black, 2004), the Iran-Russian bilateral trade decreased nearly by 20% over 1998-1999. However, since early of 2000s, economic ties between the two countries saw a certain improvement.

1. For futher information about this sanction, please read: Katzman, K. (2006). The Iran-Libya Sanctions Act (ILSA). CRS Report for U.S. Congress. URL: http://fpc.state.gov/documents/organization/66441.pdf.

This was a result of FDI liberalization in Iran, which allowed Russian oil companies to expand their investments in the Iran's petroleum industry, and also a rapprochement of the countries since the first round of international sanctions on Iran in 2006, which facilitated political and economic relations between Iran and Russia as an opposition to the West. Consequently, trade volume between the countries went up over 1 billion USD in 2003 and then reached a peak in 2008 at almost 3.6 billion USD. In 2009, under a new oil price shock and a cancellation of the contract on delivery of the S-300 system to Iran, bilateral trade decreased again by nearly 17.1%. However, the more significant reduction in Iran-Russian bilateral trade occurred in 2011-12 after the introduction of an oil embargo on Iran by the EU and disconnection of Iranian banks from the SWIFT payment system (Carbaugh, 2014). The Iran-Russian trade volume has dropped to only 1.68 billion USD in 2014 from 2.3 billion USD in 2012. The development of trade between Iran and Russia during 1991-2014 is shown in Figure 1.

Figure 1: Iran-Russian Bilateral Trade (1991-2014, Million USD)



Resource: IRICA and Trade Map

Overall, during the whole period from 1991 up to 2014, bilateral trade between Iran and Russia surged from less than 200 million USD to nearly 1.6 billion USD. Nonetheless, over recent years, trade

between the two countries was eroded. Despite Iran and Russia made various remarkable attempts to prop up and improve trade turnover through some economic cooperation agreements, but the financial and banking sanctions imposed against Iran in 2011 have noticeably pushed down the trade turnover between these two counties. Another reason for trade reduction was oil price shocks. Due to the high oil dependency of the Russian and Iranian government budgets, oil price shocks hugely influence their revenues (Smirnov, 2015; Kudrin & Gurvich, 2015; Bouoiyour et al., 2015; Bennkhodja, 2014; Fang & You, 2014; Malle, 2013; Rautava, 2004). In case of sharp decline in oil prices, their budget revenues also went down which hit bilateral trade. With a sharp increase in oil prices, the revenues of the countries also recovered, although this didn't allow them to use high revenues to improve their trade.

With regard to commodity composition of mutual trade, it has undergone significant changes during 1991-2014. While in 1991 top export commodities of Russia to Iran were machinery, electrical instruments, steel and iron, by 2013 top Russian export goods to Iran included cereals, woods and electrical instruments. The structure of Russia's merchandise imports from Iran during the period has remained virtually the same – both in 1991 and 2013 the most important items included agricultural products and organic metals. Throughout the period under review, Russia maintained a surplus in bilateral trade with Iran.

3. Literature Review of the Gravity Approach

A high number of scholars have investigated bilateral trade flows through the Gravity model, which is a well-known tool to model international trade (Brun et al., 2002; Redding & Venables, 2004; Liu & Xin, 2011; Novy, 2013; Ulengin et al., 2015; Rasoulinezhad & Kang, 2016; Rasoulinezhad, 2016; Rasoulinezhad, 2017; Popova & Rasoulinezhad, 2016). The related literature can be divided into three strands of study: (i) developing the gravity model; (ii) consideration of Iranian or Russian trade through a gravity model; and (iii) exploring the effects of oil price shocks or sanctions on trade volume.

In the first strand of the study, the authors concentrated on developing the gravity model. The first well-known study exploring

trade flows goes back to Jan Tinbergen's paper "Shaping the world economy: suggestions for an international economic policy" published in 1962. He believed that based on the Newton's gravity rule, the trade between two countries can be a function of their economic sizes and distance between them (Tinbergen, 1962). The Tinbergen's theoretical foundation of this model was further improved by (Linneman, 1966; Anderson, 1979; Helpman & Krugman, 1985; Bergstrand, 1989; Brocker, 1989; Deardorff, 1998).

By the time, scholars have developed the empirical econometric approaches of the gravity model by using a number of real and dummy variables in regard to trade flows of various countries. For instance, Byers et al. (2000) applied a parsimonious gravity model for three Baltic countries of Estonia, Latvia and Lithuania after the collapse of the Soviet Union. Their findings stated that the trade flows of these nations were not only reduced, but also shifted to the members of the former Soviet Union. Porojan (2001) tried to find trade flows-spatial effects nexus through the gravity model for the European Union and some of its potential members. In another study, Martinez-Zarzaso (2003) evaluated the effects of preferential agreements on bilateral trade flows among 47 countries in several economic blocs and areas during 1980−1999. Papazoglou (2007) attempted to explore potential trade flows for Greece with the EU member states by using a gravity model. His finding depicted that actual exports of Greece fall short of potential one, while the opposite is true for Greek imports. Okubo (2007) investigated the trading system of the Japanese Empire using border effect analysis of a gravity model from the 1910s through the 1930s. His finding showed positive trading bloc border effects in this period in regards to trade diversion and increasing of protectionism and industrialization in South Korea and Formosa. Xuegang et al. (2008) used the three new explanatory variables, namely GDP, GDP per capita and Shanghai Cooperation Organization (SCO) to construct a gravity model for Xinjiang's bilateral trade. Their result illustrated that all the three variables affect the Xinjiang's bilateral trade. Ekanayake et al. (2010) investigated trade diversion effects of the regional trade agreements in Asia on intra-regional trade flows by using a gravity model and annual data for 19 Asian countries during 1980-2009. The findings

represented the negative sign of ECO and positive signs of ASEAN, BA[1] and SAARC RTAs. Chen & Novy (2011) applied a gravity model to find out trade integration across manufacturing industries in European Union countries. They concluded that substantial technical barriers to trade in specific industries are the most important trade barriers. Ulengin et al. (2015) developed two gravity models to analyze Turkish textile exports to 18 selected EU countries between 2005−2012. Their result proved the fact that the quota limitations violate Customs Union regulations.

The second strand of literature attempted to apply the gravity model to study trade pattern in the cases of Iran or Russia. Kaukin (2013) tested various gravity models to find out the trade pattern of the Russian Federation. His results showed the positive signs of GDP in Russia's regions, GDP in Russia's trade partners and borders, while depicted a negative coefficient for distance variable. Traekorova & Pelevina (2014) applied a gravity model to explore the trade flows between BRICS for the period of 2005-2011. Their findings for Russia represented a positive coefficient of GDP for both import and export. Besides, distance had a negative coefficient in export equation, while had a positive effect on Russia's import during 2005-2010. Taghavi & Hosein Tash (2011) analyzed the international trade patterns of Iran with 12 oil exporting countries by using a gravity model. The results reported that GDP and distance are statistically significant in the case of Iran's export to developed oil exporting countries, while they are statistically insignificant in trade with other oil exporting nations such as Libya and Nigeria. Soori & Tashkini (2012) investigated trade flows between Iran and regional blocs through a gravity model over the period of 1995-2009. The results of this study proved that geographical distance has a significant negative coefficient. Furthermore, they found that FDI is positively correlated with trade.

The third strand of research considered oil price and sanctions in the gravity model of international trade. Mirza & Zitouna (2010) tried to find out the impact of oil prices on the geography of US imports

1. Bangkok Agreement (BA): Bangladesh, China, Laos, India, Republic of Korea and Sri Lanka

through a gravity model. The results showed that an oil price shock would increase the share of US neighbors by around 0.8%. Beckmann & Fidrmuc (2012) examined the effects of oil price shock as a dummy variable on the CMEA (Council for Mutual Economic Assistance) trade during 1950-1990 by applying a gravity model. They concluded that the oil price crisis in the 1970s had several repercussions on Eastern Europe.

Van Bergeijk (1992) had an attempt to find out the impact of diplomatic barriers on trade through a cross section gravity model that deals with forty countries in the year 1985. His results depicted that any diplomatic sanctions can affect the export and export flows. Evenett (2002) estimated the impact of economic sanctions of eight industrialized economies on their imports from South Africa by using a gravity model. His findings showed that sanctions most adversely affected South African exports. Yang et al. (2004) applied an empirical analysis through a gravity model for the period from 1980−1998 to find out the impact of US economic sanctions on USA trade with other countries. The findings depicted that sanctions increased trade between target countries and the EU or Japan. Ziaee Bigdeli et al. (2012) investigated the impact of economic sanctions on the Iran's trade flows with its 30 trade partners during 1972-2006 through a gravity model. Their results showed that the imposition of any economic sanctions against Iran can decrease its trade flows by 0.089%.

Overall, it can be seen that there has not been a serious attempt to examine the impact of sanctions and oil price shocks on the Iran-Russian bilateral trade. Hence, this paper would provide new and useful results in order to find out how both financial and non-financial sanctions, as well as oil price shocks can affect bilateral trade between Iran and Russia.

4. Data Description and Methodology

4.1 Dataset Description

In order to find out how oil price shocks, financial sanctions and non-financial sanctions as dummy variables can impact on the bilateral trade between Iran and Russia, an econometric model is used where the variables of our model contain aggregate trade volume (sum of

import and export) between Iran and Russia in million U.S. dollars, GDP in current million U.S. dollars, transportation cost between these two countries in U.S. dollars, population in million people, trade openness in percent, three main dummy variables that are non-financial sanctions, financial sanctions and oil price shocks, and two control dummy variables consists of PV (President's visit), WTO (Accession to the World Trade Organization). The main variables (time-variant variables) used in this study are all in natural logarithmic structure, based on the advantages of this form than using the level of variables (Wooldridge 2013). In the case of oil price shocks, we determined them based on the World Bank definition as global oil price changes of ±30% (World bank, 2015). It helps us to have a specific dummy variable of oil price shocks in our research. Table 1 reports definitions and units of all the variables. It should be noted that data on trade volume come from the ITC (International Trade Center, (Trademap, 2015)) and IRICA (Islamic Republic of Iran Customs Administration, (IRICA, 2015)). GDP, trade openness and population

Table 1: Variables of Model

Variables	Definition	Unit
Trade	Trade volume between Iran and Russia	Million US $
GDP	GDP of Iran and Russia	Million US $
POP	Population of Iran and Russia	Million people
TC	Transportation cost	U.S. Dollars
TO	Trade openness	
SANCNF	Dummy variable taking a value of one if there are non financial sanctions against Iran (1996, 2005-2014)	Dummy (0/1)
SANCF	Dummy variable taking a value of one if there are financial sanctions against Iran (2011-2014)	Dummy (0/1)
OILSHOCK	Dummy variable taking a value of one if there are sharp changes in the oil prices (1998, 2003, 2007,2008,2009 ,2011,2014)	Dummy (0/1)
PV	Dummy variable captures a value of 1 in the years when there is president's visiting from Iran or Russia, otherwise it takes 0	Dummy (0/1)
WTO	Dummy variable captures a value of 1 in the years of Russia's membership to the WTO (2012,2013 and 2014), otherwise it takes 0	Dummy (0/1)

Resource: Author's compilation.

in Iran and Russia are collected from the World Development

Indicators online database. Meanwhile, since just two countries (Iran and Russia) are considered in our gravity model, the distance variable which is a constant number over the time period should be omitted from the model. Hence, we have used the annual transportation cost (exporting full 40 ft containers from the Amirabad port in Iran to the Astrakhan port in Russia) data which are collected from the Amirabad port website.

4.2 Model Specification

The simple equational representation of the gravity model of international trade for a two countries (i and j) model is as follows:

$$T_{ij} = G * GDP_i * GDP_j / D_{ij} \quad (1)$$

Where G is the constant, T stands for bilateral trade flow, D indicates geographical distance and GDP represents economic dimensions of the two countries.

The above equation (Equation 1) can be changed into a linear form for the purpose of econometric analyses by employing logarithms:

$$LogT_{ij} = \alpha + \beta \log(GDP_i) + \delta \log(GDP_j) - \Phi \log(D_{ij}) + \varepsilon_{ij} \quad (2)$$

Deardorff (1998) used the following principle of logarithm to change the Equation 2 of gravity model:

$$\text{Log (XY)} = \text{Log (X)} + \text{Log (Y)} \quad (3)$$

Therefore, his new form of gravity model can be formulated as:

$$LogT_{ij} = \alpha + \mu \log(GDP_i * GDP_j) - \Phi \log(D_{ij}) + \varepsilon_{ij} \quad (4)$$

Deardorff (1998) also added the variable population to the above equation and his final form of gravity model become as:

$$LogT_{ij} = \alpha + \mu \log(GDP_i * GDP_j) + \psi \log(POP_i * POP_j) - \Phi \log(D_{ij}) + \varepsilon_{ij} \quad (5)$$

It should be noted that this kind of gravity model of trade has been widely used by many researchers (Ulengin et al., 2015; Narayan & Nguyen, 2016; Goh et al., 2013; Rasoulinezhad & Kang, 2016; Rasoulinezhad, 2016) in order to catching better estimations, solving the collinearity problem, and lower bias.

On the basis of the theoretical view and following the empirical

gravity model form introduced by Deardorff (1998) and developed by Yang et al. (2004), our econometric model takes the following form of time series:

$$LnTRADE_t = \beta_0 + \beta_1 Ln\ GDP_t + \beta_2 Ln\ POP_t + \beta_3 Ln\ TC_t + \beta_4 Ln\ TO_t + \beta_5 SANCNF_t + \beta_6 SANCNF_t + \beta_7 OILSHOCK_t + \beta_8\ PV_t + \beta_9 WTO_t + \varepsilon_t \quad (6)$$

In this model TRADE denotes aggregate trade fow between Iran and Russia, GDP is (GDP_{Iran}* GDP_{Russia}) which represents the joint size of the economy in Iran and Russia. POP indicates ($population_{Iran}$* $population_{Russia}$) that shows the population size in Iran and Russia. TC and TO are transportation cost between these two countries and trade openness degree, respectively. Non-financial sanctions (SANCNF), financial sanctions against Iran (SANCF) and global oil price shocks (OILSHOCK) are our main three dummy variables, while President's visiting (PV) and accession to the WTO (WTO) are our two control dummy variables.

Prior to implementation of examinations, the variables need to be analyzed for stationarity. In this study, the stationary analysis is carried by the Augmented Dickey Fuller (Dickey & Fuller, 1981; Dickey & Fuller, 1979) and the Phillips-Perron (Phillips & Perron, 1988) tests. After applying the stationary tests, if the variables are integrated of the same order, the Johansen-Juselius co-integration test (two different likelihood ratio tests, i.e. the trace test and maximum eigenvalue test) would be run to obtain the number of co-integrating vectors (before running this test, the Lag Length Selection would be implied to detect the lag length using three popular criteria as AIC,BIC and HQ)(Saboori et al., 2017).

If the Johansen-Juselius suggests that variables are co-integrated, an error correction model in VECM structure would be considered as follows:

$$\Delta \mathrm{LnTrade_t} = \alpha_1 + \alpha_1 \mathrm{ECT_{t-1}} + \sum_{i=0}^{n} \beta_i \Delta\, \mathrm{LnTrade_{t-i}} + \sum_{i=0}^{n} \delta_i \Delta\, \mathrm{LnGDP_{t-i}} + \sum_{i=0}^{n} \theta_i \Delta\, \mathrm{LnPOP_{t-i}} + \sum_{i=0}^{n} \gamma_i \Delta\, \mathrm{LnTC_{t-i}} + \sum_{i=0}^{n} \mu_i \Delta\, \mathrm{LnTO_{t-i}} + \varphi \mathrm{Dummy} + \varepsilon_{1t} \quad (7)$$

Where β, δ,θ,γ and μ are the coefficients to be estimated, ECT_{t-1} is the vector error correction term which is obtained by the long run co-integration relationship, φ is the coefficient of dummy variable, Δ is the difference operator, n is the number of lags and ε_{1t} indicates the serially uncorrelated error terms.

5. Results and Discussion

5.1 Unit Root Tests

In order to evaluate the stationarity of all series, we performed two unit root tests on all variables at levels and first differences. The tests used are the Augmented Dickey-Fuller (ADF) and Phillips-Perron tests. The results are summarized in Tables 2 and 3 through which it can be concluded all the variables become stationary through doing first difference or in other words, all time series are I(1).

Table 2: ADF Unit Root Test Results

Variable	ADF	1% level	5% level	10% level	H0	Stationary
LnTRADE	-2.04	-3.95	-3.08	-2.68	Accept	No
D(LnTRADE)	-5.85	-3.92	-3.06	-2.67	Reject	Yes
LnGDP	-0.34	-3.85	-3.04	-2.66	Accept	No
D(LnGDP)	-2.73	-3.83	-3.02	-2.65	Reject	Yes (at 10%)
LnPOP	-2.26	-3.83	-3.02	-2.65	Reject	No
D(LnPOP)	-5.05	-3.85	-3.04	-2.66	Reject	Yes
LnTC	-3.02	-3.83	-3.02	-2.65	Reject	No (at 1%)
D(LnTC)	-6.16	-3.85	-3.04	-2.66	Reject	Yes
LnTO	-1.46	-3.95	-3.08	-2.68	Accept	No
D(LnTO)	-4.62	-3.92	-3.06	-2.67	Reject	Yes

Note: ADF refers to Augmented Dicky Fuller, D refers to first differences.
Resource: Authors' compilation from Eviews 7.0

Table 3: PP Unit Root Test Results

Variable	PP	1% level	5% level	10% level	H0	Stationary
LnTRADE	-3.02	-3.83	-3.02	-2.65	Accept	No
D(LnTRADE)	-8.75	-3.85	-3.04	-2.66	Reject	Yes
LnGDP	-0.17	-3.83	-3.02	-2.65	Accept	No
D(LnGDP)	-2.73	-3.85	-3.04	-2.66	Reject	Yes (at 10%)
LnPOP	-1.96	-3.83	-3.02	-2.65	Accept	No
D(LnPOP)	-4.57	-3.85	-3.04	-2.66	Reject	Yes
LnTC	-3.02	-3.83	-3.02	-2.65	Reject	No (at 1%)
D(LnTC)	-8.75	-3.85	-3.04	-2.66	Reject	Yes
LnTO	-1.84	-3.95	-3.08	-2.68	Accept	No
D(LnTO)	-4.44	-3.92	-3.06	-2.67	Reject	Yes

Note: PP refers to Phillips-Perron, D refers to first differences.
Resource: Authors' compilation from Eviews 7.0

5.2 Lag selection

Before applying to the Johansen co-integration test, it is neccessary to

find out the appropriate lag length (Taghizadeh Hesary et al., 2015). Table 4 shows the lag order selection criteria of our model. In this study, the optimal lags are chosen in regards to the Akaike (AIC), Schwarz (SIC) and Hanna-Quinn (HQ) criteria. The results report that the model should contain one lag by AIC , HQ and SIC criteria.

Table 4: Lag Length Selection

Lag	AIC	SIC	HQ
0	11.05	11.42	11.19
1	2.38*	3.11*	2.36*
2	2.78	3.49	2.64
3	2.84	4.15	2.84

Resource: Authors' compilation

5.3 Johanson Cointegration Tes

As the ADF and PP unit root tests depicted that the variables are stationary, we can imply a co-integration analysis using Johansen's method by assuming linear deterministic trend and drift, also taking the lagged ratio as 1 according to the lag selection results. Generally, Johansen's technique is done through two likelihood ratio test statistics: the Trace and the Maximum eigenvalue. The Trace and the Maximum Eigenvalue tests suggest the existence of the co-integration relationship among research variables at the 0.05 level (Table 5). The results report that there are long-run equilibrium relationships between variables in our model.

Table 5: Johansen and Juselius Cointegration Test Results

No. of cointegrations	Trace test			
	Eigenvalue	Trace statistic	Critical value	Prob.**
None*	0.78	49.17	39.66	0.0005
At most 1	0.59	25.04	22.58	0.1183
At most 2	0.36	9.28	11.93	0.2139
At most 3	0.09	0.07	5.19	0.2904
No. of cointegrations	**Maximum Eigenvalue test**			
	Eigenvalue	**Max-Eigen statistic**	**Critical value**	**Prob.****
None*	0.78	36.71	25.83	0.0014
At most 1	0.59	14.09	19.59	0.2269
At most 2	0.36	7.78	12.04	0.2634
At most 3	0.09	1.19	7.15	0.2832

* Shows rejection of the hypothesis at the 5% level

** Mackinnon-Haug-Michelis (1999) p-values

Resource: Authors' compilation from Eviews 7.0

5.4 VECM Estimation

Since all the series are co-integrated, a VEC model is set up for exploring short- and long-run relationships. It should be noted that all the three dummy variables should be included into the VEC model as exogenous variables (Zivot & Wang, 2006), hence they will not appear in the long-run vector. The long-run co-integrating vector, estimated by VEC is as below:

$$LTRADE = -0.57*LGDP - 0.06*LTC + 0.12*LTO + 0.73*LPOP - 3.17 \quad (8)$$

According to the above equation (Equation 8), there is a positive relationship between population – trade flow and trade openness-bilateral trade flow, while there is a negative long-run relationship between economy size (GDP) and transportation cost with the Iran-Russian trade volume.

The results reveal that a 1% increase in the joint GDP in Iran and Russia, decreases the bilateral trade volume in the long-run by nearly 0.57%. The main reason is that when each of these two countries faces an economic problem with the Western countries, they try to improve the bilateral trade, while a good economic relation with the Western nations makes an economic divergence between Iran and Russia. Hence, an increase in GDP of Iran and Russia, which generally happens during good relations with the Western countries, may lead to divergence between these two countries and a lower bilateral trade flow.

In the case of the long-run relationship between Iran-Russia bilateral trade and transportation cost, the findings show that transportation cost negatively influences on the trade volume. A 1% increase in the transportation cost between these two countries, decreases the bilateral trade volume in the long-run by approximately 0.06%.

In the long-run, a 1% increase in population size of Iran and Russia, raises the bilateral trade volume between these two countries by 0.73%. It reflects the fact that a larger size of population means a larger domestic market and labor force leading to improve the trade

flow between these two countries.

Lastly, a 1% increase in trade openness degree of Iran and Russia can accelerate the bilateral trade growth between these two nations by nearly 0.12%.

Furthermore, the short-run coefficients are shown in the following table. It should be mentioned that the robustness of the VEC model is evaluated by applying the normality residual test of the Jarque-Bera and the White homoscedasticity test. Based on their results shown in Table 6, it can be concluded that our VEC model successfully passes all the tests.

Table 6: Short-run Estimation of VECM

	Short run								
Variables	**D(LGDP)**	**D(LPOP)**	**D(LTC)**	**D(TO)**	**OILSHOCK**	**SANCF**	**SANCNF**	**PV**	**WTO**
Coefficients	0.51	0.09	-0.64	0.03	-0.23	-0.49	-0.35	0.51	0.24
t-statistic	3.42	4.11	3.51	4.80	-2.48	-5.22	-4.91	6.11	1.35
P-value	0.00	0.00	0.00	0.00	0.03*	0.00*	0.00*	0.00	0.54
R-squared	0.97								
The normality residual test statistics of Jarque–Bera							3.28		
The joint test statistics of the White homoscedasticity test							36.14		
							P-value (0.31)		

Resource: Authors' compilation from Eviews 7.0

The estimation results shown in Table 6 demonstrate that in the short-run, GDP, population and trade openness degree positively impact on the Iran-Russian bilateral trade flow, while the short-run relationship between transportation cost and the trade volume is significant and negative. Furthermore, the results imply that there is a negative short-run relationship between all our three main dummy variables - oil price shocks, financial sanctions and non-financial sanctions - and the Iran-Russian trade volume. It is clear that negative impacts of both sanctions are more than oil price shocks. Our results about the negative impact of sanctions are in line with findings by Shirov et al., (2015), Newnham, (2013), Barret, (1997), Elliott & Uimonen, (1993), Dickie, (1992) and Kaplow, (1990) who obtained negative impact of sanctions on the economy of a country. Furthermore, this result reveals a contradiction to the study of Yang et al. (2004), which finds that sanctions have not any significant effect on trade. Also, our finding about the negative impact of oil price

shocks is consistent with the results of Sek et al., (2015), Rati & Vespignani, (2013), Qianqian, (2011), Korhonen & Ledyaeva, (2010), Lutz & Meyer, (2009), Faria et al., (2009) and Dick et al., (1984).

We did not find a similar result for our two control dummy variables. While president's visiting positively affects trade flow between these two countries, the effect of Russia's membership in the WTO is not statistically significant. The main reason is that by visiting the Iran's president from Russia or vise versa, a number of economic agreements are signed and therefore the trade volume would be enhanced. Furthermore, since Iran is not a member of the WTO (Iran has an observer status at the WTO since 2005), Russia's accession to the WTO could not make any opportunity for these two countries in order to go to reach a higher trade volume.

6. Conclusion and Policy Implications

This study mainly investigates the impacts of sanctions, as well as oil price shocks on Iran-Russia trade through the estimation of a gravity model for the quarterly data over the period 1991-2014. The estimation of our gravity model is done by the Vector Error Correction (VEC) approach.

As a new interesting result, it proved that GDP has a negative long-run relationship with the bilateral trade between Iran and Russia. The main reason is the tendency of these two countries to improve their trade relationship with the Western countries (Both of Iran and Russia are oil-based economy who want to have a good economic relationship with the developed and industrialized nations), while during the problem with the Western countries (sanctions, restrictions, etc.) when their GDP always decreases, they find each other as an regional allies and try to boost up their bilateral economic relationship. Hence, it can be concluded that an increase of GDP in Iran and Russia in long-run, which can be a sign of good relations with the West, may lead to divergence of these two countries. However, in the short-run, an increase in GDP leads to rise of the Iran-Russian bilateral trade, which is the principle of the gravity model of international trade.

In the case of population, the estimation's results depict the positive short- and long-run relations between this variable and the

Iran-Russian bilateral trade. This result proves the Staffan Linder (1961)'s theory (Linder, 1961). He expressed that a higher number of population tend to consume various bundles of goods. This fact is reflected by the positive coefficient of population in our gravity model of the Iran-Russian bilateral trade.

In addition, the results reveal that trade-distance nexus is negative in the case of Iran-Russia bilateral trade. This result is in line with many previous studies such as Leamer (2007) and Disdier & Head (2008) who found that trade volume declines dramatically with the distance. This variable can be considered as a geographical barrier between two trading partners and also as a cost for goods' transportation.

Furthermore, we did not find any significant relationship between accession of Russia to the WTO and the Iran-Russian bilateral trade flow, while any president's visiting strongly accelerates the trade growth between these two nations.

Lastly, the empirical results show that the coefficient of the financial sanctions was estimated as negative, which means imposing any financial sanctions against Iran has a profound negative effect on trade between these two countries. In addition, the effect of non-financial sanctions on Iran-Russian bilateral trade is statistically significant and negative as well. The influence of the oil price shocks on Iran-Russian trade is also negative, so any sharp changes in this variable will decrease the trade volume between these two countries.

According to the research findings we can make the following conclusions.

1. Due to the negative coefficient of non-financial sanctions in our research, it seems plausible that economic relations between Iran and Russia have greater potential in the absence of non-financial sanctions against Iran.

2. In regard to negative coefficient of oil price shocks in our estimation results, it can be explained that owing to the high oil dependency of the Russian and Iranian government budget, an oil price shock hugely influences the revenues of their budgets. In the case of an oil price drop, their revenues begin to reduce significantly, which hampers bilateral trade between Iran and Russia. In the case of a sharp increase in oil prices, the revenues of these two countries

suddenly rise. But this situation cannot improve the trade volume between Iran and Russia. The main cause is the existence of the Dutch disease in Iran, which has been proved by many previous studies such as Mardaneh (2012), Manzoor et al. (2012) and Atashbar (2013), and means a sudden jump in oil revenues has a negative impact on economy growth of Iran. The negative coefficient of an oil price shock in our findings proves this fact. Hence an oil price shock, whether a sudden sharp increase or decrease in prices, influences adversely the bilateral trade of these two exporting oil countries.

3. The financial sanctions against Iran have a critical significance for bilateral trade development between Iran and Russia. According to our findings, it has a remarkable negative coefficient, which stands for the harsh and vigorous influence of this variable on bilateral trade. Nevertheless, despite Iran and Russia have attempted to solve this problem by creating a joint regulatory structure in order to improve financial transactions between their banking systems, bilateral monetary agreement or enhancing barter trade during global sanctions, up to now, it has not come in their real trade process.

4. Financial sanctions have the most negative effects on Iran-Russian trade. Excluding from SWIFT system, problems with issuing and payments of Letter of Credit, sanctions on the Iranian banks and the Central bank of Iran have dramatically harmed the amount of bilateral trade between Iran and Russia in recent years. However, lifting of financial sanctions in 2016 according to the Joint Comprehensive Plan of Action (JCPOA) would have a profound positive impact on the Iran-Russia trade turnover.

To sum up the paper, we should express that one of the crucial limitations of our research was the long-run estimations of dummy variables which cannot be done through the VEC model. Future avenues of research should consider the gravity model through an econometric model that has a proper ability to estimate the long-run relations of dummy variables. Another limitation of our research was synchronization of economic events that should be considered in an econometric model. During the imposition of sanctions against Iran, this country has experienced several economic events such as the Iranian targeted subsidy plan in 2010, the Iranian rial’s devaluation in 2011. Our model could not distinguish these synchronized economic

events, thereby we suggest to use another econometric model in the future researches to cover up this limitation.

However, from the point of our view, this research, proves a useful and interesting findings, which can help economists and policy makers to achieve a better view of Iran- Russia bilateral trade.

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