

The effect of economic sanctions on the volume of trade in the agriculture sector of Iran and business partners in the European Union

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Abstract

Iranian economy was under pressured during the period of international trade sanctions. This paper investigates the effect of the economic sanctions on the bilateral agriculture trade of Iran with ten main trading partners in European Union between 2001 to 2015. A modified gravity model is used as an empirical international trading model and panel data are used for investigating the effect of sanctions. **Findings/Originality:** In the absence of sanction, the effect of all independent variables, except for population, is as expected by the theory. Under the sanction the effect of GDP and population is lower than those of without sanction. The effect of foreign exchange fluctuation gets more intense during the sanction due to instability of financial sector. Distance, however, is not a significant variable to explain the bilateral trade both in the absence and under the sanction. The weak sanction period lowered the bilateral trade by 7.5 percent lower, but unexpectedly it was 12 percent higher during the strong sanction period.

Introduction

A trading sanction limits and cuts the business relationship among the trading participants especially for the sanctioned country. The sanctions against Iran were imposed by the United States after the Islamic Revolution. After the opening of the uranium enrichment plant in 1984, then a new series of US sanctions against Iran was set up. The most severe sanctions have been imposed since the beginning of 2009.

The sanctions to Iran can be classified into three categories in terms of its status i.e. United Nations sanctions, EU sanctions and unilateral sanctions which are dominated by the United States. Other countries, such as India, China, Russia, South Korea, South Africa, Turkey and some other countries, have been punished by sanctions against Iran. These kind of congressional sanctions cannot be ignored simply because the most difficult part of the sanctions is in terms of its complexity and trade cancellation.

Hufbauer and Oegg (2003) investigated the effect of economic sanction of USA on USA trading based on the gravity model. The study calculated and estimated the amount of missing business or commercial losses in USA economy because of this sanction. It shows that amongst the six countries being studied, Iran is the second country which its sanction has imposed the most loss or missing business for the US economy.

Yahyaabadi, Samadi, and Jehantigh (2013) analyzed the oil price variability, exchange rate and economic sanctions on economic growth. Estimation shows that in the long run, the fluctuations in oil prices have a positive impact on growth of GDP, but convergent exchange rate fluctuations have a negative effect on growth of GDP. This negative effect continues in the long run.

Bigdeli et al. (2012) analyzed the effect of economic sanctions on Iran's trading business with its 30 business partners during the period from 1973 to 2007. It used the generalized gravity model and using the panel data method. It suggests that the boycott has a negative but small impact on Iran's trade and its trading partners.

Kazerooni (2014) investigated the impact of economic sanctions on Iran's trade volume with 73 major trading partners in the period from 1995 to 2014. Using a generalized gravity model, Dynamic Integrated Data was analyzed and concluded that unilateral US sanctions on Iran's foreign trade have no significant impact, but the multilateral sanctions have a negative and significant impact on Iran's foreign trade.

Dizaji (2018) showed that during 2000 to 2014, under various sanctions against Iran, the country changed its trading partners from the countries of the EUA and OECD countries towards the countries of the MENA region and East Asia. In addition, the results indicate that, while US restrictive sanctions have increased Iran's trade with other countries, widespread sanctions have led to significant reductions in exports and imports. However, the change in the political behavior of the government of Iran and the negotiation with global powers have been able to moderate the negative impact of sanctions on trade.

Various methods have been used to analyze and estimate the impact of economic sanctions on the overall economy or trade. The most important of them are consumer surplus model, gravity model, the proposed curve in trade, game theory model, and public selection model (sanction intelligence).

In the consumer surplus model using the concept of consumer surplus and social welfare, the impact of export and import taxes is examined. In order to estimate the cost of trade sanctions (such as sanctions on exports to the target country or import sanctions from the target country), direct production will be changed. By limiting the sales market or restricting the purchasing market, it impacts and reduces economic growth. The financial sanctions target the flow of funds and capital into the country, and by limiting it to the capital market which in turn made domestic firms harder and real interest rates are rising. The implication is the production fall due to the decline in foreign loan and investment.

The gravity model is used to analyze the effects of economic sanctions on the country's trade. The gravity model is based on the principle that the economic interactions between the two countries are proportional to the size of the two and have a photographic distance with them. The system of interactions resulting from these two-way relationships shapes the spatial structure of the economy. It is, in fact, a metaphor from Newtonian mechanics, according to which, the amount of gravity between the two objects has a direct relation to their mass and distance.

The proposed curve in trade is a sign of a country's trade-off in terms of exchange interfaces. This curve indicates that the country in question is willing to export the quantity for which it is required for the different quantities of imported goods it needs. This approach examines the consequences of a trade embargo, analyzes the effects of sanctions on the interface between the target country and the sanctions country, and also reflects the welfare effects of the sanctions.

Game theory models describe the strategic choices of both parties in economic and political relations. Pending benefits or revenues will change during the boycott, and decisions on both sides can be changed before and during the game. In addition, this model explains a collaboration against the competition under uncertainty. The strategy adopted by one side is conditional on the strategy adopted by the other party and the result is so-called Nash equilibrium which explains strategic economic decisions. This co-operation framework will go beyond the sanctioning country's decisions on the current situation and take into account the decisions of other countries in the power of influence and compulsion of the sanctions country.

Based on public selection models (sanctions intelligence), the sanctions in the world is considered as a two-edged diplomatic tool, potentially harming the innocent citizens of a country,

as well as the government of that country. Indeed, innocent citizens are penalized for their government's political behavior.

One of the consequences of sanctions in Iran's economy was the weakening of the national currency and affecting various economic sectors. The intensification of international sanctions along with the decline in oil revenues and restrictions on the transfer of foreign currency revenues to the country has increased incentives for speculation that weakening the exchange rates. Under these conditions, the country's economy witnessed two currency shocks in 2011 and 2012. The government tried to manage these shocks by clarifying the flow of allocations and consumption of foreign exchange, managing foreign exchange resources, establishing a currency exchange center and dealing with offenders. So that from November 2012 onwards, the foreign exchange market has been stable. Previously the sanction had effects on the economy of the country, especially on inflation.

In foreign trade, restrictions on the purchase and supply of imported goods have led to increased costs and prices for imported goods. By weakening the exchange rate, on the one hand, the prices of imported intermediate goods and capital have increased, which in fact has led to an increase in production costs. In contrast, in the export sector, except for petrochemicals and gas condensate products, other goods have benefited from competitive advantages in response to weakening in the exchange rate. Therefore, exchange rate changes in commercial and manufacturing sectors have asymmetric effects on the profitability.

In most agricultural sectors, it can even be said that weakening in exchange rates had a positive effect on the competitive ability of the agricultural sector. However, due to the dependence of livestock and poultry products on feed, the price of these products has experienced an increasing trend.

Faryadrac (2015) in 2000-2014, using time series data, the Hodic-Prescott filter calculated the trend of value added and investment in agricultural sector in the years before and after the boycott. The effect of sanctions on the agricultural sector will increase the cost of transporting goods, curtailing foreign currency reserves, the multiplicity of currency exchange rates, reducing government revenues and decreasing government budgets. The issue of food security and a tendency towards state-owned trade has been toughening the possibilities of importing agricultural institutions and uncertainty about the volume of production and trade. In general, the results of the surveys show that sanctions had a significant negative impact on the country's export and import trade (Cordesman, Gold, Khazai, & Burke, 2013).

The agricultural sector do not only provides food and national security. It also contributes employment and income generation, basic needs for consumption, as well as providing revenue needed by the country. Ezzati & Calmani (2014) examines the impact of sanctions imposed on Iran on the interactions between agricultural products and their business partners in Diyala.

In order to examine the process of trade in agricultural products between Iran and its trading partners in the European Union, as well as to compare it with two conditions for imposing economic sanctions and without economic sanctions, the period under consideration is divided into two periods i.e. unilateral sanctions (2000 to 2005), and multilateral sanctions (2006 to 2014). Between 2000 and 2005, the unilateral economic sanctions imposed by the United States did not have the significant negative impact on trade between Iran and its trading partners. It is because the sanctions imposed only affected trade between Iran and the United States, and Iran was still able to maintain its trade relations with other trading partners (Fadaye & Derakhshan, 2014).

Between 2006 and 2014, with the more serious entry of the European Union and the Security Council in support of sanctions against Iran and the application of multilateral sanctions on Iran along with the implementation of comprehensive sanctions by the United States, the significant changes in macroeconomic policies and Iranian business trade took place. Meanwhile,

the agricultural sector has never been included in the list of sanctions imposed on Iran because it is providing people's food and showing human rights by the sanctions.

The total value of exports, imports and trade of agricultural products between Iran and the European Union countries from 2000 to 2014 was 35,976; 30,230 and 5,746 million dollars, respectively. This bilateral export value was on average 16% of the total value agricultural trade while the total value of import was equal to 84% of the total value of agricultural trade. The share of the value of bilateral export and import during the period of sanctions 2000 to 2005 were 26% and 74%, respectively. Meanwhile the share of bilateral export and import under the multilateral sanctions period (2006-2014) were 14% and 86%, respectively. Based on that facts, the share of export and import of agricultural products between Iran and the EU countries Union has dropped 9.17 and 10 percent, respectively compared to those of under unilateral sanctions.

Methods

Since the beginning of the 1860s, the gravity model was widely applied to explain the regional and international trade flows. In addition to international trade analysis, this model is also used in other cases such as migration analysis, road traffic, urban economics, urban geography, and so on. The gravity pattern is typically used as an analytical framework for two-way trade flows in empirical studies. In the most basic form, the gravity pattern explains the export record from country i to country j through GDP of the exporting country and GDP of the importing country and the distance between them.

In this research, investigating the effect of USA sanction on bilateral trading of Iran and its business partners in the European Union is considered as the main purpose. Therefore, for expressing circumstance of bilateral trade the gravity model is considered in form of a linear and logarithmic equation. The model specification is in the following the form:

$$\ln TRADE_{ijt} = B_0 + B_1 \ln GDP_{it} + B_2 \ln GDP_{jt} + B_3 \ln POP_{it} + B_4 \ln POP_{jt} + B_5 \ln POP_{ij} + \ln ER + \ln DIS + U_{ijt} \quad (1)$$

The first model explains the total trade of Iran with business partners as function of GDP, population, exchange rate, and distance. The GDP_{it} and GDP_{jt} are gross domestic product of Iran and business partners respectively. The POP_{it} and POP_{jt} are populations of Iran and business partners respectively. The $DIST_{ij}$ is distance between Iran and capital city of business partner countries, and ER is the variable of foreign exchange rate. U_{ijt} is error term.

$$\ln TRADE_{ijt} = B_0 + B_1 \ln GDP_{it} + B_2 \ln GDP_{jt} + B_3 \ln POP_{it} + B_4 \ln POP_{jt} + B_5 \ln DIST_{ij} + \ln ER + \text{sanl} + \text{sans} \quad (2)$$

In the second model the variable of sanction are added in two form i.e. weak (sanl) and strong (sans) sanctions. The weak sanctions is before 2005, and since 2005, sanctions was strong due to the fact that the US introduced nuclear sanctions with support of European Union.

Results and Discussion

Hausman test is used for choosing the type of the model. The statistic value is significantly more than the critical value, therefore, the null hypothesis is rejected. It implies that the fixed effects model is appropriate.

The estimation of gravity model without considering the sanction variable results that the population is negatively significant in affecting the bilateral agricultural trade between Iran and European Union countries (Table 1). A 1 percent increase in Iran's population will reduce the bilateral trade with EU countries about 1.39 percent. This inverse relationship of mutual trading and the number of population may explain that the domestic production is mostly absorbed by the

domestic consumption. On the other hand, the increasing production explained by the GDP promotes the increasing flow of bilateral trade. The rising GDP may result in higher income so it can increase the trade flows. The weakening exchange rate was not proven promoting higher export as the depreciation of the currency cannot induce the bilateral trade flow. A one percent increase in Iran nominal exchange rate will lower the bilateral trade by 0.82 percent. It may be because the cost of importing commodity from abroad become more expensive. The distance variable between the countries, however, is not statistically significant to affect the bilateral trade even though the direction is negative as suggested by the gravity theory.

Table 1. Results of estimating the gravity model without considering the sanction variable (2001-2016)

Variable	Coefficient	Statistic	Probability
C	34.56	0.98	0.740
lnDISTANC	-2.3	-1.67	0.650
lnTRADE(-1)	0.065	5.76	0.044
lnGDP _i	1.39	2.89	0.004
lnGDP _j	0.73	4.92	0.046
lnPOP _i	-1.27	-4.56	0.040
lnPOP _j	-0.53	-3.12	0.032
LNRE	-0.82	-5.67	0.001
SANL	-	-	-
SANS	-	-	-
DW=2.18		R ² = 0.86	

The results of estimation of gravity model considering sanction variable

Considering the presence of sanction, the effect of population is still negative significant to the agriculture trade flows (Table 2). A 1 percent increase in Iran's population will reduce 1.21% of bilateral agriculture trade with the EU countries. The GDP variables are positively significant in affecting the trade flows where a 1 percent increase in Iran's GDP will raise 1.07% the bilateral agriculture trade. However, the magnitudes of the effect of these variables are much lower compared to those of absence of the sanction. The exchange rate is negatively significant in affecting the bilateral trade flow. A 1 percent increase in Iran nominal exchange rate will reduce the bilateral agriculture trade by 0.96 percent. Once again it may deter the purchasing power to import product from the trade partners. The distance is still insignificant in explaining the bilateral agriculture trade between Iran and EU countries.

Table 2. Results of estimation of gravity model considering sanction variable (2001-2015)

Variable	Coefficients	Statistic	Probability
C	19.16	1.28	0.120
lnDISTANC	-4.1	-1.08	0.84
lnTRADE(-1)	0.016	2.66	0.0302
lnGDP _i	1.07	3.19	0.005
lnGDP _j	0.003	4.65	0.041
ln POP _i	-1.21	-4.16	0.022
lnPOP _j	-0.22	-2.87	0.021
LNRE	-0.96	-2.67	0.001
SANL	-0.075	-6.55	0.021
SANS	0.122	4.1	0.05
DW=2.54		R ² = 0.91	

The lower sanction period was able to reduce the bilateral trade flow by 0.075 percent. Unexpectedly the trade flow was getting significant increase during the strong sanction period. Under the strong sanction the agriculture bilateral trade is 12% higher. Including the sanction variables in this model results in better model specification. It can be seen from the coefficient of determination 0.91. It means that about 91 percent variation in agriculture bilateral trade can be explained by the model that considering both lower and strong sanction.

Conclusion

The sanctions have affected various sectors of the Iranian economy including the agriculture trades. It is proven that Iran bilateral trade with EU countries experience lower during the lower sanction even though it was getting increase under strong sanction. In response to the sanction, the Iranian government have been trying to manage sanctions by adopting appropriate measures. The high contribution of oil revenues to current and future government budget give larger fiscal space to stimulate the economy. Strengthening non-oil resources sectors, the use of stagnant resources, such as surplus assets and the continuation of savings, are among the urgent policies to reduce the negative effect of the sanction. The exchange rate stabilization is one of the priority to the Iranian government policy so that it is able to promote the bilateral trade between Iran and the trade partner countries.

Undoubtedly, the Iranian government have to intensify the trade cooperation to promote the bilateral trade flow. One of the steps necessary to join the World Trade Organization (WTO) is to strengthen and expand trade to the major trading partners and regional economic arrangements, such as the EU member states. It is desirable to reevaluate potential facilities in various production sectors, including agricultural products, with a clear view on obtaining and awarding business concessions and business development. The study of trade with the European Union, including agricultural trade, shows that more than two-fifths of the world's agricultural trade is taking place in the region. Therefore, providing trade facilitation policies and proper access to the market is a must.

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